



MULTI-FUNCTIONAL PASTURE REJUVENATION IN THE CARIBOO

FARM ADAPTATION INNOVATOR PROGRAM | RESEARCH SUMMARY | MARCH 2021 - JANUARY 2023

Geographic Applicability

- Research location: 100 Mile House and Quesnel, BC
- Applicability: The Cariboo and anywhere woody species encroachment is being experienced

Commodity Relevance

- Cattle
- Agricultural land

Practical benefits

- Grazing is an effective treatment for reducing woody shrub cover
- Seeding can increase forb abundance
- The complete removal of trees may prove too costly for remote ranches without easy access to machinery

Project lead

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Research Team

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Project Overview

The multi-functional pasture rejuvenation project is a collaborative effort to determine economic operationally feasible methods for producers and managers to reduce the negative impacts of woody plant encroachment. This environmental change occurs when woody species such as shrubs and trees begin to encroach on grasslands and pastureland, reducing available edible species and limiting movement of livestock. To investigate various methods, two main ranches were set up as test sites. Results from these sites are still being analyzed but preliminary data from two years of establishment has been promising. Seeding alone with no additional treatment has been found to increase forb cover. Grazing has proved a successful method of reducing shrub cover in these pastures and after enough time, could result in promotion of additional forb and grass cover with the benefit of seeding. More data is required to further test this idea but the first two years of this project have added useful information to the understanding of woody plant encroachment and its affects on pastures, as well as finding suitable methods of removal.



KEY FINDINGS

The preliminary results of the multi-functional pasture rejuvenation project have been promising and illustrate the need for continued analysis of the current data, more data collection on different parameters, and an increase in the utilization of remote sensing data. The initial determination that species richness was reduced across the pastures that had grazing occur is in contrast to current understanding that grazing increases biodiversity. This specific result needs to be investigated further to understand more about the systems at work.

The visual difference in areas where grazing occurred compared to ones with cattle exclusion is stark in most cases, as illustrated below in Figure 1. The apparent

effectiveness of grazing to reduce regrowth of brush cut woody species (here, aspen and snowberry) shows that cattle can enact change through simple grazing.

The data collected so far corroborates this finding, with grazed areas representing a significant decrease in shrub cover compared to areas with exclusion (Figure 2).

These results point to grazing as a useful mechanism for reducing woody plant encroachment when those plants are mainly shrubs. This, combined with seeding, could lead to increased abundance of palatable species for livestock and a reduction in woody plants in affected pastures.



Figure 1. Southeast corner of the Honeypot meadow enclosure in the 100 Mile House site October 2022, showing the visual difference in regrowth of aspen inside and outside of the fence where both brush cutting and seeding occurred.

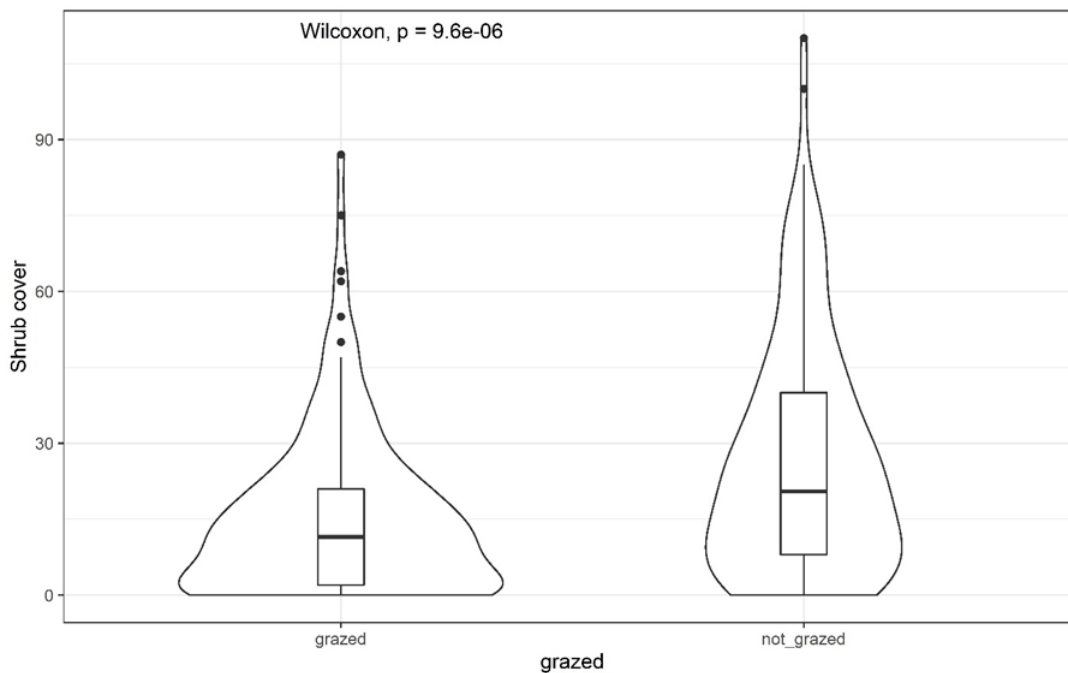


Figure 2. Grazing effect on percentage cover of functional group 'shrubs' in 100 Mile House and Hallis Lake combined. Shrub cover was significantly decreased under grazing treatment.

RESEARCH METHODS

This research was conducted at two ranches in the Cariboo region, one near 100 Mile House and one near Quesnel. A third ranch in Alexis Creek was established a year after initial setup occurred at the other two sites.

Research questions that were asked included:

- What effect does grazing have on woody species?
- What effect does brush cutting have on the plant communities, soil, and productivity of areas affected by woody plant encroachment?
- Can seeding over encroached areas introduce enough competition to displace woody species?
- What method or combination of methods is most effective at reducing woody species and increasing forage production?

The 100 Mile House and Quesnel ranches had three experimental plots established measuring 100m-by-100m or 200m-by-50m depending on topography and proximity to roads or coniferous forests. Half of each of these was fenced with three strand electric fence to act as cattle or grazing exclusion areas while the other half was left open to grazing pressure. Half of the fenced and unfenced area was brush cut using brush saws and hand

tools, and half of the sites were also seeded. This gave eight treatment types:

- Seeded, Grazed, Not Brushed
- Not Seeded, Grazed, Not Brushed
- Seeded, Grazed, Brushed
- Not Seeded, Grazed, Brushed
- Seeded, Not Grazed, Brushed
- Not Seeded, Not Grazed, Brushed
- Seeded, Not Grazed, Not Brushed
- Not Seeded, Not Grazed, Not Brushed

After setting up the plots, seeding occurred in the late fall to reduce mortality from birds and allow for dormancy to set in before spring melt to provide sufficient moisture for germination and growth.

Vegetation cover data was taken in the fall of 2021, two-three months after fencing and brush cutting and immediately after seeding. Drone flights were performed at the same time to ensure consistency of timing. The following year, vegetation data and drone flights were once again conducted in the fall. Data from these procedures has been analyzed using various R packages and Pix4D for multispectral drone imagery.

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