

# Biological Sampling from a Wrigley Community Harvest of Bluenose-East Barren-ground Caribou in the Tseepantee Lake Area, January 2008

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## ABSTRACT

During mid-winter, the Bluenose-East caribou (*Rangifer tarandus groenlandicus*) population is occasionally found within a hundred kilometres east of the community of Wrigley in the vicinity of Tseepantee (Spruce) Lake and are traditionally hunted by local First Nations. Pehdzeh Ki First Nation (PKFN) wanted to train local harvesters on how to properly take biological samples from country foods. Local harvesters were interested in collecting samples that could be used to monitor animal health and condition, while providing wild meat for the community. Staff from the Department of Environment and Natural Resources (ENR) worked with PKFN harvesters on the proper procedures to collect biological samples. The community hunt took place at Tseepantee Lake 16-19 January, 2008. Thirty-three caribou were harvested and a set of eight biological samples were successfully collected from ten caribou.

Another community hunt took place 18-20 March, 2009 with elders and youth in a similar area where 35 caribou were harvested; no ENR staff members were present. Three complete sets of biological samples were provided to ENR by the youth and their results are included in this report.

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## INTRODUCTION

The community of Wrigley relies heavily upon country foods harvested from the land. Knowledge of the health and condition of country food sources has always been a priority of the Pehdzeh Ki First Nation (PKFN) membership. At Dehcho Regional Wildlife Workshops elders and leadership of PKFN consistently voice concerns about the need to know the health and condition of country foods harvested in their traditional hunting areas.

As part of a moose monitoring program conducted by the Department of Environment and Natural Resources (ENR), a limited number of PKFN harvesters had participated in collecting moose biological samples (Larter 2009). PKFN and ENR wanted to build upon this initial sample collection by exposing and training more local harvesters on how to collect biological samples in the field.

The original intent had been for ENR staff to participate in a community harvest for moose and provide training on how to collect biological samples. The Cumulative Impacts Monitoring Program (CIMP) funded the community moose hunt; however, when an abundance of barren-ground caribou (from the Bluenose-East population) were located in the Tseepantee Lake area (Figure 1) it was decided, with CIMP approval, that a community caribou hunt would provide an opportunity to collect more biological samples and train more harvesters over a shorter period of time than originally proposed (Pehdzeh Ki First Nation 2008).

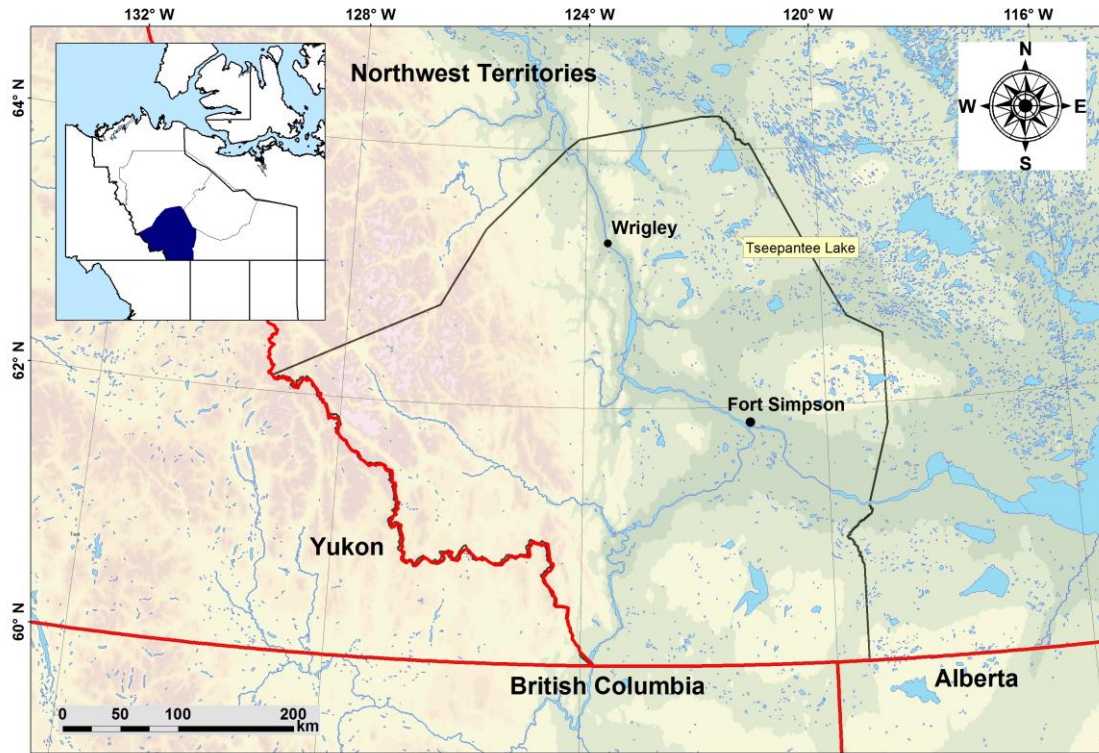
During winter 2007-08 barren-ground caribou were more numerous in traditional harvesting areas around Tseepantee Lake (Figure 1) than in previous years. This

provided the opportunity for a community caribou hunt to provide wild meat for the community, and an opportunity to train local harvesters to collect biological samples which could be used to assess the health and condition of the food they were harvesting.

To reduce costs and ensure harvesters could spend the maximum amount of time hunting and/or being trained to collect biological samples, harvesters and equipment were transported by air to the general area. PKFN leadership utilized their joint venture with Dehcho Regional Helicopters (Darcy Moses, personal communication) for transportation. A community hunt took place 16-19 January 2008. The author accompanied and trained harvesters in collecting biological samples. The following year a community hunt by youth, elders, and harvesters took place 18-20 March, 2009. No ENR staff accompanied this hunt; however, youth were taught how to take biological samples by harvesters that had participated in the 2008 hunt.

This report documents details of the hunt in January 2008 and provides the sample analysis results from samples collected from both the January 2008 and March 2009 hunts.

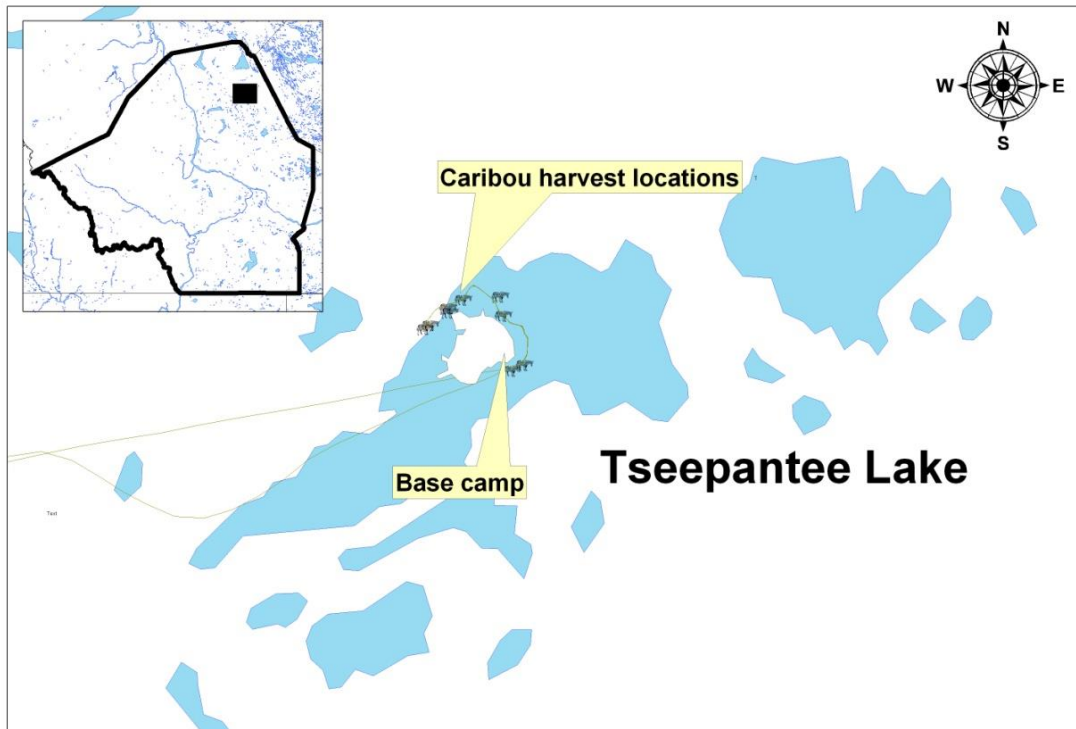




**Figure 1.** The Dehcho political region and the location of Tseepantee Lake.

## METHODS

A reconnaissance flight was flown by a fixed-wing aircraft on 11 January, 2008 to locate groups of caribou. From what was observed during the reconnaissance flight, several experienced hunters suggested the best sites for harvesting caribou and a location for setting up a base camp (Figure 2). The hunting party, consisting of four local harvesters and an ENR representative, were flown out to the hunting area with their gear on 16 January, 2008, to establish the base camp. Snowmobiles were ferried out the following day because of limited daylight.



**Figure 2.** Tseepantee Lake area with base camp and harvest locations.

The hunting party travelled by snowmobiles on 17 and 18 January, 2008, to harvest caribou. Harvesters were provided with field data sampling sheets (Figure 3) and labelled sampling bags for the biological samples. The following data were collected in the field from each caribou sampled: location, date, harvester's name, age/sex/condition of animal, and if it was female was it pregnant and/or lactating. The location was recorded using a Garmin 12XL GPS and digital images were taken of the hunt to make a poster handout for PKFN. Biological samples collected were: front incisor bar, a whole kidney and accompanying kidney fat, an ankle bone with marrow, feces, a handful of rumen, and 5 cm x 5 cm pieces of liver, heart, and muscle. Once sampling was completed, sample kits were left outside in a secure location to freeze. All data were recorded on the field data sampling sheets. Frozen biological samples were brought back to Fort Simpson ENR for processing and/or forwarding on to laboratories for further analyses. Meat was distributed amongst community members in Wrigley.

An individual incisor tooth was extracted from the incisor bar and forwarded to Matson's Laboratory for aging (Matson 1981). Frozen fecal samples (5-25 g wet weight) were forwarded to the Bow Valley Research Lab in Calgary. Subsamples were screened specifically for the presence of *Giardia* and *Cryptosporidium* by sucrose flotation method, and screened for parasites using the modified Wisconsin fecal floatation technique. Parasite presence was reported as the number of eggs/g of feces.

At ENR Fort Simpson, marrow was extracted from a 5-8 cm cross section of ankle bone and placed on a Petri dish. The Petri dish and the wet marrow fat were weighed on an Ohaus electronic balance ( $\pm 0.005$  g) and then placed in a drying oven at  $100^{\circ}\text{C}$  for a minimum of 48 hr until the weight of the dried marrow fat and Petri dish was

constant. The percentage of marrow fat content was calculated with the following formula:

$$\% \text{ fat content} = (\text{dry weight of fat} + \text{Petri dish} / \text{wet weight of fat} + \text{Petri dish}) \times 100$$

Individual kidneys plus their accompanying fat were thawed and weighed on an Ohaus electronic balance ( $\pm 0.005$  g). The fat was trimmed following Riney (1955) and the kidney with remaining fat was weighed. The kidney was then peeled of all fat and reweighed. The ratio of the total fat weight (before trimming) to kidney weight was also calculated for each kidney. The kidney fat index (KFI) was calculated for each kidney with the following formula:

$$\text{KFI} = (\text{weight of fat remaining after trimming} / \text{weight of kidney}) \times 100$$

Rumen samples were dried at 60°C for 48 hr and ground in a coffee grinder. These samples were banked for potential future analysis. Tissue samples (kidney, liver, muscle, and heart) were banked frozen for potential future analyses.

From 18-20 March, 2009, a similar community hunt was conducted in the area by a hunting party of five harvesters and two youth. Two harvesters who had participated in the 2008 hunt (and received training from ENR) provided youth participants with training prior to hunting. ENR provided sampling kits. The youth were successful in collecting three full sets of biological samples from the 2009 hunt. The samples were forwarded to ENR after the hunt.

<b>CARIBOU FIELD DATA SAMPLING SHEET</b>	
<b>HARVESTER'S NAME:</b>	
<b>HARVEST LOCATION (description &amp;/or GPS co-ordinates):</b>	
<b>HARVEST DATE:</b>	
<b>AGE:</b> calf / yearling / adult	<b>SEX:</b> male / female
<b>BODY CONDITION:</b> Excellent      Good      Fair      Poor	
<b>PREGNANT:</b> yes / no	<b>LACTATING:</b> yes / no
<b>SAMPLES COLLECTED (place in labelled plastic bags &amp; freeze):</b> Lower front teeth <input type="checkbox"/>  Faecal pellets <input type="checkbox"/>  Stomach contents <input type="checkbox"/>  Ankle bone (whole) or a 6" piece with marrow <input type="checkbox"/>  Whole Kidney + surrounding fat <input type="checkbox"/>  2 inch x 2 inch piece of Liver <input type="checkbox"/>  2 inch x 2 inch piece of Muscle <input type="checkbox"/>  2 inch x 2 inch piece of Heart <input type="checkbox"/>	
<b>GENERAL COMMENTS AND OBSERVATIONS:</b> (e.g. signs of disease, condition of animal, etc.)	
<b>Would you like to know how old the caribou was that you harvested?</b> Yes/No	

**Figure 3.** Barren-ground caribou field data sheet – 2008.

## RESULTS

The goals of this community hunt had been to harvest 33-35 barren-ground caribou and to collect as many sets of biological samples from individual caribou as possible. A total of 33 barren-ground caribou were harvested from the approximately 400-500 individuals that were observed in the vicinity of the base camp. Timing and limited communication between ENR staff and the harvesters prior to departure resulted in only 15 caribou being accurately classified into a sex/age class, and complete sets of biological samples were collected from just ten individuals harvested on 18 January. The 15 caribou classified included three adult females (cows), one calf, and 11 adult males (bulls). The ten individuals with complete sets of biological samples consisted of one cow and nine bulls.

The vast majority of the 35 caribou harvested during the March 2009 hunt were bulls (George Moses, personal communication), but not all caribou were classified. The three complete sets of biological samples collected were from bulls and were pooled with the ten sets collected from the 2008 hunt.

### **DISEASE/PARASITE ANALYSIS**

There were no *Giardia* or *Cryptosporidium* found in any fecal samples. Small traces of nematodes and protozoans were found in all samples but not enough to be reported on a number of eggs/g basis.

### **AGE**

Ages were determined from 13 individuals: 12 males and 1 female. The age range was one to eight years (mean 4.9; median 5.0; Table 1).

**Table 1.** Ages of 13 barren-ground caribou harvested during Wrigley community hunts in 2008 and 2009.

Species ID	Date	Location	Sex	Age
WBG1	01/18/08	Tseepantee Lake	Male	8
WBG2	01/18/08	Tseepantee Lake	Male	5
WBG3	01/18/08	Tseepantee Lake	Female	8
WBG4	01/18/08	Tseepantee Lake	Male	4
WBG5	01/18/08	Tseepantee Lake	Male	2
WBG6	01/18/08	Tseepantee Lake	Male	4
WBG7	01/18/08	Tseepantee Lake	Male	7
WBG8	01/18/08	Tseepantee Lake	Male	4
WBG9	01/18/08	Tseepantee Lake	Male	5
WBG10	01/18/08	Tseepantee Lake	Male	4
WBG11	03/19/09	Tseepantee Lake	Male	7
WBG12	03/19/09	Tseepantee Lake	Male	1
WBG13	03/19/09	Tseepantee Lake	Male	5

### KIDNEY AND MARROW FAT ANALYSIS

Based upon visual observations of the carcasses by harvesters, all caribou looked in good condition showing no signs of disease or malnutrition. The percent marrow fat from 13 individual caribou ranged from 60.9-90.2% (mean 82.7; median: 84.3 Table 2). The Riney fat index (KFI) from 13 individual caribou ranged from 11.54-79.27 (mean 48.2; median 51.2; Table 2). Kidney mass ranged from 80.95-114.32 g (mean 96.4; median 96.7; Table 2).

**Table 2.** Kidney and marrow fat measurements from 13 barren-ground caribou.

<b>Species ID</b>	<b>Kidney +Fat Weight (g)</b>	<b>Riney Fat Weight (g)</b>	<b>Kidney Weight (g)</b>	<b>KFI</b>	<b>KF:KW</b>	<b>Marrow Fat %</b>
WBG1	150.30	136.80	95.04	43.94	0.5814	60.9
WBG2	213.00	186.94	105.94	76.46	1.0106	84.3
WBG3	159.55	145.12	80.95	79.27	0.9710	81.9
WBG4	132.32	129.20	114.32	13.02	0.1575	80.2
WBG5	180.71	158.70	98.12	61.74	0.8417	86.6
WBG6	148.53	145.15	88.04	64.87	0.6871	82.3
WBG7	132.60	127.41	97.07	31.26	0.3660	86.3
WBG8	211.63	188.29	106.38	77.00	0.9894	85.4
WBG9	142.45	136.62	88.65	54.11	0.6069	90.2
WBG10	127.95	120.67	83.93	43.77	0.5245	86.8
WBG11	100.11*	99.69	89.38	11.54	0.1201	85.2
WBG12	112.88	111.62	97.04	15.02	0.1632	81.1
WBG13	236.98	168.56	108.66	55.13	1.1809	84.0

\*Some of the kidney missing from the sample.



## DISCUSSION

It was fortunate for harvesters in Wrigley that during winters 2007/8 and 2008/9 fairly substantial numbers of barren-ground caribou frequented the Tseepantee Lake area. Not only did it provide the opportunity for harvesting barren-ground caribou for the community of Wrigley, but community hunts provided an opportunity to train local harvesters to collect biological samples that could be used to help monitor the health and condition of their country foods. The provision of complete sets of biological samples from only 13 of the 68 harvested animals was disappointing, but it is encouraging that some of those samples came during the second year without field assistance from ENR.

A number of issues affected the success of collecting biological samples during the 2008 hunt. The community hunt was hastily thrown together with little chance for a full discussion of the goals and objectives between local harvesters and ENR staff before personnel were flown out to the area. As the camp was being set up in the evening, caribou were observed. In the ensuing excitement amongst the harvesters the two animals killed were quickly butchered with just flashlights as a light source precluding the collection of biological samples.

The following day hunters went in two different directions, three caribou were harvested from a small group and 18 were harvested from a larger group. Due to low temperatures, carcasses in two different locations and only five people (including the author) available to butcher, the caribou carcasses began to freeze before being processed which precluded the collection of biological samples. Also when butchering a

number of animals, traditional harvesters keep all of the organs from the animals together collectively to make sure they are not lost in the snow; it is critical for biological sampling that all samples come from a known individual. This had not been effectively communicated to the harvesters before they began butchering. That evening the sampling protocol was explained in detail with the harvesters. There was a discussion on the reasons why samples were collected, what information could be gathered from the various samples, and the importance of keeping all samples with each individual animal.

The most successful training came on the final day of the harvest, after the evening discussion, and when all harvesters watched as the author butchered one caribou, taking appropriate biological samples. Harvesters then butchered the remaining nine caribou with the author checking their progress. The ten complete sets of biological samples were collected on day 3.

In retrospect, a tent could have been set up for sampling, with discussions and demonstrations occurring before the hunt. Carcasses would have been brought to the tent where they would have been butchered and sampled.

Some harvesters needed to see the process just once to become proficient at sampling because they successfully taught youth on a community caribou hunt the following year. The samples ENR received from the youth in 2009 were of exceptional quality.

The caribou that we had biological samples for were visually in generally good condition. Measures of fat indices and the disease and parasite analyses from the

samples supported the visual observations. The Riney fat index (KFI) from 13 individual caribou ranged from 11.54-79.27 (mean 48.2) with the lowest value from a kidney sample that was not fully complete. The KFI results from the Eskimo Lake community hunt held in 1995 were comparable ranging from 21.22-101.43 (mean 56.4) (Larter and Nagy 1996). The ratio of fat weight to kidney weight from 13 individual caribou ranged from 0.12-1.18 (mean 0.63), similar to the ratio of fat weight to kidney weight from the 1995 Eskimo Lake community hunt which ranged from 0.21-1.17 (mean 0.68). The percent marrow fat from 13 individual caribou ranged from 60.9-90.2% (mean 82.7). This could not be compared to Larter and Nagy (1996) because they did not collect leg bones from the harvest.

The cost for fecal plant fragment analysis (Hansen et al. 1976) to determine diet was prohibitive for this project. The samples were prepared and banked for future analysis. Also, due to the limited number of samples and cost of analyses, no samples were sent for elemental (contaminant), radionuclide, or pollutant levels analyses.

## **ACKNOWLEDGEMENTS**

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## **PERSONAL COMMUNICATIONS**

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Colin Munro, Helicopter Pilot, Dehcho Regional Helicopters, Fort Simpson, NWT

Chris Yarrow, Manager/Owner, Wolverine Air Ltd., Fort Simpson, NWT

Nic Larter, Manager, Wildlife Research and Monitoring Dehcho Region, Environment and Natural Resources, Fort Simpson, NWT

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