



Project Title: Soil health assessment for enhanced productivity and resilience for cattle grazing systems in Manitoba grasslands

Project Lead: Dr. Terence McGonigle, Brandon University

Project Start Date: April 2019 **Status:** In Progress

Collaborating Partners: CAP AAM funded grant with advisory group Duncan Morrison, Mary-Jane Orr, Steve Crittenden, Mae Elsinger, Pam Iwanchysko, Glenn Friesen, Marla Riekman, and Cedric MacLeod

Purpose:

The MBFI site and five farm sites in Manitoba form this study to evaluate soil health indicators under different styles of grazing management, which are as follows.

- 1) Intensive rotation grazing: typically using a stocking rate of 25 cow-calf pairs per acre per day, with a return after 60-80 days
- 2) Annual crop integration: inclusion of annual crops in the grazing system
- 3) Enhanced legume content: inclusion of legumes in the grazing system
- 4) Balanced fertility: fertilizing to improve soil fertility and pasture productivity
- 5) Bale grazing: use of a winter-feeding system that distributes bales across a pasture. Baseline was established at the on-farm sites in 2019.

Approach:

Biological indicators of soil health are soil organic C, microbial biomass C, and soil respiration. Soil nitrate is also being studied, along with infiltration rate and bulk density. Performance data in terms of forage biomass and cattle weight gains are generated by Brookdale staff and farm producers. We supplement this industry-led data collection for production with scores of vegetation cover using pin-frames. Soil C data contribute to understanding of sequestration under different management.

Key Message:

For the MBFI experiment to compare intensive rotational grazing and continuous grazing, the four years of intensive rotation grazing at Brookdale are associated with a non-significant trend for a modest increase in percentage forage cover. Soil organic C and microbial biomass C have not responded to intensive rotational grazing in the manner of an indicator of soil health. It is not clear if microbial biomass tells us anything about soil health other than what we know already. Across all sites, microbial biomass C gives a consistent report of whether the land use is pasture or cropping; soils with a given level of soil organic C have twice the quantity of microbes under pasture as compared to crop fields.



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