Timing of Grazing to Reduce Cheatgrass Fuels

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Introduction

The introduction and subsequent invasion of cheatgrass onto millions of acres of Great Basin rangelands has transformed secondary succession by providing a fine-textured early maturing fuel that has increased the chance, rate, spread and season of wildfires. With each passing wildfire season, more and more critical wildlife and grazing resources are being burned and converted to cheatgrass dominance (**Figure 1**), therefore resource managers and land owners are facing the daunting task of reducing wildfire risks caused by associated cheatgrass fuels. Mechanical and chemical weed control practices, in combination with rangeland seeding efforts, have the ability to be successful in actively suppressing and reducing cheatgrass associated fuels, but with vast landscapes infested with cheatgrass there is a need for additional tools. The grazing animal is the only real fuels management tool available on these vast landscape scales to biologically reduce cheatgrass densities and fuel loads. Here we investigate the use of cattle (*Bos Taurus*) in an effort to reduce cheatgrass fuel loads and the impact of this grazing on existing perennial grass densities.

Methods

The study site is a 16 hectare exclosure located at the Horse Creek Ranch of King's River Valley, 113km north of Winnemucca, Nevada. The site was a highly degraded big sagebrush (*Artemisia tridentata*) community with an understory dominated by cheatgrass. In 2010 we spring disked the site, fallowed the site all summer and seeded the site to perennial grasses and 'Immigrant' forage kochia in the fall of 2011 (**Figure 2**). Following the establishment of seeded species, we initiated a grazing experiment to investigate the effects of fall versus spring grazing on cheatgrass densities/fuel loads and seeded species densities. We hypothesized that spring grazing would reduce cheatgrass more than fall grazing, but that perennial grass species would experience a higher reduction rate than with fall grazing treatments. We tested a fall grazing treatment in 2014, September 7th-27th, and a spring grazing treatment in 2017, May 6th-26th by placing 30 cattle in the 40 acre exclosure during each treatment period. Cheatgrass above-ground densities and seed banks were measured as well as cheatgrass biomass/fuel loads prior to placing cattle on the study area. Cheatgrass densities and bioamass as well as seeded species densities were recorded 30 days following the grazing treatment. Precipitation totaled 237mm in 2014/2015 and 302mm in 2016/2017.

Figure 1. A failed rehabilitation project resulting in cheatgrass dominance. Current stocking rates cannot begin to affectively reduce cheatgrass fuel loads.

Figure 2. Horse Creek Ranch 2010 Rehabilitation Project resulted in a successful seeding of perennial grasses and 'Immigrant' forage kochia.

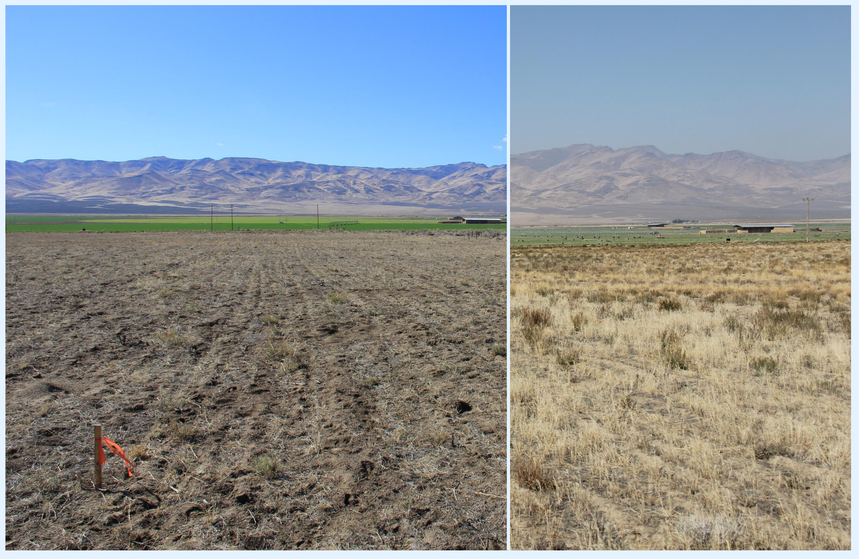

Figure 3. (left) September 28 2014, cheatgrass fuels reduction after 20 days of grazing. (right) Fuel loads before grazing treatment.

Results and Discussion

Grazing in the fall and spring both significantly ($P \geq 0.05$) reduced cheatgrass densities and fuel loads. Grazing from September 7 to 27-2014 reduced cheatgrass from 1,759kg/ha down to 155kg/ha, or 91.2% reduction (**Figure 3**). The 2014 fall grazing treatment resulted in a reduction of 8.6% in perennial grass density, 5.8/m^2 down to 5.3/m^2 (**Figure 4**). Grazing from May 6 to 26-2017 resulted in a cheatgrass fuels reduction of 95.8%, 1,876kg/ha down to 80kg/ha and a 1.4 % reduction of perennial grass, 4.77/m^2 down to 4.7/m^2. Though we hypothesized that spring grazing would be more detrimental than fall grazing to established perennial grasses, our results do not support this hypothesis. Even though the literature suggests that spring grazing has more impact than dormant season grazing on perennial grasses, our study suggests that under favorable precipitation years and available soil moisture, perennial grasses can sustain spring grazing treatments. It also reduced cheatgrass fuel loads by more than 90%, which is a 90% reduction prior to the upcoming wildfire season. Fall grazing on the other hand decreased carry-over fuel by more than 90%, but does not address the cheatgrass fuel build-up of the upcoming wildfire season. The use of cattle to decrease cheatgrass fuel loads can be accomplished and will not be detrimental to the existing perennial grass communities if properly monitored (**Figure 5**).

Figure 4. Oct 8 2014, Ten days after Fall Grazing treatment. Perennial regrowth is rapid with adequate precipitation.

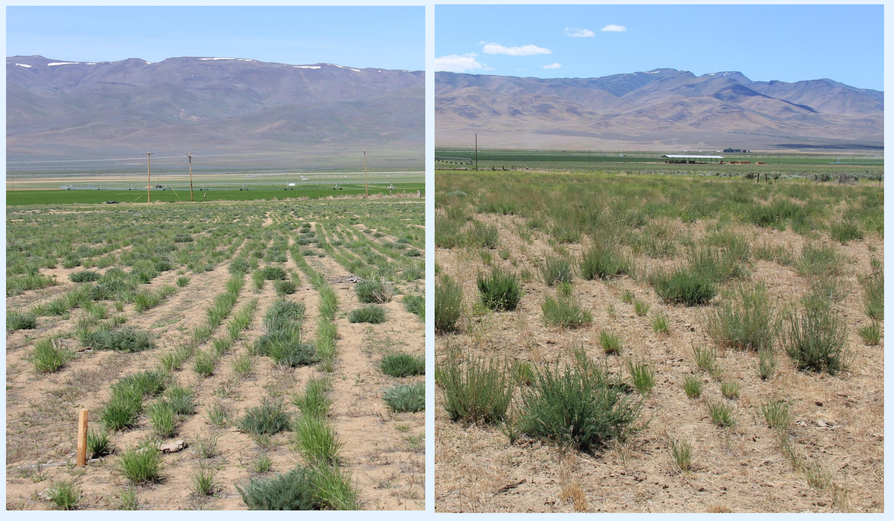

Figure 5. Perennial regrowth (left) June 2016, two years after Fall grazing treatment. (right) July 2017, two months after Spring grazing treatment. Both grazing treatments had little negative impact on perennial grass densities, with Spring grazing having less impact (8.6% vs. 1.4% perennial reduction).