Animal and Fire Disturbances on the Yukon-Kuskokwim Delta

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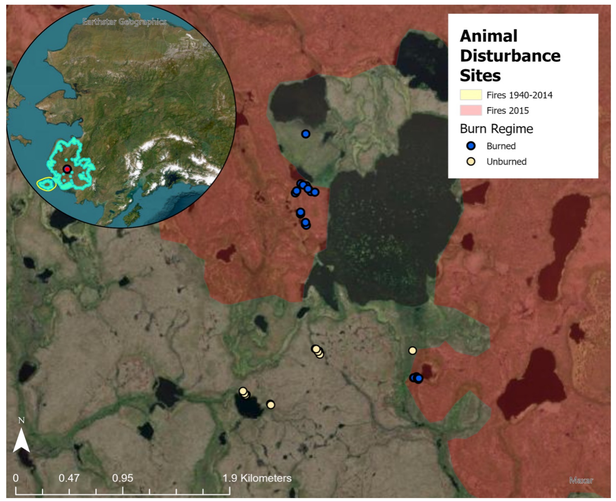
Introduction

- Wildfire activity is increasing across the Arctic, which can have long-term consequences for Arctic plant, soil, and animal communities.
- Additionally, wildlife activity such as burrowing and roosting can influence plant and soil conditions, yet little is known about the cumulative impacts of wildlife and fire disturbance in the Arctic tundra.
- To investigate this, we conducted sampling of ptarmigan roosts and burrows in both burned (2015) and unburned areas. Our objective was to compare and connect the effects of wildlife and wildfire disturbances on the landscape.



Methods

- Plant and soils sampled in 0.025 m^2 plots in burned and unburned areas with and without ptarmigan disturbance (10 plots each)
- Measured soil temperature, moisture, and thaw depth
- Soils sampled for nutrients, carbon, & moisture content

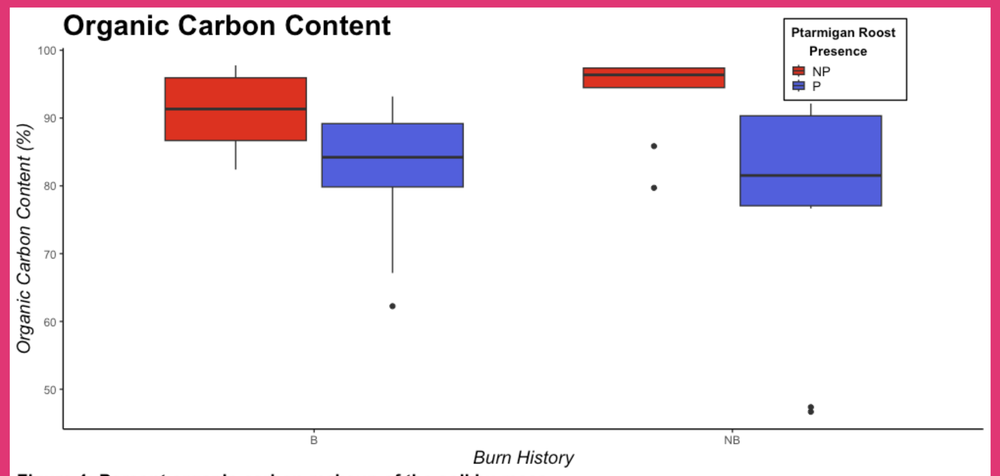


Figure 1: Percent organic carbon makeup of the soil by mass

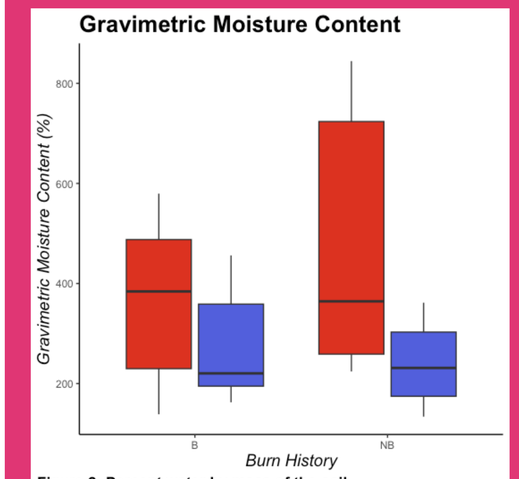


Figure 2: Percent water by mass of the soil

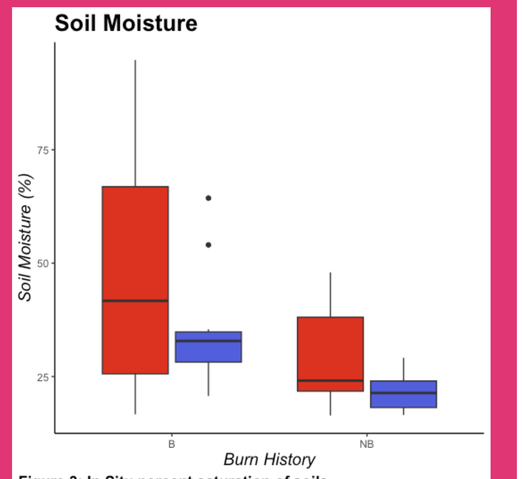


Figure 3: In Situ percent saturation of soils

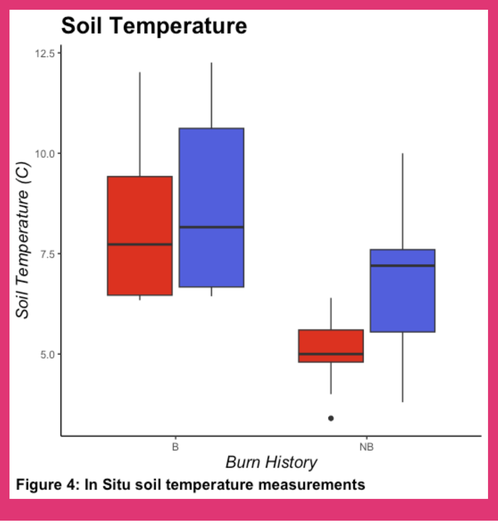


Figure 4: In Situ soil temperature measurements

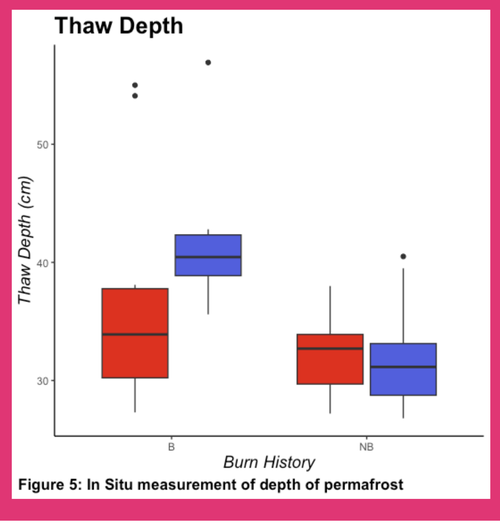


Figure 5: In Situ measurement of depth of permafrost

Results & Discussion

- Both fire and ptarmigan roosts had noticeable effects on soil moisture. Plots with ptarmigan roosts were drier, while areas that had experienced a burn were wetter. These trends were consistent for both moisture content and saturation.
- Burned areas exhibited higher soil temperature compared to unburned areas. Ptarmigan presence also led to increased soil temperature, particularly pronounced in unburned areas.
- Thaw depth varied between burned and unburned sites; ptarmigan roosts in burned areas had the greatest depth on average
- The roosts seem to be associated with reduced organic carbon content in the soil, potentially attributable to the clearance of vegetation at the roost site.

Conclusion/Future Work

- An expansion into how nest frequency varies from burned to unburned areas would provide helpful insight into how these roosts affect the overall landscape.
- Other animal disturbances would provide more generalizable conclusions and/or demonstrate species-specifc impacts.
- Increase data to test statistical significance

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