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NWT Environmental Research Bulletin (NERB)

NWT Cumulative Impact Monitoring Program (NWT CIMP)

A source of environmental monitoring and research in the NWT. The program coordinates, conducts and funds the collection, analysis and reporting of information related to environmental conditions in the NWT.

NWT Environmental Research Bulletin (NERB)

A series of brief plain language summaries of various environmental research findings in the Northwest Territories. If you're conducting environmental research in the NWT, consider sharing your information with northern residents in a bulletin. These research summaries are also of use to northern resource decision-makers.

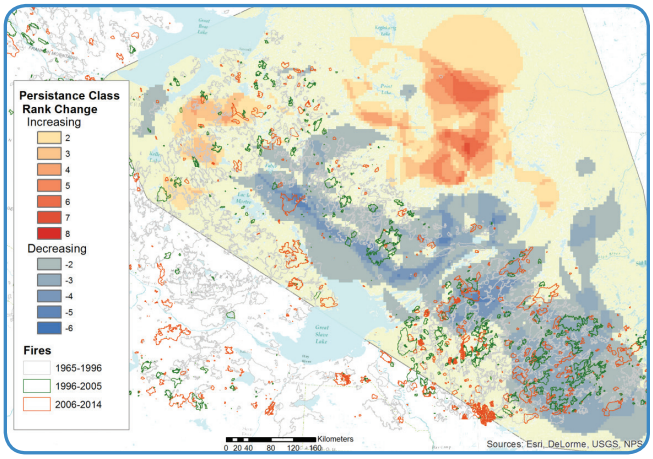
Warmer temperatures and changing snowpack structure: what this means for the Bathurst Caribou Herd

This research looked at how the yearly snowpack is changing, and how it may influence the well-being of the Bathurst caribou herd.

Research shows that warming temperatures in the North may be causing early snow melts, which can cause thick, icy layers of snow crust to form. This can impact the health of the Bathurst caribou herd because it makes it difficult for them to access their main food source, lichen. An icy snow crust also allows wolves to travel more easily, improving their chances when hunting caribou.

Why is this research important?

The Bathurst population fell to about 19,800 caribou in 2015, a 96% decline from peak numbers in 1986 estimated at 470,000. This is of special concern to northern Aboriginal peoples, whose culture and way of life is intimately tied to caribou.



Changes in winter range over time. This map compares areas where the collared Bathurst caribou usually foraged during the winters of 1996-2005 (blue) compared to areas where they usually foraged between 2006 and 2014 (red).

Studying ways in which climate change contributes to the decline of caribou, along with other factors, can help us understand how this affects caribou and inform caribou conservation and management strategies.

What did we do?

'Globsnow' satellite data covering the Bathurst herd winter range was collected and used to analyze snow cover thickness. Field work was conducted out of Wek'weètì, including a snow survey, to verify satellite data. Local trappers were interviewed to determine the frequency of ice lenses/crusts.

To determine how snow characteristics may affect the movement and health of the Bathurst population, these results were compared to data collected from collared caribou through a partnership between the Tłı̨chǫ Government and the Government of the Northwest Territories. They have tracked the migratory pattern of the herd since 1996.

What did we find?

- Analysis of remotely sensed snow cover and caribou collar data showed caribou prefer areas with thick layers of snow.
- With warming global temperatures, trappers in Wek'weètì have noticed an increasing number of ice lenses and crusts in the snow pack in the last decade. A recent snow survey showed a range of 10-15 centimetres in thickness of the snow crust.
- There have been migratory changes of the Bathurst herd since 2006. In winter, the caribou have shifted from the Wek'weètì area towards the tree line and into the tundra of the Coppermine River basin.

What does this mean?

Caribou spend the winter months searching for lichen and prefer areas with deeper soft snow, perhaps due to greater plant productivity or protection from wolves. Crusted snow or ice causes caribou to expend more energy to break through to access lichen.

Caribou may be migrating further north during the winter to avoid areas with crusted snow or ice; however, there is a limit to this avoidance as tundra snow is also very dense. The northward shift of Bathurst caribou in winter represents a fundamental change in their annual migration and seasonal distribution. Changes in snow/ice crusts are one possible factor that may influence this change.

What do we do next?

There is a knowledge gap about where and how drastically snow structure is changing. This gap can be addressed by analyzing satellite data, and data from weather stations throughout the Bathurst herd range. This information, along with further research determining the increase in caribou's energy expenditure, may assist our understanding and management of the Bathurst herd.

Caribou of the Bathurst herd south of Wek'weètì, NT, April 2014 (Credit: M. English)

Recommended reading

Contact the researcher for a complete list.

Arseneault, D. 2001. Impact of fire behavior on post-fire forest development in a homogeneous forest landscape. Can. J. For. Res. 31, 1367–1374.

Cohen, J.L., J.C. Furtado, M.A. Barlow, V.A. Alexeev and J.E. Cherry. 2012. Arctic warming, increasing snow cover and widespread boreal cooling. Env. Res. Lett. Vol 7 (1) 014007 (8pp)

Environment Canada 2015. http://www.ec.gc.ca/sc-cs/Default.asp?lang=En&n=A5F83C26-

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