Grazing following Juniper Cutting

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Introduction

Removal of western juniper by cutting can increase understory biomass, forage quality, ground cover, and plant diversity. These results are based on resting sites 2 or more years after treatment. There is limited research on how grazing influences herbaceous recovery after juniper cutting. Reintroducing livestock too quickly after treatment may inhibit herbaceous recovery, particularly on sites with a diminished perennial component, and promote dominance of the site by undesirable exotic grasses and forbs. However, cut juniper sites often account for only a small proportion of a field. Resting fields for longer than 2 years may not be feasible for livestock operators or land managers, especially if longer-term rest or deferment interfere with other land management goals and objectives. Because the amount of woodlands treated has increased significantly during the past decade, evaluating grazing impacts following juniper control is important for developing strategies that successfully rehabilitate shrub-grassland plant communities in the northern Great Basin.

Experimental Protocol

Understory succession in western juniper woodlands on Steens Mountain, Oregon, was assessed under grazed and ungrazed conditions immediately following tree cutting over a 4-year period. Cattle grazed plots only the first 2 years after treatment. Plots were not grazed the 3rd and 4th year post-treatment to evaluate short-term impacts on herbaceous biomass and seed production. The prescription was to graze the field for a short duration in the spring when perennial grasses were in vegetative to early-boot growth stages. Stocking rates were 0.3 cow-calf pairs per acre for 5 days in early May 1999 and 0.38 cow-calf pairs per acre for 4 days in early May 2000. Utilization in cut-grazed plots averaged 73 percent in 1999 and 71 percent in 2000. Utilization above 70 percent is considered heavy in sagebrush plant communities. Utilization in uncut grazed plots averaged 64 percent in 1999 and 15 percent in 2000.

Results and Management Implications

Juniper cutting resulted in increased herbaceous cover, biomass, and seed production when compared to woodland controls. By the third year post-cutting, perennial bunchgrass and annual grass canopy cover in both cut-grazed and cut-ungrazed treatments were significantly greater than in the uncut treatments.

However, grazing had no measurable short-term impacts on understory recovery as measured by plant cover and biomass. Increases in herbaceous cover and biomass were similar in grazed and ungrazed-cut treatments (Fig. 1). In the cut treatment, biomass of the large perennial grass group was greater in the ungrazed prescription. This difference was attributed to the accumulation of dead leaf and reproductive material within grass bunches between 1999 and 2002 in the ungrazed treatment.

These trials were conducted across relatively dry years, with little spring precipitation. Soils on this site are shallow and dry relatively quickly. Regrowth on the cut-grazed plots was adequate following May grazing in 1999 and

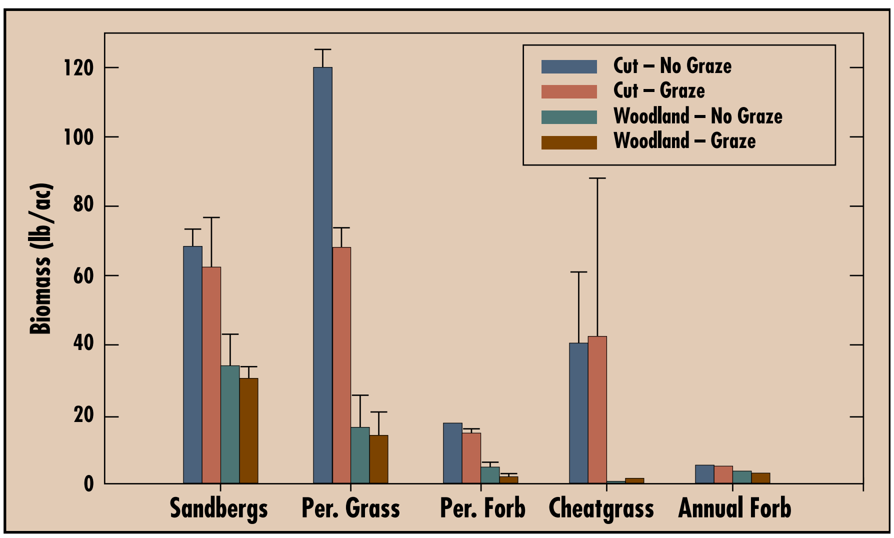

Figure 1. Biomass (lb/acre) comparisons for species functional groups collected in June 2002 on Steens Mountain, Oregon, as affected by juniper cutting and grazing treatment. Values are in means ± one standard error.

Table 1. Comparison of total seed production (lb/acre) for perennial grasses collected on Steens Mountain, Oregon, as affected by juniper cutting and grazing treatment. Weights are for raw seed produced with awns remaining on seeds.Table 1. Comparison of seed production (lb/acre) values for perennial grasses collected on Steens Mountain, Oregon, as affected by juniper cutting and grazing treatment.

Treatment	*Sandberg's bluegrass*	*Bluebunch wheatgrass*	*Basin wildrye*	*Junegrass*	*Indian ricegrass*	*Squirreltail*	*Thurber's needlegrass*
	------------------------------------ lb/acre ------------------------------------						
2000							
Cut	0.6 ± 0.3 a[1]	2.0 ± 1.4 a	0.4 ± 0.3 ab	0.6 ± 0.6	4.0 ± 2.3 bc	2.4 ± 1.0 c	5.9 ± 1.9 c
Cut-graze	0.1 ± 0.0 a	0.04 ± 0.0 a	0.3 ± 0.0 ab	0.0 ± 0.0	1.5 ± 0.4 b	0.5 ± 0.1 a	0.6 ± 0.2 b
Woodland	0.2 ± 0.0 a	0.0 ± 0.0 a	0.0 ± 0.0 a	0.0 ± 0.0	0.0 ± 0.0 a	0.0 ± 0.0 a	0.0 ± 0.0 a
Woodland Graze	0.2 ± 0.0 a	0.0 ± 0.0 a	0.0 ± 0.0 a	0.0 ± 0.0	0.0 ± 0.0 a	0.0 ± 0.0 a	0.0 ± 0.0 a
2001							
Cut	5.0 ± 1.5 b	8.3 ± 4.2 b	1.1 ± 0.6 b	2.2 ± 2.2	8.1 ± 5.3 c	5.8 ± 4.2 cd	12.8 ± 10.1 c
Cut-graze	4.8 ± 1.0 b	6.1 ± 3.0 b	0.3 ± 0.2 ab	0.0 ± 0.0	8.5 ± 5.7 c	6.8 ± 1.4 d	5.3 ± 2.5 c
Woodland	4.6 ± 1.6 b	0.0 ± 0.0 a	0.0 ± 0.0 b	0.0 ± 0.0	0.0 ± 0.0 a	0.0 ± 0.0 a	0.2 ± 0.0 a
Woodland Graze	5.0 ± 1.3 b	0.0 ± 0.0 a	0.0 ± 0.0 b	0.0 ± 0.0	0.1 ± 0.1 a	0.0 ± 0.0 a	0.1 ± 0.0 a

[1] Weights are for raw seed produced with awns remaining on propagules. Different lower case letters indicate significant differences among treatment means within a column ($p < 0.05$).

2000, but this growth was primarily vegetative with little seed produced. The dry conditions were a major factor in the lack of perennial grass recruitment for the grazed and ungrazed-cut treatments.

The relatively short and heavy grazing prescriptions imposed were detrimental to perennial grass seed production (Table 1). Thurber's needlegrass seed production was the most negatively impacted by the grazing prescription. Seed production of other perennial grass species was less affected by the grazing treatment and made a relatively quick recovery the fourth season after cutting. To provide plants the opportunity to maximize seed crops and enhance opportunities for seedling establishment when environmental conditions are favorable, this site requires rest or deferment the first few growing seasons.