

2012 ANNUAL REPORT

Anthro Mountain Greater Sage-grouse



Photo Courtesy of Erin Duvuvuei

Cooperators

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Figure 1. This image shows the geographic location and spatial reference of the three study areas used for this research project4

The cover photo is a view looking south on Nutter’s Ridge and typifies the habitat commonly found on Anthro Mountain.

Introduction

Greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse or grouse), the largest of all grouse species in North America, are dependent on sagebrush (*Artemisia* spp.) communities throughout their range for annual food and cover (Wallestad 1975, Wallestad and Eng 1975). Sage-grouse were once found in 16 western states and 3 Canadian provinces (Schroeder et al. 2004) but populations have experienced considerable range-wide declines over the past century. In Utah, for example, Beck et al. (2003) reported that sage-grouse currently represent less than fifty percent of their historical distribution in the state. More recently, population trends based on male lek attendance rates have continued to decline range wide with some local populations exhibiting dramatic decreases (Garton et al. 2011). Habitat loss and alteration have been identified as a primary cause for the range wide sage-grouse population declines in the past century (Schroeder et al. 2004, Connelly et al. 2004). Additional factors such as low nest success, low chick survival, and decreased hen survival also contribute to declines in local population (Schroeder 1997, Johnson and Braun 1999, Schroeder et al. 1999, Moynahan et al. 2006, Aldridge and Boyce 2007).

Translocations have been successfully used as a management tool to augment extirpated or declining wildlife populations for both game and nongame species including native upland game birds (McMahon and Johnson 1980, Woolf et al. 1984, Miller et al. 1985, Griffith et al. 1989). Although sage-grouse translocations have been attempted multiple times in seven states and one Canadian province, their success is limited. Reese and Connelly (1997) estimated that 5% of sage-grouse translocations were successful compared to an 86% success rate for other native game species (Griffith et al. 1989). Due to low population numbers following sage-grouse translocations and the historical failure of these translocations, Reese and Connelly (1997) warn that sage-grouse translocations should be viewed as experimental and not as a viable option to restore extirpated populations.

Most sage-grouse translocation attempts failed to provide criteria to evaluate the success of the effort (Reese and Connelly 1997). A long-term translocation research project conducted in Strawberry Valley, Utah outlined criteria for evaluating sage-grouse translocations citing that success should be based on integration into the population, site fidelity, courtship compatibility, survival and reproductive success of translocated grouse as well as the overall contribution to population growth (Baxter et al. 2008).

In 2002, Ashley National Forest regional biologists initiated a sage-grouse research project on Anthro Mountain, Utah to gather baseline data and observe population trends. From 2002 through 2006, several grouse were fitted with radio-collars to monitor vital rates, track movements, and examine habitat use. According to the project report, survival rates of resident hens from 2002 through 2006 are similar to those recorded by Connelly et al. (2000). The biologists also determined that Anthro Mountain provides nesting, brood rearing, and wintering habitats that are within the recommended habitat guidelines suggested by Connelly et al. (2000).

Using male lek counts as an indication of population abundance, Anthro Mountain's sage-grouse population dramatically declined from 2006 to 2008 (44 males in 2006, 13 males in 2008) (B.

Maxfield, UDWR, unpublished data). Concerned about this declining sage-grouse population, UDWR and Utah State University initiated a translocation project where 60 total sage-grouse were translocated from Parker Mountain, Utah to Anthro Mountain in 2009 and 2010. Parker Mountain was chosen as the source population because it was deemed stable by the UDWR and is genetically compatible with sage-grouse on Anthro Mountain (Smith 2009). Translocation protocols were based on the long-term translocation research conducted in Strawberry Valley which used several source populations including Parker Mountain (Baxter et al. 2008).

Research Purpose

The purpose of this research is to: 1) compare resident and translocated hen survival on Anthro Mountain to those in Strawberry Valley and residents in the source population, 2) compare the relative contribution of resident and translocated sage-grouse on Anthro Mountain, and 3) examine if resident and translocated sage-grouse on Anthro Mountain exhibit similar habitat-use patterns and movements. Ultimately, we want to answer the question: Was the translocation successful at augmenting Anthro Mountain's sage-grouse population four years after initial release?

Study Areas

Anthro Mountain, Utah

Anthro Mountain is located on Ashley National Forest in Duchesne County, Utah approximately 29km (18 mi.) southeast of the town of Duchesne. This high elevation mountain sagebrush community is dominated by mountain big sage (*Artemisia tridentata* subsp. *vaseyana*) and is intermixed with pockets of quaking aspen (*Populus tremuloides*) and Douglas-fir (*Pseudotsuga menziesii*). Black sagebrush (*A. nova*) is found on ridge tops across the mountain. Two-needle pinyon (*Pinus edulis*) and juniper (*Juniperus* spp.) can be found at the lower elevations and is encroaching on the sagebrush community. Anthro Mountain ranges from 2400-2800 m (7900-9200 ft.) in elevation.

Parker Mountain, Utah

The source population of the sage-grouse used for the translocation came from Parker Mountain. Parker Mountain is located in south-central Utah approximately 218 km (141 mi.) southeast of

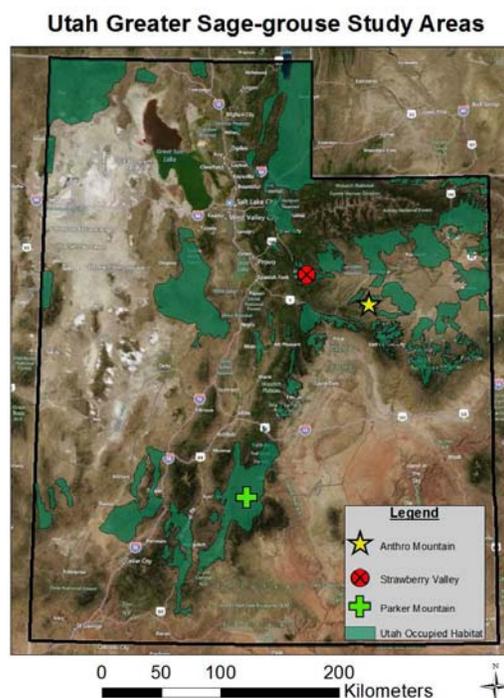


Figure 1. This image shows the geographic location and spatial reference of the three study areas used for this research project

Anthro Mountain and is situated among the largest contiguous area of sagebrush steppe ecosystem in Utah (Chi 2004). This high elevation sagebrush ecosystem is characterized by rolling hills and gently northeastern sloping plateaus (Chi 2004). The ridges and slopes are dominated by black sagebrush while big sagebrush, bitterbrush (*Purshia tridentata*), and rabbitbrush (*Chrysothamnus viscidiflorus*) are found in the drainages. Elevations on Parker Mountain range from 2100-3000 m (6900-9800 ft.).

Strawberry Valley, Utah

Sage-grouse translocations were initiated in Strawberry Valley in 2003 to restore a declining population that was also being heavily predated by introduced mammalian predators. Parker Mountain also provided the primary source population these translocations. Strawberry Valley is located in north-central Utah and is a montane sagebrush-steppe community with over 9,000 ha (22,000 ac.) of sagebrush habitat. Big sagebrush (*Artemisia tridentata*) is the predominant shrub with silver sagebrush (*A. cana*) found in wet meadows and riparian areas. Strawberry Valley ranges from 2,330-3,050m (7,600-10,000 ft.) in elevation and it is surrounded by mountain ridges and high mountain meadows. The dominant feature in the valley is Strawberry Reservoir which covers approximately 6,950 ha (17,179 ac.).

Methods

Lek Counts and Searches

In March 2012, we began monitoring established leks to document the number of sage-grouse attending the leks. If no grouse were documented on or near the lek, we searched the general area for tracks or other evidence that sage-grouse have been using the area. Brian Maxfield, the UDWR sensitive species biologist, set a game camera on a newly established lek to monitor daily lek attendance from early March through the end of April. We continued checking each lek through the end of the breeding season in mid-May. In addition to counting established leks, we conducted lek searches by driving roads at dawn, stopping every half mile and scanning sage-grouse habitat with binoculars and listening for displaying grouse.

Capture, Tracking, and Vital Rates

We began trapping grouse at the beginning of March by spotlighting roost sites at night and netting with long handled hoop nets from an ATV. After capture, we determined the sex and age of each grouse using plumage characteristics outlined by Beck et al. (1975) and fitted them with an ATS necklace mounted radio-transmitter equipped with an 8 hour mortality switch. For each captured grouse, we recorded the sex, age, and weight as well as the capture date, time, location, habitat, distance and visibility of nearest oil well, and distance to nearest lek. Any injuries or other comments about the bird's condition were also noted. We collected blood samples from each grouse by clipping the nail of the hallux and applied silver nitrate to the clipped area to stop the bleeding.

We located each collared grouse at least once a week from April to the end of August but located nesting hens and those with broods three times a week. To locate the sage-grouse, we followed

the signal emitted from the radio transmitter and made a complete circle around the strongest signal to confirm that the grouse was in that location. If a grouse flushed, we marked its exact location; otherwise we estimated the location by standing at a cardinal direction from the strongest signal, estimating the distance to the sage-grouse and adjusting the UTM coordinates accordingly. At each location we recorded the date, time, location type, location (in NAD 83 UTM coordinates), the primary habitat type, secondary habitat type and distance, altitude, slope, aspect, and distances to nearest lek, well, two-track, fence, and road. We also noted the flock size if known. We based the location type on the sex of the sage-grouse and the various stages of a hen's reproductive cycle. For example, a hen that has not initiated a nest is considered "Pre-nest", those with broods less than 6 weeks old are considered "Early Brood", and those with broods older than 6 weeks are "Late Brood."

We determined a hen to be nesting if it was located under the same shrub on two consecutive days. Once a hen moved from the nest, we examined it to determine whether it was depredated or successfully hatched. If depredated we searched for evidence indicating the cause of the depredation (i.e. - mammalian, avian, or unknown). We considered a nest successful if at least one egg hatched. If a nest was successful, we recorded the clutch size and the number of hatched eggs. We monitored hens with successful nests three times a week until the brood was lost or fledged at fifty days of age (Schroeder 1997). We conducted brood checks when the broods were twenty days old and brood counts when the broods were thirty-five, and fifty days old. In addition to the scheduled counts, we noted anytime chicks were observed with a collared brood hen and if the hen acted 'broody' when flushed. If a brood hen made a large move, for example if she changed ridges, we flushed her to observe her behavior and search for chicks. We used the nesting and brood success information to determine the overall reproductive success of the hen.

Our tracking schedule also allowed us to estimate survival for collared hens in the population. When a radio-collared sage-grouse dies and the transmitter lies motionless for 8 hours, the transmitter will switch to mortality mode. If we detected a mortality signal, the researcher found the radio-collar and conducted a thorough search of the area to check for any sign indicating the cause of mortality. The appearance of feathers and body parts were recorded as well as any predator sign present such as tracks, scat, or whitewash in the immediate area. We distinguished mammalian predation from avian predation based on the appearance of the remains and predator sign at the mortality site. If the feathers, remaining body parts, and collar appeared crunched and chewed we attributed mortality to a mammalian predator. Intact feathers that were plucked from the carcass indicated an avian predation.

Habitat Assessment

We conducted vegetation surveys at each nest site and at one brood location a week until the brood was lost or fledged at 50 days of age (Schroeder 1997). Vegetation plots were centered as close as possible to the brood's former location. We attempted to complete the brood vegetation plot surveys within a week of locating the brood to ensure that what we measured resembled what the brood was using. At each plot we estimated shrub canopy cover using the line intercept method and obtained herbaceous cover estimates using a 20cm x 50cm Daubenmire frame (Daubenmire 1959, Connelly et al. 2003). We also estimated the percent of litter, rock, and

bareground. Visual obstruction into and out of each site was estimated using a variation of the Robel Pole method (Robel et al. 1970).

Preliminary Results

Lek Counts and Searches

We were able to access all leks in the Anthro Mountain lek complex during the lekking season this year and counted each lek a minimum of 3 times. On 02 April 12, we had our high male count of 13 and peak hen attendance of 7 females on the Jeep Trail Lek, a new lek that was found in 2011. We also counted a maximum of 5 males on the established Alkali Ridge Lek for a total of 18 males attending the Anthro Mountain lek complex. This is an improvement from 2011 when we counted 8 males, all on the newly established Jeep Trail Lek, using the Anthro Mountain lek complex. The traditional leks on Wire Fence, Nutter's Ridge, and Cracker Grove did not have any grouse attendance and we did not locate any new leks during our lek searches this spring.

Capture, Tracking, and Vital Rates

A milder winter afforded access to Anthro Mountain much earlier this year than in 2011 and we began spring trapping at the beginning of March. Trapping continued until our hens started initiating nests in mid-April. We captured 2 male and 5 female grouse. At the time of capture, both males and one female were adults and the rest were yearlings at the time of capture.

The UDWR (Brian Maxfield) began searching suspected wintering areas for collared sage-grouse at the end of January and located several grouse in the Sand Wash area approximately 30 km (18 mi.) east of Anthro Mountain. He located another hen near Duchesne, Utah approximately 22 km (13 mi.) north of Anthro Mountain. Although we detected some grouse on Anthro Mountain at the beginning February, we were unable to access it to locate the grouse until 24 February. The spring and summer locations varied from ridge tops, side hills, and drainage bottoms. As of 12 August, there have been 2 mortalities, a male and a hen, both from unknown causes. We have 18 remaining sage-grouse collared but 2 hens are currently missing from the study area.

The first nest initiation occurred on 16 April, 16 days earlier than in 2011, and each hen initiated a nest. Of the 15 initiated nests, 7 were depredated, 1 was abandoned, and 7 successfully hatched. One hen re-nested after her first nest was depredated and successfully hatched the second nest. The average clutch size for 2012 was 7.4 eggs per nest. Of the 7 hens with successful nests, 5 hens raised broods to independence at 50 days.

Habitat Assessment

We conducted vegetation plots at 15 nest sites and 43 brood sites. The sage-grouse nested under Mountain big sagebrush, pinyon, juniper, and grass. Twelve nests were located under sagebrush, the remaining 3 nests were located under pinyon, juniper, and grass. We located broods and

conducted vegetation surveys in various habitats ranging from mountain big sagebrush, black sagebrush, pinyon/juniper, aspen, and introduced grasses.

Future Work Plan

We will continue to track through 2012 and locate each grouse as often as possible until we are no longer able to access Anthro Mountain due to snow-pack. We will attempt to locate the collared grouse during the winter to determine seasonal movements and survival. All data will be entered and we will begin analysis during the fall 2012 semester. We anticipate completing all analyses and writing during the spring semester in preparation for the thesis defense.

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