COLORADO STATE UNIVERSITY EXTENSION

GOAT GRAZING FOR VEGETATION CONTROL AND FIRE MITIGATION

BOULDER COUNTY

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INTRODUCTION

Both fire mitigation and invasive plant control are important to land managers in Colorado. With large unmanaged dry fuel loads and invasive plants spreading throughout the state, managers are left with a lot of vegetation to figure out how to handle.

Native grazers such as bison, pronghorn, mule deer and more have handled this vegetation for centuries, but with habitat encroachment and agricultural sprawl, domestic livestock have primarily been the grazing force on the Front Range.

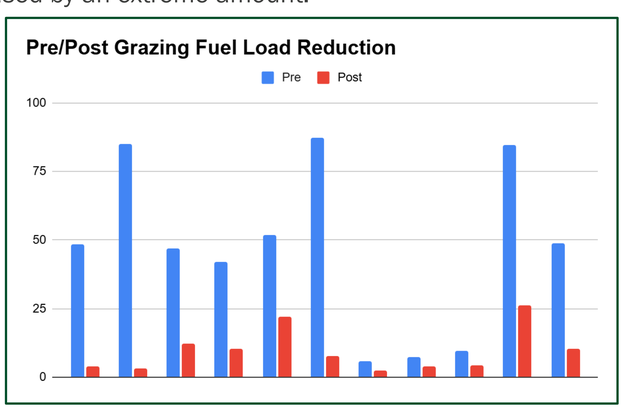
Mowing and chemical herbicides are the main tools of vegetation managers, but mowing is labor intensive and spraying may have harmful effects on wildlife, the public, and creates pesticide tolerance in many species. Grazing cattle is a commonly studied practice, but goat grazing is becoming a popular alternative.

Goats are small and hardy, selecting different plant species, causing less erosion and soil compaction than cattle. We set out to establish if goats could really be the answer to all vegetation related issues.



FUEL LOAD REDUCTION

Cuttings of a m^2 plot were taken at every transect established. When a post-grazing transect was established, another m^2 cutting was taken. Both samples were weighed. The weights per transect were averaged for the total site, and then a percent reduction of fuel biomass was calculated. An average reduction of 73.25% was seen across all the sites. This is a reassuring result, as the fuel load decreased by an extreme amount.



INVASIVE MANAGEMENT

A 30 meter transect was established 2-3 times per site. At this transect, a Daubenmire frame was used at 5.5-6m, 11.5-12m, 17.5-18m, 23.5-24m, and 29.5-30. The frame had 5 quadrats, each quadrat representing 20% of a full 100%. Cover was estimated for each quadrat to equal a total cover estimation. Percent of each plant species was also recovered.

Across all sites bare ground and litter almost doubled, and the total vegetation cover decreased significantly. Below is a chart showing percent reduction of estimated cover of some of the targeted invasive plants and a comparative native grass at different sites.

Plant	Pre-Grazing %	Post-Grazing %	Site
Bassia scoparia	69	0	Monarch
Lepidium draba	22	0	Keyes
Convolvulus arvensis	27	3	Erin Arsenault
Elymus repens	61	14	Keyes
Secale cereale	78	16	Erin Arsenault
Elymus smithii*	286	129	Monarch

The goats targeted the noxious weeds for their greater foliage. The native grasses were grazed, typically towards the end of the time the goats were in one paddock.

Pre vs. Post Grazing Pictures

The pictures below are of transects established at the Keyes and Monarch Park sites. These pictures demonstrate how stocking density is an integral factor to consider before introducing livestock, and that maturity of plants can impact plant palatability.

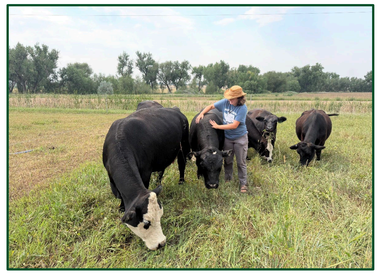


CATTLE COMPARISON

The same Daubenmire frame and fuel load reduction methods were performed at two transects for cattle grazing. It was determined the cattle had a reduction of 73% of the fuel load biomass, but the cattle did it in 1/3 of the amount of time.

The cattle were quicker but left behind more invasives than the goats. Bindweed, hoary cress and other invasives were left behind in greater amounts. This likely stems from different management practices and the reduced stocking rate of the cattle.

For fuel reduction, cattle are an obvious winner, as they can remove large amounts quicker and have fewer fencing requirements. For invasive targeting, goats may be a more reasonable move.



CONSIDERATIONS

If the goal is fire mitigation, little planning must be done for timing of goats grazing, and there will be significantly less considerations. Though, keeping the goats alive is a full-time job.

- Electric net fencing is best for containment.
- Livestock-carnivore conflict is an increased risk. There may be a need for guardian dogs, llamas, a donkey, or a person present.
- Livestock need water access & potential supplemental nutrition.
- Accessibility to location may also create problems.

If the goal is noxious weed control, plant-species, plant stage of growth, time of year, climate, and location may need to be considered.

- Have the invasives gone to seed? The plant should be grazed before it produces viable seed.
- Are there any risks to the goats such as toxic plants, recent chemical applications, or other health risks?
- Is it the correct time of year? You may want put the goats out before the plants can produce seed, but if too early the plants will need to be grazed again later in the season.
- Are there plants you *don't* want the goats to eat?
- What is the right stocking density for the area, and how long can the goats graze before they are overgrazing?