

From Litter to Llamas: Managing Sub-Alpine Rangelands

Jade Meinzer, Colorado Section SRM

Introduction

Just like human litter is harmful to the environment, an abundance of plant litter can be destructive to an ecosystem. The 2007 Camp Rocky Range Management group was challenged with determining if controlled grazing of sub-alpine rangelands would continue to be beneficial to the health of the rangeland surrounding the Rocky Mountain Mennonite Camp, located on the western slope of Pikes Peak at an elevation of 9,600 feet.

Objectives

The objectives of our study were to:

- Manage a sub-alpine rangeland by using prescribed llama grazing.
- Determine the carrying capacity and grazing duration of the rangeland.
- Analyze the health of grazed versus un-grazed ranges.

History

Human interaction at the campsite has prevented free grazing wildlife from properly utilizing the rangeland over the past 40 years, resulting in a steady deterioration of rangeland health. Historically, rangelands in this sub-alpine region have evolved with grazing animals such as buffalo, elk, and bighorn sheep. These animals would stay in one grazing area for a period of a few days, then move on because of predators, hunters, and animal impact to the rangelands.

To mitigate this problem, llamas were introduced to graze the rangelands beginning in 2001. Since that time, the camp has grazed llamas on two separate grazing cells, the Chalet Emmental and the Park Ridge site. Llamas grazed the Chalet Emmental during the years 2001 and 2002, and grazed in the Park Ridge cell the following three years. The llamas were returned to graze the Chalet Emmental in 2006 and 2007.

Llamas were selected for grazing because they are an eco friendly species, and having evolved in the Andes Mountains, they are more suited to the Rocky Mountain Mennonite Camp's sub-alpine terrain. Llamas also graze only the tops of the plant rather than over-grazing, like sheep or goats.

Associated Problems

Improperly managing the rangelands can result in four specific problems:

- Decadent plants
- Excess litter
- Exposed topsoil
- Lack of plant diversity

Over-resting the rangeland results in the accumulation of litter, decadent plants and exposure of topsoil, which causes a negative interruption of the nutrient cycle and the energy flow. Overgrazing exposes the topsoil, which leads to erosion and the degradation of plant life. Long-term grazing results in a reduction of the quality, quantity, and diversity of plant species.

Procedures

Our group conducted two studies to analyze the effects of the llamas grazing in recent years, which allowed a comparison of the grazed and ungrazed rangeland located at the Chalet Emmental cell northwest of camp. The type of rangeland sampled was Mountain bunch grass and the specific ecological site is sub-alpine loam.

The Chalet Emmental is a six-paddock cell, with each paddock measuring approximately three-tenths of an acre. Using clipping frames, we compared three grazed areas randomly selected within the paddocks to the three ungrazed areas located immediately outside the paddocks. A variety of plant species and the accumulation of litter were collected by hand within each clipping frame. We obtained the plant material including grasses, forbs, and shrubs by clipping the current year's growth and collecting and weighing each species in a paper bag with a gram scale. The results were recorded and converted to air dry biomass, then multiplied by a factor of ten to determine the pounds per acre.

Two transect lines were used to determine the rangeland's ground cover frequency. One line was located within the grazed cell and the other was used on a nearby ungrazed rangeland.

Results

Based on results obtained from transect lines and the biomass gathered from the clipping frames, we determined the cell's carrying capacity was four llamas for a grazing period of approximately one month. The llamas were rotated every four days within the cell's six paddocks. Data was collected to determine pounds per acre of litter, percent of plant composition, plant diversity, and total production in pounds per acre.

Data from the two transect lines revealed a significant change in the composition of the ground cover. The rested area showed a higher frequency of exposed ground and litter, which are both undesirable. Exposed ground creates greater potential for erosion, while an overabundance of litter restricts nutrients from getting to the plant roots.

Comparatively, the grazed area revealed a higher frequency of live vegetation with Parry Oatgrass, the most palatable plant for llamas, showing the most increase. In all, six

native plant species were detected on the transect lines, including Rose Pussytoes, Shrubby Cinquefoil, Elk Sedge, Arizona Fescue, Thurber's Fescue, and Parry Oatgrass.

Further results concluded that the ungrazed area showed an increase over the grazed area of approximately 3,400 pounds per acre of litter. This is an important recognition because the plants in the grazed area show greater genetic diversity than those of the ungrazed area. The grazed cell revealed a 15 percent increase in plant composition, indicating that the forage quality in the grazed area is linked more closely to the historic climax plant community. Total production in pounds per acre decreased by seven percent, due to adverse growing conditions between 2006 and 2007.

Conclusion

Just as human litter is destructive for our environment, and abundance of plant litter creates an unhealthy ecosystem by deterring nutrient intake. Plant diversity increased in the grazed area, which more closely resembles the ideal plant community. The results revealed that the amount of exposed topsoil has decreased since llamas have been introduced to the grazing cell.

The 2007 Camp Rocky Range Management Group recommended that prescribed llama grazing be continued as a rangeland management tool for the Rocky Mountain Mennonite Camp.

References

Berlinger, Ben. 2007, USDA-NRCS.

Graber, Corbin. Director, Rocky Mountain Mennonite Camp. Personal communication, July 2007.

Interpreting Indicators of Rangeland Health. Technical Reference 1734-6, ARS-BLM-NRCS-USGS, 2005.

National Range & Pasture Handbook. USDA-NRCS, 2003.

Nosal, Dan. 2007. USDA-NRCS.

Rangeland Science Curriculum for Camp Rocky. 2007.