

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.

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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.

Remote Sensing of Vegetation on the Bathurst Caribou Herd Range

The Bathurst barren-ground caribou herd is a critically important resource for northerners. The herd has been in decline for decades. To help understand what impact changes to their habitat have had on this decline, we analyzed satellite imagery to detect changes in vegetation in the Bathurst caribou herd range.

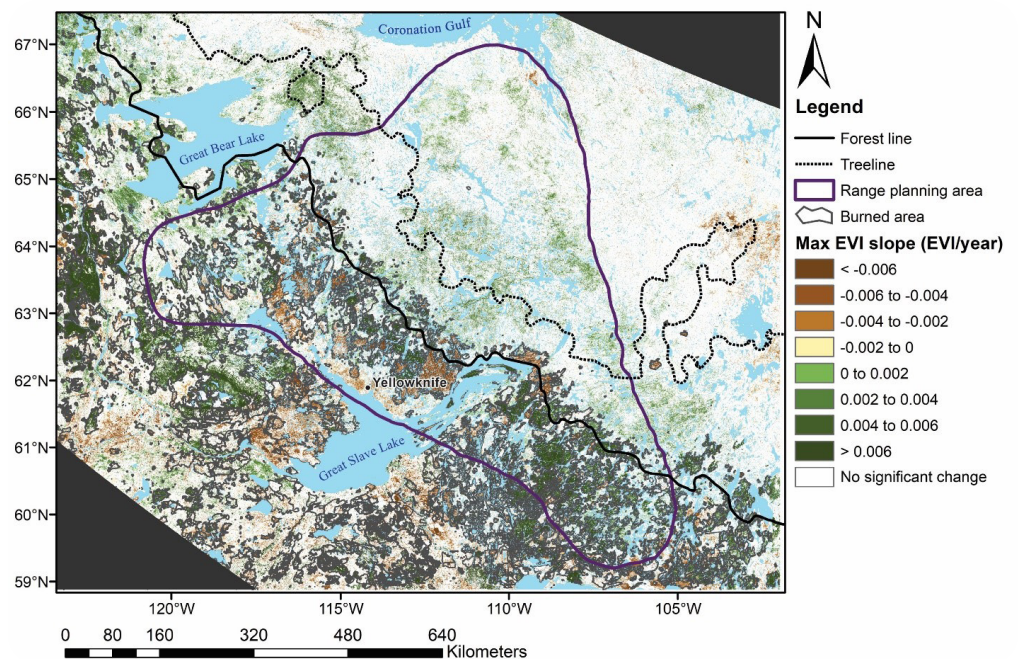


Figure 1: Trends in annual vegetation productivity from 2000-2017. Green indicates areas where vegetation productivity increased and brown indicates areas where it decreased. Darker shades indicate stronger trends. White areas did not experience any significant trends.

Why is this research important?

The Bathurst caribou herd has declined by 98% since 1986. Caribou are a critical resource for northerners and it is important to understand the factors that have contributed to the population decline. Changes in vegetation across the herd's range are one possible reason for the decline. Satellite imagery is an effective tool for monitoring vegetation change across large areas.

What did we do?

We analyzed 18 years of satellite data collected by NASA (2000-2017). We used the data to map peak plant production, growing season length, and total vegetation productivity for each year. We then analyzed the yearly maps to determine where, and by how much, these variables changed over time.

What did we find?

- Areas below the treeline experienced a wide variety of change due to the influence of forest fires both in recent years and further in the past. In contrast, tundra regions beyond the treeline mostly showed increases in productivity.
- Areas beyond the treeline mainly experienced a longer growing season. This was due mostly to an earlier spring in many years, rather than a later fall.
- As shown in Figure 1, nearly half of all areas beyond the treeline experienced a significant increase in the total annual productivity.

What does this mean?

Vegetation change on the herd's winter range is closely linked with forest fire dynamics, but changes beyond the treeline (particularly on the calving and summer ranges) may be related to:

- climate warming,
- a reduction in grazing due to significant declines in caribou numbers, or
- a combination of the two.

What do we do next?

Understanding what these changes mean 'on the ground' is key to understanding their impacts on caribou. We are visiting sites where the greatest amount of change was observed, surveying their ecosystems, and sampling trees and shrubs to analyze their yearly growth rings. The results will be used to determine if increases in tree and shrub growth are responsible for the changes detected by satellite.



Large portions of the Bathurst caribou herd's summer range, like this landscape near Big Lake, have experienced significant increases in vegetation growth. Work is underway to determine if this is due to increased shrub growth as a result of climate warming. (Photo: R. Danby)

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