Fate of the Caribou: Studying Caribou and Climate, with Communities

Article · January 2024

CITATIONS
0

READS
12

5 authors, including:

Anna Brose
SUNY College of Environmental Science and Forestry
13 PUBLICATIONS **12** CITATIONS
SEE PROFILE

Eliezer Gurarie
SUNY College of Environmental Science and Forestry
115 PUBLICATIONS **5,660** CITATIONS
SEE PROFILE

Chloe Beaupre
SUNY College of Environmental Science and Forestry
8 PUBLICATIONS **4** CITATIONS
SEE PROFILE

Xàgots'eèhk'ǫ Journal , Vol. 2, Issue 2, (Winter 2023/2024)
https://xagotseehkojournal.com

Fate of the Caribou: Studying Caribou and Climate, with Communities

Anna L. Brose[1]*; Megan Perra[1]; Anne Gunn[2]; Eliezer Gurarie[1]; Chloe Beaupre

We sat halfway up a ridge, soggy with rain and cross-eyed from staring at the same bushes for three days. The valley below us, brimming with caribou only a few years ago, was empty. Doing our best to keep dry, we waited. Napping in shifts, we watched. But the valley floor was still except the rain-swollen river churning past.

On the fourth day of waiting to see caribou, I was dozing. Sick of wet feet, cranky because I'd eaten all the blueberries in the radius of our knoll, a nap seemed like a good way to pass the time.

Glassing for caribou on a tundra-covered ridge.

But just as my eyes closed, my friend grabbed my arm, so suddenly and forcefully my first thought was that he was having a heart attack. Alarmed, I followed his gaze and saw a bull caribou running – no, sprinting – down the middle of the valley. My friend scrambled for his glasses while dad and I tracked the caribou through binoculars. The bull didn't slow. Appearing in between thickets of willow, hounded relentlessly by a cloud of mosquitoes, the bull ran so hard his tongue lolled. The bull ran on and disappeared, just as silently as he had come, a ghost. Had he realized we were there or had something else – a distant sound or smell alerted him?

Six days of watching, waiting, praying, and the memory of the running bull was the closest thing we had to seeing caribou. Looking down the valley as we broke camp, I wondered where that bull was going. Caribou readily alter their movement and migration patterns, and a valley full of caribou one year may be vacant the next. But as caribou, landscapes, and their climate change, how will our relationships with caribou be altered?

Already, we see shifts in caribou movements and populations. Some herds that were once as numerous as the stars now dwindle. Their food is changing as warmer temperatures encourage more shrubby growth, but does that shade out the lichens? And what does that do to the mushrooms that caribou so avidly eat? We have already seen how shorter winters alter the timing of spring migration and when caribou reach their calving grounds (Gurarie et al., 2019). Just as the Tłı̨chǫ elders have been telling us, we are seeing the cascading effects of climate change, industrial development, and roads affecting the way caribou move, live, and die.

We are a group of researchers committed to working with Indigenous partners to investigate changes in caribou, grounded in concerns and observations from Elders, hunters, and Knowledge Keepers. With experts on caribou cycles, migrations, soundscapes (what caribou hear), and vegetation mapping using satellites, we use science to further our collective understanding of on-the-ground observations. Our project, called the Fate of the Caribou, while based at a U.S. university, is closely tied to what we have learned from discussions with the Wek'èezhìı Renewable Resources Board, Tłı̨chǫ Government, Government of the Northwest Territories, and North Slave Métis Alliance. We seek to understand shifts in caribou movements, their survival, and how they use their landscapes in the context of the communities that live with caribou.

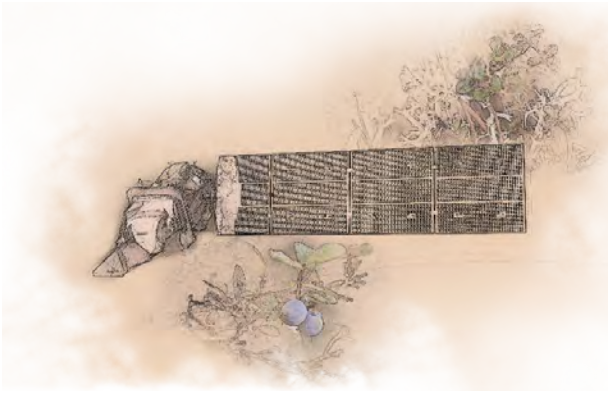
In the Northwest Territories, Elders and hunters know several large diamond mines and the associated roads are disrupting caribou movements and migration. One of our team members is partnering with the Wek'èezhìı Renewable Resources Board and North Slave Métis Alliance to use audio recorders to see how sound disturbance from mining traffic is altering caribou behavior and what the caribou hear.

Roads are also a concern for caribou in Alaska. In Alaska, locals are concerned that a new mining road is causing caribou to not migrate where and when they used to. We are using advanced mapping and computer models to demonstrate those changes, and to quantify how the road is affecting caribou survival. Using caribou movement data, we can show that caribou avoid crossing built-up roads, and may be more susceptible to predation or other mortality events when their migration stalls at roads.

An acoustic recording device, mounted to a post, can be used to monitor sound disturbance (i.e., trucks, aircraft) without disrupting caribou.

We have heard that warming temperatures and melting permafrost are leading to changes in the plant communities that caribou rely on. So we are using satellite imagery and computer programming to map those changes at a continental scale across northern Alaska and Canada. Using those maps, we can explore how caribou are responding to changes in forage availability.

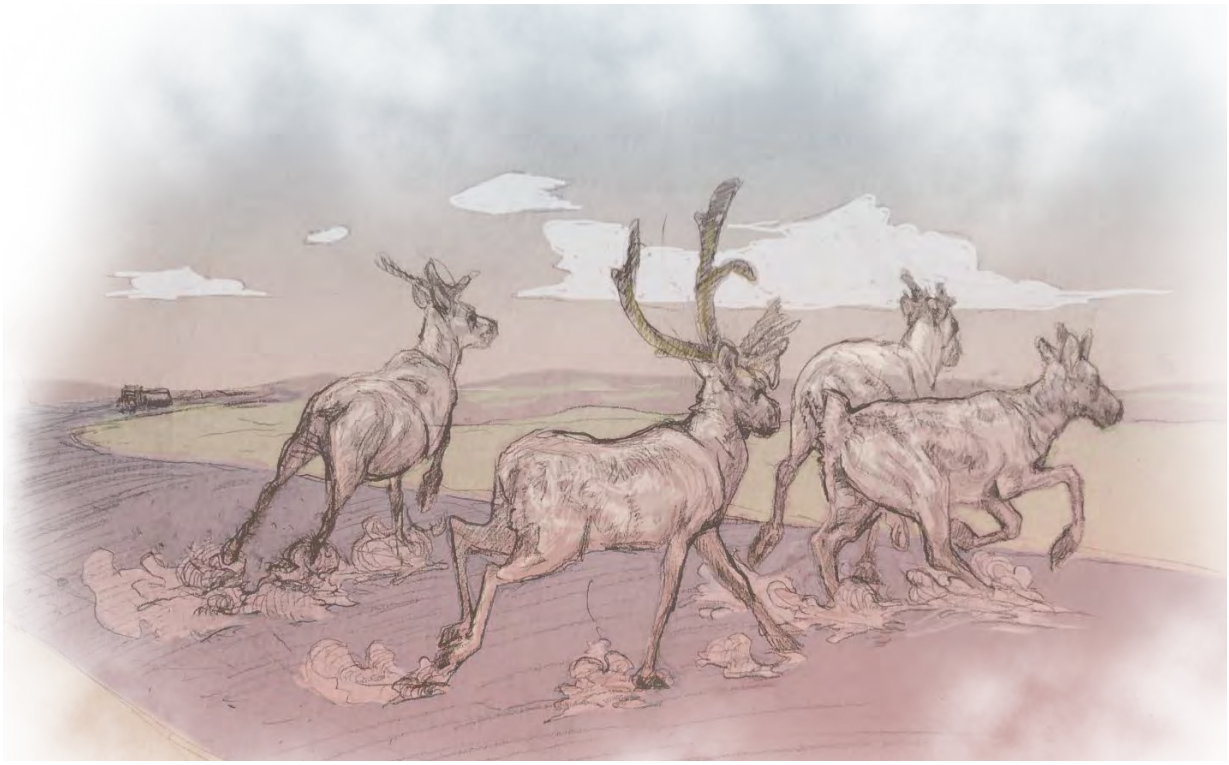
Our partners in the Northwest Territories and Nunavut have raised the alarm that earlier springs and more frequent rain-on-snow events are making it hard for female caribou to migrate to their calving grounds. We are using migration data and weather records to better understand this relationship across the years.



Images taken by the Landsat satellite, drones, and ground surveys can be used jointly to map changes in vegetation across large areas and times.

Understanding the relationships between caribou and their habitat is important from a scientific perspective, so governments and land stewards can make informed decisions. But at the Fate of the Caribou project, we know that those relationships go beyond government reports, and have real impacts on lives, relationships with the land, and livelihoods. We therefore ground our research in the knowledge that caribou are not wildlife to be studied, but the beating heart of the North.

To learn more about our team and work, email us, and check out FateOfTheCaribou.esf.edu.



Caribou cross a road as a haul truck approaches. Sketch by Megan Perra.

Anna Brose: *Anna grew up alongside caribou in Alaska before receiving a bachelor's in Wildlife Biology at Colorado State University. With extensive field experience across the United States, she has worked for several state and federal agencies in various wildlife research positions. She completed her Master's in Wildlife Ecology at the University of Wisconsin - Madison in 2021, where she studied elk habitat use in northern Wisconsin. Anna is a self-taught science communicator and illustrator, and is a wildlife artist on the side. She is affiliated with the State University of New York College of Environmental Science and Forestry.*

Megan Perra: *Megan is a PhD student in the Gurarie lab interested in how biological cues like soundscapes and interspecific vocalizations influence movement decision making in caribou. More simply: Do caribou eavesdrop on the soundscape to help them find good habitat patches? She completed her masters at the University of Alaska Fairbanks, where she studied caribou auditory physiology and the soundscapes of the Arctic Coastal Plain. She is affiliated with the State University of New York College of Environmental Science and Forestry.*

Anne Gunn: *After university in the UK and Ireland, Anne came to Canada to work in the Arctic – a dream realized in the 1970s. She eventually settled down with the Government of the NWT (1979-2006) as the regional biologist in the central Arctic and then the Caribou Biologist based in Yellowknife. Then by 2006, Anne continued with caribou but for aboriginal co-management boards and councils including the Wek'èezhìi Renewable Resource Board and Kivalliq Inuit Association. She is affiliated with the CircumArctic Rangifer Monitoring and Assessment Network.*

Elie Gurarie: *Dr. Elie Gurarie is a professor of quantitative wildlife ecology in the Department of Environmental Biology at SUNY - College of Environmental Science and Forestry. Dr. Gurarie develops novel approaches to understanding complex ecological processes, with a particular interest in animal movements, behaviors, space-use, cognition and links to populations and demography. After extensive field experience studying marine mammals in the North Pacific and wolves in Finland (and dabbling in dozens of other systems), it is now the Fate of the Caribou that keeps him up at night.*

Chloe Beaupre: *Chloe is a PhD student with Dr. Gurarie who's fascinated by animal movement behavior and survival. She's sleuthing the who, what, where, when, and why of caribou deaths in boreal and barren-ground caribou. She holds a dual masters (Master in Environmental Management, Master of Science in Ecology), from Western Colorado University, where she studied a slew of Colorado's ungulate species.*

REFERENCES

Gurarie, E., Hebblewhite, M., Joly, K., Kelly, A. P., Adamczewski, J., Davidson, S. C., Davison, T., Gunn, A., Suitor, M. J., Fagan, W. F., & Boelman, N. (2019). Tactical departures and strategic arrivals: Divergent effects of climate and weather on caribou spring migrations. Ecosphere, 10(12), e02971. https://doi.org/10.1002/ecs2.2971