2007 Range Vegetation Assessment at the United States Sheep Experiment Station, Dubois, Idaho

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ABSTRACT

The rangeland vegetation of two summer pastures at the US Sheep Experiment Station (USSES) in Dubois, Idaho was assessed in the summer of 2007. Field measurements were made at 99 randomly generated point locations, with 49 and 50 sample points at the Henniger and Humphrey pastures respectively. Ground cover types, their percent cover, and available forage biomass were estimated within 10m x 10m plots at the 99 locations. Live herbaceous species had the greatest mean percent cover at the Humphrey pasture (61%), while shrubs represented the greatest mean percent cover at the Henniger pasture (35%). Available forage biomass estimates were 300 kg per hectare at the Henniger pasture, and 669 kg per hectare at the Humphrey pasture. This is the first year of data collection at either of these USSES pastures.

KEYWORDS: Field measurements, forage estimate, ground cover estimate

INTRODUCTION

The 2007 sampling effort focuses upon the Humphrey and Henniger pastures at the U. S. Sheep Experiment Station (USSES) near Dubois, Idaho (Figure 1). The Humphrey pasture consists of 2,600 acres of land near Monida, Montana and is used for spring, summer, and autumn grazing and rangeland research. The Henniger pasture consists of 200 acres of land near Kilgore, Idaho, and is used for summer grazing and rangeland research. Mean annual precipitation (1971 to 2000) at the Dubois Experiment Station (112° 12' W 44° 15'N, elevation, 1661 m) is 331 mm with 60% falling during April through September. Soils are mapped as complexes of Maremma (Fine-loamy, mixed, superactive, frigid Calcic Pachic Argixerolls), Pyrenees (Loamy-skeletal, mixed, superactive, frigid Typic Calcixerolls), and Akbash (Fine-loamy, mixed, superactive, frigid Calcic Pachic Argixerolls) soils on slopes less than 20 percent, but mostly 0 to 12 percent (NRCS 1995).

Vegetation on the study sites are sagebrush-grass communities that is dominated by mountain big sagebrush (*Artemisa tridentata* ssp. *vaseyana* [Rydb.] Beetle) and threetip sagebrush (*A. tripartita* Rydb.). Subdominant shrub species include antelope bitterbrush (*Purshia tridentata* [Pursh] DC.), yellow rabbitbrush (*Chrysothamnus viscidiflorus* (Hook.) Nutt.), and spineless horsebrush (*Tetradymia canescens* DC.). There are a few small patches of the exotic forbs leafy spurge (*Euphorbia esula* L.) and spotted knapweed (*Centaurea stoebe* L. ssp. *micranthos* [Gugler] Hayek) and trace amounts (<1% of overall plant cover) of the exotic annual cheatgrass. Lupine (*Lupinus argenteus* Pursh) is the most plentiful forb on the study sites and the graminoids present are thickspike wheatgrass (*Elymus lanceolatus* [Scribn. & J.G. Sm.] Gould ssp. *lanceolatus*), bluebunch wheatgrass (*Pseudoroegneria spicata* [Pursh] A. Löve ssp. *spicata*), and plains reedgrass (*Calamagrostis montanensis* Scribn. ex Vasey).

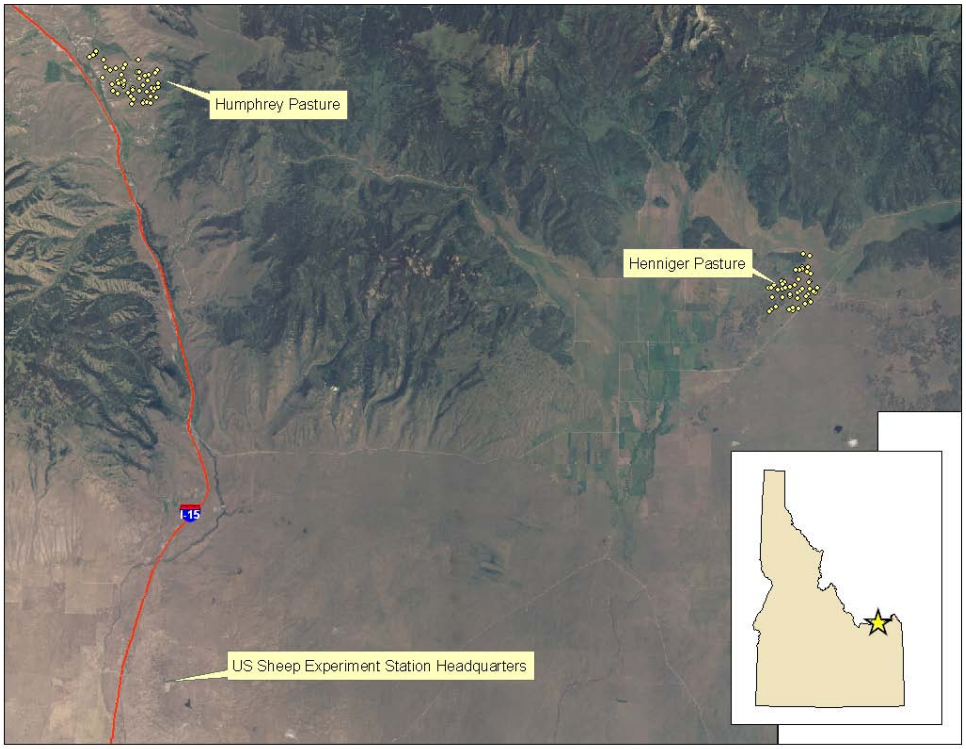

Figure 1. US Sheep Experiment Station, Henniger and Humphrey pastures.

The objectives of this study are to: 1) assess the rangeland vegetation at the Henniger and Humphrey pastures using LANDSAT and SPOT satellite imagery and field measurements and 2) compare the rangeland vegetation assessment with similar assessment performed at the Tsakhiriin tal area of the

Darkhad Valley, Mongolia. The field-based measurements of the USSES pasture vegetation assessment were performed in late July-early August of 2007. The results of the field-based measurements are presented here and will be later combined with satellite imagery analysis results.

METHODS

A total of 100 random points were generated within the Henniger and Humphrey pasture sites prior to field assessment. Each point represented a sample location, at which field measurements were made within 10m x 10m plots. The plots were centered at each random point and the edges of the plots were aligned in the cardinal directions. Four digital photographs were taken at each plot in each of the four cardinal directions. The field measurements included ground cover estimation and forage biomass measurement. Ground cover estimation included estimates of percent cover of bare soil, rock >75 mm, litter, herbaceous standing dead, dead standing wood, live herbaceous species, live shrubs, and dominant weed. Percent cover estimates were made along two 10 m line transects, perpendicular to each other and crossing at the center of the plot at 5m of each line transect, using a point-intercept method (Gysel and Lyon 1980). Records were made every 20 cm along each 10 m line, beginning at 10 cm and ending at 990 cm, to indicate the cover type at the point (n = 50 points for each line and 100 points for each plot).

Litter refers to biomass that is on the ground and in contact with the ground. Live herbaceous species refers to live (i.e., green) forbs and grasses, while live shrubs include all species of shrubs.

Forage biomass was measured twice at each sample plot using one 2 meter by 0.5 meter modified Daubenmire frame (Daubenmire and Daubenmire 1968). The frame was placed north of the east-west transect line, with the 0.5 meter end centered on the transect tape at 2.5 meters. The frame was then moved south of the east-west transect line, with the 0.5 meter end of the frame centered on 7.5 meters. All green and senescent herbaceous biomass was clipped, separated into forbs and grasses, and then wet-weighed in a paper bag using a spring scale (Chambers and Brown 1983). For each field day, 5 bags each of clipped forbs and grasses were labeled and kept to be air-dried and weighed again to convert wet weights to dry weights.

RESULTS

The most common ground cover type at the Henniger pasture was shrub species with a mean estimate of 35% cover (Figure 2). The second most common ground cover type was grass, which made up 19% cover on average. The most common ground cover type at the Humphrey pasture was grass species with a mean estimate of 42% cover (Figure 2). The second most common ground cover type was shrub, which made up 26% cover on average. Bare soil cover was more common at the Henniger pasture than at the Humphrey pasture, comprising 17% and 3% respectively. Forb cover class was more common at the Humphrey pasture than at the Henniger pasture, comprising 19% and 8% respectively. Other ground cover types of rock, weed, standing dead wood, and standing dead herbaceous comprised less than 1% cover (Figure 2).

Plot-level averages of wet forage biomass ranged between 31-568 gm per frame at the Humphrey pasture, and between 2-142 gm per frame at the Henniger pasture. The average wet forage biomass at Humphrey was 66 gr per frame, while the average wet forage biomass at Henniger was 18 gr per frame. These estimates translate to average forage biomass of 300 kg per hectare at the Henniger pasture, and 669 kg per hectare at the Humphrey pasture.

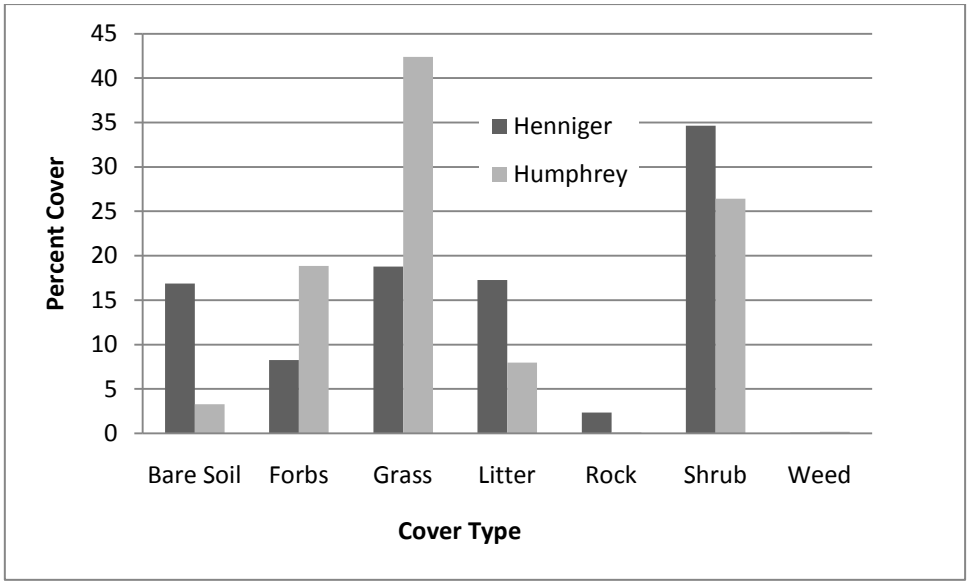

Figure 2. Mean (±SE) percent cover of all primary ground cover types at the Henniger and Humphrey pastures in the summer of 2007. Percent Standing Dead Wood, and Percent Standing Dead Herbaceous were <1%.

CONCLUSIONS

The observed ground cover types and their estimated percent cover showed distinct differences between the two pastures. While the Humphrey pasture sees sheep grazing during the spring, summer and fall, as well as a low number of cattle in the fall, forage per acre is much greater than that found at the Henniger pasture. The lower percentage of shrub at the Humphrey pasture might be attributed to the higher altitude of the site and the resultant high snow load and high winter winds. Low percent cover of bare soil and weeds, but high percent cover of live herbaceous species might suggest that the Humphrey pasture, while heavily used, is not overgrazed.

ACKNOWLEDGEMENTS

This study was made possible by a grant from the National Aeronautics and Space Administration Goddard Space Flight Center (NNX06AE47G). Idaho State University would also like to acknowledge the Idaho Delegation for their assistance in obtaining this grant.

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