

# Use of and Preference for Traditional Foods among the Belcher Island Inuit

ELEANOR E. WEIN,<sup>1</sup> MILTON M.R. FREEMAN<sup>1</sup> and JEANETTE C. MAKUS<sup>1</sup>

(Received 9 December 1995; accepted in revised form 6 April 1996)

**ABSTRACT.** To document the extent of use of traditional foods (marine and land mammals, birds, fish, and plants) and degree of preference for these foods in contemporary diets and culture, 102 households (98% of Inuit households) in the community of Sanikiluaq, Northwest Territories, Canada, were studied. During personal interviews, individuals estimated their frequency of use of traditional foods, systematically by season. In addition, 100 adults (from 96% of households) and 64 young people (84% of those in Grades 6–11) rated 41 foods (32 traditional and 9 market foods) for preference on a 5-point hedonic scale. According to respondents' estimates, traditional foods were used by all households, on average  $1171 \pm 852$  times annually. Fish and shellfish were most frequently consumed ( $523 \pm 490$  times annually), followed by birds ( $254 \pm 204$ ), sea mammals ( $184 \pm 161$ ), berries ( $166 \pm 115$ ), and land mammals ( $45 \pm 70$ ). Preference ratings showed that most traditional foods were well-liked by both adults and young people, although adults rated 25 traditional foods higher ( $p < 0.01$ ) and 2 market foods lower ( $p < 0.01$ ) than young people did. Traditional foods remain an important part of contemporary Sanikiluaq lifestyle.

**Key words:** traditional foods, food preferences, Belcher Island Inuit, Sanikiluaq

**RÉSUMÉ.** Afin de documenter l'importance de l'utilisation des aliments traditionnels (mammifères marins et terrestres, oiseaux, poissons et plantes) et le degré de préférence pour ces aliments dans les régimes alimentaires et la culture actuels, on a fait une étude auprès de 102 foyers (98 p. cent de foyers inuit) dans la collectivité de Sanikiluaq (Territoires du Nord-Ouest [Canada]). Au cours d'interviews individuelles, les personnes estimaient la fréquence de leur utilisation des aliments traditionnels, de façon systématique, sur une base saisonnière. En outre, 100 adultes (provenant de 96 p. cent des foyers) et 64 jeunes (dont 84 p. cent scolarisés de la 6<sup>e</sup> à la 11<sup>e</sup> année) ont classé 41 aliments (32 traditionnels et 9 commerciaux) selon leur préférence sur une échelle hédonique de 5 points. Selon l'évaluation des répondants, les aliments traditionnels étaient consommés par tous les foyers, sur une base annuelle moyenne de  $1171 \pm 852$  fois. C'est le poisson et les fruits de mer qui étaient consommés le plus souvent ( $523 \pm 490$  fois par an), suivis des oiseaux ( $254 \pm 204$ ), des mammifères marins ( $184 \pm 161$ ), des baies ( $166 \pm 115$ ), et des mammifères terrestres ( $45 \pm 70$ ). Le classement par préférence révèle que les adultes comme les jeunes apprécient la majorité des aliments traditionnels, bien que les adultes donnent à 25 aliments traditionnels une cote supérieure ( $p < 0,01$ ) et à 2 aliments commerciaux une cote inférieure ( $p < 0,01$ ) à celles données par les jeunes. Les aliments traditionnels continuent à jouer un rôle important dans le mode de vie contemporain de Sanikiluaq.

**Mots clés:** aliments traditionnels, préférences alimentaires, Inuit de l'île Belcher, Sanikiluaq

Traduit pour la revue *Arctic* par Nésida Loyer.

## INTRODUCTION

Relatively few traditional food species occur in the Belcher Islands of southeast Hudson Bay; yet these species have nourished the Inuit there for generations, and continue to sustain them today. The importance of these foods is unmistakable, as they form the basis of the local noncash economy (Quigley and McBride, 1987; Fast and Berkes, 1994). Studies in other Canadian Inuit communities have shown the continuing importance of traditional foods (Kinloch et al., 1992; Kuhnlein and Soueida, 1992; Wein and Freeman, 1992; Moffatt et al., 1994; Chan et al., 1995; Kuhnlein, 1995; Kuhnlein et al., 1995a, 1995b; Santé Québec, 1995; Kuhnlein et al., 1996). Inuit consume a wide range of food products from these species (Kuhnlein and Soueida, 1992). Furthermore, the process of procuring, preparing, and consuming

traditional foods has important social and cultural significance, and is an integral part of Inuit identity (Freeman, 1982, 1988a, 1996).

A cross-sectional health survey in the Keewatin has shown that food consumption patterns are changing toward greater reliance on store-bought food among the younger generation (Moffatt et al., 1994). Among the Cree and Inuit of northern Quebec, changes in lifestyle toward more store-purchased food and a lessened reliance on hunting and fishing, along with other factors, seem to be leading to health problems such as cardiovascular disease, hypertension, and diabetes (Thouez et al., 1989). Schaefer (1971) made similar observations about the Northwest Territories more than two decades ago. Thus, continuing to use traditional resources—to the maximum extent consistent with sustainable resource management—provides cultural, economic, and health benefits.

<sup>1</sup> Canadian Circumpolar Institute, 3rd Floor, Old St. Stephen's College, 8820 – 112th Street, University of Alberta, Edmonton, Alberta T6G 2E1, Canada

Hydroelectric and other developments in southeast Hudson Bay may jeopardize the traditional food base. For example, hydro developments which change the timing and rate of the flow of fresh water into Hudson Bay may cause changes in (1) the nature and duration of the ice cover; (2) the habits of marine mammals, fish, and migratory birds; (3) currents into and out of the bay; (4) loads of sediments and nutrients to marine ecosystems, likely leading to lower biological productivity of estuaries and coastal areas; and (5) anadromous fish populations (Canadian Arctic Resources Committee et al., 1991). Recognizing the potential effects of such industrial changes on the environment, in August 1993 leaders of the community of Sanikiluaq requested a study to document the importance of traditional foods in contemporary diets and provide some baseline data against which future changes could be measured. Two ways of showing that importance, namely by estimated household frequency of consumption and by individual preference, are presented in this paper. (Daily food intakes of both traditional and market foods for a sample of adults and the cost of market foods will be reported separately.) Specific objectives of this paper were as follows: (1) to estimate the annual frequency of consumption of traditional food species by Inuit households in Sanikiluaq; (2) to demonstrate the variety of traditional food products prepared and consumed from these species; (3) to examine the degree of preference for selected traditional and market foods among adults and young people; and (4) to provide insight into the cultural and social importance of traditional foods to Inuit living on the Belcher Islands.

### *The Community*

Situated on the Belcher Islands of southeast Hudson Bay, the hamlet of Sanikiluaq (population 526, Government of the Northwest Territories, 1994) comprises 104 Inuit households and four non-Inuit households (excluding temporary residents such as teachers, RCMP officers, etc.). Employment opportunities are very limited. Salaried employment is largely from municipal or territorial government jobs, although some income is generated from local soapstone carving and from home production of clothing. Hunting, fishing, and gathering contribute relatively little cash income. Food can be purchased at two local stores; however, food costs are high, and traditional food is considered essential to meet food and health needs (Quigley and McBride, 1987; Usher et al., 1995).

## METHODS

### *Food Frequency*

With the help of four people who knew the community well (two Inuit and two non-Inuit) and the literature (Freeman, 1967, 1970; Quigley and McBride, 1987; Fleming, 1989; Cameron and Weis, 1993), a household traditional food frequency questionnaire specific to the Belcher Islands

was developed. The questionnaire was divided according to the six seasons (of different lengths) recognized by Belcher Island people (Fleming, 1989). The preliminary version was reviewed by several other community members, pretested, and revised. The revised questionnaire listed 28 species of marine and land mammals, birds, fish, and plants used as food. Respondents were asked to estimate, systematically for each Inuit season of the preceding year (December 1992 through November 1993), how often their households had consumed each food species, either as a meal or as a snack. Choices were "once per day," "five times per week," "twice per week," "twice per month," "once per month," or "never," but other specific responses were also accepted. (For analysis, totals per season were calculated for each household). In addition, respondents were asked to estimate qualitatively (i.e., "often," "sometimes," or "not at all") how often each food product (meat, blubber, organs, etc.) from these species was consumed. (For analysis, the number of households that ate each food "often" was presented.) All key words (species names) were translated into Inuktitut on the questionnaire to assist the interviewers, who administered the questionnaire orally.

All 104 Inuit households on the hamlet list were asked to participate. Either the male or female household head was interviewed in Inuktitut by one of two local interviewers trained by the researcher. The researcher accompanied the interviewers on their first few home visits to answer questions that arose.

The number of households that used each species was tabulated. The mean annual number of times each species was used was computed (sum of six seasonal estimates for each household, summed over all households, divided by the number of households). In addition, the numbers of households that used various food products from these species "often," "seldom," or "not at all" were examined. All these calculations used the computer programs of Statistical Package for the Social Sciences (SPSS) (SPSS Inc., 1993).

### *Food Preference*

A food preference questionnaire consisting of 32 traditional foods and 9 market foods was also developed with the help of four people who knew the community well. Respondents were asked to rate each food item on a five-point hedonic scale (range = 1–5; 1 = dislike very much, 5 = like very much, 0 = never tasted). Food items were presented in the same random order to each participant, to avoid any potential bias created by the sequence of presentation. Respondents were also asked, in an open-ended question, to name their five favourite traditional foods, with reasons for their choices.

The food preference questionnaire was administered orally by individual personal interview to the same 102 adults as above, on the same occasion as the frequency interview. In addition, all young people in Grades 6 to 11 were asked to complete the food preference questionnaire individually, in writing, at school. Food names were written in both English

and Inuktitut. No prior discussion of the responses was allowed. The two Inuktitut interviewers were available throughout to clarify the questions.

The adult questionnaire further asked respondents to name foods they believe are needed for health, and invited any other food comments.

For each food item separately, mean preference ratings of adults and young people were compared, using a t-test. Within each age group, differences by gender were also examined, using a t-test. Those who had never tasted the food were removed from each comparison. Favourite foods and foods needed for health were tabulated and summarized.

## RESULTS

### *Annual Frequency of Traditional Food Use among Households: The Sample*

In all, 102 (98%) Inuit households took part. The two households that declined did not differ from the others in demographic characteristics or in any other noticeable way. Households contained on average 5.2 persons, including 2.2 children and 0.2 elders. On average, per household 0.7 individuals were employed, 0.9 were hunters, and 0.7 were carvers. Male and female household heads had spent 4.0 and 4.6 years in school respectively; however, the number of years in school ranged from 0 to 12 years.

### *Estimated Annual Frequency of Use*

Of the 28 species used (Table 1), the majority (20 species) were consumed by 75% or more of households, four others by 50% or more of households, and four others by 25% or more of households.

Overall, traditional foods were consumed on average 1171 times per household per year, or 3.2 times per household per day. Among individual species, ringed seal was consumed most often, followed by blue mussels, eider duck, arctic char, sea urchin, sea cucumber, Canada goose, lake herring, and snow goose. Among the categories of foods, fish appeared most often, in part because this group contained the largest number of species, including four of the most frequently consumed individual species. The mean number of occasions each category was used within the six seasons recognized by the Inuit is shown in Figure 1.

There were no statistically significant differences between male and female respondents in mean household estimates of all traditional foods combined, or of subgroups such as land mammals, sea mammals, fish, seafood, birds, or bird eggs ( $p < 0.05$ ).

### *Parts of Species Used and Preparation Methods*

Many parts of the mammal, bird, and fish species were used as food, and these were prepared in various ways, such as raw-fresh, raw-frozen, cooked, dried, or aged. The

TABLE 1. Species used as food, number of user households, and estimated annual household frequency of consumption (mean  $\pm$  SD), in descending order within each category.

Food species <sup>1</sup>	Number of user households (N = 102)	Mean annual frequency of consumption <sup>2</sup>
<b>Sea Mammals</b>		
Ringed seal, <i>Phoca hispida</i>	99	122 $\pm$ 109
Beluga whale, <i>Delphinapterus leucas</i>	100	26 $\pm$ 26
Bearded seal, <i>Erignathus barbatus</i>	81	25 $\pm$ 61
Walrus, <i>Odobenus rosmarus</i>	75	11 $\pm$ 23
All sea mammals		184 $\pm$ 161
<b>Land Mammals</b>		
Reindeer, <i>Rangifer tarandus tarandus</i>	101	34 $\pm$ 61
Arctic hare, <i>Lepus arcticus</i>	25	3 $\pm$ 18
Polar bear, <i>Ursus maritimus</i>	53	3 $\pm$ 9
Caribou, <i>Rangifer tarandus caribou</i>	25	3 $\pm$ 13
Arctic fox, <i>Alopex lagopus</i>	26	1 $\pm$ 3
All land mammals		45 $\pm$ 70
<b>Seafood</b>		
Blue mussels, <i>Mytilus edulis</i>	101	95 $\pm$ 90
Arctic char, <i>Salvelinus alpinus</i>	101	90 $\pm$ 99
Sea urchin, <i>Sphaerechinus droebachiensis</i>	93	87 $\pm$ 91
Sea cucumber, <i>Cucumaris frondosa</i>	93	83 $\pm$ 92
Lake herring (whitefish), <i>Coregonus clupeaformis</i>	88	58 $\pm$ 98
Seaweed, <i>Rhodomenia</i> spp. and <i>Laminaria</i> spp.	60	46 $\pm$ 78
Tom cod, <i>Boreogadus saida</i>	94	34 $\pm$ 40
Sculpin, <i>Myoxocephalus quadricornis</i> and <i>Scorpio</i> spp.	91	29 $\pm$ 36
All seafood		523 $\pm$ 490
<b>Birds and Eggs</b>		
Hudson Bay eider, <i>Somateria mollissima sedentaria</i>	99	92 $\pm$ 105
Canada goose, <i>Branta canadensis</i>	99	66 $\pm$ 56
Snow goose, <i>Chen caerulescens</i>	100	53 $\pm$ 50
Red-breasted merganser, <i>Mergus serrator serrator</i>	85	21 $\pm$ 28
Rock ptarmigan, <i>Lagopus mutus</i>	52	3 $\pm$ 8
Wild bird eggs	95	18 $\pm$ 17
All birds and eggs		254 $\pm$ 204
<b>Berries</b>		
Blueberries, <i>Vaccinium uliginosum</i>	101	43 $\pm$ 28
Crowberries, <i>Empetrum nigrum</i>	98	43 $\pm$ 31
Bog cranberries, <i>Vaccinium oxycoccus</i>	94	40 $\pm$ 43
Cloudberries, <i>Rubus chamaemorus</i>	100	33 $\pm$ 30
Red bearberries, <i>Arctostaphylos uva-ursi</i>	39	7 $\pm$ 19
All berries		166 $\pm$ 115
All traditional food species		1171 $\pm$ 852

<sup>1</sup> Scientific names follow Banfield (1974) for mammals, Freeman (1970) for birds, Scott and Scott (1988) for fish, and Porsild and Cody (1980) for plants.

<sup>2</sup> Number of occasions.

number of households that stated that they ate these items "often" is shown in Table 2. For example, seal liver and kidney were eaten "often" by 79 and 32 households respectively, while reindeer liver and kidney were eaten "often" by only 1 and 2 households respectively. (Households that stated that they ate these foods "sometimes" or "rarely" are not shown in Table 2.)

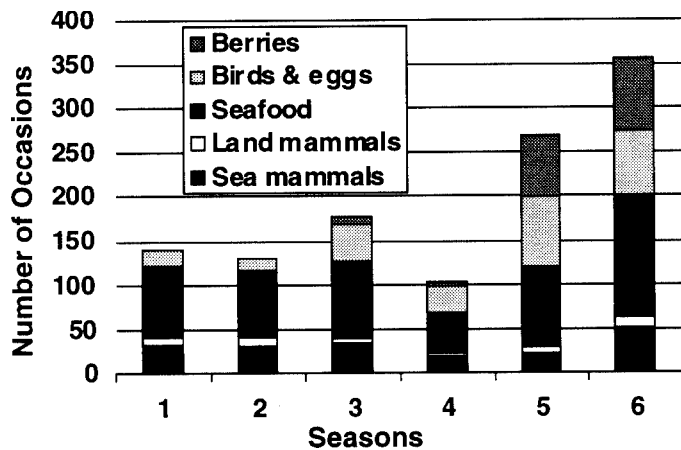


FIG. 1. Mean number of occasions per household when traditional foods were used. The six seasons recognized by the Inuit are 1) Ukiak (sea ice, short days, December–January); 2) Ukiuk (sea ice, very cold, February–March); 3) Upinguaksak (sea ice, long days, April–May); 4) Upinguak (break-up, June); 5) Aujaq (open water, July–August); and 6) Ukiaksak (windy, snow on land, lake ice, September–November) (Fleming, 1989).

*Food Preferences: The Sample*

Food preference ratings were obtained from 100 adults (96% of households) and 64 young people (84% of those in Grades 6–11). (Four other individuals, each 21 years of age, provided preference ratings, but these four were excluded from the analysis to more clearly define the two age groups, since two came from the school group and two from the adult household group.) The 100 adults included 46 males and 54 females, with a mean age of 42.3 ± 13 years. The 64 young people included 32 males and 32 females, 11 to 19 years of age, with a mean age of 14.7 ± 2.4 years.

*Mean Preference Rating per Food Item*

As shown inversely by the number of persons who had never tasted certain food items, the majority of foods on the questionnaire were well-known to participants (Table 3). Some exceptions, however, were capelin, hare, starfish, fox, and polar bear; generally, a higher proportion of young people, compared to adults, had not tasted such foods. Within each age group, however, the number of males and females who had not tasted specific items was nearly identical.

Among adults, mean preference ratings for most traditional food items were high, in the range “like” (rating 4) to “like very much” (rating 5) (Table 3). The most preferred foods of adults were dried fish, dried reindeer meat, goose, and beluga muktuk (skin with attached fat). Within the adult group, gender differences in mean preference ratings were statistically significant for only six items. Males rated seal liver, wild bird eggs, merganser, bearded seal, polar bear, and hare higher ( $p < 0.05$ ) than females did (data not shown).

Young people rated 25 of 32 traditional food items lower than adults rated them ( $p < 0.01$ ), but most items were still in the “like” (rating 4) range. Young people also rated two of nine market foods higher than adults did ( $p < 0.01$ ). The best-liked foods of young people were goose, beluga muktuk,

blueberries, canned fruit, and apples. Within the group of young people, females rated six food items higher ( $p < 0.05$ ) than males did. These foods were arctic char, blueberries, sea urchin, sea cucumber, pork chop, and canned fruit (data not shown). For other food preference ratings, gender differences were not statistically significant.

*Favourite Foods*

Favourite foods identified by adults in the open-ended question were seal meat, beluga muktuk, arctic char, and Canada goose, while those identified by young people were reindeer meat, seal meat, Canada goose, and arctic char (Table 3, last two columns). Reasons given for liking foods included taste, texture, satiety, warmth, health, considered a staple, traditional, freshness, availability, delicacy, association with pleasurable events like hunting or Christmas, medication, and ease of preparation. Adults gave various reasons for liking foods; however, young people most often stated “taste” as the reason. Liking a food because of its association with special times, such as spring camp, was unique to young people (data not shown).

*Foods for Health and Other Comments*

Table 4 (footnote) summarizes responses to the question “What do you believe a person should eat to be strong and healthy?”, which was posed only to adults. Responses were largely traditional foods, most often seal or fish. Only four individuals mentioned market foods (vegetables, milk and cheese, bannock, foods from the four food groups).

Fifty adults provided other comments as well (Table 4). Most expressed concern about food security, both in relation to their traditional food base and in relation to the high cost of market foods. The comments also expressed clearly people’s opposition to developments that might pose threats to the wildlife that constitute their traditional food base.

DISCUSSION

Since the sample comprised a very large proportion of households (for the frequency data) and of adult household heads and young people (for the preference data), it can be considered representative of these major parts of the community.

The purposes of evaluating food use and technical aspects of conducting dietary surveys in aboriginal communities have been discussed in the literature (Campbell et al., 1994; Wein, 1995a). The food frequency method used here is designed to provide information about usual food consumption patterns over an extended time by estimating how often certain foods are eaten during specified periods. Food frequency questionnaires are developed for specific purposes and specific population groups, and have better relative validity when they consider a limited number of dietary components, rather than the total diet (Cameron and van

TABLE 2. Number of households that ate various forms and parts of food species "often."<sup>1</sup>

Item	Number of households (N = 102)	Item	Number of households (N = 102)
<b>Sea Mammals</b>		<b>Land Mammals – continued:</b>	
Ringed seal	meat, frozen, raw 78	Reindeer and caribou	kidney 2
	meat, fresh, raw 72		liver 1
	meat, cooked 64	Arctic hare	21
	meat, dried 25	Polar bear	meat 11
	blubber, fresh 52		fat 10
	blubber, aged 42	Arctic fox	19
	liver 79		
	intestine, dried 64	<b>Birds</b>	
	intestine, cooked 58	Canada and snow goose,	meat, cooked 93
	brain 52		gizzard, boiled 85
	heart, raw 52		gizzard, raw 80
	heart, cooked 29		wing 79
	eyes 47		feet 65
	kidney 32	Eider duck	meat, cooked 88
	tongue 30		meat, raw 87
	mustache 30		gizzard 75
Beluga whale	meat, dried 74		liver 66
	meat, cooked 42		heart 63
	meat, raw 27	Rock ptarmigan	meat, raw 57
	muktuk, cooked 95		meat, cooked 45
	muktuk, raw 73		intestine, raw 24
	flippers and fluke, raw 77	<b>Fish and shellfish</b>	
	flippers and fluke, dried 55	Arctic char	meat, raw 94
	intestine, cooked 30		meat, boiled 90
	heart 12	Tom cod	meat, boiled 83
Bearded seal	meat, cooked 60		meat, raw 63
	meat, raw 49		liver 52
	meat, dried 34	Lake herring, (whitefish)	meat, frozen, raw 66
	intestine, cooked 50		meat, fresh, raw 60
	intestine, dried 17		meat, cooked 44
	flippers, aged 15		eggs, raw 57
	flippers, raw 11		eggs, frozen 40
	flippers, cooked 10	Sea urchin	raw 84
	tongue 10	Sea cucumber	raw 75
	heart 8	Sculpin	roasted on fire 76
	mustache 5		boiled 68
Walrus	meat 41		raw 39
	skin and fat, raw 46	Clams	raw 42
	skin and fat, aged 35		boiled 30
	flippers, raw 30	Starfish	34
	flippers, aged 28	Capelin	boiled 33
	stomach contents 18		raw 25
<b>Land mammals</b>		<b>Berries</b>	
Reindeer and caribou	meat, cooked 86	Blueberries	raw 92
	meat, dried 78	Cloudberries	raw 91
	meat, raw 58	Crowberries	raw 89
	fat, raw 62		with canned sardines and vegetable oil 80
	fat, dried 42	Bog cranberries	raw 82
	tongue 58		frozen 63
	head, cooked 27		cooked 27
	stomach contents 19	Red bearberries	raw 21
	heart 11		

<sup>1</sup> Choices were "often," "sometimes," or "not at all."

Staveren, 1988). A food frequency questionnaire places little burden on respondents other than to recall, estimate, and average; thus, the response rate is good, and a representative sample of the population can be obtained. In order to include seasonal variation, the questionnaire used here covered a one-year period. Even though a systematic approach based on the six seasons recognized by the Inuit was used, estimation over this long period is obviously subject to memory errors. Furthermore, one year's data does not take into account

variation in species populations or hunting conditions, which may differ from year to year. Hence the data should be interpreted with caution. Furthermore, frequency data alone do not give portion sizes by weight or volume; there is no distinction between meals and snacks. Other dietary measures are needed for this.

The lack of statistically significant differences between male and female respondents in mean household estimates of traditional food use suggests that both are quite familiar with

TABLE 3. Food preference ratings of adults (n = 100) and youth (n = 64), in descending order for adults (Scale: 1 = dislike very much, 2 = dislike, 3 = neutral, 4 = like, 5 = like very much), and foods named as favourites.

Food item	Preference rating (mean ± SD)		Never tasted number(%) <sup>1</sup>		Named as favourites(%) <sup>2</sup>	
	Adults	Youth	Adults	Youth	Adults	Youth
<b>Traditional Foods</b>						
Dried fish	4.9 ± 0.4	3.8 ± 1.1*	1	1 (2)	3	9
Dried reindeer meat	4.8 ± 0.6	4.1 ± 1.0*	1	6 (9)	1	8
Goose, Canada snow	4.8 ± 0.4	4.4 ± 0.8*	0	0 (0)	41	50
Beluga muktuk	4.8 ± 0.5	4.3 ± 1.0*	0	1 (2)	13	8
Blueberries	4.7 ± 0.6	4.3 ± 0.9*	1	1 (2)	51	36
Eider duck	4.7 ± 0.7	3.8 ± 1.2*	1	3 (5)	1	9
Arctic char	4.7 ± 0.6	4.1 ± 1.0*	1	0 (0)	35	14
Blue mussels	4.7 ± 0.7	3.7 ± 1.2*	1	0 (0)	46	42
Sea urchin	4.7 ± 0.6	3.8 ± 1.2*	2	1 (2)	25	16
Bannock <sup>3</sup>	4.6 ± 0.6	4.1 ± 1.1*	0	0 (0)	5	12
Ringed seal	4.6 ± 0.6	3.7 ± 1.2*	1	0 (0)	1	6
Dried beluga meat	4.5 ± 0.8	3.4 ± 1.2*	1	8 (12)	99	50
Wild bird eggs	4.5 ± 0.7	3.6 ± 1.1*	2	5 (8)	2	5
Sea cucumber	4.4 ± 1.0	3.6 ± 1.3*	2	3 (5)	1	0
Lake herring	4.4 ± 0.8	3.1 ± 1.4*	2	12 (19)	4	14
Crowberries	4.4 ± 0.8	4.0 ± 1.1	1	2 (3)	1	0
Dried seal intestine	4.4 ± 0.8	3.4 ± 1.2*	3	12 (19)	2	2
Seal liver	4.4 ± 1.0	3.5 ± 1.4*	2	8 (12)	1	0
heart					1	2
kidney					1	0
Merganser	4.3 ± 0.9	3.2 ± 1.2*	4	10 (16)	4	0
Reindeer	4.3 ± 0.7	4.1 ± 1.0	0	1 (2)	27	52
Cranberries	4.2 ± 0.8	3.9 ± 1.1	1	1 (2)	1	0
Tom cod	4.2 ± 0.8	3.1 ± 1.2*	0	6 (9)	4	5
Seaweed	4.1 ± 1.1	3.1 ± 1.4*	12	16 (25)	2	0
Guillemot chicks	4.1 ± 1.1	2.8 ± 1.2*	15	32 (50)	0	0
Sculpin	4.1 ± 0.8	2.9 ± 1.1*	4	9 (14)	2	2
Capelin	3.9 ± 1.2	2.8 ± 1.6*	28	25 (39)	0	2
Starfish	3.6 ± 1.2	3.4 ± 1.4	19	24 (38)	0	0
Walrus	3.6 ± 1.2	2.9 ± 1.4*	8	14 (22)	3	5
Aged walrus					3	0
Walrus skin					3	0
Bearded seal	3.5 ± 1.1	3.1 ± 1.5	5	12 (19)	0	0
Hare	3.3 ± 1.1	2.7 ± 1.2	23	34 (53)	2	0
Arctic fox	3.3 ± 1.3	2.2 ± 1.3*	19	35 (55)	0	1
Polar bear	3.1 ± 1.2	3.2 ± 1.4	18	27 (42)	2	2
<b>Market Foods</b>						
Pork chops	3.9 ± 1.1	4.0 ± 1.2	3	1 (2)		
Canned fruit	3.8 ± 1.0	4.2 ± 1.1	2	2 (3)		
Apple	3.7 ± 1.0	4.2 ± 0.9*	1	0 (0)		
Chicken, fried	3.7 ± 1.0	4.0 ± 1.0	1	1 (2)		
Macaroni	3.5 ± 1.0	3.8 ± 1.0	1	0 (0)		
Bread, white	3.5 ± 1.0	3.6 ± 1.0	3	0 (0)		
Ground beef	3.5 ± 1.2	4.1 ± 1.1*	4	3 (5)		
Wiener	3.3 ± 0.9	3.5 ± 1.0	1	2 (3)		
Canned fish	3.2 ± 1.0	3.6 ± 1.1	3	2 (3)		

\* Significantly different from adult rating ( $p < 0.01$ , t-test).

<sup>1</sup> Those who had never tasted it were removed from each comparison.

<sup>2</sup> Also named as favourites were ptarmigan (9% of adults), caribou (4% of adults), aged food (4% of adults), wild birds (2% of adults), sea mammals (2% of adults), cloudberries and unnamed berries (2% each, adults and youth).

<sup>3</sup> Considered a traditional food for the preference study only.

household use of these foods. This probably means that both men and women are involved in procuring or preparing these foods, and that household members normally eat recently obtained foods together. It may also reflect the prominence of these foods in contemporary diets, and the high regard in which Inuit hold them.

Although many parts of most marine species were eaten “often” by a majority of households, certain parts of the land mammals, such as reindeer liver and kidney, were seldom eaten (Table 2). The Belcher Island Inuit are traditionally a marine-oriented group (not caribou eaters). Reindeer were introduced to the Belcher Islands about 15 years ago, and hunting was prohibited at first to allow the small number introduced to increase. Only during the last decade has hunting been permitted. Hence reindeer is a relatively new food for the Belcher Island Inuit. Caribou and reindeer can be infected with tapeworms, *Echinococcus granulosus*, which encyst in the lungs, and *Taenia hydatigena*, which encyst in the liver. It is widely recognized by caribou-eating Inuit that visibly infected livers should not be eaten. The Belcher Island Inuit, who have limited experience with reindeer as a food source, but have heard about tapeworm-infected reindeer liver, may be quite cautious about eating this organ. This may explain the infrequent use of reindeer liver and kidney. The liver taboo, however, extends to all animals with four legs, including beef (Zack Novalinga and other community members, pers. comm. 1995). Such taboos have implications for nutrition educators, especially if availability of traditional food sources diminishes in the future.

Other beliefs may account for both the infrequent use and the low preference ratings of species such as polar bear, arctic fox and arctic hare (Tables 2 and 3). Polar bear, when skinned, is said to resemble a human in shape. Meats such as bear, fox, and hare, which are viewed as having little blood (as opposed to seal, which has lots of blood and is very dark in color), when lean are considered to have a strong odor, and are not choice foods (M.M.R. Freeman, unpubl. field notes). Foxes are good when they are fat; however, they must be well cooked, as must all animals having little blood. If foxes or bears are lean, they are not eaten; there is too much odor. Fox is not relished; rather, it is despised as food, since it is a scavenger. Some Inuit believe that the hare carcass must be cut across the long axis; sickness will result if it is cut longitudinally (M.M.R. Freeman, unpubl. field notes).

In the Keewatin Health Study of eight communities, including Sanikiluaq, an individual (as opposed to a household) food frequency questionnaire was used, and the percentage of individuals in each frequency category (e.g., daily, weekly, etc.) was reported, rather than estimates of total frequency (Moffatt et al., 1994; Young et al., 1995). More than half the adults ate meat from the land (e.g., caribou) daily, and about 50% ate locally caught fish (e.g., arctic char) at least weekly. Sea mammals (e.g., seal) were not available in all communities; nevertheless, 20% ate sea mammals more than once a week. Differences by age were apparent, however. More than 80% of older adults (over 55 years) reported eating meat from the land daily, compared to only 45% of those 18 to 34 years

TABLE 4. Summary of comments from adults about food.

Theme	Number of persons mentioning (N = 102)
Oppose developments/destroying wildlife	20
Traditional foods are necessary for:	
• Health*	6
• Energy	3
• Survival	3
• Good blood (iron status)	2
• Satiety	1
• Remedies	1
Want fresh traditional foods to be available always	11
Concerned about contamination/pollution of foods	3
Concerned about the affordability of market foods, if traditional foods are no longer available	3
Do not want monetary compensation; prefer to keep traditional foods	2
Wishes he had more food	1

\* When asked to name foods needed for health, the following responses occurred (number of persons): seal (including meat, liver, blood) (80), arctic char (13), traditional foods (unspecified) (13), eider duck (7), Canada goose (5), meat (unspecified) (4), fish (3), caribou (2), and plants from the land (2). Foods named by only one respondent were walrus, beluga muktuk, fish eggs, sea urchins, ptarmigan, blueberries, seaweed, vegetables, milk and cheese, foods from the four food groups, lots of fluids, and bannock.

of age (Moffatt et al., 1994). Similarly, local fish was consumed more often by older than by younger adults. Although methodological differences do not allow a direct comparison, frequency of traditional food consumption in Sanikiluaq appears higher than in the Keewatin as a whole. Sanikiluaq is among those communities with ready access to sea mammals, and the Belcher Islands offer greater biological diversity and richness of marine species than do most of the Keewatin communities. Furthermore, the Sanikiluaq study included all traditional species, not just the major ones.

Although different methods were used, people in Sanikiluaq appear to use traditional foods at least as often, if not more often, than people in Baffin Island (Kuhnlein and Soueida, 1992; Kuhnlein et al., 1995b) or northern Quebec (Santé Québec, 1995). Clearly the frequency is greater than among Inuvialuit in Aklavik (Wein and Freeman, 1992), and than among some northern Indian people (Wein et al., 1991; Wein and Freeman, 1995). However, the number of food species available in the Belcher Islands is much more limited than in the Subarctic. As among the Baffin Island Inuit (Kuhnlein and Soueida, 1992) and Inuit generally (Freeman, 1988b, 1996), the wide range of food products used by the Belcher Island Inuit from this small number of species demonstrates their ingenuity and resourcefulness in using almost all parts of the carcass.

As in other aboriginal groups (Kuhnlein, 1989; Wein et al., 1989; Campbell et al., 1992; Wein and Freeman, 1992; Wein et al., 1989, 1993), preference for traditional foods remains high. Comparison to findings from most other studies (Kuhnlein, 1989; Wein and Freeman, 1992; Wein et al.,

1989, 1993), however, shows that generational differences in preference between adults and young people are more pronounced in Sanikiluaq.

Although within each age group there were few gender differences in mean preference, those few were consistent in direction. Among adults, men gave higher ratings than women to six traditional foods, some of which are infrequently obtained, such as bearded seal and polar bear. (The polar bear is hunted more for its skin than as a food source.) Others, such as seal liver, are customarily shared and eaten by hunters at the hunting site, immediately after the animal has been obtained, and hence are more often consumed by men (the usual hunters) than by women. Among young people, females rated three types of seafood, blueberries, and two market foods higher than males did; these types of foods may be more readily accessed by women and girls. Within each age group, the number of persons who had not tasted specific foods was very similar for both sexes.

Substantially more young people than adults had not tasted such foods as arctic fox, polar bear, capelin, and guillemot chicks. Few people are trapping foxes now that the price of pelts is low, and this small animal does not provide much meat to share with others. Furthermore, fox is considered an emergency food, eaten only when the foxes are fat and other food sources are scarce. Polar bear is not well-liked as a food; it is hunted mainly for its skin. Capelin occurs at only one or two locations on the Belcher Islands, and traditionally was gathered when it beached for spawning. Since people are now settled into the community, rather than moving camp regularly, young people likely have had little opportunity to taste capelin. Guillemots rest on islands among the eider ducks. People make only one trip to each nest site, and try to time the visit to get eggs, not chicks; hence, it is rare to find chicks. Young people have had fewer opportunities than older people to encounter guillemot chicks; this explains why so many young people had not tasted these chicks. Less frequent travelling and camping on the land may also explain the large numbers of young people, as opposed to adults, who had not tasted other traditional foods. In contrast, only a few adults and young people had not tasted the market foods studied. These differences likely reflect differences in the availability of the foods studied. We attempted to assess preference for a wide range of traditional foods, but included only a few common market foods for comparison.

Food preference alone is not a good predictor of consumption, since many factors other than preference (such as availability, role of staple foods, cost, effort required to obtain and prepare the food) also influence consumption. Relative food preference ratings, however, can provide insight into the cultural and social importance of certain foods. They can also provide nutrition educators with practical guidance on which food sources to recommend. The high mean ratings that adults assigned to most traditional foods confirm anthropologists' claims that procuring, preparing, and consuming traditional food is an integral part of Inuit identity (Bockstoce et al., 1982; Freeman, 1982, 1988a, b, 1996; Condon et al., 1995).

Adults believe strongly that traditional foods, especially seal, are needed for health, as shown by the large proportion who identified such foods in the open-ended health question and by their other comments. This evidence supports findings from a recent study by Usher et al. (1995). As background for developing cross-cultural communication approaches, Inuit concepts of food and health in Sanikiluaq were studied from an ethnographic/linguistic perspective. Bodily warmth and strength were directly linked to diet. Without the right food, Inuit soon feel tired, weak, and cold. For most Inuit, however, only country food, more specifically only the meat, organs, and blood of wild animals, constitute good food. Ringed seal, especially ringed seal blood, best characterizes good food for the Inuit of Sanikiluaq. Seal blood is "the source of strength for the body." In contrast, market foods are referred to as "bloodless meats," which offer little sustenance (Usher et al., 1995:149). Many respondents in the present study made similar comments (Wein, 1995b).

### CONCLUSIONS

For the Belcher Island Inuit, traditional foods remain the dietary staple, as shown by their frequent consumption (up to three times daily), by the extensive variety of food products prepared and consumed from these species, and by the high preference ratings assigned to them by adults and to a lesser extent by young people, as well as by people's belief that these foods remain essential for health.

### ACKNOWLEDGEMENTS

Sincere thanks are extended to all the adults and young people of Sanikiluaq who kindly participated in this study, to interviewers Mary Inuktaluk and Mina Meeko, to Mayor Peter Kattuk, the Environmental Committee, and the hamlet office staff, for their assistance in many ways. Brian Fleming was particularly helpful in organizing the study. Thanks are also expressed to Principal Bernie Bridgman and the teachers for permission to collect the young people's preference data at school. This research was funded by a grant from the Arctic Environmental Strategies Program of Indian and Northern Affairs Canada.

### REFERENCES

- BANFIELD, A.W.F. 1974. *The mammals of Canada*. Ottawa: National Museums of Canada and University of Toronto Press.
- BOCKSTOCE, J., FREEMAN, M., LAUGHLIN, W.S., NELSON, R.K., ORBACH, M., PETERSEN, R., TAYLOR, J.G., and WORL, R. 1982. Report of the anthropology panel. In: Donovan, G.P., ed. *Aboriginal/subsistence whaling*. Cambridge: Reports of the International Whaling Commission, Special Issue 4. 35–49.
- CAMERON, M.E., and VAN STAVEREN, W.A., eds. 1988. *Manual on methodology for food consumption studies*. New York: Oxford University Press.
- CAMERON, M., and WEIS, I.M. 1993. Organochlorine contaminants in the country food diet of the Belcher Island Inuit, Northwest Territories, Canada. *Arctic* 46:42–48.
- CAMPBELL, M.L., DIAMANT, R., GRUNAU, M., and HALLADAY, J. 1994. Conducting dietary surveys in aboriginal communities: Methodological considerations. *Canadian Home Economics Journal* 44:118–122.
- CAMPBELL, M.L., DIAMANT, R.M.F., and MACPHERSON, B.D. 1992. Dietary survey of preschool children, women of child-bearing age, and older adults in God's River, Nelson House, and South Indian Lake. Final Report. Winnipeg: Department of Foods and Nutrition, University of Manitoba.
- CANADIAN ARCTIC RESOURCES COMMITTEE, ENVIRONMENTAL COMMITTEE OF SANIKILUAQ, and RAWSON ACADEMY OF AQUATIC SCIENCES. 1991. Sustainable development in the Hudson Bay/James Bay bioregion. *Northern Perspectives* 19(3):3–8.
- CHAN, H.M., KIM, C., KHODAY, K., RECEVEUR, O., and KUHNLEIN, H.V. 1995. Assessment of dietary exposure to trace metals in Baffin Inuit food. *Environmental Health Perspectives* 103:740–746.
- CONDON, R.G., COLLINGS, P., and WENZEL, G. 1995. The best part of life: Subsistence hunting, ethnicity, and economic adaptation among young Inuit males. *Arctic* 48:31–46.
- FAST, H., and BERKES, F. 1994. Native land use, traditional knowledge and the subsistence economy in the Hudson Bay bioregion. Technical paper prepared by the Hudson Bay Programme. Winnipeg: Natural Resources Institute, University of Manitoba.
- FLEMING, B. 1989. Working at leisure: Inuit subsistence in an era of animal protection. M.A. Thesis, University of Alberta, Edmonton.
- FREEMAN, M.M.R. 1967. An ecological study of mobility and settlement patterns among the Belcher Island Eskimo. *Arctic* 20:154–175.
- . 1970. The birds of the Belcher Islands, NWT, Canada. *Canadian Field-Naturalist* 84:117–190.
- . 1982. An ecological perspective on man-environment research in the Hudson and James Bay region. *Le Naturaliste Canadien* 109:955–963.
- . 1988a. Environment, society, and health: Quality of life issues in the contemporary north. *Arctic Medical Research* 47 (Suppl. 1):54–59.
- . 1988b. Tradition and change: Problems and persistence in the Inuit diet. In: de Garine, I., and Harrison, G.A., eds. *Coping with uncertainty in food supply*. Oxford: Clarendon. 150–169.
- . 1996. Identity, health and social order: Inuit dietary traditions in a changing world. In: Foller, M.L., and Hansson, L.O., eds. *Human ecology and health: Adaptation to a changing world*. Göteborg: Department of Interdisciplinary Studies of the Human Condition, Göteborg University. 57–71.
- GOVERNMENT OF NORTHWEST TERRITORIES, BUREAU OF STATISTICS. 1994. Community census population (1991), Northwest Territories. *Statistics Quarterly* 16(1):4.
- KINLOCH, D., KUHNLEIN, H., and MUIR, D.C.G. 1992. Inuit foods and diet: A preliminary assessment of benefits and risks. *Science of the Total Environment* 122:247–278.



- KUHNLEIN, H.V. 1989. Factors influencing use of traditional foods among the Nuxalk people. *Journal of the Canadian Dietetic Association* 50:102–106.
- . 1992. Change in the use of traditional foods by the Nuxalk native people of British Columbia. *Ecology of Food and Nutrition* 27:259–282.
- . 1995. Benefits and risks of traditional food for indigenous peoples: Focus on dietary intakes of arctic men. *Canadian Journal of Physiology and Pharmacology* 73:765–771.
- KUHNLEIN, H.V., and SOUEIDA, R. 1992. Use and nutrient composition of traditional Baffin Inuit foods. *Journal of Food Composition and Analysis* 5:112–126.
- KUHNLEIN, H.V., RECEVEUR, O., MUIR, D.C.G., CHAN, H.M., and SOUEIDA, R. 1995a. Arctic indigenous women consume greater than acceptable levels of organochlorines. *The Journal of Nutrition* 125(10):2501–2510.
- KUHNLEIN, H.V., SOUEIDA, R., and RECEVEUR, O. 1995b. Baffin Inuit food use by age, gender and season. *Journal of the Canadian Dietetic Association* 56:175–183.
- KUHNLEIN, H.V., SOUEIDA, R., and RECEVEUR, O. 1996. Dietary nutrient profiles of Canadian Baffin Island Inuit differ by food source, season, and age. *Journal of the American Dietetic Association* 96(2):155–162.
- MOFFATT, M.E.K., O'NEIL, J.D., and YOUNG, T.K. 1994. Nutritional patterns of Inuit in the Keewatin region of Canada. *Arctic Medical Research* 53 (Suppl. 2):298–300.
- PORSILD, A.E., and CODY, W.J. 1980. *Vascular plants of the continental Northwest Territories, Canada*. Ottawa: National Museum of Natural Sciences.
- QUIGLEY, N.C., and McBRIDE, N.J. 1987. The structure of an arctic microeconomy: The traditional sector in community economic development. *Arctic* 40:203–210.
- SANTÉ QUÉBEC. 1995. A health profile of the Inuit: Report of the Santé Québec survey among the Inuit of Nunavik, 1992. Vol. 3. Diet: A health determining factor. Jette, M., ed. Montreal: Ministère de la Santé et des Services sociaux, Gouvernement du Québec.
- SCHAEFER, O. 1971. When the Eskimo comes to town. *Nutrition Today* 6(6):8–16.
- SCOTT, W.B., and SCOTT, M.G. 1988. *Atlantic fishes of Canada*. Ottawa: Fisheries and Oceans and University of Toronto Press.
- SPSS Inc. 1993. *SPSS for Windows - base system user's guide*. Release 6.0. Chicago, Illinois: SPSS Inc.
- THOUEZ, J.P., RANNOU, A., and FOGGIN, P. 1989. The other face of development: Native population, health status and indicators of malnutrition—the case of the Cree and Inuit of Northern Quebec. *Social Science and Medicine* 29:965–974.
- USHER, P.J., BAIKIE, M., DEMMER, M., NAKASHIMA, D., STEVENSON, M.G., and STILES, M. 1995. *Communicating about contaminants in country food: The experience in aboriginal communities*. Ottawa: Inuit Tapirisat of Canada.
- WEIN, E.E. 1995a. Evaluating food use of Canadian aboriginal peoples. *Canadian Journal of Physiology and Pharmacology* 73:759–764.
- . 1995b. *Sanikiluaq traditional food study report*. Edmonton: Canadian Circumpolar Institute, University of Alberta.
- WEIN, E.E., and FREEMAN, M.M.R. 1992. Inuvialuit food use and food preferences in Aklavik, Northwest Territories, Canada. *Arctic Medical Research* 51:159–172.
- WEIN, E.E., and FREEMAN, M.M.R. 1995. Frequency of traditional food use by three Yukon First Nations living in four communities. *Arctic* 48:161–171.
- WEIN, E.E., HAWRYSH, Z.J., and GEE, M.I. 1993. Food preferences and food health beliefs of native school children and mothers in northern Alberta. *Ecology of Food and Nutrition* 29:259–273.
- WEIN, E.E., SABRY, J.H., and EVERS, F.T. 1989. Food health beliefs and preferences of northern native Canadians. *Ecology of Food and Nutrition* 23:177–188.
- WEIN, E.E., SABRY, J.H., and EVERS, F.T. 1991. Food consumption patterns and use of country foods by native Canadians near Wood Buffalo National Park, Canada. *Arctic* 44:196–205.
- YOUNG, T.K., MOFFATT, M.E.K., O'NEIL, J.D., THIKA, R., and MIRDAD, S. 1995. The population survey as a tool for assessing family health in the Keewatin region, NWT, Canada. *Arctic Medical Research* 54 (Suppl. 1):77–85.