2008 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 2008. Field measurements were made at 100 randomly generated point locations with 50 sample points taken at each summer pasture. The two pastures sampled at the USSES were the Humphrey and Henniger pastures. Ground cover types, their percent cover, and available forage biomass were estimated within 10m x 10m plots at the 100 locations. Live herbaceous species had the greatest mean percent cover in both pastures. Humphrey held close to 30% average grass cover while the Henniger pasture contained about 29% average grass cover. Mountain big sagebrush was the most commonly seen shrub dominating over half of the sample points in each pasture. Weeds are having little impact on the land with less than 1% found in both the Humphrey and Henniger pastures.

KEYWORDS: Field measurements, forage estimate, ground cover estimate

INTRODUCTION

The 2008 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-grassland communities dominated by mountain big sagebrush (*Artemisa tridentata* ssp. *vaseyana* [Rydb.] Beetle) and threetip sagebrush (*A. tripartita* Rydb.).

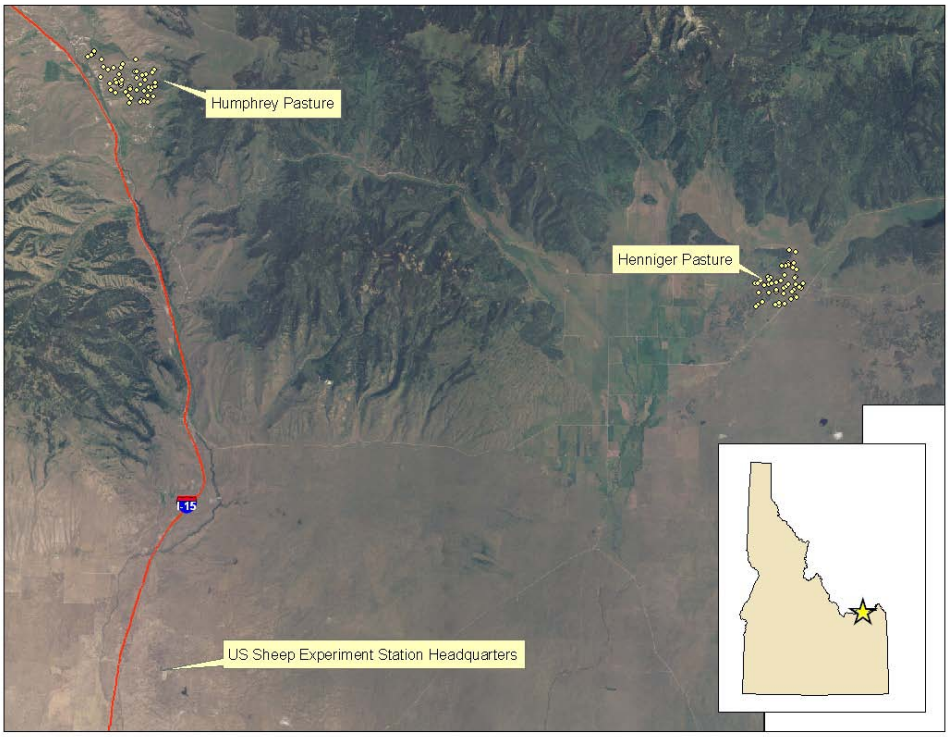

Figure 1. US Sheep Experiment Station, Humphrey and Henniger pastures.

The objectives of this study were 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 to early August of 2008. The results of the field-based measurements are presented in this document and will be later combined with satellite imagery collected during the summer of 2008.

METHODS

A total of 100 random points were generated within the Humphrey and Henniger 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. These were taken first to avoid photographs containing disturbances to the land that may have been caused while the researchers gathered the information. The field measurements included ground cover estimation and forage biomass measurement. Ground cover estimations were made describing percent cover of bare soil, rock >75mm, litter, herbaceous standing dead, dead standing wood, live herbaceous species, live shrubs, and dominant weed. Percent cover estimates were made along two 10m line transects perpendicular to each other and crossing at the center of the plot at 5m of each line transect. This was done using a point-intercept method (Gysel and Lyon 1980). Records were made every 20cm along each 10m line, beginning at 10 cm and ending at 990 cm, to indicate the cover type at the point using ocular estimates (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. The dominant shrub species were noted in each sample point.

Forage biomass was measured four times at each sample plot using a plastic coated cable hoop 2.36 m in circumference, or 0.44 m^2. The hoop was randomly tossed into each of the four quadrants (NW, NE, SE, SW) that were made from the transect lines. All green and senescent herbaceous biomass was clipped and weighed in a paper bag using a Pesola scale tared to the weight of an ordinary paper bag. All grass species were considered forage. The measurements were then used to estimate forage amount in AUM's, pounds per acre, and kilograms per hectare (Sheley et al. 1995).

RESULTS

The most common ground cover type at the Henniger pasture was live herbaceous species, or grass, with a mean estimate of 29% cover (Figure 2). The second most common ground cover type was live shrubs which made up 23% cover on average. The most common ground cover type at the Humphrey pasture was also grass species with a mean estimate of 30% cover (Figure 2). The second most common ground cover type was shrub which made up 21% cover on average. Bare soil cover was only a little more common at the Henniger pasture than at the Humphrey pasture, comprising of 14% and 13% respectively. Forb cover class was again more common at the Henniger pasture, but only by a small amount. Henniger comprised of 17% mean forb cover while the Humphrey pasture contained 15% mean forb cover. Litter had an average higher percentage in the Humphrey pasture with 14% and less in the Henniger pasture with 10% average cover. Rock was seen in <1% on average in the Henniger pasture while the Humphrey pasture had just barely over 1% average cover. Standing Dead Herb and Standing Dead Wood both had a very low average cover (between 1-5%) in the Humphrey and Henniger pastures. In both pastures weed had an average cover of <1% (Figure 2).

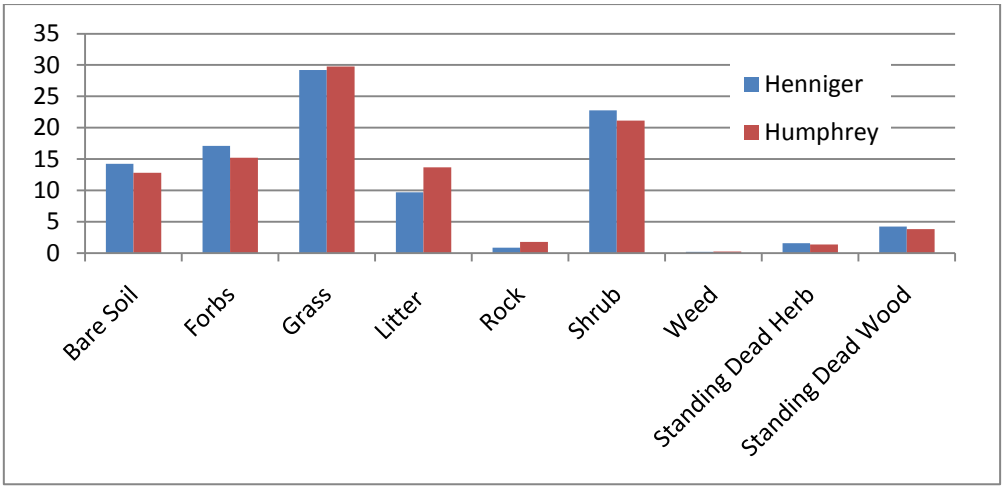

Figure 2. Mean percent cover of all primary ground cover types at the Henniger and Humphrey pastures in the summer of 2008.

CONCLUSIONS

The two pastures seemed very similar when comparing average shrub cover. Grass, litter, and rock had higher percent cover in the Humphrey pasture while bare soil, forbs, and shrub had higher percentages in the Henniger pasture. These differences in percentages were not significant though (Figure 2). In the summer of 2007, a similar assessment occurred at both the Henniger and Humphrey pastures (Figure 3). When compared with the sampling from 2008 it is easy to see differences between the two summers. Sample points were randomly generated both years, so it should be noted that the varying results may be due simply to the placement of sample points. In addition, environmental factors as well as observational bias should be noted as other possible influences to account for the observed changes from the previous year. In the Henniger pasture grass and forbs both saw a fairly significant increase while the Humphrey pasture saw an increase in bare soil and litter. Bare ground exposure is considered detrimental, so this change is a negative result of this sampling. This is only the second year spent sampling this type of data in the Humphrey and Henniger pastures, so by further sampling and comparison, a better analysis could be made to see if this trend continues.

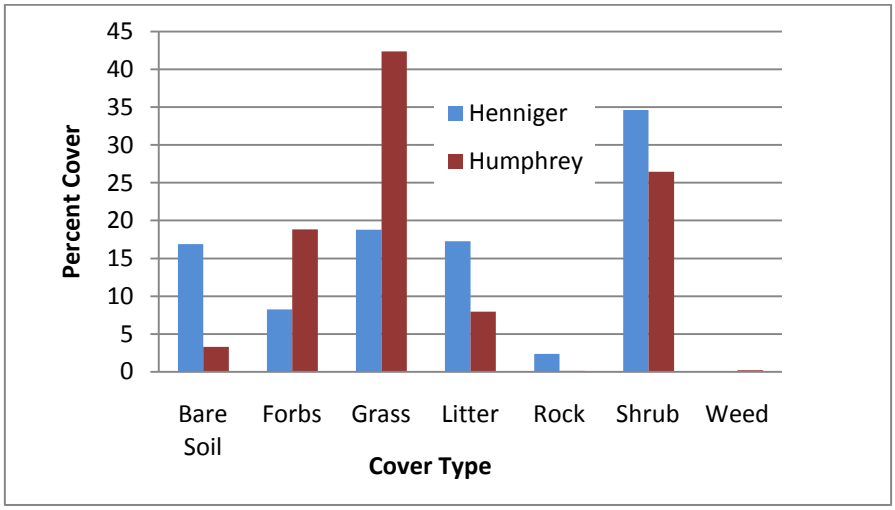

Figure 3. Mean percent cover of all primary ground cover types at the Henniger and Humphrey pastures in the summer of 2007. Percent Standing Dead Wood, and Percent Standing Dead Herbaceous were <1%.

Cheatgrass is a weed that is invasive to rangelands of the Intermountain West (Colorado State University 2008. It is good to note that none of the samples in either site contained cheatgrass. This is a positive result that also suggests the need for continued sampling. Weeds observed in the pastures tended to be Canada thistle (*Cirsium arvense* (L.) Scop) which was found at very low cover (<1%) in both 2007 and 2008. Though an increase in bare soil was seen in the Humphrey pasture from 2007 to 2008, the percentage still remains low (Figure 2 and 3). A low percent exposure of bare soil and weeds, but high percent cover of live herbaceous species (grass, forbs, and shrubs) suggests the Humphrey and Henniger pastures are currently in a good rangeland state.

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LITERATURE CITED

Chambers, J. C., and R. W. Brown. 1983. Methods for Vegetation Sampling and Analysis on Revegetated Mine Lands. USDA For. Serv. Gen. Tech. Rep. INT-151. 57pp.

Daubenmire, R. F. and J. B. Daubenmire. 1968. Forest Vegetation of Eastern Washington and Northern Idaho. Wash. Agric. Exp. Stn. Tech. Bull. 60. 104pp.

Davison, J. and G. Beck. 2008. Cheatgrass and Wildfire. Colorado State University URL: http://www.ext.colostate.edu/Pubs/natres/06310.html visited 27-October-2008

Gysel, L. W., and L. J. Lyan. 1980. Habitat Analysis and Evaluation. Pages 305-317 in: S. D. Schemnitz, ed. Wildlife Management Techniques Manual, 4th ed. Revised. The Wildl. Soc. Washington. D. C. 111pp.

Natural Resources Conservation Service (NRCS). 1995. Soil Investigation of Agriculture Research Service, United States Sheep Experiment Station headquarters range, US Department of Agriculture. Rexburg, ID: NRCS. 133pp.

Sheley, R., S. Saunders, and H. Charles. 1995. AUM Analyzer. Montana State University. URL= http://www.montana.edu/wwwpb/pubs/mteb133.pdf visited 1-October-2003

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