

Does the Duration of Cattle Grazing Impact the Severity of Soil Compaction at Crane Creek Regional Park?



Therese Azevedo, Trevor Campbell, Sanne Put, & Rebecca Wynn
Science 120 Spring 2018, Sonoma State University, Rohnert Park, CA 94928



Introduction

Cattle grazing is considered by many land managers to contribute to healthier grasslands by reducing thatch that reduces native plant growth (U.S. Fish and Wildlife Service, 2009). We studied impacts of grazing on soil quality at Crane Creek Regional Park. At this location, there were three sites that had different grazing duration periods. In order to measure soil compaction, we calculated soil bulk density. We believe that increased soil compaction will be found in areas that have been grazed for a longer period of time.

Research Methods

We measured soil bulk density to quantify soil compaction (Bulk Density- Measurement, 2018). We went to five randomly selected sites at three predetermined locations at Crane Creek Regional Park (Figure 1). At each site, we placed a cylinder that was 2.54 cm in diameter in the middle of a quadrat square and hit the cylinder with a hammer in order to obtain a core soil sample. We repeated this fifteen times. Each sample was then placed in an oven at 105°C for four hours to dry. Once dried, we weighed each soil sample to calculate the bulk density. Bulk density is found by dividing the weight of the dry soil sample by the total volume of the soil sample.

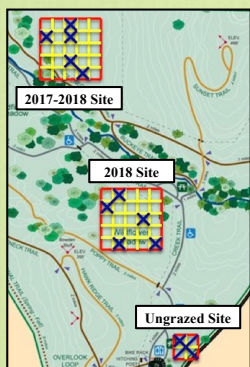


Figure 1: Sites of Sampling



Figure 2: Group Members Sampling



Figure 3

Results



Figure 4: Dried Samples From 2017-2018 Site

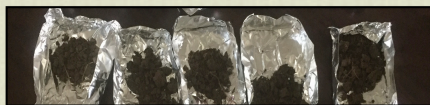


Figure 5: Dried Samples From 2018 Site



Figure 6: Dried Samples From Ungrazed Site

Average Bulk Density Levels at Crane Creek Regional Park

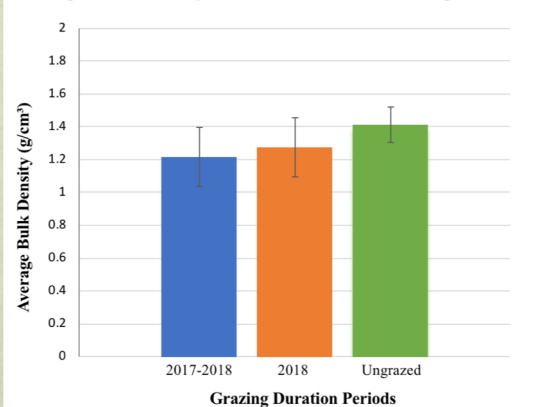


Figure 7: As grazing duration periods decreased, bulk density increased.

Conclusion

Our results revealed that the soil compaction in the ungrazed area was the highest. A bulk density of 1.6 g/cm³ can prevent root growth, but none of our samples reached this value (Bulk Density- Measurement, 2018). Thus, we conclude that Crane Creek Regional Park's grazing history has minimal effect on the severity of soil compaction. Future work can be done to understand how soil compaction can differ in various land geographies such as hills or low-lying grasslands.

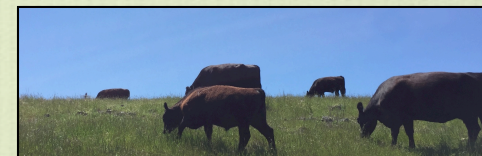


Figure 8: Cattle Grazing at Crane Creek Regional Park

References

- Bulk Density – Measurement. *Soil Quality*. (2018). Retrieved from <http://soilquality.org.au/factsheets/bulk-density-measurement> in April 2018.
- U.S. Fish and Wildlife Service. (2009). Management Methods: Prescribed Grazing. Retrieved from <https://www.fws.gov/invasives/staffTrainingModule/methods/grazing/introduction.html> in April 2018.

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