

Research Bulletin

NWT Cumulative Impact Monitoring Program

How does climate affect barren-ground caribou mortality and when?

Summary

Survival (and its opposite, death or mortality) is central to understanding why caribou herds grow or decline. We analyzed collar data from over 1,400 caribou across six NWT barren-ground herds (1996-2023) to understand when, where, and why caribou die, and how survival relates to weather, movement, and health. Survival is shaped by seasonal weather conditions and individual movement behaviors, with mortality patterns that vary across herds and shift over time.

Why is This Important?

Understanding what drives caribou mortality is essential for effective management. This research uses long-term data to directly address concerns raised by community members and Indigenous governments about climate change, road access, and changing environmental conditions.

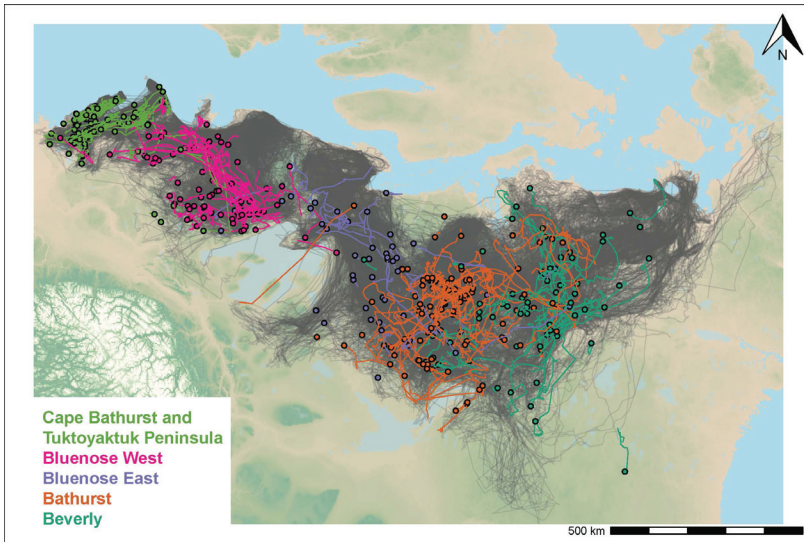
What Did We Do?

We compiled collar data from six herds collected by GNWT into a single standardized dataset, that included each individual's movement trajectory and fate (whether they lived or died). We developed research questions collaboratively through conversations with North Slave Métis Alliance members, and we prioritized analyses where community concerns, researcher questions, and available data converged.



A collared caribou bull mortality. (Credit: A. Kelly, GNWT)





Movements of collared barren-ground caribou, 1996-2023. Colored lines show each animal's movements in its final season of life, with points marking where they died.

What Did We Find?

- Cow seasonal mortality patterns have shifted in recent years toward a more pronounced late winter/spring peak.
- Harsh weather affects cow survival differently by season: warmer winters and shallow snow decreased overwinter mortality, while extreme summer heat and insect harassment increased summer/fall mortality.
- Caribou that moved less and were more isolated were more likely to die, and movement declines were detectable in the location data weeks before death.
- Neighboring herds did not always respond the same way to the same conditions. For example, Bluenose-East showed opposite survival responses to its neighbors, highlighting mortality drivers vary even across adjacent herds.

What Does This Mean?

Patterns like shifting seasonal mortality and relationships with weather only emerge from decades of data across multiple herds, underscoring the value of long-term monitoring. Reduced movement and spatial isolation predict mortality weeks in advance, which could allow managers to identify and investigate mortalities sooner from collar data which is particularly valuable given how long it can take to reach mortality sites.

What's Next?

Our climate-survival relationships have been integrated into a caribou population simulation model (CIMP 207 CBGC ALCES), providing more realistic projections of how herds may respond to future environmental conditions. Survival estimates will also be incorporated into a separate population model evaluating the impacts of predator control programs on Bathurst caribou recovery.

For More Information

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Beaupré, C. & Gurarie, E. (2026). Comparative analysis of factors affecting caribou survival patterns. [https://nwt.discoveryportal.enr.gov.nt.ca/geoportaldocuments/2025-26%20-%20Deliverable%20-%20Technical%20Report%20-%20SUNY\(Beaupre\)%20-%20CIMP241-BG%20-V1.0.pdf](https://nwt.discoveryportal.enr.gov.nt.ca/geoportaldocuments/2025-26%20-%20Deliverable%20-%20Technical%20Report%20-%20SUNY(Beaupre)%20-%20CIMP241-BG%20-V1.0.pdf)

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