

**FINAL INTERIM PROJECT REPORT
TO THE NUNAVUT WILDLIFE MANAGEMENT BOARD**

1. NWRT Project #2-13-03**2. Title: Community-Based Caribou Health Monitoring on Baffin Island and the Melville Peninsula, Nunavut****3. Project Leaders:**

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*Funding under Project#2-13-03 was originally awarded to Debbie Jenkins (former Regional Biologist – Baffin Region, Department of Environment, Government of Nunavut).

4. Summary:

Caribou are a keystone species within the arctic ecosystem and are economically, socially, and culturally significant to the Inuit communities that rely on them. Since the mid-1990s hunters have been reporting a decline in caribou numbers on Baffin Island, and currently Inuit Knowledge and scientific studies indicate that caribou numbers on Baffin Island are critically low. The purpose of this project was to establish a hunter-based sample and information collection program that will contribute to the monitoring of caribou health and genetics in the Baffin Region of Nunavut. This program combines the knowledge and resources of hunters and scientists to monitor the occurrence of disease, parasites, and other health related parameters of caribou over time, and will add to our current understanding of the mechanisms of population decline and health related obstacles that may hinder recovery of this population. This information will be used to address key concerns from communities and wildlife managers about the health of their caribou and will inform effective management initiatives for caribou on Baffin Island.

5. Project Objectives:

The Caribou Health Monitoring Program is a community-based program established to assess the overall health and genetics of caribou in the Baffin Region of Nunavut, and is guided by the following objectives:

- 1) Establish baseline values for health related parameters and genetic variation of caribou.
- 2) Long-term monitoring to detect future changes.
- 3) Increase the capacity of community members, including youth, in research.

6. Materials and Methods:

Sample Collection – HTOs and hunters were given an overview of the project, sample/data requirements, and collection methods through consultations, public meetings, and other training and information documents. Harvesters were given information about the project and shown videos and/or pictures of visibly recognizable caribou diseases and trained to collect data and samples from their freshly killed caribou. While on the land, hunters carried sample kits with labels, data sheets, instructions, and sample bags. When caribou were harvested they collected the samples and information required. Basic samples included a datasheet to record information about the harvest, (including the hunters name, date of kill, harvest location, sex of animal harvested, and a section to provide notes about anything that the hunter observed as unusual or worth documenting), a skin sample (1x3" strip), fecal pellets (~20 pellets), blood (collected on filter strips), tissue (1" cube), and a backfat measurement (recorded as zero if none). Additionally, hunters may choose to submit the lower left hind leg with hoof (left metatarsal) and the lower jaw. Hunters received payment of up to \$115 for their samples. The kits were designed so that it would only take a few minutes for harvester to collect the required samples. Each sample kit was for one caribou only, however, multiple kits may have been used if multiple caribou were harvested. As well, the program was modified to allow hunters to submit samples when they return to the community without completing an entire kit. Based on feedback received, some hunters may not want to collect samples while out on the land, but may want to submit one or two of the samples after returning to their community. The new changes accommodated this request, and payment was provided to the hunter for individual samples. Hunters returned their collected samples to the Conservation Officers or HTO in their community for later shipment to the Department of Environment regional laboratory in Pond Inlet.

This program was initiated in 2008 as a collaborative effort between the GN, Department of Environment and the University of Calgary and was modeled on the Sahtu Wildlife Health Monitoring Program (Jenkins 2010). Protocols for sample collection were adapted from the Rangifer Health and Body Condition Monitoring: Monitoring Protocols, Level 1 (CARMA, 2008), to facilitate collection standards that are comparable to those other regions. The implementation of this program was largely coordinated with the HTOs and GN Conservation Officers in participating communities.

Sample Analysis – The samples and data collected can be analyzed to evaluate caribou health and obtain information about the population(s). Some analysis can be done in-house, but specific expertise and equipment at various specialized labs throughout North America will be required for others. The types of analysis that may be performed include, but are not limited to,: disease testing using blood collected

on filter strips and coarse visual assessment of skin, jaw, and metatarsal; general parasitology using fecal samples; diet composition using fecal samples; genetic analysis using skin samples; cementum age analysis using incisors on the lower jaw; morphological measurements using the lower jaw and metatarsal; and overall body condition through assessment of metatarsal/jaw bone marrow and other information provided by the hunters.

7. Preliminary Results:

A total of 183 sample kits (or samples from individual caribou) were returned to the GN-Department of Environment between 2009, when the project was initiated, and 2014. Hunters from nine communities on Baffin Island, the Belchers Islands, and the Melville Peninsula contributed samples to the project. See Table 1. Sample kits consisted of a combination of two or more individual samples (totalling 1079) from each caribou harvested. See Table 2.

Table 1. Number of sample kits returned by hunters in participating communities.

Community	Collection Year					
	2009/10	2010/11	2011/12	2012/13	2013/14	
Sanikiluaq	10	-	-	-	-	
Iqaluit	-	-	-	-	34	
Kimmirut	-	-	-	-	20	
Cape Dorset	-	-	-	-	14	
Pangnirtung	-	-	-	-	13	
Qikiqtarjuaq	-	-	2	16	16	
Pond Inlet	-	-	-	3*	19 (15*)	
Igloolik	-	-	2	-	10	
Hall Beach	-	-	-	-	24	
Total	10		4	19	147	183

*Individual samples were collected from hunters not part of sample kits

Table 2. Number of samples returned by sample type.

Sample Type	No.	Analysis
Data Sheet	137	General Harvest Information
Skin	147	Genetics
Blood on Filter Strips	135	Disease
Fecal Pellets	142	Parasites, Diet*
Lower Jaw	148	Age, Morphology
Lower Leg	150	Body Condition, Morphology
Tissue	79	Contaminants*, Parasites
Backfat Measurement	73	Body Condition
Additional Information (on backfat tag)	68	Sex, Reproductive Status, Body Condition

*Analysis has not been initiated. Samples will be archived for future work.

The samples and data collected are being analyzed to evaluate caribou health and obtain information about the population(s). Initially all harvest information provided on the data sheets was catalogued into a database and samples archived for their ongoing and future use. Samples were analyzed following the standardized protocols outlined in, 'Rangifer Health and Body Condition Monitoring: Monitoring Protocols Level 1 (Carma Network, 2008). This included taking morphological measurements from the lower jaw and lower left hind leg and assessing the metatarsal bone marrow as an index of body condition. Summarization of body condition, reproductive status, and harvest information is ongoing.

The Caribou Health Monitoring Program is currently providing training and employment one local persons as a laboratory technician to assist with preparing and analyzing samples. In this respect we hope to build technical capacity and further engage local residents in the project.

Further Analysis Underway:

Aging – Age classification is currently in-progress at the GN-DOE laboratory facility in Pond Inlet. Categories of maturity based on tooth eruption have been outlined by CARMA Network (2008). Classification of caribou into three (3) age groups; calf (less than one-year old), sub-adult (1-3 years old), and adult (≥ 3 years old), based on visual assessment of the cheek teeth of the lower jaw (ie. presence/absence of milk premolars and adult molars). A more accurate evaluation of the age of the individual harvested will also be determined by counting annuli in the cementum layer of incisors extracted from lower jaw samples. Tooth samples will be sent to Matson's Laboratory LLC, Montana, USA, for aging using a standardized cementum aging model for the species. Results from the cementum analysis can also be used to confirm classifications based on tooth eruption.

Genetics – Skin or tissue from all 183 sampled caribou were sent to Wildlife Genetics International (WGI), Nelson, B.C., for DNA extraction, profiling, and subsequent analysis. These samples will contribute to the database of genetic samples from across Nunavut and will be used to examine the genetic diversity and population structure of caribou on Baffin Island and surrounding areas. Genotyping was completed for 18 highly variable microsatellite markers which were chosen to allow for maximum overlap with recent caribou studies and published data, including those in Nunavut (Paetkau, pers. comm.). The results of this analysis is expected for late spring 2015.

Disease – Prevalence of disease can be monitored using a number of the samples collected through the project. At the coarsest scale of detection, samples are being visually inspected for macroscopic parasites, lesions, swellings, abnormalities, or other indicators of disease or parasitic infection. Hoof rot and Besnoitia, although not yet recorded in Baffin caribou, are among several infections that are being visually examined and monitored for.

In addition, serological analysis for Brucella, Toxoplasma, Neospora, Besnoitia, IBR, BVD, and PI3 is currently underway using the blood collected on filter strips. These infections were chosen for

monitoring based on consultations with wildlife veterinarians and caribou biologists, and known or historical occurrence in Baffin caribou or adjacent herds. There is particular interest to monitor for diseases with reproductive consequences, such as Brucellosis, which can have a catastrophic impact on infected herds. Specific expertise and equipment at various laboratories across North America are required to perform each individual analysis. The Canadian Cooperative Wildlife Health Center (Alberta Node), under the supervision of Dr. Susan Kutz, will pre-process the samples and coordinate with various specialized labs across North America. A total of 126 samples (10 in 2010, 20 in 2013 and 96 in 2014) have been sent for testing, the results of which are expected for late spring 2015.

Parasites – Again, at a coarse scale of detection, all samples are visually inspected for evidence of parasitic infection. General parasitological analysis of fecal samples are being performed to detect the presence of larvae, Nematodirinae eggs, *Monezia benedeni* eggs, fluke eggs, and other parasites contained within the fecal matter. Fecal testing is being conducted by the CCWHC at the University of Calgary under the supervision of Dr. Susan Kutz. To date, these tests were run for 20 fecal samples collected prior to the 2013/14 collection season, and testing of fecal samples collected during the 2013/14 season will begin in winter 2014. A compilation of the results are expected for late spring 2015.

8. Discussion/Management Implications:

The 2013/14 collection season was concluded in early June 2014 and a number of the sample tests and subsequent analysis are ongoing. Because few samples were submitted in 2009/10 to 2012/13, the results were delayed in order to obtain a larger, more representative distribution of samples from across Baffin Island and the Melville Peninsula. In 2013/14, additional media and communication efforts to raise awareness of the project led to an increase in hunter participation. As a result, over 80% of the total project sample submissions were received this year. A full compilation of the results, including those from samples collected in the early stages of the program (eg. 2009/2010) are projected for late spring 2015.

The combination of information that will be generated through this project can be used to help interpret existing abundance data and overall trends in population size. This will aid in developing effective management plans aiming to promote recovery of the population(s). Furthermore, ongoing collection and analysis will allow us to monitor long-term trends or future changes, and inform adaptive management strategies or initiatives.

9. Reporting to the Communities/Resource Users:

Interim reporting to communities and Baffin HTOs has occurred during scheduled consultation meetings (December 2013 and January 2014), and the exchange of project feedback from HTOs and participants has been ongoing. Further Interim updates on the project will be presented during the next Baffin caribou workshop (early November 2014). The final results, when available, will be reported back to the

communities where hunters, elders, and other local experts will have an opportunity to assist researchers in interpreting the observations and information obtained by sharing knowledge and combining IQ with science. In addition, non-technical public education documents will be produced to communicate the findings to the general public.

10. References:

CircumArctic Rangifer Monitoring and Assessment (CARMA) Network. 2008. Rangifer health and body condition monitoring: monitoring protocols, level 1.