

Research Report Fortymile**Interim Report – May 2026****Project Title: Assessing the impacts of shrubification on Fortymile caribou habitat****Yukon S&E License No.:** 25-60S&E**PI:** Isla Myers-Smith¹**MSc:** Claire Ethier¹, Sarah Naughtin¹**Research Staff:** Anya Boardman¹, Pauline Deschodt¹¹*University of British Columbia***Research funding:** CERC in Global Change Ecology of Northern Ecosystems (NSERC)
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This interim report provides a summary of the research conducted by Dr. Isla Myers-Smith and her research group (Team Shrub) from the University of British Columbia over the summer of 2025 (for more information see <https://teamshrub.com/>).

In 2025, Team Shrub research was conducted under the following Scientists and Explorers Act Licenses: 25-60S&E, 25-41S&E, 25-42S&E, 25-44S&S, 25-45S&E, 25-46S&E. See previous research reports (<https://teamshrub.com/research-reports/>).

Summary

Team Shrub has studied climate-driven vegetation change in Kluane and on Qikiqtaruk for over two decades. In 2025, our research efforts expanded beyond previously established sites to investigate the impact of climate-driven landscape change on wildlife habitat in the Central Yukon.

In 2025, we conducted vegetation surveys, recorded percent cover by species or functional group, recorded height measurements per species or functional group and flew a DJI M3 Multispectral drone to capture detailed imagery of the greenness and high-resolution aerial view at eight sites in western-central Yukon (Figure 1). Field data collected in 2025 are being compared with data from 2018 collected by Kathleen Orndahl¹ to quantify shrub change in recent years and to compare with satellite analyses of shrub change.

The goal of this project is to evaluate the impact of climate-driven vegetation change, such as shrub expansion, on caribou habitat patch dynamics and connectivity. The project is part of Team Shrub MSc student Claire Ethier's research, which combines repeat field-based and drone-based vegetation surveys with long-term satellite remote sensing and caribou GPS telemetry data to assess how shifts in plant functional types, particularly shrub expansion, are altering habitat structure, availability and connectivity across the Fortymile caribou range. This work will inform conservation efforts by identifying how climate change may be reshaping the spatial patterns of critical habitat and influencing caribou movement behaviour.

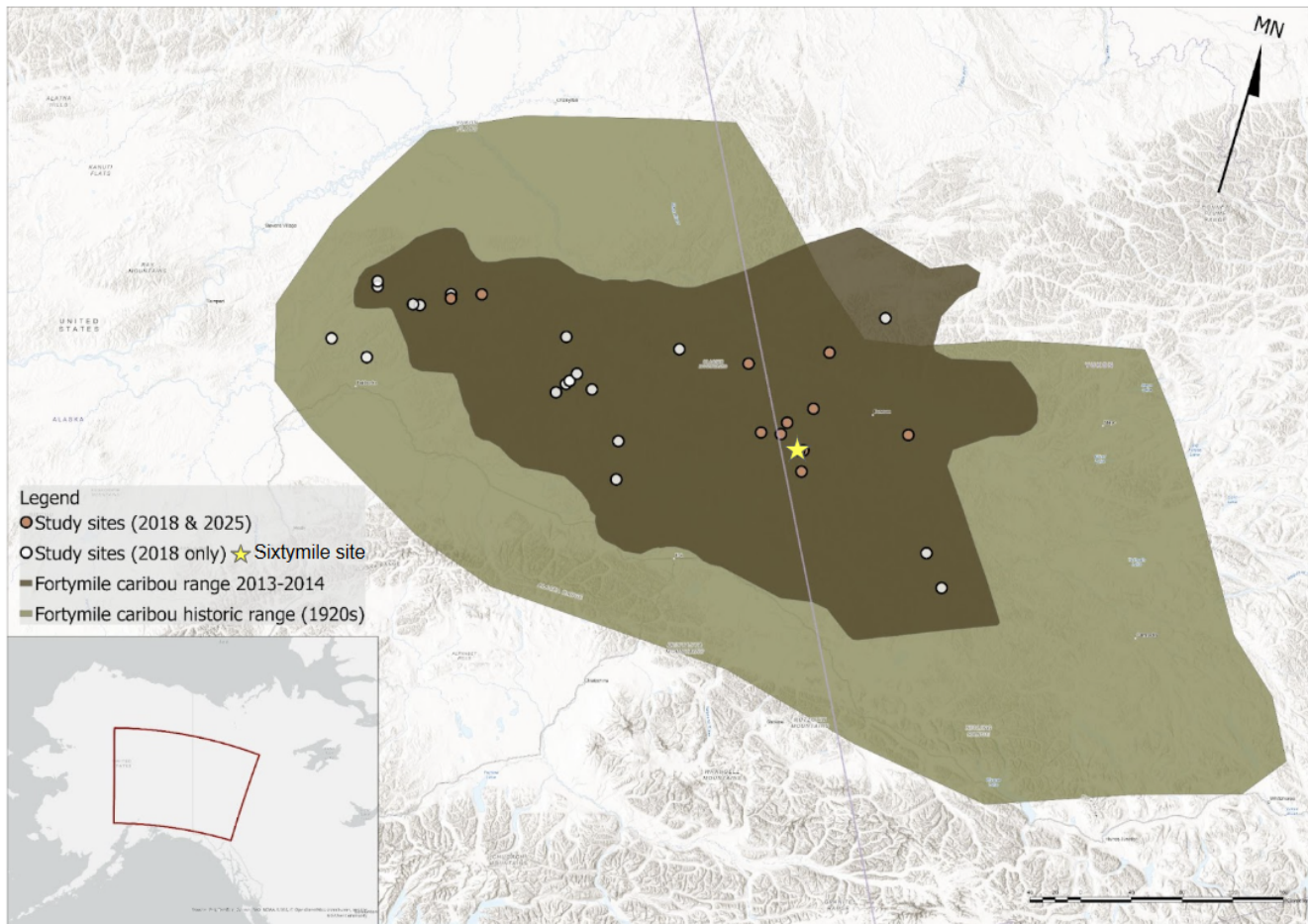


Figure 1. Map of Fortymile caribou historic and current range with study sites visited in 2018 and 2025 in pink and study sites visited in 2018 only in white.

Background

Climate-driven landscape change has been well documented across northern ecosystems²⁻⁶. Increasing shrub dominance across the landscape is associated with decreases in lichen availability⁷, an important forage species for caribou, and decreased movement rates⁸. Vegetation species do not respond uniformly to climate shifts, so it is useful to map vegetation across ecologically meaningful groups.

Plant functional types (PFTs) group plants based on their function within ecosystems and include deciduous shrubs, forbs, graminoids, and light-colored macrolichens^{9,10}. These partitions are particularly meaningful to caribou, whose habitat selection is strongly influenced by the presence of specific PFTs for forage, such as selecting lichens during early and late summer (May and September), while trading off for shrubs in June and July¹¹.

Recent advances in remote sensing have produced multi-temporal mapping of PFTs across broad spatial extents^{9,10}. Despite growing evidence of vegetation change across northern ecosystems, understanding the impact of these shifts on caribou habitat availability and connectivity remains poorly understood. To address this gap, I will use existing time-series (1985-2020) maps of PFTs⁹ paired with repeat drone surveys (2018 and 2025) to assess how climate-driven vegetation changes have altered caribou habitat patch dynamics and connectivity across the Fortymile caribou's historical range.

Objective: Quantify shrub change between 2018 and 2025 within the Fortymile caribou range.

Our project will quantify the rate of shrub change across the Fortymile caribou range and test whether shrub change differs between alpine habitat and lower elevation movement corridors. In 2025, we re-surveyed eight alpine sites previously surveyed in 2018. We collected multi-spectral drone imagery using a cross hatch pattern to be used to create digital surface models to extract vegetation height and density. We conducted *in situ* vegetation surveys to measure plant height, percent cover and abundance. Additionally, we completed cover sheet surveys to measure horizontal vegetation structure, a proxy for line-of-sight critical for predator detection (Figure 2). Visual inspection of orthomosaics developed from the drone surveys show change in vegetation cover (Figure 3). Currently a model recognizer is being developed to identify plant functional types (i.e., shrubs, lichen, graminoid, etc.), vegetation height and area. Differencing analyses will then be used to detect change in proportion of plant functional type top cover and vegetation height and area. Shrub change quantified from our drone surveys will be compared to trends observed in ABoVE Plant Functional Type Cover Maps⁹.



Figure 2. Photograph of a cover sheet survey from the plot center, demonstrating the point of view of the observer. The cover sheet is divided into alternating red and white rectangles (25 cm x 50 cm). The observer records percent of each rectangle obstructed by vegetation.

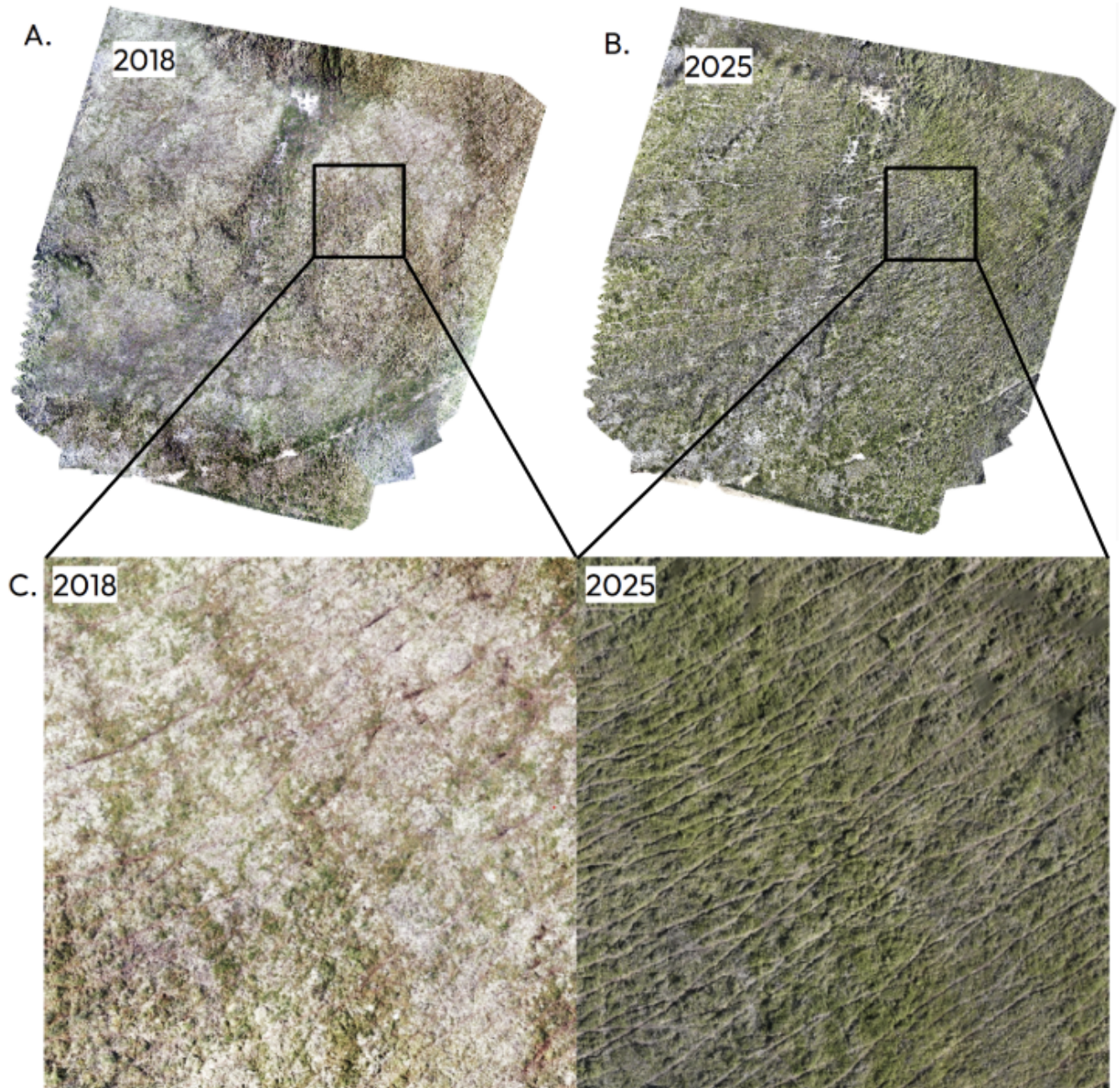


Figure 3. By visually comparing our drone maps we see a decrease in lichen cover and an increase in shrubs and more prominent caribou tracks in some of our field sites. Drone maps (orthomosaic models) developed from drone images collected at the Sixtymile study site surveyed in 2018 (A) and 2025 (B). The zoomed in images (C) show that top cover in 2018 was a mixture of shrub and lichen but in 2025 top cover is predominantly shrub.

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