



ERYSIPELOTHRIX RHUSIOPATHIAE ON ELLESMERE AND AXEL HEIBERG ISLANDS

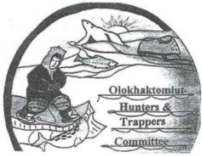


COMMUNITY-BASED MUSKOX AND CARIBOU HEALTH MONITORING ACTIVITY UPDATE – JUNE 2024

PARTNERS



Kugluktuk Angoniatit Association



Olokhtomiut Hunters and Trappers Committee



Ekaluktutiak Hunters and Trappers Organization



WHAT ARE WE DOING?

In the summer of 2021, a documentary film crew alerted us about an abnormal number of muskox carcasses (recent deaths) on the Fosheim Peninsula of Ellesmere Island, Nunavut. Testing showed that these dead animals contained the bacterium *Erysipelothrix rhusiopathiae*. This same pathogen was also linked with mass mortality events on Victoria and Banks Islands between 2010 and 2014, and on Prince Patrick Island in 2017.

Since the summer of 2021, and in partnership with the Government of Nunavut (GN), we have done yearly sampling (and re-sampling) of muskox mortality sites, feces of wolves, foxes, and lemmings, bird casts (stomach contents), insects, soil, water, vegetation, and other dead animals on Ellesmere Island. In 2022 and 2023, GN wildlife biologists did multiple flights over Ellesmere and Axel Heiberg Islands to observe the size of the disease outbreak. Through this work, we are beginning to build a better understanding of why *Erysipelothrix* is having such a severe impact on muskoxen, how it is surviving in the environment, and what other animals may be important in spreading it.

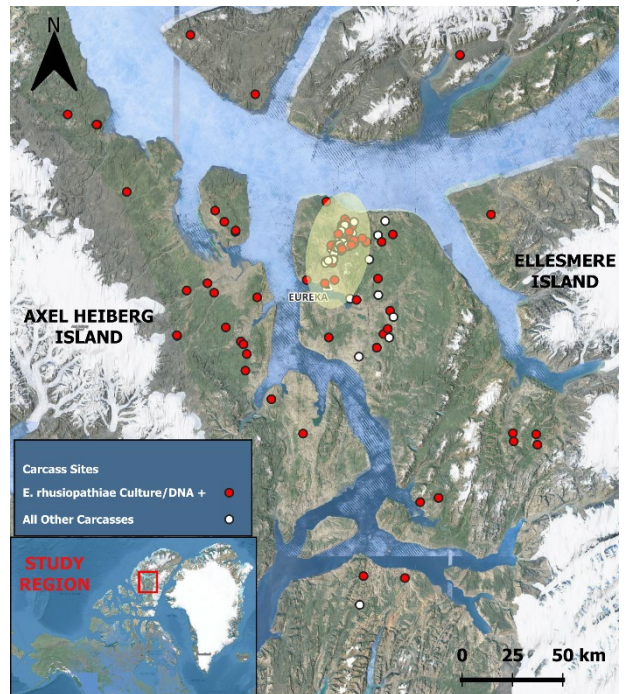


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WHAT ARE WE FINDING?

Over the past three field seasons, we have documented 133 muskox carcass sites across central Ellesmere and eastern Axel Heiberg Islands. We have found *E. rhusiopathiae* in 64/74 (86%) of the muskoxen we were able to test tissues from. Our work sampling bones and soil has shown that *Erysipelothrix* can survive at carcass sites for at least **2 years** after a muskox dies. The soil areas where animals are decaying have the highest amounts of *Erysipelothrix*; detecting it is less likely the farther one moves away from a carcass site.

We are also beginning to better understand the role of predators and scavengers in this



Map of the Fosheim Peninsula region of central Ellesmere Island. Points mark documented muskox carcass sites with color indicating whether live *E. rhusiopathiae* has been recovered from associated tissues or soil. The yellow oval outlines the approximate region where land-based investigations have occurred since 2021.

Developed with QGIS, version 3.36.3 'Maidenhead'
Map Data: Google, Satellite Imagery: TerraMetrics.

disease system. So far, we have grown live bacteria from the feces of wolves, foxes, and birds (species not determined). In wolves, 91% of 46 samples tested contained *Erysipelothrix*. The stomach contents from predator/scavenger birds have also tested positive (53% of 19 tested). We have also found these bacteria in maggots from muskox and wolf carcasses, but not in mosquitoes or other flying insects.

At this point, we are not sure what role/s other species play in spreading *Erysipelothrix* to muskoxen; however, we have found it in many other species and there are many ways it could be maintained in the Arctic. We are also starting to research whether other agents may be playing roles in muskoxen getting sick from *Erysipelothrix*.



Muskoxen grazing on Ellesmere Island in August 2023.

In 2022, we saw very few muskoxen and no muskox calves at our study site near Eastwind Lake on the Fosheim Peninsula, Ellesmere Island. In 2023, we observed some muskox calves and only found two adult muskoxen that had recently died. While these findings bring hope that the deaths from *E. rhusiopathiae* may be slowing in this region, the full effects of this disease on the muskox population are

not yet known. We will return to the Fosheim Peninsula in July and August 2024 to continue to study how *E. rhusiopathiae* is maintained and spread in the Arctic environment. We have also partnered with Parks Canada to assess whether this pathogen is present in Qausittuq and Quttinirpaaq National Parks, the nearest national parks in the region.

WHY DOES THIS WORK MATTER?

This collaborative research will help us understand disease threats to muskoxen and other species in the Arctic. It will also give information on whether the animals are safe to eat. The mass mortality events linked with *E. rhusiopathiae* on Banks and Victoria Islands were destructive to muskox populations. On Banks Island, numbers fell from 37,000 animals in 2010 to 11,000 in 2019. Island-wide numbers on Victoria Island are more difficult to assess due to surveying differences across the Northwest Territories and Nunavut boundary, but both territories have reported consistent declines over the past 15 years. All commercial harvesting activities on Banks and Victoria Islands have been suspended, and harvesters are having to travel farther to find animals.

We hope that by thoroughly investigating this disease outbreak we will be able to better understand and forecast i) how *Erysipelothrix* could affect muskox herds that haven't been exposed to it before, and ii) how herds already exposed may recover. We hope our results will inform ways that Arctic communities, governments, and other co-management agencies can act to minimize the effects of this disease on muskox populations in the future. Developing management strategies that will ensure the continued health of muskox herds in the Canadian Arctic is a top priority for the scientists, organizations, and communities involved in this project.



In 1am sunlight, a herd of muskoxen graze in a cottongrass meadow on Ellesmere Island in August 2023.

THANK YOU TO ALL THOSE WHO MAKE OUR RESEARCH IN THE ARCTIC POSSIBLE

For over 10 years, the Kutz Research Group, the communities of Ulukhaktok, Kugluktuk and Cambridge Bay (Ekaluktutiak), the Government of Nunavut, the Government of the Northwest Territories, and Canada North Outfitting, have been partnering to investigate and monitor wildlife health on Victoria Island and the adjacent mainland. We thank all our collaborators and funders. Please contact Susan Kutz skutz@ucalgary.ca if you have any questions about this program.

