



Qamanirjuaq Caribou (Photo by Frank Nuturasungnik)

Introduction

Caribou provide an important food resource for Northerners across the Arctic, and have been designated in the NCP blueprint as key species for monitoring contaminants in the terrestrial Arctic ecosystem. Two barren-ground caribou herds, one from the eastern (Porcupine) and one from the western (Qamanirjuaq) Arctic, have been designated for annual sampling.

Objectives

To determine levels of and temporal trends in contaminants in Arctic caribou in order to:

- Provide information to Northerners regarding contaminants in these traditional foods, so that:
 - ❑ They may be better able to make informed choices about food consumption. This includes providing information for health assessments and/or advisories as required.
 - ❑ Wildlife managers can assess possible health effects of contaminants on Arctic caribou populations.
- Further understand the fate and effects of contaminant deposition and transport to the Canadian Arctic.

Frank Nuturasungnik hunting Qamanirjuaq caribou.



Activities in 2012/13

Porcupine caribou: Samples collected from 20 caribou by Environment Yukon staff as part of a Yukon Government initiative working with hunters in Old Crow to study body condition in the Porcupine caribou herd. All kidneys have been analyzed and other tissues archived.

Qamanirjuaq caribou: The usual hunting effort in Arviat was unsuccessful this year as a result of changes in the herd's migration and poor weather. However, samples from 50 Qamanirjuaq caribou from the spring of 2012 were acquired from a GNWT project studying body condition in that herd. Twenty samples from this collection were chosen to fulfill the 2012 requirement and are currently being analyzed.

Data Analysis: Although kidneys were analyzed for 34 elements, only results for 7 elements of concern were statistically analyzed in detail (arsenic, cadmium, copper, lead, mercury, selenium and zinc). Results from the Qamanirjuaq Caribou are not yet available.

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Contaminants in Arctic Caribou

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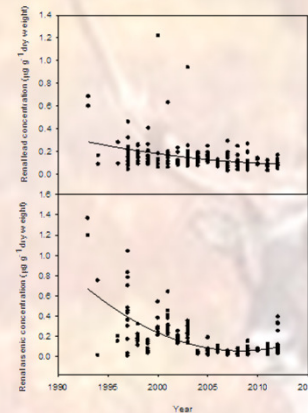
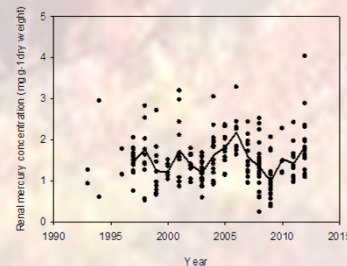
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Key Messages

- Levels of most elements measured in caribou tissues are not of concern, although kidney mercury and cadmium concentrations may cause some concern for human health depending on the quantity of organs consumed. Caribou meat (muscle) does not accumulate high levels of contaminants and is a healthy food choice.
- Lead concentrations in the Porcupine and Qamanirjuaq herds are declining over time, likely reflecting reductions in lead in the environment due to the prohibition of the use of leaded gasoline in Canada.
- Over the long term, mercury in the Porcupine caribou is stable, but appears to undergo a cycle. More research is required to determine drivers of the cycle and mercury dynamics within the caribou food chain.

Temporal Trends

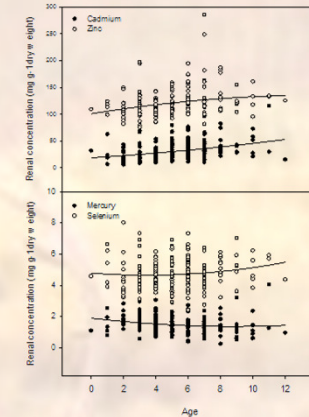
Year of collection was negatively correlated with renal arsenic and lead in male, fall-collected Porcupine caribou. However, the absolute declines are small and may reflect an increased ability for laboratory detection of smaller amounts of these elements as well as an increase in precision and accuracy of measurement rather than actual declines in the caribou over time. Both arsenic and lead levels measured prior to 2004 were more erratic than more recent measurements. Renal lead concentrations in these caribou may also be affected by the reduction of the use of unleaded gasoline after the prohibition of leaded gasoline in Canada in 1990.



The inter-annual variation seen in mercury levels in the Porcupine caribou herd seems to be at least somewhat cyclic and is likely affected by atmospheric patterns of deposition of Hg as well as local environmental conditions affecting Hg concentrations in winter forage in conjunction with forage availability and selection by the caribou. This includes timing of green-up in the spring and the subsequent switch to lower-mercury forages and could therefore potentially be impacted by a changing climate.



Porcupine Caribou (Photo by Yukon Government)



Effect of Age

Renal element concentrations in male Porcupine caribou, collected fall, 1993-2012. Cadmium, zinc and selenium were positively correlated with age while mercury was negatively correlated with age ($p < 0.05$).

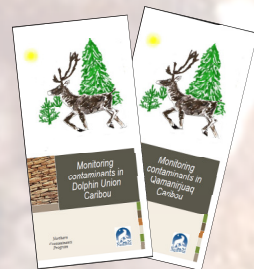
Communications

2012/13

- NCP Science Event, Whitehorse: Poster presentation
- Biodiversity Forum, Yukon College, Whitehorse: Poster presentation
- Wood St. School, Whitehorse: Lecture given to Experiential Science class
- CBC, CKRW and CHON FM radio, Whitehorse: Interview
- Yukon News, Whitehorse Star: Interview
- CBC Television News Northbeat: Interview

2013/14

- NCP Results Workshop, Ottawa
- Community meetings in Aklavik, Inuvik
- Yukon Environment Forum: Poster
- Development of brochures on Contaminants in the Qamanirjuaq and the Dolphin & Union Caribou herds.



Conclusions

Levels of most elements measured in the Porcupine caribou herd were not of concern toxicologically, although renal mercury and cadmium concentrations may cause some concern for human health depending on the quantity of organs consumed. Yukon Health has advised restricting intake of kidney and liver from Yukon caribou, the recommended maximum varying depending on herd (e.g. a maximum of 32 Porcupine caribou kidneys/year). The health advisory confirms that heavy metals are very low in the meat (muscle) from caribou and this remains a healthy food choice.