

YUKON FISH AND WILDLIFE ENHANCEMENT TRUST – RESULTS REPORT

PROJECT ACTIVITIES

I have almost completed the second year of study and will be continuing with data analyses and reporting throughout the summer of 2016. Since March 2015, I continued to explore how lichen recovers post-fire in the Klaza caribou herd (KCH) range, and completed my first thesis chapter titled, *Post-fire forage lichen dynamics on the Klaza caribou herd range*. My research goal for this chapter was to examine the environmental characteristics that influence the variability of lichen abundance within burns. In doing so, I aimed to investigate the reputed influence of the time since burn on lichen abundance, determine how much forage lichens are in burns of a given age, and comment on the cumulative impact burns have within the range of the KCH.

Keeping in mind that these results are still in review, there were some interesting conclusions drawn. By highlighting the variability within a burn or burns of a similar age, I aimed to improve upon the process in which burns are evaluated in the context of caribou lichen forage. In the case of the KCH range, it appears that lichen abundance can be relatively high in stands as young as 45 years post-fire, with biomass levels consistent with caribou selection. At the landscape level, burn age provides a rudimentary guide for lichen succession post-fire, but my results suggest this does not hold true at finer scales. Within a burn, there is considerable variability that is likely driven by the presence of microsites favourable to lichen recovery. Based on my findings, up to 23% of burns ≤ 50 years post-fire have biomass levels of forage lichen that are consistent with caribou selection thresholds, while 18% may be used in passing by caribou. Age-based thresholds, although easy to use and broadly applicable, do not capture the variability of lichen abundance within burns. In the absence of alternatives, an age-based threshold for burns (e.g., 50 years) can provide a conservative evaluation of caribou habitat at the landscape level; however, improvements can be made by evaluating individual burns within a herd's range using a combination of the time since burn and other environmental predictors to estimate the area within a burn that may have high lichen abundance.

In addition, I am well into my second thesis chapter that explores caribou use of burns. Using GPS locations from collared Klaza caribou, I modelled early and late-winter resource selection strategies of individuals across the herd range and those within burns. Along with environmental predictors, burn-focused predictors were used to provide insight into both the general distributional and resource selection strategies of the population as well as variation in strategy among individual caribou that choose to use burns during winter. These findings will provide an

understanding of how burn characteristics influence the distribution and habitat requirements of caribou at the scale of both the range and patch. Individual strategies may indicate that not all caribou are averse to recently burned areas, suggesting the need for further consideration of burns in range-wide assessments. In addition to this, I will also be conducting analyses of movement to further characterize individual behaviour in relation to burns. In combination with the results of the lichen-related data, these analyses will piece together the interactions between burns, winter habitat, and caribou behaviour in a novel way.

Fire has resounding effects on forest structure and composition, landscape patterns, and influences key components of wildlife habitat. In accordance with the Trust's mandate, the results of this research will undoubtedly contribute to the protection of wildlife and their habitat. The Klaza caribou herd serves as a case study; with the hope that any resulting findings can be applied to other caribou herds in the North. Where the dynamics between caribou and terrestrial lichen are altered by forest fire, a better understanding of the spatiotemporal succession of lichens can provide guidance for conservation and management efforts. Considering the effect fire can have on forage for caribou on their winter range, there remains uncertainty about how best to assess the impacts of burns over time and space in the context of cumulative effects.

The cumulative effects to caribou can be more accurately assessed during an environmental assessment process, which will ultimately have long-term, indirect benefits to woodland caribou and their habitat. While this research focuses on one caribou herd as a case study, it will have positive impacts to other northern mountain caribou herds and potentially other wildlife species. Also, this research will add to the growing body of literature surrounding cumulative effects to wildlife, primarily by highlighting the importance of better quantifying cumulative effects to all wildlife species. The support from the Trust has allowed me to go back to the North and share my results with other funding agencies and local researchers. Additionally, the Trust's support has enabled me to attend and present my research at the 2016 North American Caribou Workshop, "...the foremost conference of its kind addressing caribou biology, research and management." This will allow me to not only share my findings, but improve the overall research product by discussing it with other researchers. The Trust has been essential to my success thus far, and I am proud to participate in and communicate the importance of northern research under the Trust's mandate.

COMMUNICATIONS

The results of this research are currently being shared with Environment Yukon (Troy Hegel) and members of the Natural Resources and Environmental Studies Institute (NRESi, University of Northern British Columbia). Scheduled communications include a M.Sc. thesis (with three data chapters) and one or more published papers once the thesis chapters have been reviewed. Additionally, I am attending the North American Caribou Workshop in Thunder Bay, ON from 16–20 May 2016. At this conference, I will be giving a 12-minute presentation titled, '*Post-fire lichen dynamics on the Klaza caribou herd range, west-central Yukon*' as well as a poster titled '*Caribou use of burns during winter on the Klaza caribou herd range, west-central Yukon*', and hope to discuss my research findings with other caribou biologists. I hope to attend other conferences/workshops to continue to share my findings as they are finalized. In all of these communications, the Yukon Fish and Wildlife Enhancement Trust has, and will continue to be, acknowledged as a primary contributor, with its mandate communicated where possible. Upon completion and defense of my thesis, the Trust will receive a final copy of the entire document, as well as any journal articles published in the interim.



Figure 1. Winter caribou pellets amongst some *Cladina rangiferina* lichen, a primary component of the Klaza herd's diet in late-winter (also attached electronically).



Figure 2. Graduate student researcher, Kelsey Russell, takes a hemispherical photograph to determine canopy openness in a recent burn in the Klaza caribou herd range (also attached electronically).



Figure 3. The location data from GPS collars on Klaza caribou cows (like this one) will help to inform how they use burned habitat during winter (also attached electronically).