



David Little Livestock Range Management Endowment

AT THE UNIVERSITY OF IDAHO

2017 Project Progress Report:

Livestock management to facilitate sage-grouse habitat in wet meadows: effects of grazing intensity on preferred forbs

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PERSONNEL:

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PRELIMINARY RESULTS FOR 2017:

BACKGROUND:

In the Rocky Mountain west, meadow and riparian pastures are an important component of ranching operations, and are also used by many species of wildlife because of the high forage production and access to water. Management of meadow and riparian pastures has been a topic of interest to the livestock industry, public lands agencies, and conservationists because of the need to understand how best to accommodate livestock and wildlife. One species that commonly co-occurs with livestock in riparian and meadow pastures is the Greater sage-grouse (*Centrocercus urophasianus*). Sage-grouse often use riparian and meadow pastures as late brood-rearing habitat because of the availability of forbs and insects that provide important dietary resources for chicks during the first month of life (Schrieber et al. 2015). The availability of suitable habitat during the juvenile growth period is critically important to juvenile sage-grouse survival and population recruitment. If well-managed, sustainable livestock grazing can be compatible with the habitat and dietary needs of sage-grouse (Sage Grouse Initiative 2017).

This research addressed the question of whether and how livestock grazing influences habitat conditions in meadow pastures that are potential brood-rearing habitat for sage-grouse. Grazing guidelines for brood-rearing habitat in meadows and riparian areas on public lands require a specific residual stubble height be retained at the end of the grazing season, but the relationship between residual vegetation height and desired conditions for sage-grouse habitat, including the quality and availability of forbs and grasses for sage-grouse, is not clearly understood. We collected data to evaluate how different levels of grazing utilization affect important sage-grouse brood-rearing habitat characteristics, such as foliar cover, abundance of forbs, canopy cover and vegetation structure. This work will yield information about the expected benefits of recently amended public lands sage-grouse habitat management guidelines. It will also advance the understanding of how livestock grazing may mediate the availability of food resources for sage-grouse in a sustainable way that achieves benefits for both wildlife and the livestock industry.

HYPOTHESIS or OBJECTIVES:

To address the knowledge gap regarding the relationship of residual stubble height (related to grazing intensity) with availability of preferred forbs, we created an experimental gradient of increased stocking rate and utilization by heifer cattle in meadow pastures. During data analysis, we will investigate the effects of increasing utilization on abundance of preferred forbs, vegetation structure and canopy cover, and cattle performance.

The objectives of this research were to determine how increased stocking rates and utilization (which result in decreased stubble heights) affect:

1. Post-grazing cover, biomass, horizontal and vertical structure, and regrowth of forbs preferred by sage-grouse and all vegetation;
2. Short-term changes in species composition of preferred forbs; and,
3. The performance and growth of heifer cattle

We predicted that as utilization increased, the cover of preferred forbs would not be affected until utilization was high enough to influence cattle diet preferences, or would be positively affected (though the removal of grass and dead biomass) up to moderate levels of utilization. At high levels of utilization during our experiment, the abundance or condition of some preferred forbs may be diminished, if they were species that are consumed by cattle.

PROCEDURES:

This trial took place at Rock Creek Ranch in Blaine County, ID in 2017 and is scheduled to be repeated in 2018. The ranch is owned by Wood River Land Trust and The Nature Conservancy and managed in collaboration with the University of Idaho. It is encumbered by Grassland Reserve Program conservation easements held by the Natural Resources Conservation Service, and is the site for a number of restoration, conservation, and educational activities.

Bred heifers ($n=75$) were shipped from the University of Idaho's Nancy M. Cummings Research, Extension, and Education Center to Rock Creek Ranch on July 7, 2017. The July 7 date was chosen because of plant phenology and approximate timing of when producers in this region would begin utilizing public lands grazing allotments that have meadow pastures as a component. Five pastures of approximately 5.5 acres (28, 328 m²) each were marked with fiberglass posts and three-strand high-tinsel electric wire. A sixth pasture of the same size was marked by fiberglass posts as an ungrazed control to provide a measurement of herbivory by wildlife. The experimental pastures were located in irrigated meadows on the southern part of the ranch that is approximately two miles from known sage-grouse leks. Stockwater was provided by the irrigation ditch that runs through all six pastures.

Vegetation and biomass data were collected along 150-ft transects prior to grazing (within three weeks before grazing), post-grazing (within one week after cattle were removed), and re-growth (eight weeks after cattle were removed). Transect locations were spatially balanced by establishing them at systematic intervals along each pasture boundary and marked for replication during each sampling period. Biomass data collected before and during the trial, as well as utilization data collected during the trial, were used to estimate an experiment duration necessary to achieve a utilization rate of 75% in the pasture with 25 cattle. Visual obstruction and measurements of average residual grass height were incorporated during post-grazing and regrowth periods.

ACCOMPLISHMENTS or RESULTS:

In 2017, cattle grazed for a total of 25 days to reach a utilization rate of 74% in the pasture with 25 cattle, and we achieved a utilization gradient throughout the five pastures (Figure 1). This suggests that our biomass and utilization data collection and analysis before and during the 25 days were accurate in estimating experimental duration based on animal size and available forage.

Seven forb species preferred by sage-grouse as dietary resources ("sage-grouse preferred forbs") were encountered during vegetation surveys, five of which are introduced (Table 1). Similarly, three of the common perennial grass species are also introduced. The pasture with ten heifers had a greater coverage of Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) than all others, and this will be taken into account during data analysis and interpretation. Our preliminary data summary suggests that percent foliar cover of perennial grasses did not increase or decrease greatly among data collection periods, but that total forb foliar cover varied among pastures and among data collection periods (Figure 2). As expected due to the short grazing duration, heifer cattle had similar gains and performance across pastures. Statistical tests and additional summaries will be performed to determine significance of patterns and differences among data.

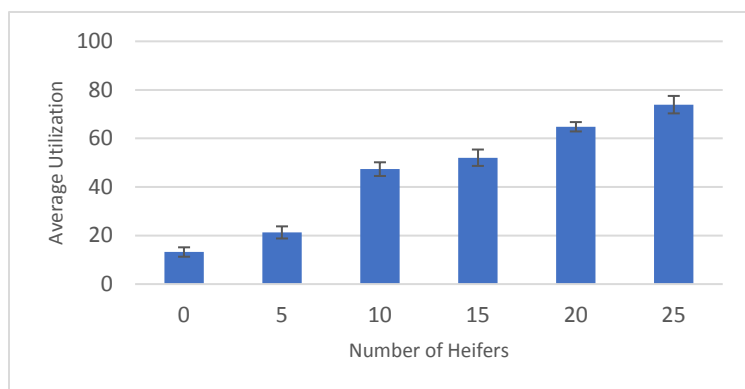


Figure 1. Average utilization in all grazing trial pastures in 2017 (\pm SE%).

Table 1. Common perennial grass and sage-grouse preferred forb species in grazing trial pastures.

Functional Group	Native/Introduced	Common Name	Scientific Name
Perennial grass	Introduced	Quackgrass	<i>Elymus repens</i>
Perennial grass	Introduced	Smooth brome	<i>Bromus inermis</i>
Perennial grass	Introduced	Meadow foxtail	<i>Alopecurus pratensis</i>
Perennial grass	Native	Baltic rush	<i>Juncus balticus</i>
Perennial grass	Native	Nebraska sedge	<i>Carex nebrascensis</i>
Sage-grouse preferred forb	Introduced	Perennial pepperweed	<i>Lepidium latifolium</i>
Sage-grouse preferred forb	Introduced	Prickly lettuce	<i>Lactuca seriola</i>
Sage-grouse preferred forb	Introduced	Salsify	<i>Tragopogon dubia</i>
Sage-grouse preferred forb	Introduced	Western tansymustard	<i>Descurania pinnata</i>
Sage-grouse preferred forb	Introduced	Common dandelion	<i>Taraxicum officinale</i>
Sage-grouse preferred forb	Native	Geranium	<i>Geranium viscosissimum</i>
Sage-grouse preferred forb	Native	Lupine	<i>Lupinus sp.</i>

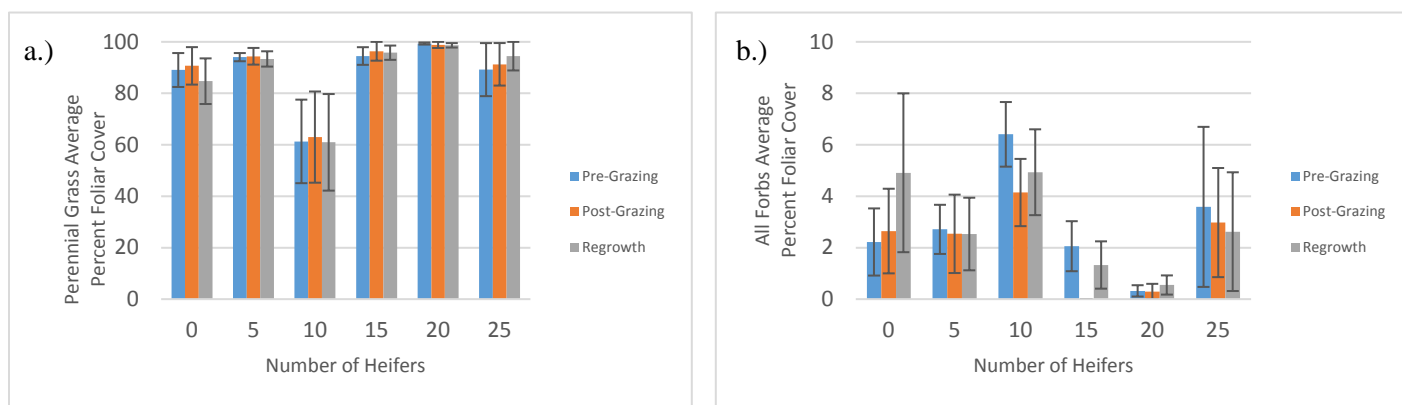


Figure 2. Percent foliar cover for a.) perennial grass and b.) all forbs for all pastures in 2017 (\pm SE%).

PUBLICATIONS or OUTPUTS:

This research has resulted in two presentations given by Keri York:

1. University of Idaho Sagebrush Saturday presentation at Rock Creek Ranch July, 2017. Sagebrush Saturdays are aimed at public audiences and advertised throughout southern Idaho.
2. Rock Creek Ranch Research Symposium presentation November, 2017.

Articles were submitted by Melinda Ellison to the Idaho Cattle Association's Line Rider Magazine for the December 2017 edition and by Tracey Johnson to the University of Idaho Alumni Magazine detailing the progress of this trial. An abstract has been accepted by the 2018 Society for Range Management annual meeting for a poster presentation, and we also expect to present a poster at the Idaho chapter of the Wildlife Society in March 2018. Society for Range Management meetings are attended by researchers, students, and producers. Additional outputs are expected upon completion of the

second year of this project (2018), including scientific oral and poster presentations, extension talks, peer-reviewed journal articles, magazine and extension articles, and Keri York's master's thesis.

LITERATURE CITED:

Sage Grouse Initiative. 2017. Grazing Management In Perspective: A Compatible Tool For Sage Grouse Conservation. Science to Solutions Series Number 14. Sage Grouse Initiative. 4pp.

Schreiber, L.A., Hansen, C.P., Rumble, M.A., Millspaugh, J.J., Gamo, R.S., Kehmeier, J.W., Wojcik, N. 2015. Microhabitat selection of brood-rearing sites by Greater sage-grouse in Carbon County, Wyoming. *Western North American Naturalist*, 75(3): 348-363.