Estimating the distribution of forage quality for caribou and ptarmigan across Tongait KakKasuangita SilakKijapvinga, Nunatsiavut, Labrador

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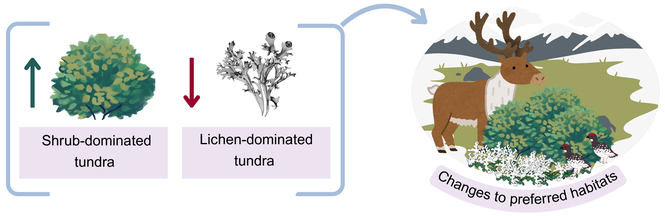
REFERENCES & MAPS

Scan the QR code to access the list of references and larger-sized maps. To get in touch with the authours, contact **Nhu Le** at nqle@uwaterloo.ca

1 CONTEXT



Tongait KakKasuangita SilakKijapvinga (Torngat Mountains National Park; TMNP; Figure 1) in Nunatsiavut, Labrador is home to the tuttuk (caribou; *Rangifer tarandus*) and aKiggik (ptarmigan; *Lagopus* spp.). Both caribou and ptarmigan are cultural keystone species for Labrador and Nunavik Inuit and important indicator species for tundra ecosystem health. Recent studies have indicated fast and widespread shrubification across TMNP, resulting in an increase of shrub-dominated tundra and a decrease in lichen-dominated tundra [1,2]. These changes are hypothesized as having the potential to decreasing the availability of lichen, the primary winter forage for caribou while simultaneously increasing the availability of shrubs, such as willow (*Salix* spp.), which are important forage for willow ptarmigan [3–8].

2 QUESTIONS

To identify potential areas of preferred caribou and willow ptarmigan habitats across TMNP to support long-term management and ecological integrity assessment, we would like to know:

Q1:
What are the summer and winter forage for caribou and willow ptarmigan in Arctic ecosystems?

Q2:
What is the distribution of summer and winter forage quality for caribou and willow ptarmigan across TMNP?

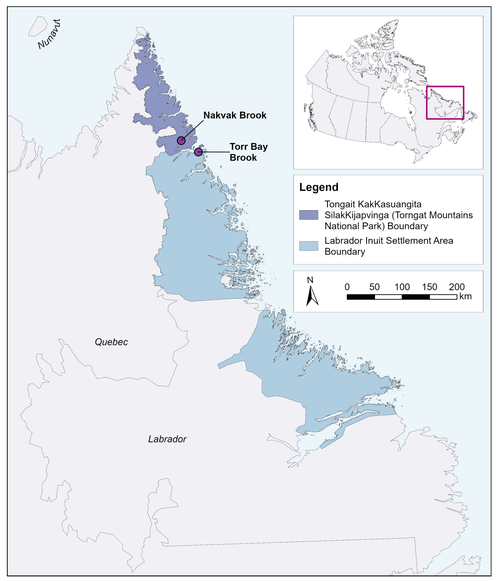


Figure 1. *Map and uncrewed aerial vehicle photos of Nakvak Brook (top) in TMNP and Torr Bay Brook (bottom) just south of TMNP. Photo credits: Nakvak Brook (Way, 2022) and Torr Bay Brook (Way, 2017).*

3 METHODS

Q1: Literature Review

- Identification of summer and winter forage for caribou and willow ptarmigan in Arctic ecosystems
- Development of seasonal species forage quality ranking building on Johnson et al.[4]

Q2: Local Distribution of Forage Quality

- Collection of local forage data from two focal areas, Nakvak Brook and Torr Bay Brook (just south of TMNP) with plot scale ground photography
- Development of local ecological and topographic predictor variables for Nakvak Brook and Torr Bay Brook with data from uncrewed aerial vehicle surveys (Figure 2)

4 RESULTS

Figure 2. *Circular plots highlighting identified vegetation with relative frequencies greater than 5% and maps displaying select predictor variables at Nakvak Brook and Torr Bay Brook. The maps show I) RGB Orthomosaic; II) Land Classification; III) Normalized Difference Vegetation Index (NDVI); IV) Canopy Height Model (CHM); V) Topographic Wetness Index (TWI), and; VI) Normalized Difference Water Index. Scan the QR code to access larger-sized versions of the maps. Photo credits: Betula glandulosa (Le, 2025), Carex spp. (Montgomery-Stinson, 2025), Cladonia spp. (Johnson, 2021), Empetrum nigrum (Mullally, 2021), Rhododendron tomentosum (Trant, 2025), Salix herbacea (Le, 2025), Stereocaulon spp. (Le, 2021), and Vaccinium uliginosum (Lightfoot, 2025).*

5 NEXT STEPS

- Test different predictive models for mapping local forage quality at Nakvak Brook and Torr Bay Brook
- Evaluate the accuracy of forage quality maps against out-of-sample plot data
- Test methods for upscaling forage quality maps using medium-resolution satellite imagery