

# Research Bulletin

## NWT Cumulative Impact Monitoring Program

### How do parasites impact caribou health and population dynamics?

#### Summary

Traditional and scientific knowledge teach us that parasites and insect harassment can impact caribou behavior (including foraging) and energy use. We developed a caribou energy-population model to understand how internal parasites, warble flies, and insect harassment could impact caribou body condition and population dynamics. We also worked with Tłìchò Government's Ekwò Nàxoèhdee K'è (ENK, also called 'Boots on the Ground' – see NERB #50) to help improve our methods for monitoring caribou health in the field.

#### Why is This Important?

Caribou are an extremely important source of cultural and physical well-being for Indigenous communities across Canada. In the NWT, Indigenous communities are concerned about how parasites impact the health of caribou.

#### What Did We Do?

We built a predictive caribou energy-population model that simulates energy intake (foraging), energy use (growth and activity), survival, and reproduction. We used the best available estimates for barren-ground caribou, with a focus on the Bathurst herd. Working with Tłìchò Elders and the ENK team, we also improved non-invasive health monitoring field guides and fecal sampling methods for monitoring caribou health and body condition on the land.

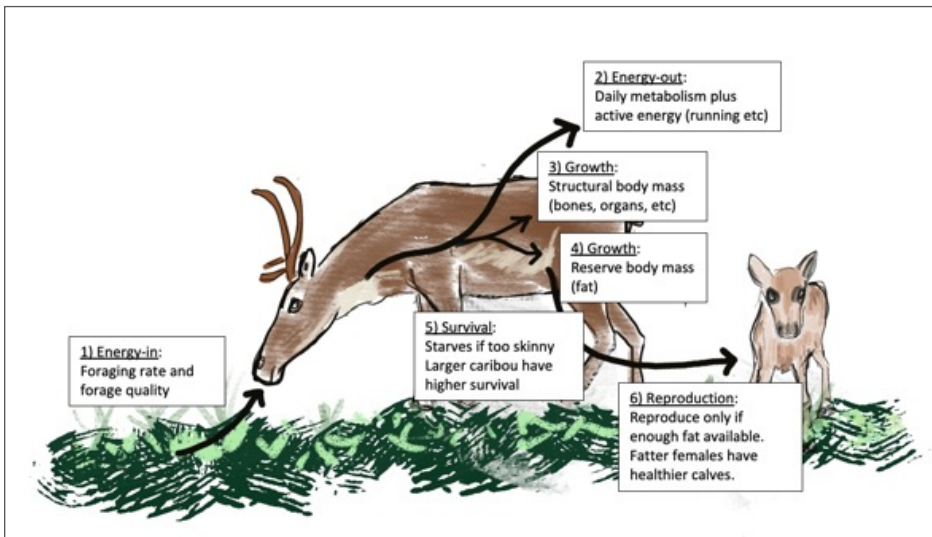


Diagram of the basic energy-population model showing energy in, energy out, survival and reproduction.



## What Did We Find?

- Insects, warble flies, and nematodes (roundworms) may have small impacts on caribou on their own or at low numbers. When combined, the cumulative impacts are enough to reduce body condition and may contribute to population declines.
- Using 1980-2020 weather data from the Bathurst herd's range to estimate insect activity and parasite development rates, parasites and insects likely contributed to population declines.
- Non-invasive monitoring of health by ENK provides information on current health status and parasite numbers which can be used to improve model results.

## What Does This Mean?

As climate warms, insect harassment and parasite growth rates are expected to increase. These impacts, along with changes in the quantity and quality of caribou forage throughout the year could lead to lower body condition and impact population size.

Combined monitoring efforts help prioritize:

- Health indicators: Survival and reproduction is linked to fat built up in summer and fall. Observations of body condition can provide an early warning for future population trends.
- Forage quality and quantity: The energy costs of insects and parasites can be overcome if caribou forage is abundant and of high quality.
- Other signs of disease: The parasites included in our models are common and are not a risk for people eating caribou meat. Harvesters should report other observations for tracking disease and to ensure food safety.

## What's Next?

We are continuing our partnership with ENK to identify threshold levels for indicators of caribou health using hunter-based sampling, field observations and Traditional Knowledge.

## For More Information

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NWT Cumulative Impact Monitoring Program (CIMP214)

Peacock, S. J., F. Mavrot, M. Tomaselli, A. Hanke, H. Fenton, R. Nathoo, O. A. Aleuy, J. Di Francesco, X. F. Aguilar, N. Jutha, P. Kafle, J. Mosbacher, A. Goose, S. J. Kutz, E. H. T. Org, K. A. Assoc, and O. H. T. Com. 2020. *Linking co-monitoring to co-management: bringing together local, traditional, and scientific knowledge in a wildlife status assessment framework*. ARCTIC SCIENCE 6:247–266.



A page from the caribou health field guide which is being used by ENK on the barrenlands. The guide focuses observations on four areas that can provide important health information.

NWT CIMP is a source of environmental monitoring and research. The program coordinates, conducts and funds the collection, analysis and reporting of information related to NWT environmental conditions. If you're conducting environmental monitoring and research, consider sharing your information with northern residents and decision-makers in a Bulletin.