



Colorado Science and Engineering Fair

2024 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: What Lies Beneath: A Study on the Effects of Grazing Intensities on the Nutrients in the Soil

Finalist's Name: Kaycee Clark

School and City: Wray Jr. Sr. High School, Wray Colorado

Sponsor's Name: Eric Oestman

Category: Environmental Engineering (ENEV)

Division: Junior (6th - 8th grades)

Abstract (250 words or less):

"Grazing is the most important method of grassland utilization and has an important influence on the structures and functions of grassland ecosystems."(Hao and He, 2019) The purpose of this project is to help understand if cattle grazing intensities have an influence on the nutrients in the soil. I hypothesized that grazing will have an effect on nutrients in the soil. Based on two different studies, organic matter, total phosphorus, and total nitrogen will decrease and potassium will increase as the intensity of grazing increases. (Hao,He,2019)(Rahmanian, Hejda et. al, 2019)

To test, 10 subsamples were taken at a location with different grazing methods that included not grazed, moderate, and heavy grazing methods. Soil samples containing the 10 subsamples from each location were submitted to a lab for analysis. Once the results were received, nutrients in the soil were compared in relation to the intensity of grazing.

In this study it was found that there is a trend between nutrients in the soil and the intensity of grazing. Organic matter, iron, and manganese were higher in the soil where the ground was moderately grazed with a short rotation. Calcium, phosphorus, and boron were higher in moderately grazed areas and decreased in ungrazed and heavily grazed areas. Magnesium was similar to organic matter but was higher in heavily grazed than ungrazed. The percentage of magnesium cations were higher in the rotational grazing method. In conclusion, in Yuma County a moderate grazing rotation is the preferred grazing method for maintaining soil health.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: *Kaycee Clark*

Date: *3/1/24*

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.