Will Spring Cattle Grazing among Young Bitterbrush Enhance Shrub Growth?

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Introduction

Because of its palatability and sustained levels of forage quality, antelope bitterbrush is a desirable shrub for cattle and wintering big game on western United States rangelands. Earlier research in Utah and Oregon established that conservative early spring livestock grazing could stimulate bitterbrush growth compared to shrubs in ungrazed communities. Spring grazing of stands by cattle removed competing grasses and forbs and left more moisture and minerals for the shrubs later in the growing season. Because little information is available regarding the grazing management of newly established stands of bitterbrush, this study was undertaken to 1) determine the effects of light and heavy spring cattle grazing on the subsequent growth of young shrubs, and 2) explore stocking pressure thresholds for management of young bitterbrush.

Experimental Protocol

Nine small pastures (about 1.9 acres each) north of Burns, Oregon, were used for the study. They occupied areas reclaimed by Bureau of Land Management and Oregon Department of Fish and Wildlife personnel and seeded with bitterbrush after the 1990 Pine Springs Basin wildfire. Treatments included 1) control pastures ungrazed by livestock, 2) lightly grazed pastures, and 3) heavily grazed pastures. Stands were grazed by cattle in 1997, 1998, and 1999 when grasses were in the vegetative to boot-stages of growth beginning in about mid-May each year. Lightly grazed pastures supported two cows, and heavily grazed pastures supported four cows for about 14 days each. Before the study began, we measured forage standing crop and the height and diameter of shrubs. We returned every other day while cattle were present and checked 25 shrubs in each pasture for signs of browsing by cattle or trampling damage. When cattle exited the study, we again measured the height and diameter of the bitterbrush and sampled standing crop to assess degree of utilization on the grasses. Finally, we returned a third time in early September and remeasured the shrubs to see how they had grown over the summer.

Results and Discussion

Average forage utilization was 32 percent in lightly grazed pastures and 59 percent in heavily grazed units. On average, 14 percent of the bitterbrush was partially browsed by cattle in lightly stocked pastures and 62 percent was browsed in heavily stocked units. Cattle did not initially begin foraging on bitterbrush, but began browsing plants

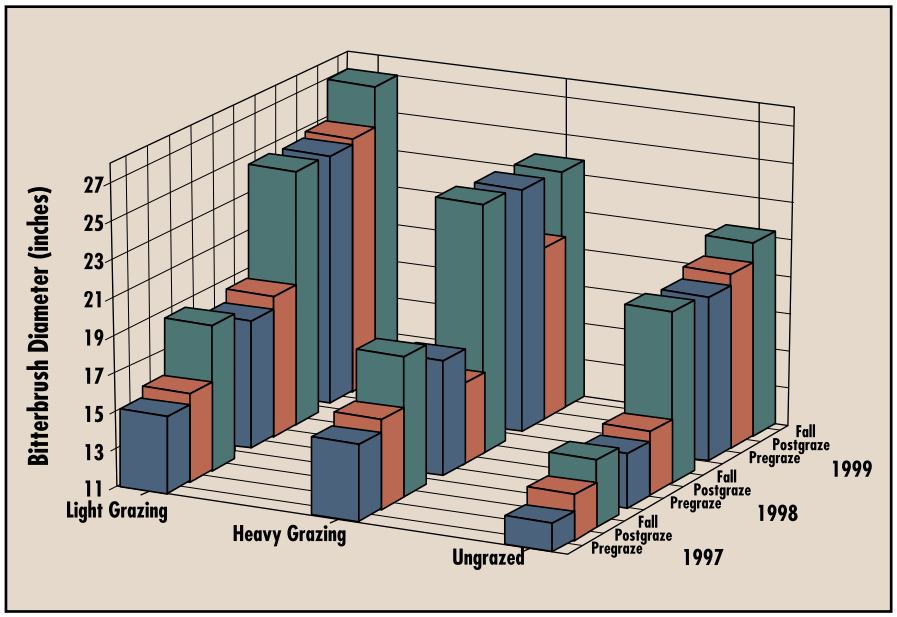

Figure 1. The changes in bitterbrush diameter monitored in lightly grazed, heavily grazed, and ungrazed pastures before and after grazing by cattle and at the end of the growing season during 1997–1999 on big game winter range near Burns in southeast Oregon.

by about days 5–6 in the heavily grazed treatment and about day 8 in the lightly grazed paddocks. Bitterbrush diameter was reduced by about 1.7–3.7 inches in heavily grazed pastures for 2 of 3 years of study (Fig. 1). Height was not reduced by cattle browsing in any of the treatments, and no growing season browsing by big game occurred among bitterbrush in ungrazed controls. Analyses of standing crop data suggested cattle began foraging on bitterbrush in spring months when forage levels declined to about 90–135 lb/acre. Trampling damage included evidence of broken twigs or skinned bark on the main trunk of shrubs. About 29 percent of the shrubs received some trampling damage under light grazing, and 55 percent suffered trampling damage with heavy grazing. Trampling impacts appeared to be a simple function of time and the number of animals stocked per acre. Only one shrub, located where the cattle habitually bedded in a heavily grazed pasture, was lost to trampling.

At the end of the growing season (early September), bitterbrush in lightly grazed stands exhibited a 50-percent greater increase in diameter (Fig. 1), 30 percent greater increase in height (Fig. 2), and 8 percent longer twigs than shrubs in ungrazed pastures. For 2 of 3 years, bitterbrush shrubs in heavily grazed pastures were about 4.2 inches wider in the fall than shrubs in ungrazed controls. In the third and driest of the 3 years, bitterbrush in the heavily grazed units did not exhibit the same degree of compensatory growth as in the previous years and was about 1.7 inches shorter than lightly grazed or ungrazed controls at the end of the growing season. Bitterbrush in heavily grazed pastures was either wider or the same diameter as ungrazed controls at the end of the growing season in all 3 years.

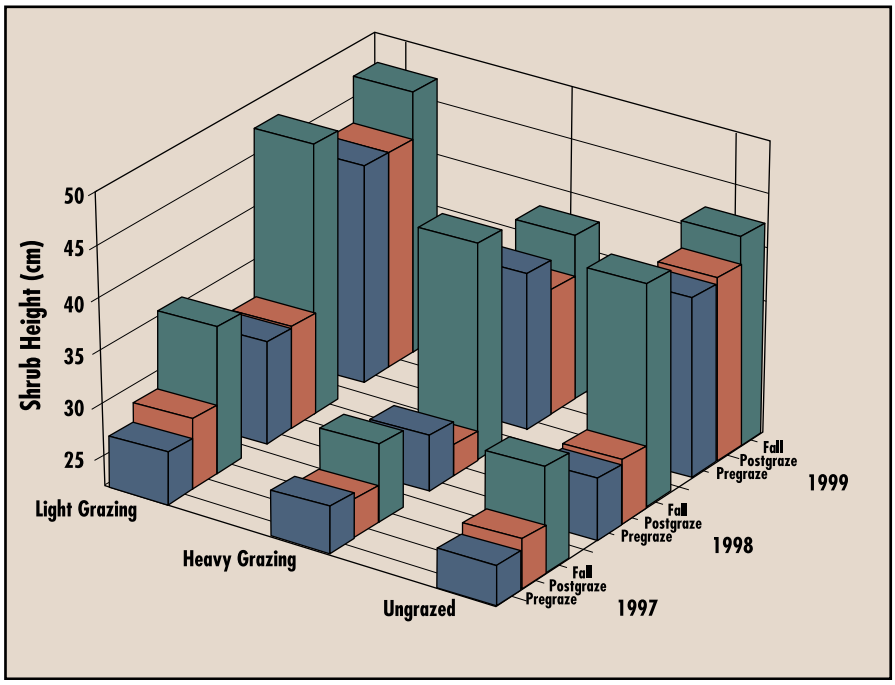

Figure 2. The changes in bitterbrush height measured in lightly grazed, heavily grazed, and ungrazed pastures before and after grazing by cattle and at the end of the growing season during 1997–1999 on big game winter range near Burns in southeast Oregon.

Management Implications

These findings suggest that if a manager's goal is to stimulate bitterbrush growth in northern Great Basin grass/shrub communities, the stand should be lightly grazed (about 30–40 percent utilization of the herbaceous forages) by cattle when bitterbrush is flowering and accompanying grasses are in the vegetative to late-boot stages of phenology. This level of grazing will stimulate bitterbrush growth, and shrubs will be wider and taller than companions in ungrazed pastures. Heavier grazing applications, where utilization approaches 60 percent on herbaceous forages, can have some immediate effect on bitterbrush diameter. Browsed shrubs in heavily grazed pastures, however, can respond with as much growth as cohorts in ungrazed pastures if cattle leave while there is still sufficient soil moisture for twig growth to continue. In drier growing seasons, bitterbrush may not be able to compensate for heavy, early-season browsing if soil moisture is depleted and shrubs cannot initiate mid-summer growth. While some trampling of young bitterbrush may occur, young shrubs are quite resilient and can tolerate moderate damage without long-term effects.