Targeted Sheep Grazing for Dalmatian Toadflax and Geyer’s Larkspur Management

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Introduction
Targeted grazing is a land-management tool that can be used for weed control. Managers may manipulate defoliation timing, intensity, and frequency to maximize negative effects on weeds and minimize native plant community impacts. Effective perennial weed control generally requires multiple defoliations separated by periods of regrowth.

Dalmatian toadflax (Linaria dalmatica) is a noxious, competitive forb found in Wyoming and across the West (it’s one of 26 plants on the state’s “designated noxious weeds” list). L. dalmatica reduces desirable forage when present. Repeated grazing is predicted to reduce toadflax density over time, but clipping studies have shown mixed results.

Geyer’s (plains) larkspur (Delphinium geyeri) is a native forb of the High Plains of the Intermountain West that is toxic to cattle. Historically, managers used sheep, which are more resistant to alkaloids, to graze dense larkspur patches to reduce subsequent cattle poisoning; however, this practice has not been well researched for Geyer’s larkspur.

Objectives
Objectives of this study are to quantify effects of targeted sheep grazing and herbicides on Dalmatian toadflax, Geyer’s larkspur, and the native plant community.

Materials and Methods
We established four experiment sites in 2014 on a northern mixed-grass prairie at the U.S. Department of Agriculture’s High Plains Grasslands Research Station near Cheyenne. Two herbicide treatments, four grazing treatments, and a non-treated check were applied in a randomized complete block design to 30- x 60-ft cells, with each site serving as a block. Herbicide treatments—Perspective® (4.5 oz/ac) and Escort® (0.5 oz/ac)—were applied June 19, 2014, when both target species were flowering. Grazing treatments varied in density and timing with annual stocking rate held constant at 1.6 animal unit months (AUM)/ac in 2014 and 0.9 AUM/ac in 2015. Two treatments received their entire annual stocking rate in the spring: (1) the highest-density (HD) treatment, which used 40 sheep and was grazed only in 2014; and (2) the 1x grazing treatment, which held 20 sheep (as did all other grazing treatments) and was grazed in both 2014 and 2015. Grazing was distributed throughout the growing season in our two other grazing treatments. The 2x grazing treatment received half its annual stocking rate in spring and half in summer, while 3x grazing had the annual stocking rate distributed evenly among spring, summer, and fall grazing events.

We estimated initial weed density by counting live toadflax stems in a belt transect and larkspur plants in the entire cell. We counted both species again after grazing. Toadflax stems showing signs of grazing or trampling were excluded from post-grazing counts. We also measured plant biomass by growth form (i.e., grass, forb, shrub) at midsummer and after each grazing event.

Results and Discussion
Sheep utilization of both toadflax and larkspur increased with increasing grazing intensity in 2014 and 2015; however, toadflax density was similar across all treatments after any period of regrowth in 2014. Prior to the spring 2015 grazing event, Perspective was the only treatment to reduce toadflax stem density relative to spring 2014 values (Figure 1). Toadflax stem density

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increase appeared to be reduced by the 2x grazing treatment, but additional years of treatment may be needed to determine whether this trend continues. We saw high utilization of perennial grasses in all of our grazing treatments. Midsummer 2015 perennial grass biomass was similar to the check in all our grazing treatments, but repeated heavy utilization over time may put desirable species at a competitive disadvantage.

Grazing treatments greatly reduced larkspur density for the duration of the growing season in both years, but impacts of 2014 treatments carried over into 2015 only for the herbicide treatments, particularly Perspective (Figure 2). We believe that a lower grazing intensity may satisfactorily reduce larkspur within the season of treatment while retaining greater perennial grass biomass.

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Figure 1. Percent toadflax stem density change between spring 2014 (pre-treatment) and spring 2015 (following one year of treatment).

Figure 2. Percent larkspur density change between spring 2014 (pre-treatment) and spring 2015 (following one year of treatment).