

Project Status Report: June-July, 2009.

**Evaluation of the Role of Strategic Livestock Grazing to Enhance
Greater sage-grouse Brood-rearing Habitat on Anthro Mountain**



Greater sage-grouse numbers and distribution have been declining in Utah and other western states. In some cases these declines have been associated with loss and degradation of brood-rearing habitat. Sage-grouse habitat on Anthro Mountain was disked and seeded with smooth brome grass in the 1950s. This grass has become naturalized and dominates the understory of brood-rearing habitat in the study site. Strategic livestock grazing has been used to manage cover of grass species and of sagebrush to attain a more desirable balance of forbs for wildlife habitat. This grazing-wildlife habitat project will evaluate the use of livestock grazing management to enhance brood-rearing habitat for sage-grouse on Anthro Mountain.

Evaluation of the Role of Strategic Livestock Grazing to Enhance Greater sage-grouse Brood-rearing Habitat on Anthro Mountain

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Greater sage-grouse (*Centrocercus urophasianus*) are a sagebrush (*Artemisia spp.*) obligate species (Wirth and Pyke 2003, Schroeder et al. 2004). Sage-grouse require several types of sagebrush habitat throughout their life cycle (Braun et al. 1977, Connelly et al. 2000). The Utah Division of Wildlife Resources (UDWR) estimates that both numbers and distribution of sage-grouse in Utah have decreased to less than 50% of historic levels (UDWR 2002). Similar declines have occurred throughout the western United States and western Canada. These declines have led to multiple petitions for the species' protection under the Endangered Species Act of 1973 (USFWS, <http://ecos.fws.gov/speciesProfile/SpeciesReport.do?spcode=B06W>). In Utah these declines are generally attributed to the reduction and fragmentation of sagebrush habitats. In some areas, the declines are more specifically considered related to loss and degradation of brood-rearing habitat for sage-grouse chicks.

During the brood-rearing phase of their life cycle until about 3 months of age, sage-grouse chicks depend largely on insects for dietary nutrients (Klebenow et al. 1968, Peterson 1970). Adequate insects are generally found in habitat characterized by diverse, abundant forb and insect communities within relatively open shrub communities with abundant forb and grass understory (Sveum et al. 1998, Connelly et al. 2000, Hagen et al. 2007).

Management of sagebrush ecosystems for increased brood-rearing habitat using chemical and mechanical treatments may result in more abundant forb and grass understory and reduced sagebrush cover (Dahlgren et al. 2006). However, sagebrush ecosystems may also be managed utilizing livestock grazing (Vavra 2005).

Livestock grazing may have either negative or positive impact on sage-grouse habitat depending on how it is applied (Beck and Mitchell 2000). Improperly applied it may reduce sagebrush cover and alter plant community composition (Archer 1989, Laycock 1991, Fleischner 1994, Weiss 1999, Vavra 2005). Livestock grazing when properly applied may change plant community composition, increase productivity of selected species, increase forage quality, and alter structure to increase habitat diversity (Vavra 2005). Properly applied livestock grazing has been used to manage habitat for wildlife species such as elk (*Cervus elaphus*; Vavra and Sheehy 1996), and to achieve a desired balance of sagebrush to forbs and grass for ground nesting birds such as the endangered Atwater prairie chicken (*Tympanuchus cupido attwateri*; Holechek 1981). Careful timing of controlled intensive grazing may reduce sagebrush and grass cover, and increase forb cover (Holechek 1981, Vavra 2005).

Project Objective

The purpose of this project is to evaluate the ecological viability of using strategic intensive cattle grazing to manage sage-grouse brood-rearing habitat on Anthro Mountain, Utah.

Study Site

Anthro Mountain study area is in the U.S. Forest Service (USFS) Ashley National Forest in northeastern Utah. Elevations range from 2500 - 2900 meters. Historically the area was used for livestock grazing. In the mid 1950s approximately 80% of the arable land was disked and seeded to smooth brome (*Bromus inermis*). The smooth brome has become naturalized in the area as other components of the native plant community have returned (Figure 1). The areas that have not been seeded to smooth brome are dominated by blue bunch wheatgrass (*Pseudoregeneria spicata*), and an array of native forbs including vetches (*Astragalus spp.*) and penstemons (*Penstemon spp.*). Shrub species include snowberry (*Symphoricarpos occidentalis*) and rabbitbrush (*Chrysothamnus viscidiflorus*).

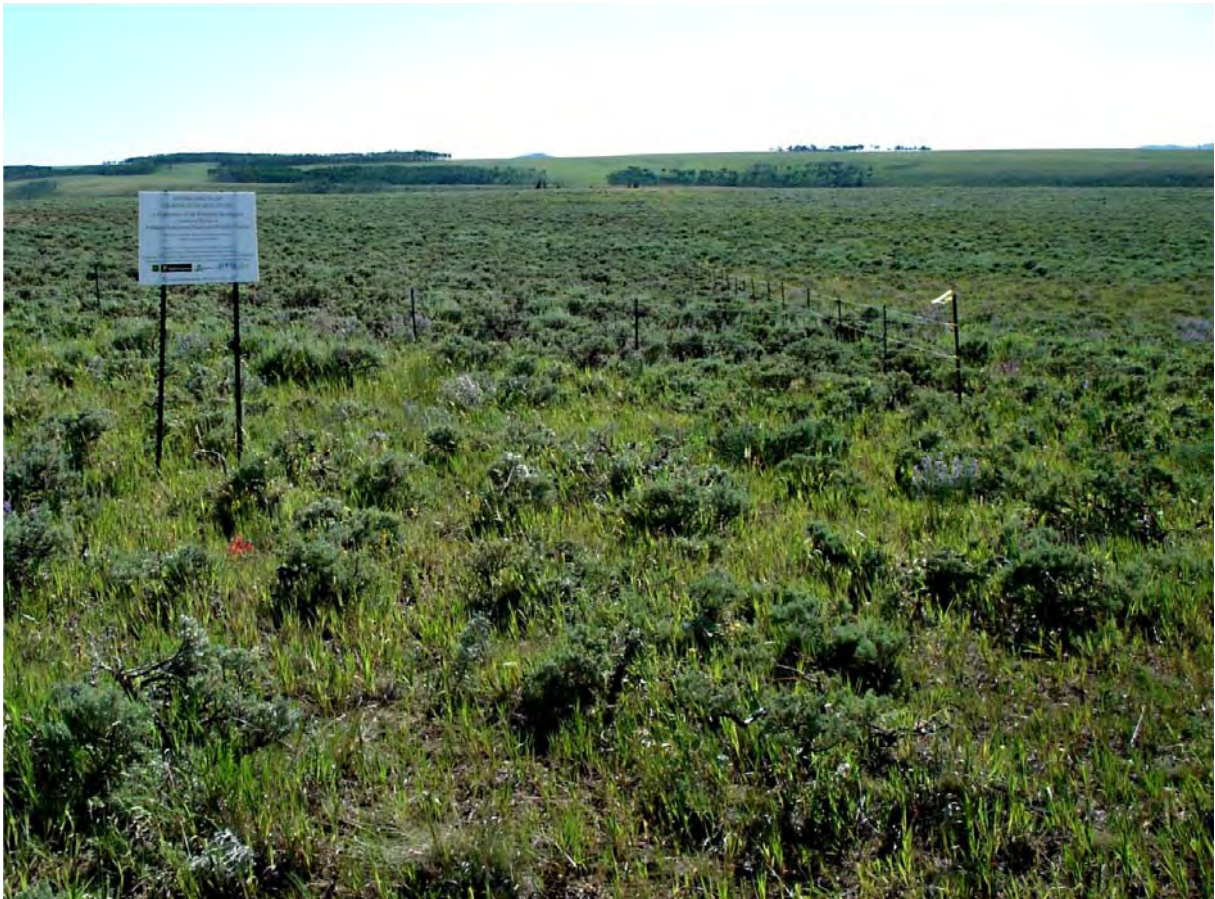


Figure 1. A view of the general study area and project sign on Anthro Mountain, with one of the treatment pastures in the upper third of the photo. All photos courtesy of Chris Peterson.

Methods

In late-June, 2009, we identified 4 paired-plot (1 paired-plot = 1 treatment plot and 1 control plot) locations on similar ecological sites. Each plot was approximately 10 acres. Individual plots were randomly assigned to the grazing treatments of graze, or control. Plot corner coordinates were downloaded into a GPS unit and marked with steel t-stakes. The 4 treatment plots were fenced with 2 strands of portable electric polypropylene fencing. The electric fencing was charged using 12-volt deep cycle batteries. A baseline with 5 randomly located 30-m vegetation transects was established and marked in each treatment and control plot. Baseline endpoints were marked with metal t-stakes; transect endpoints were marked with 8" metal spikes driven to ground level, painted with fluorescent paint, and flagged (Figure 2). Grazing exclosures were also constructed around representative vegetation in each plot for productivity measurements.



Figure 2. To establish a transect, a 100' tape is stretched from the baseline point. Endpoints are marked with permanently placed 8" steel spikes and flagging. Vegetation is measured at predetermined intervals along the transect for characteristics such as forb or shrub cover and species composition.

Three 8-10' circular water troughs were provided for treatment pastures #3 and #6. The Nutter's Spring pipeline supplied water for these troughs. Six 8' steel water troughs were provided for treatment pastures #2 and #7. Water delivery for these pastures was privately contracted. All water troughs were located in a general access area to be opened and closed to use from each pasture as needed (Figure 3).



Figure 3. The herd required over 5070 gallons of water each day. A private contractor trucked water to the study site and left the full tanker onsite. Six steel troughs were filled 5-6 times each day to maintain free access to water for all cattle.

Two days prior to initiation of the grazing treatment, we measured all transects for species composition, foliar cover with the point intercept method (every 20 cm), shrub cover with line-intercept, and forb-grass cover with Daubenmire frames every 3 m (Figure 4, Daubenmire 1959). Productivity and utilization were estimated from clipping and weighing all forbs and grasses within the Daubenmire frame at 2, 8, 14, 20, and 26 meters.



Figure 4. Daubenmire frames provide units of reference for estimating the percentage of cover within the frame area provided by each species of grass and forb, as well as of bare ground, litter, and rock.

Pre- and post-treatment photos were taken from baseline endpoints, transect endpoints, and of each Daubenmire frame.

One hundred sixty-nine cow-calf pairs and 6 bulls were introduced to each treatment pasture in succession. Immediately following the grazing treatment in the final treatment pasture, electric fencing was removed and cattle were released into the entire grazing allotment (Figures 5, 6). The upper pasture water troughs were also removed. The remainder of the seasonal grazing on the allotment proceeded according to recent past years: cattle were free to graze at will, both treatment and control plots.



Figure 5.



Figure 6.

Cattle had no problem deciding to leave the experimental pastures for the greener pastures outside of the fence. They will remain in the entire grazing allotment including the open treatment and control plots, for the remainder of the season. Fencing was removed for free access to all areas.

Results

Grazing treatments were conducted from July 7-14. Cattle remained in each treatment for 18-24 hours. Utilization was estimated at >90%. All pre-treatment data was collected immediately prior to introduction of cattle to pastures. Post-treatment data was collected on the treatment pastures immediately following the grazing treatment.

Still to come

In mid-August we will conduct sage-grouse pellet surveys, and use bird dogs to assess numbers, age, and sex of sage-grouse on treatment and control plots. Post-treatment data will be collected on the control pastures when cattle are removed from the allotment for the season.

Photos

Extra photos depicting conditions pre- and post- treatment are included immediately following the references section.

References

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Extra Photos

Pre-treatment forage in pasture #6.



Fenceline showing forage conditions after 18 hours of grazing in pasture #3 on the left of the fence, and immediately prior to grazing in pasture #6 on the right of the fence.



At 18 hours of grazing in pasture #3 cattle are seriously considering the grass on the other side of the fence.



169 cow-calf pairs fill a 10 acre pasture.



Contemplating life (on the other side of the fence). Notice the green vegetation on the other side of the fence in the background.



Anthro Mountain view of the Uinta Basin, and of 169 cow-calf pairs on 10 acres.



Electric fencing works, but it doesn't stop 'reaching under'.



Post-grazing.



Cows agree to move to pasture #2.



Cattle waiting for the gate to be taken completely down.



Utilization estimated at over 90%.



Utilization estimated at over 90%.



Anthro Mountain Grazing Research Study sign with cattle in pasture #7 gathered around the water troughs and tanker.



Fenceline of pasture #7 showing pre- and post-grazing conditions.



Corner post of pasture #7 after grazing and removal of fencing.



Fenceline after removal of fencing in pasture #2.