

# Evaluating the use of prescribed fire to rejuvenate forage pastures and its impact on soil health

## Executive Summary

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The loss of managed fire on the landscape has been detrimental to pasture and rangeland health due to brush encroachment and lack of natural disturbance, leading to underutilized grazing lands. At the same time, wildfire risk has increased due to climate change (particularly increased temperature and drought). Prescribed fire is a management tool that has the potential to improve the health and functioning of degraded pastures, and to remove hazardous fuel build-up and reduce wildfire risk. Prescribed fire is also part of Indigenous practices, often described as cultural burning, in support of food forests and food sovereignty. However, there are also concerns around fire use and potential changes to soil carbon stocks.

In the proposed project, we will implement a prescribed fire plan on pastures in the Peace Region of British Columbia, an agriculturally diverse and important region in Canada. We will evaluate how forage production and nutrition responds to prescribed fire and grazing practices, along with soil chemical and microbial properties (in particular carbon storage and cycling). We will undertake this research at four locations on private and Crown land (such as the Bear Mountain Community Pasture) in both north and south Peace Regions. Each project site will implement a pre-approved prescribed fire plan to follow all steps for safe and lawful burning. Treatments will include burning and grazing, resulting in four comparisons: unburned/ungrazed, unburned/grazed, burned/ungrazed, and burned/grazed. Data will be collected pre-fire, immediately post-fire, and over subsequent years. Not only will this research provide important information to producers seeking pasture rejuvenation through prescribed fire but will also generate data to understand the impact of prescribed fire on soil carbon. This information will be essential for ranchers to make informed decisions and potentially improve the adoption and approval process for prescribed fire.

This proposed research aligns with several priority areas within the AgriScience Program. First, it responds to the priority of “economic growth and development” by exploring the use of prescribed fire as a tool to improve forage and grassland productivity, which will support economic growth and agricultural resilience in the Canadian beef cattle industry. Secondly, this project aligns with the priority of “climate change and environment”, with a primary focus on carbon sequestration. As warmer and drier conditions may lead to more frequent and intensive wildfires, prescribed fire may serve as a climate change adaptation tool by creating fire breaks and protecting critical infrastructure. Importantly, the proposed research will study soil carbon sequestration and carbon cycling following prescribed fire. Thirdly, this project aligns with the priority of “sector resilience and societal challenges” as the project will seek to build relationships with Indigenous communities within Treaty 8 Territory, in support of sharing the knowledge of cultural burning. The project will provide mentorship opportunities to Indigenous community members, to learn safe prescribed fire practices and support a rekindling of fire-related land stewardship techniques.