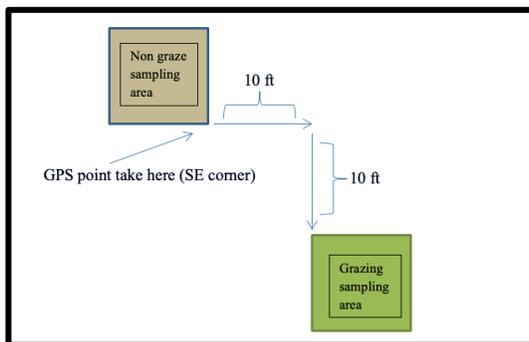


Integrating Livestock into Small Scale Vegetable Farming

Livestock integrated cropping systems typically include high diversity and find value in under-utilized crops as a forage base for livestock. The proposed project will look at livestock integrated systems in the Great-Northern Plains on small scale vegetable crops, specifically looking at differences in grazed versus un-grazed sampling sites with an emphasis on soil health, soil microbial diversity and crop yield. The results from this study will improve our understanding of how grazing livestock will impact soil health and subsequent crop production. Previous studies of livestock integration have shown a positive impact to soil health.

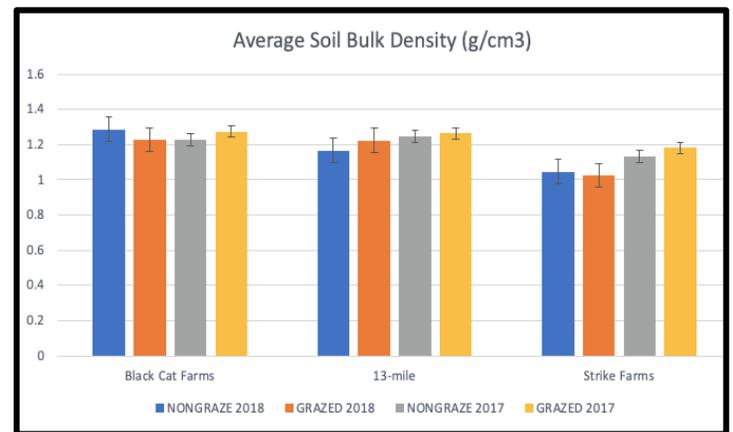


Produce collected at Black Cat Farms during harvest



Grazed and un-grazed sampling areas

The project takes place in Boulder, CO at Black Cat Farms, Bozeman, MT at Strike Farms and Belgrade, MT at 13 Mile Lamb and Wool and began summer of 2017 and will conclude in 2020.

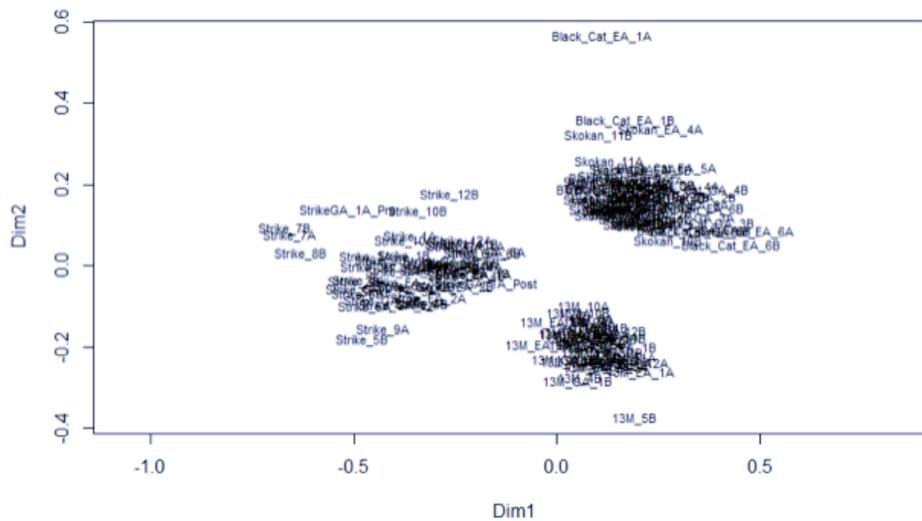


Soil bulk density averages for 2017 and 2018 at 13-mile, Strike and Black Cat



Sheep grazing squash residue at 13 Mile Lamb and Wool

Results so far have shown that bulk density (indicator of compaction) decreased at all three farms from 2017 to 2018. There was no difference between bulk density measurements in the grazed and un-grazed treatments in 2017 and 2018. There was also no difference in any of the soil nutrient measurements including % organic matter and total % N between grazed and un-grazed treatments in 2017 and 2018. Differences in nutrient composition between 2017 and 2018 were found in several soil measurements, but there was no consistent trend among any of the farms. All three cooperating farms opted to till their fields after grazing to prepare for cultivation, because of this it may be difficult to see any differences between treatments.



Preliminary results for the soil microbial diversity show that samples clustered by farm. Samples before grazing occurred (2017) had significantly less **richness** (number of microbial species detected) and **alpha diversity** (richness and evenness of species) than the grazed and un-grazed samples. The grazed and un-grazed samples were not statistically different, but small numerical differences in the average were seen with the grazed samples having a slightly higher alpha-diversity.



Grazing enclosure at Strike Farms



MSU Targhee and Columbia Ewes grazing at Strike Farms



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