

# OFF-SEASON GRAZING REDUCES EXOTIC ANNUAL GRASSES AND INCREASES A NATIVE BUNCHGRASS


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## Introduction

Invasion of sagebrush steppe communities by exotic annual grasses is a major threat to ecological sustainability and rural economies. Many sagebrush-bunchgrass communities already have a noticeable presence of exotic annual grasses. Management of these plant communities needs to focus on reducing the competitive advantage of exotic annual grasses over native perennial vegetation. An understory dominated by perennial bunchgrasses is probably the single most important assurance against exotic annual grass dominance. Therefore, management approaches should strive to limit exotic annual grasses while having neutral to positive effects on perennial bunchgrasses. Prior efforts have focused on limiting disturbances, most notably excluding, or greatly reducing grazing, in these communities. However, this has largely been ineffective, unless

grazing management was improper (e.g., heavy, repeated use during the growing season). A different management approach is needed to address the exotic annual grass problem with management intervention occurring prior to annual grass dominance.

Land management needs to apply actions that reduce exotic annual grasses, but these management actions need to be feasible to apply across the vast rangelands already invaded. Strategic grazing may be feasibly applied to expansive landscapes, but there is disagreement over the ability of grazing to reduce exotic annual grasses without negatively impacting native perennial vegetation. Off-season (fall-winter) grazing is increasingly becoming a common grazing management alternative to growing season use in Wyoming big sagebrush communities, in part to reduce accumulations of fine fuels to decrease fire probability and to also decrease the cost associated



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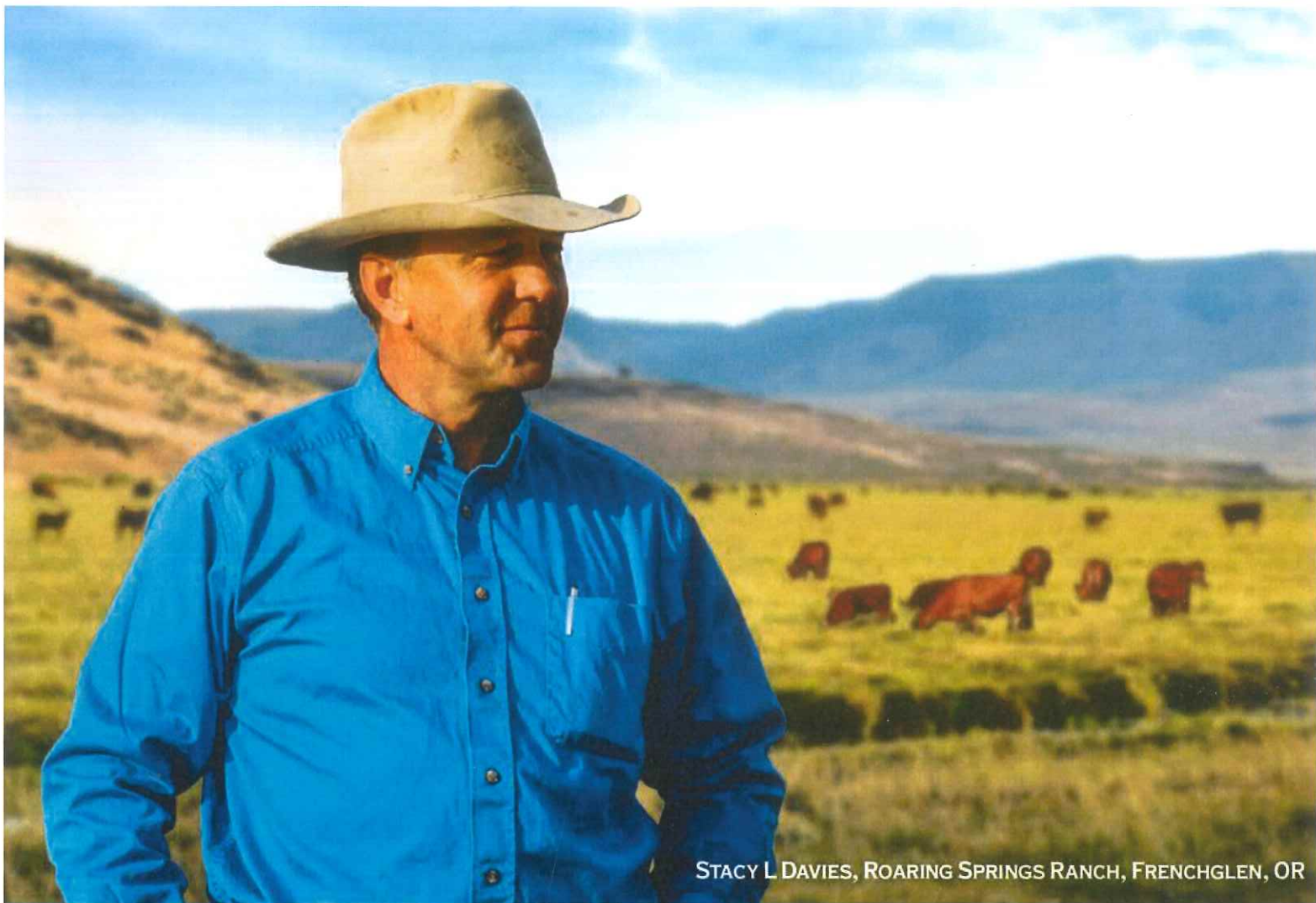


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with feeding hay. Moderate, off-season grazing may decrease annual grasses by removing ground litter (usually annual grass litter). Litter is critical to annual grass success because it creates a favorable micro-environment (i.e., safe sites) for its emergence and growth. Off-season grazing may also result in cattle selectively grazing exotic annual grasses because they often initiate growth earlier than native perennial grasses. After a substantial post-fire invasion of annual grasses, off-season grazing reduced annual grasses and increased Sandberg bluegrass, a native bunchgrass. However, the effects of moderate grazing during the off-season on unburned Wyoming big sagebrush communities with native bunchgrass-dominated understories is unknown.

The purpose of this study was to investigate the effects of moderate grazing during the off-season on exotic annual grasses and native vegetation in Wyoming big sagebrush-bunchgrass communities that are moderately-invaded by annual grasses. To accomplish this objective, we compared areas that for the past 6-10 years were off-season grazed or not grazed.

## Experimental Procedures

This study was conducted in Wyoming sagebrush-bunchgrass steppe south and southeast of Burns. These sagebrush-bunchgrass communities are at risk of converting to exotic annual grasslands. We applied two treatments: grazed (moderate, off-season grazing) and ungrazed (not grazed since to 2009) to five sites. Grazing by cattle was applied as part of the normal management of the pastures containing enclosures between November and early April each year. Pastures were located adjacent to one another. Cattle consumed 40-60 percent of the available forage based on biomass. Cattle were provided a protein supplement to ensure their nutritional needs were met during the off-season. Treatments were applied annually for the duration of the study. Vegetation characteristics were measured in mid to late June of each year from 2015 through 2019. We measured herbaceous vegetation cover and density by species. Bare ground, biological soil crust, and litter cover were also recorded. Sagebrush cover and density were also measured each year.

## Off-season grazing effects

Moderate, off-season grazing reduced the density and cover of exotic annual grasses in Wyoming big sagebrush-bunchgrass communities. Exotic annual grass cover and density were likely reduced with off-season grazing because cattle may selectively graze annual grasses during this time-period when other vegetation may be dormant or producing very little accessible new growth. Annual grass success is also expected to be less in grazed areas because grazing decreases safe sites for its emergence and growth by reducing herbaceous vegetation and litter cover. Bare ground was greater with off-season grazing, suggesting that favorable microsites for exotic annual grasses were reduced with this treatment. Thus, we speculate that off-season grazing reduced annual grasses through the physical effects of grazing it as well as modifying the microenvironment for its emergence and growth.


Off-season grazing also increased the density of the Sandberg bluegrass, a short statured native bunchgrass. The increased density of the Sandberg bluegrass suggests that off-season grazing may be opening safe sites for native perennials by reducing annual grasses. Similarly, Sandberg bluegrass increased with reductions in exotic annual grasses with off-season and spring grazing in recently burned sagebrush communities. However, large perennial

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bunchgrass density did not increase with reductions in annual grasses with off-season grazing. Though large bunchgrasses did not increase with off-season grazing, they also didn't decrease, suggesting that off-season grazing is compatible with bunchgrass conservation goals.

Off-season grazing general did not affect other measured variables with the exception of large bunchgrass cover. Off-season grazing reduced the cover of large bunchgrasses, but this was expected because grazing decreases the contribution of prior years' growth to cover. Importantly, other variables of conservation concern, such as soil biological crusts and sagebrush cover were not affected by off-season grazing. The results of prior studies and our current study suggest that off-season grazing by cattle may be a valuable tool for managing the expanding exotic annual grass problem.

If you would like to discuss this article or obtain a copy of the scientific journal article reporting these results, contact Dr. Kirk Davies at 541-573-4074 or [kirk.davies@oregonstate.edu](mailto:kirk.davies@oregonstate.edu).

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BW: +3.9, WW: +68, YW: +119, Milk: +28,  
Docility: +24, \$M +84, \$W +61, \$F +109, \$G  
+52, \$B+161, \$C +293  
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20% for Docility, Top 25% for Wean Wt.

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### RAA Phenom 12

Tag # P12 Reg No 20157128 DOB: 1/8/2021  
Sire: Tex Phenom 8051 Dam: Kessler's Generation 6559 Daughter  
Birth wt = 74 Wean wt. = 720  
BW: +2.6, WW: +70, YW: +127, Milk: +28, Docility:  
+24, \$M +79, \$W +66, \$F +114, \$G +55,  
\$B+169, \$C +298  
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\$F, Top 15% for \$M