

## **Project Title: Greater Sage-grouse Use of Restored Sagebrush Areas in Rich County Utah**

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### ***Project Summary***

We are using several methods to assess Greater Sage-grouse habitat use in three types of areas: areas where sagebrush cover is being actively reduced (treated), areas of historic treatment (retrospective) and reference (untreated) areas. We will assess the efficacy of several methods which range from “quick and dirty” to state-of-the-art. This will allow us to develop portable and efficient means of evaluating sage-grouse use on a broader scale. Methodologies include distance sampling to estimate density of sage-grouse pellets (potential index to use), flushing counts using trained dogs and distance sampling techniques (snapshot measure of use), occupancy estimation (proportion of landscape used) and GPS radio-telemetry (roost site and seasonal use). Since habitat use may vary with population size, we are also conducting lek counts (as a covariate) in association with habitat use measures.

We have employed a 2-tiered study design: at the county-wide level, habitat and sage-grouse use data are collected at random locations across a tessellated grid at grid points separated by 5,000 m to 10,000 m; at the study site level, data are collected at grid points separated by 625 m to 2,500 m. At the study site level, we are focusing on two areas where large scale treatments have been recently conducted and where additional treatments are planned in the near future; these are Deseret Land and Livestock (DLL) and the Duck Creek Allotment (DC). In these areas, we collect data before and after treatments in treated and untreated areas. We also collect information from historically treated areas in the two primary study sites and across the county. This combination of approaches will allow us to assess the immediate impact of sage reduction treatments on sage-grouse as well as evaluate long-term recovery after such treatments.

### ***Accomplishments***

Our project addresses the following objectives: 1) Monitor sage-grouse response to sagebrush reduction by comparing use on treated, untreated and retrospective study areas; 2) Determine Ecological Site Descriptions and habitat characteristics of areas used by sage-grouse; 3) Model habitat characteristics of sage-grouse use areas; 4) Develop “portable” and efficient sage-grouse monitoring techniques through evaluation of various methodologies.

During 2007, we initiated a full field schedule with a graduate student and 4 technicians. This project also benefits from several related projects with similar objectives on different focal species and their habitats.

### ***Objective 1:***

*Pellet transects:* In DC (where sampling was most intense), we collected sage-grouse use data on 45 transects in treated areas and 34 transects in untreated areas. Many of the treatment samples had “roost piles” indicating that these areas were used as roosting sites. We also found several probable leks within treatments as indicated by very high densities of pellets. We will verify lek locations in spring of 2008.

At the county level, we conducted transects at 13 points from the 10,000 m grid. Most of these points fell in untreated areas. The data shows that the density of sage-grouse varied greatly at each location which is likely a result of varying sage-grouse habitat quality among sampled points.

We sampled 18 historically treated sites that differed in treatment type (mechanical, chemical, and fire) and age (from 1960's-1990's) throughout the county. We also placed several transects in reference sites adjacent to treatments.

We were also able to collect before-treatment pellet data on a 150 acre site at DLL. We conducted 20 pellet transects within and adjacent to the treatment area. We will collect post-treatment data in subsequent years.

*Occupancy plots:* We collected two seasons of occupancy sampling data at DC: Season 1: 4 June - 19 June; Season 2: 23 July - 13 August. Preliminary results indicate a change between seasons ( $P = 0.038$ ) with season 1 occupancy higher than season 2. Anecdotal observations suggested that sage-grouse moved from treated areas (i.e., upland shrubsteppe) to wet meadows between these two seasons.

We will collect occupancy data for in 3 more seasons (October-fall, March/April-lekking, May-nesting and possibly January/February-winter) beginning in 2008.

Dog flushing transects: we were largely unsuccessful in locating sage-grouse with this technique during the sampling period. However, we sampled only treated areas during periods that do not coincide with breeding behavior (lekking, nesting, or brood rearing). We will expand our sampling effort in the future to cover treated and untreated sites during various seasons.

### ***Objectives 2 and 3:***

Vegetation data were collected at all line transects and occupancy plots from June and through early September. Vegetation was also sampled at locations across the county where sage-grouse were incidentally flushed; all Rich County technicians and graduate students recorded GPS locations of all sage-grouse “sightings” they made during incidental field work.

Through cooperation with other researchers in Rich County, vegetation sampling was conducted at several thousand sampling points in treated, untreated and retrospective study sites across the county. Imagery (as described in the 2006 report) and on-the-ground vegetation samples are being used to develop a continuous-field vegetation map of the area. This vegetation map will in

turn be used in the development of habitat models and species abundance estimates for sage-grouse. The vegetation data will also contribute to the determination of habitat characteristics and Ecological Site Descriptions (ESDs) at our study sites and across Rich County (our data will be shared with Drs. Douglas Ramsey and Neil West).

#### ***Objective 4:***

In 2007, we field tested 3 of the 4 methods proposed for comparison in this study (see Objective 1 for results). We collected information on effort and cost required to conduct each of the field methods and will weigh this against data quality to determine which methods or combinations are most efficient.

In 2008, we will add the final technique (GPS radio-telemetry). We will use radios which include a “micro-GPS” receiver and a small VHF transmitter. The GPS receiver collects highly accurate triangulations 3 times per day for the 144-day life of the battery. The small (<30 g) “micro-GPS” can not be remotely downloaded, so grouse must be recaptured to collect to location data and recharge the telemetry units (which can be left on the birds). The VHF transmitters will allow relocation of marked birds for up to 6 months. While VHF location accuracy is inherently poor, we can use the VHF transmitters as a check of the new GPS technology as well as locate nests, mortalities and birds for recapture. In addition to addressing Objective 4 the radio-telemetry data will allow us to determine the migratory status of these sage-grouse.

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

We will continue to address all 4 project objectives over the next two years by 1) continuing full field research with a graduate student and 4-6 technicians including increased radio-telemetry efforts, 2) continuing field efforts to depict current vegetation status, 3) determining, with other Utah State University (USU) researchers, habitats and ESDs used by sage-grouse and 4) developing descriptive and predictive sage-grouse/habitat models.

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

SGRP and NRCS have provided the pivotal seed money for this multi-partner project. SGRP funding could only be obtained for one year of this three-year project and SGRP funding has been exhausted. Despite the lack of current SGRP funding, the project is on schedule to meet all primary objectives by the end of year 3 with the exception of evaluating radio-telemetry methods. The Utah Division of Wildlife Resources (DWR) and the Utah Department of Natural Resources (DNR) have provided sufficient funding for personnel through project completion, though funding for additional GPS radios is still being sought.

This project is being closely coordinated with several other shrubsteppe wildlife research projects in Rich County; these include response of vegetation, passerines, pygmy rabbits, small mammals, and mule deer to sagebrush reductions. While DWR and NRCS/SGRP are the only funders identified for this specific project, the project actually also involves partner support from Utah DNR, Intermountain West Joint Venture, U.S. Fish and Wildlife Service, Bureau of Land Management, The Quinney Foundation, Rich County Coordinated Resource Management

(CRM), U.S. Forest Service, U.S. Geological Survey, North American Space Administration and the Rich County Landowners. We are also coordinating with USU researchers who are developing Ecological Site Descriptions and state-transition models for shrub steppe in Rich County and USU researchers studying sage-grouse in other areas of the state.

**Amount funded over 3 years: \$48,000**

**Status: On-going**