Confounding Factors Affecting Soil Health During Field Restoration

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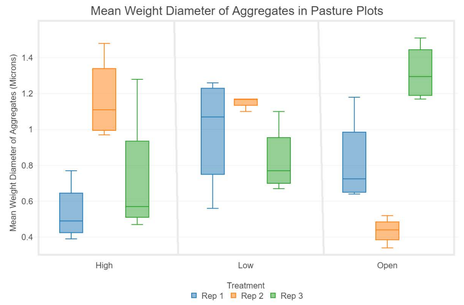
Introduction

- **Soil Health**
  - Plant nutrient availability
  - Microbial activity
  - Soil porosity
- **Impact of grazing on soil health**
  - Compaction
  - Nutrients from manure
  - Plant biomass removal by grazing
  - Plant selection during grazing
  - Changes in animal diversity and numbers

Methods

- **Experimental Area: Grazing Experiment**
  - 9 equally sized plots: 3 treatments x 3 reps
  - Treatments: High fence, Low fence, Open
  - Cattle removed in 2020
- **Soil sampling**
  - Randomized composite core sampling (0-15cm)
  - Four replicate composites per plot
  - Soils air dried for nutrient analyses
  - Soils kept moist and refrigerated for aggregate analysis
- **Analyses**
  - Nutrient analyses (SEAL & Texas A&M AgriLife)[1]
  - Permanganate Oxidizable Organic Matter[2, 3]
  - Aggregate Stability[4]
  - Microbial Biomass[5]

Results



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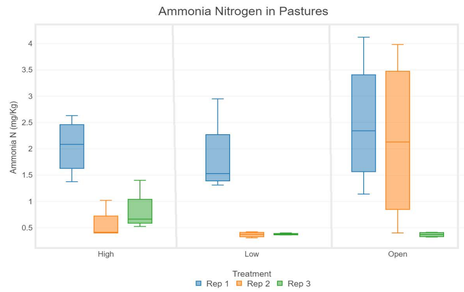

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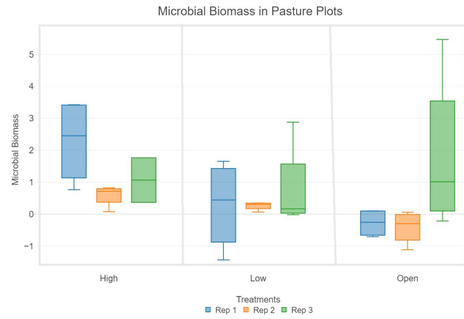

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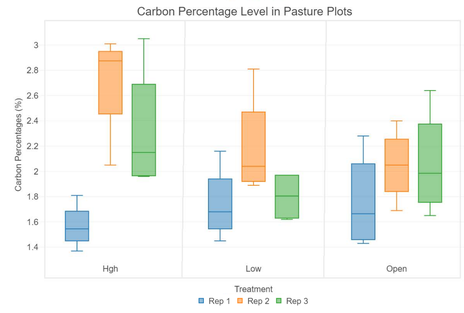

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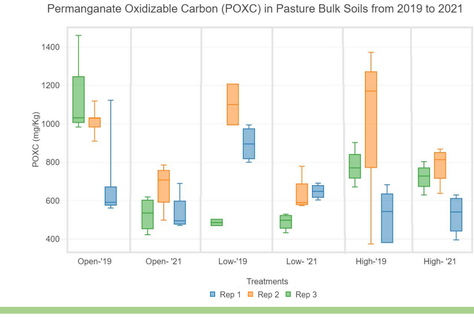

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Conclusion

- General Observations
  - Soil texture changes from sandy in the eastern side to more clayey on the western side
  - Eastern side is unshaded while western side is shaded
- Open Treatment
  - Open 2 has low aggregate stability and variable nitrogen due to prior cattle congregation
  - Open 3 has greater aggregate stability, low ammonia nitrogen and higher microbial biomass due to a tree being removed in making pastures
- Low Treatment
  - Low 1 has higher moisture due to a tree to the west providing shade to only this plot, and less microbial activity
  - Low 2 has higher aggregate stability due to seeing higher levels of carbon
- High Treatment
  - High 2 has the highest level of microbial activity due to diverse woody vegetation and small mammal activity
  - High 1 and High 3 are affected by various moisture conditions, high 1 is not provided shade from trees while high 3 is provided shade during part of the day, this effects their soil characteristics
- Changes from 2019 to 2021
  - Stability seen across treatments as time as passed
  - Overall decrease of oxidizable carbon observed

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