

**Project Title: Grazing Sagebrush with Sheep to Enhance Greater Sage-grouse Brood-rearing Habitat**

Research Team:

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***Project Summary***

The purpose of this study is to evaluate the effects of strategic sheep grazing on vegetative communities believed important to sage-grouse brood. Intensive dormant season sheep grazing should increase the abundance of herbaceous understory plants (i.e. dandelion, cinquefoil, locoweed) by reducing competition by sagebrush as well as through pedoturbation and nutrient recycling (sheep urine and feces).

The experimental design consists of 8 sets of paired plots, 1 grazed plot and 1 control. Four sets of paired plots are located in areas having received a once-over Dixie harrow treatment in 2001. The other 4 sets of paired plots are located in unmanipulated sagebrush stands. Selection of which plots would be grazed and which would serve as a control was random. Each plot is approximately 3.2 ha.

***Pre-treatment data collection***

Pre-treatment vegetation data was collected during the first 2 weeks of July 2006. Four transects were randomly located within each plot as well as at 10m, 20m, and 30m outside each plot. Vegetation metrics measured included shrub cover and height (line intercept), vertical obstruction (Robel pole), and understory vegetation composition and ground cover (20 x 50 centimeter Daubenmire frame and point intercept).

Immediately after vegetation data collection was completed, arthropods were sampled in and around all plots. Pitfall traps were established near each vegetation transect. Diluted antifreeze was poured into each pitfall trap to euthanize and preserve arthropods falling into the traps. Each pitfall trap was left open for approximately 48 hours.

During late July 2006, pellet counts and bird dog flush counts were conducted in all plots. Sage-grouse pellets were counted and removed from 1-meter radius circular plots located at each end of each vegetation transect in and around each plot. Bird dog flush counts were conducted using dogs experienced at locating sage-grouse on Parker Mountain. Each plot was thoroughly

covered by at least 1 dog and 1 handler. All grouse flushed from a plot were counted and their approximate location marked with a GPS.

Just prior to sheep grazing, shrub density was estimated using 5 3-m radius circular plots in each control and grazed plot. At the same time, 5 sagebrush plants were randomly chosen and all above ground biomass was harvested. Harvested plants were dried and weighed as an estimate of sagebrush biomass within each plot. Biomass sampling was repeated immediately after grazing to determine the amount of biomass consumed by sheep.

### ***Sheep Grazing***

Beginning in mid-September, 3-strand electric fences were constructed around plots randomly chosen to be grazed. Approximately 1,000 local ewes belonging to Andy Taft were used to graze plots. The sheep were split into 2 herds of approximately 500 head each so that plots could be grazed 2 at a time. The sheep were moved onto the first 2 plots on 17 October. Grazing was conducted at this time to insure that herbaceous plants were dormant and therefore not negatively effected and to allow time for terpene levels in the sagebrush to decline. Grazing typically took between 7 and 10 days per plot, depending on the amount and size of the sagebrush in each plot. Grazing was completed on 27 November 2006. Assessments of sheep body condition were conducted prior to grazing and again at the end of the treatment by the local Extension Livestock Specialist, Kim Chapman. The average pre-grazing body condition was determined to be 2.5. After over a month of grazing sagebrush, the average body condition was determined to be between 2.5 and 2.75.

## **Results**

### ***2007 Field Season***

During the 2007 field season, vegetation and grouse use data were collected as described for the pre-treatment data. In addition, 3 area constrained surveys were conducted in each plot. Area constrained surveys consisted of 4 people, spaced approximately 20 meters apart, walking the length of one side of the plot and then walking back along the opposite side.

### ***Preliminary Findings***

Sagebrush coverage in grazed plots was reduced from approximately 27.3% in July 2006 to approximately 8.6% in 2007. Conversely, sagebrush coverage in ungrazed plots increased from 26.5% in 2006 to 26.9% in 2007. In 2007, both forbs and grasses had less coverage than in 2006 (Figure 1). However, both forbs and grasses had greater coverage in grazed plots than in control plots, despite heavy season long grazing by cattle and antelope. The general reduction in forbs and grasses is likely due to the lack of winter snow pack and summer precipitation. Shrub density was reduced from approximately 25,818 plants per hectare in 2006 to 10,232 in 2007. Density in ungrazed plots did decline from an average of 24,174 plants per hectare in 2006 to 21,638 plants per hectare in 2007.

Pellet counts conducted in all plots indicate that in 2007, grouse used grazed plots in the Parker Lake area (area received a twice-over Dixie harrow treatment in 2001) more than any of the other plots. On average, grazed plots contained 5 times as many pellets as did ungrazed plots. Both area constrained surveys and bird-dog flush count surveys further confirm that grouse used grazed plots more heavily than ungrazed control plots (Figure 2). During 3 area constrained surveys, an average of 5.8 grouse were flushed per grazed plot, compared to an average of 1.9 grouse per ungrazed plot. Bird-dog surveys conducted in 2006 indicate that sage-grouse were using control plots more than grazed plots (bird-dog surveys were conducted prior to applying grazing treatments in 2006). In 2007, no grouse were flushed from control plots. In comparison, an average of 2.6 grouse were flushed per grazed plot. Figures 3-6 provide a pictorial site overview from 2006-to fall 2007.

### ***Project and Budget Status***

All project activities are currently on track. All insect and biomass samples from the 2007 field season have been processed and all data has been entered. The project is operating within the allotted budget.

### ***2008 Plan of Work***

Vegetation measurements, pellet counts, area constrained surveys, and bird dog flush count surveys will be conducted during July 2008. Shrub density and biomass sampling will be conducted during early October. The preliminary findings of the research will be presented at the 2008 national meeting of the Society for Range Management.

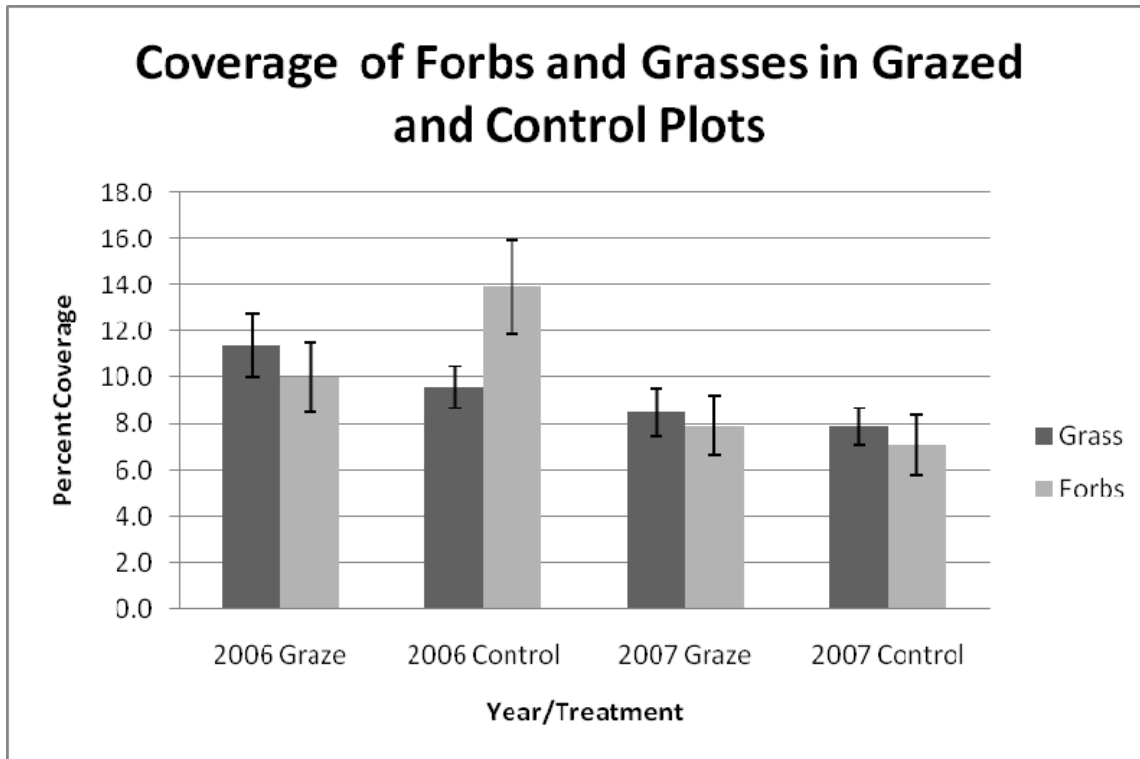


Figure 1. Forb and grass coverage in experimental sheep plots, Parker Mountain 2006 and 2007.

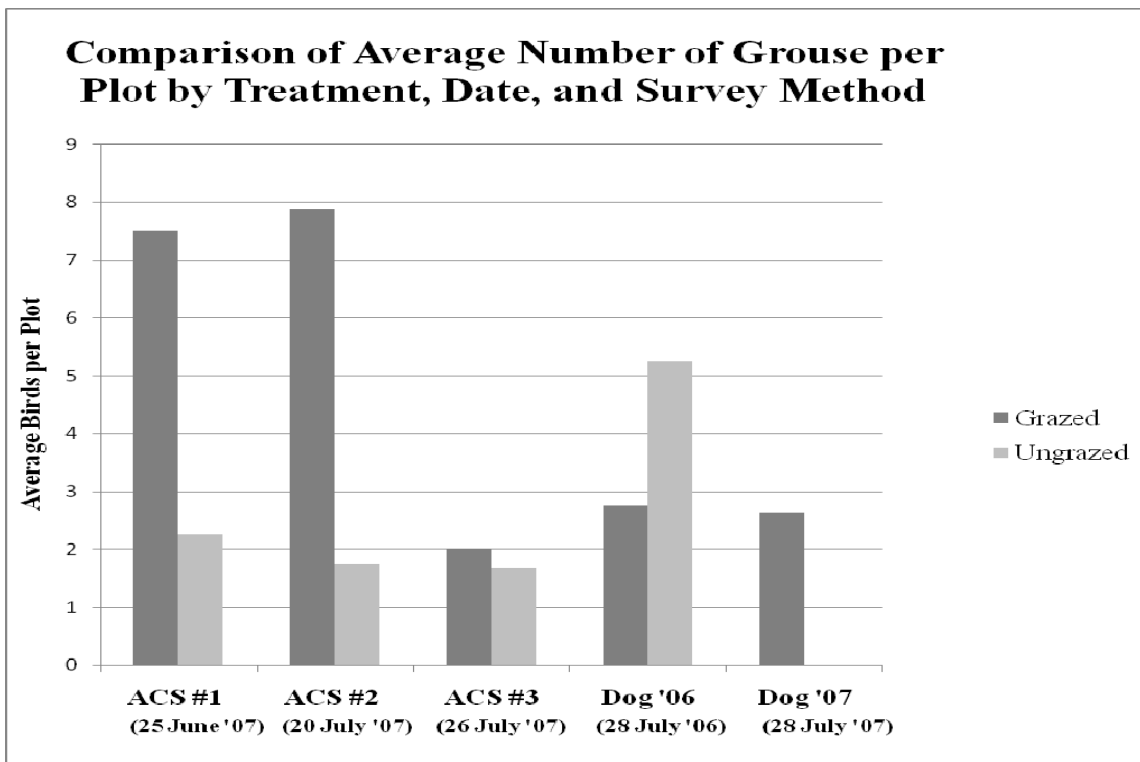


Figure 2. Average number of bird flushed per plot during area constrained surveys (ACS) and bird-dog flush counts.

**Amount funded over 3 years: \$141,124**  
**Status: On-going**

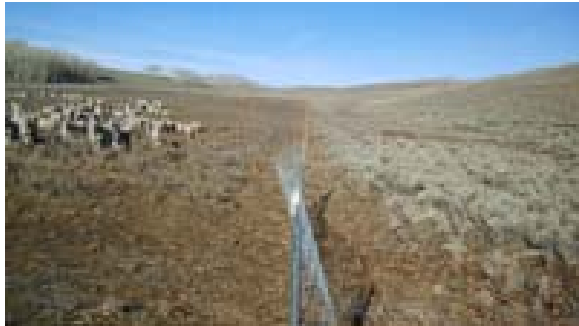


Figure 3. Grazed plot (left) and ungrazed plot (right), Parker Mountain Study Site, 2006.



Figure 5. Sagebrush plot (center of photograph) in the spring, Parker Mountain Study Site, 2007.



Figure 4. Heavily grazed sagebrush plant, Parker Mountain Study Site, 2006.



Figure 6. Greater sage-grouse brood flushing from a grazed sagebrush plot (center of photograph), Parker Mountain Study site, 2007