Wildlife Planting, Gallatin County, MT

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Objective: Improve wildlife habitat
County: Gallatin County near Big Sky
Average Annual Precipitation: 20 inches
MLRA: 43B, Central Rocky Mountains
Dominant Soil Type: Typic Cryoborolls & Argic Cryoborolls
Elevation: 6100 ft
Site Preparation: Rake plant litter off site and apply herbicide
Seeding Date: November 12, 2015
Seeding Method: Broadcast seed
Acres Seeded: Three test areas, 0.1 acre total
Previous Site History: Douglas fir forest opening, bighorn sheep winter range
Herbicide: Glyphosate (Makaze) to remove all plants
Irrigation: None
Grazing: Wildlife only, grazing exclusion cages at Sites 1 & 2
Monitoring Dates: June 2016, July 2017, July 2018

Fig. 1. Site preparation included raking the plant litter off site and spraying with Roundup prior to seeding.

Introduction:

The purpose of the field planting was to evaluate the potential for improving the condition of Rocky Mountain bighorn sheep winter range located near Big Sky, Montana. This was a cooperative project with the Gallatin Invasive Species Alliance, Gallatin County Weed District, US Forest Service, Montana Fish, Wildlife and Parks, and NRCS. Noxious weeds were controlled for five years prior to this project. Weed management resulted in decreased noxious weed populations but increased cheatgrass cover. Prior to seeding, sites were raked to remove plant litter, glyphosate was applied (5 oz/gallon water) to kill remaining vegetation, and then seed was broadcast applied. There were three test areas with eight plots: individual species, a non-seeded control, and a mix of all species. Grazing exclosure cages (32 x 48 inches) were placed in each plot at Sites 1 and 2. During monitoring, the number of seeded species per plot were counted and the density (plants/ft^2) was calculated.

Table 1. Seeded species and their seeding rate.

Scientific Name	Common Name	Cultivar	lbs PLS/acre
Poa secunda	Nevada bluegrass	Opportunity	8.4
Pseudoroegneria spicata	Bluebunch wheatgrass	Goldar	30.0
Elymus lanceolatus	Thickspike wheatgrass	Critana	30.0
Linum lewisii	Lewis flax	Maple Grove	14.8
Dalea candida	Slender white prairie clover	Antelope	17.0
Ratibida columnifera	Prairie coneflower	Stillwater	8.4

Results:

The seeded species had low establishment in 2016 and 2017. All species increased over time except for slender white prairie clover. In 2018, all seeded species were observed except Nevada bluegrass (Table 2). Where seeded species established, the density was higher within the grazing exclosure cage than outside the cage indicating that protecting seedlings from grazing was beneficial in their establishment. Lewis flax and prairie coneflower had the highest density for forbs, and they established well throughout the plots. Thickspike wheatgrass had the highest density of the seeded grasses. Lewis flax averaged 23 inches tall, prairie coneflower averaged 15 inches tall, and thickspike wheatgrass was 10 inches tall.

Cheatgrass, common mullein, musk thistle, and other weeds species re-established on the sites at approximately 70% canopy cover (Fig 2). Even with the weed pressure, prairie coneflower, Lewis flax and thickspike wheatgrass successfully established. Prairie coneflower was the only seeded species being grazed by wildlife.

Fig. 2. Grazing exclusion cages in plots at Site 2, July 2018.

Summary:

- Prairie coneflower, Lewis flax, and thickspike wheatgrass were the seeded species with the highest densities. They established well on the weedy, southern aspect.
- Protecting seeded species from grazing improved the density of all species.
- Additional weed management for cheatgrass prior to seeding, or using a herbicide with residual to control cheatgrass and other weeds for a longer period of time, may improve seeded species establishment.

Table 2. Seeded species density (plants/ft^2) outside of grazing exclusion cages and within cages, July 2018.

Location	Bluebunch Wheatgrass		Thickspike Wheatgrass		Lewis Flax		Slender White Prairie Clover		Prairie Coneflower	
	Out Cage	In Cage	Out Cage	In Cage	Out Cage	In Cage	Out Cage	In Cage	Out Cage	In Cage
Site 1	0.07	0.6	0.2	0.9	0.1	1.0	0.0	0.1	0.2	0.8
Site 2	0.02	0.2	0.12	0.8	0.3	0.4	0.0	0.0	0.2	2.0
Site 3	0.01	n/a	0.0	n/a	0.1	n/a	0.0	n/a	0.01	n/a
Ave[1]	0.03	0.4	0.1	0.85	0.16	0.7	0.0	0.05	0.14	1.4

[1] Outside the cage is average of three sites, inside the cage is average of two sites. n/a: cages were not installed at site 3.

Fig. 3. Lewis flax (left) and prairie coneflower (right) established well despite cheatgrass cover.