Development of a Sagebrush Habitat Improvement Guide for the Gunnison Sage-grouse by Evaluating Recently and Historically Treated Areas within the Gunnison Basin

Principal Investigator: Joe Brummer

List Names of Other Individuals on Project and Primary Responsibility:

John Scott, District Conservationist, NRCS, Gunnison, CO - Location of historical treatment sites and data, creation of maps, and GIS support. Paul Jones, Habitat Biologist, Colorado Division of Wildlife, Gunnison, CO - Project coordination and location of historical treatment sites and data. Gunnison County Stockgrowers, Gunnison, CO - Location of historical treatment sites and data plus access to their private land. Gunnison Conservation District, Gunnison, CO - Location of historical treatment sites and data. Various individuals from the Bureau of Land Management and US Forest Service, Gunnison, CO - Location of historical treatment sites and data. Gunnison County, CO - GIS support and creation of map delineating locations of historical treatment sites.

List Five Relevant Publications in Last Five Years

Brummer, J.E. and C.H. Pearson. 2004. Colorado forage research 2003: Alfalfa, irrigated pastures, and mountain meadows. Colo. Agri. Exp. Sta. Tech. Bull. TB04-01. Fort Collins, Colo. 113 p.

Brummer, J.E., J.M. Scott, and G. Peterson. 2006. Improving sagebrush habitat for the Gunnison sage-grouse in combination with managed livestock grazing. Colo. Agri. Exp. Stat. Tech. Bull. Fort Collins, Colo. (In review)

Reece, P.E., J.E. Brummer, B.K. Northup, A.E. Koehler, and L.E. Moser. 2004. Interactions among western ragweed and other Sandhills species after drought. J. Range Manage. 57:583-589.

Scott, J.M., J.E. Brummer, and L. Santana. 2004. Sagebrush manipulation for sagegrouse. Abstr. Soc. Range Manage. 57th Annu. Meeting, Salt Lake City, Ut. No. 324.

White, S.K., J.E. Brummer, W.C. Leininger, G.W. Frasier, R.M. Waskom, and T.A. Bauder. 2003. Irrigated mountain meadow fertilizer application timing effects on overland flow water quality. J. Environ. Qual. 32:1802-1808.

PROPOSAL ABSTRACT

The Gunnison sage-grouse (*Centrocercus minimus*) is unique to southwestern Colorado and southeastern Utah with the largest population located in the Gunnison Basin. Many factors have been identified as contributing to the recent population decline in Gunnison sage-grouse with habitat loss and degradation listed as major factors. Efforts have been undertaken recently in the Gunnison Basin to improve habitat for the sage-grouse by treating decadent stands of sagebrush using various methods. However, it can take years before land managers can truly assess whether or not a treated stand meets the habitat needs of sage-grouse.

The objectives of the proposed study are to evaluate the status of overstory and understory vegetation within recently and historically treated sagebrush areas in the Gunnison Basin and relate those findings to the habitat requirements of sage-grouse as outlined in the Gunnison Sage-grouse Rangewide Conservation Plan. To accomplish these objectives, a database of recent and historic treatments that have been applied on both private and public land within sagebrush communities in the Gunnison Basin will be compiled. Baseline information to be gathered will include type of treatment, year and date of application, rate of herbicide application if applicable, species seeded and rate of seeding if applicable, livestock grazing history, and site characteristics such as soil type, range condition at time of treatment, sagebrush species present, elevation, slope, and aspect. Potential sampling sites will be narrowed down and stratified using the above information. Vegetation parameters to be measured include canopy cover of sagebrush and other shrubs, cover of grasses and forbs by species, and height of sagebrush, grasses, and forbs. From this data, a guide will be prepared for land managers that will

allow them to objectively select sagebrush treatments to achieve desired long-term habitat improvements for the benefit of Gunnison sage-grouse and other sagebrush obligates.

INTRODUCTION/BACKGROUND

The sage-grouse that inhabit southwestern Colorado (south of I-70) and southeastern Utah have been identified as a separate species and are referred to as Gunnison sage-grouse (*Centrocercus minimus*) (Young et al. 2000). The largest and most viable population of Gunnison sage-grouse can be found in the Gunnison Basin of western Colorado (GSGRSC 2005). Therefore, the Gunnison Basin is a key area for protection and improvement in sagebrush habitat. Habitat loss and degradation have been identified as major factors leading to population declines in sage-grouse throughout the West (Crawford et al. 2004).

Historically, sagebrush treatments were implemented with the primary goal of improving forage for livestock grazing. Large tracts of land were treated using methods such as prescribed fire or spraying with 2,4-D herbicide. Within the last 15 to 20 years, smaller tracts of sagebrush in the Gunnison Basin have been treated using such methods as brush mowing, Dixie harrowing, Lawson aerating, and thinning with low rates of Spike (tebuthiuron) herbicide. Some of these treatments have been applied in conjunction with seeding of both native and introduced grasses, forbs, and legumes. Collectively, these various treatments were implemented from 1 to over 50 years ago. The more recent treatments have been specifically targeted at improving sagebrush habitat for the Gunnison sage-grouse. However, most treatments do not immediately create the ideal habitat for sage-grouse (SRM 2006). It may take 5 to 20 years following application of a treatment before the plant community meets the habitat requirements for sage-grouse.

To guide future habitat improvement efforts for the Gunnison sage-grouse, land managers are in need of more detailed information on the responses of sagebrush dominated communities to various treatments and how those responses relate to the habitat needs of the grouse. Questions need to be answered such as how long does it take following treatment application before a site meets the habitat needs of the sage-grouse, what is the longevity of various treatments before a site no longer meets habitat needs, and how do factors such as type of treatment, sagebrush species present, elevation, slope, aspect, and grazing history affect treatment response. Since time is of the essence, the quickest way to obtain this type of data is to evaluate historic treatments. This information will not only be applicable to the Gunnison Basin, but other locations that have similar vegetation communities in which the Gunnison sage-grouse occur.

PURPOSE AND OBJECTIVES

Proposed projects must specifically address efficacy of integration of the effects of conservation provisions of the 2002 Farm Bill on sagebrush-steppe obligate species. See research priorities for specific guidance. The Gunnison Conservation District, USDA-NRCS, Colorado Division of Wildlife (CDOW), Colorado State University, and U.S. Fish and Wildlife Service have been working recently with private landowners in the Gunnison Basin to implement habitat restoration practices for the Gunnison sage-grouse utilizing funding from EQIP, WHIP, GRP, Partners for Wildlife, CDOW Game Cash Dollars, Habitat Partnership Program, and the Gunnison Sage Grouse Conservation Trust Fund. However, the time frame is too short to fully evaluate the effectiveness of these practices towards enhancing habitat for the sage-grouse. By comparing data from these recent treatments and historically treated areas, land managers will be able to assess the potential long-term benefits from various sagebrush treatments prior to their actual implementation.

The objectives of the proposed study are to evaluate the status of overstory and understory vegetation within recently and historically treated sagebrush areas in the Gunnison Basin and relate those findings

to the habitat requirements of sage-grouse as outlined in the Gunnison Sage-grouse Rangewide Conservation Plan (GSGRSC 2005). From this data, a guide will be prepared for land managers that will allow them to objectively select sagebrush treatments to achieve desired long-term habitat improvements for the benefit of Gunnison sage-grouse and other sagebrush obligates.

STUDY SITE

This study will be conducted at numerous locations within the Gunnison Basin of western Colorado. The potential range of Gunnison sage-grouse within the Basin encompasses an area of about 593,000 acres (GSGRSC 2005). Of that range, approximately 51% is managed by the Bureau of Land Management, 14% by the United States Forest Service, 2% by the National Park Service, 2% by the Colorado Division of Wildlife, 1% by the Colorado State Land Board, and 31% by private owners (GSGRSC 2005). Areas on both private and public land will be identified for sampling.

STUDY DESIGN METHODS

A database of both recent and historic treatments within sagebrush communities in the Gunnison Basin will be compiled during the spring of 2006. Personnel at the local NRCS office have already started to compile a list of treatments applied on private land (John Scott, personal communication). Similar lists will be requested from the public land management agencies.

Baseline information to be gathered will include type of treatment, year and date of application, rate of herbicide application if applicable, species seeded and rate of seeding if applicable, livestock grazing history, and site characteristics such as soil type, range condition at time of treatment, sagebrush species present, elevation, slope, and aspect. If available, any prior monitoring data or photos will also be requested. Potential sampling sites will be narrowed down using the above information.
For example, 2,4-D herbicide has been used for many years in the Gunnison Basin and elsewhere to treat sagebrush and improve the productivity of understory species. Because this treatment was so common, we will have many potential sites to choose from. First and foremost, an array of 2,4-D treated areas will be chosen based on age of treatment since our primary objective is to quantify vegetation change in relationship to when the treatment was applied. The other information will be used to stratify our sampling locations such as by type of sagebrush treated or elevation. This will ensure that we have sites that are as comparable as possible. Where possible, treated areas will be paired with untreated or control areas at a given location as a second level of comparison. For treatments such as Spike herbicide, we may only be able to find areas that were treated less than 15 years ago and may be limited on the number of possible sampling sites. At each site, a minimum of 5 (preferably 10), 30 m long transects will be randomly established and marked using a GPS unit. Vegetation will be sampled so that the data can be compared to the structural habitat guidelines as outlined in the Gunnison Sage-grouse Rangewide Conservation Plan (GSGRSC 2005). Canopy cover of sagebrush and other shrubs will be measured using the line intercept method of Canfield (1941) as further described by Connelly et al. (2003). Cover of grasses and forbs will be determined by placing 10, 0.1 m2 quadrats along each transect (Daubenmire 1959). Additionally, heights of sagebrush plants will be measured along each transect while droop heights of grasses and forbs will be measured within each quadrat (Connelly et al. 2000). All grass and forb data will be recorded by species. In addition to the quantitative data, several digital photographs will be taken at each transect to visually document the status of the vegetation. Sampling will occur throughout the growing season from mid May to late August. The data will be analyzed using analysis of variance (ANOVA). The primary variables of interest include type and age of treatment. Variables such as elevation, slope, and aspect will be used as covariates in the ANOVA model. Where applicable, paired t-tests will be used to compare treated to untreated areas at a given site.

EXPECTED BENEFITS

1. Note the importance of the response of sage-grouse and/or sagebrush obligates to 2002 Farm Bill conservation practices.
2. Note the technology and tools to be developed by the project. Of special concern is the importance of the project to NRCS, SCD and state wildlife agency field staff from a planning perspective.
3. Note the importance of technology and tools to be developed to partners (NGOs, State wildlife agencies, etc.)

The database of information generated from this project will be used to develop a sagebrush habitat improvement guide that all land managers (both private and public) can use to help select conservation practices for the restoration of sagebrush habitat for the Gunnison sage-grouse. This information will aid in the planning of future conservation efforts for the sage-grouse, not only within the Gunnison Basin, but also for the outlying populations in western Colorado and eastern Utah. The requirement of a 2-4 page wildlife technical note and accompanying Powerpoint presentation fits nicely as part of the final product that we envisioned for this project. Input from local NRCS and Colorado Division of Wildlife personnel stressed the need to make the guide as simple and concise as possible if it is to be beneficial to them in the field. We also plan on developing a more in depth technical bulletin that will be beneficial to the scientific community. This publication would be similar to what the Montana Natural Heritage Program developed on postfire succession for big sagebrush in southwest Montana (Lesica et al. 2005).

LITERATURE CITED

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Connelly, J.W., K.P. Reese, and M.A. Schroeder. 2003. Monitoring of greater sage-grouse habitats and populations. Univ. Idaho Station Bull. 80, Moscow.

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Gunnison Sage-grouse Rangewide Steering Committee (GSGRSC). 2005. Gunnison sage-grouse rangewide conservation plan. Colorado Division of Wildlife, Denver, Colo.

Lesica, P., S.V. Cooper, and G. Kudray. 2005. Big sagebrush shrub-steppe postfire succession in southwest Montana. Unpublished report to Bureau of Land Management, Dillon Field Office. Montana Natural Heritage Program, Helena, MT. 29 pp. plus appendices.

Society for Range Management (SRM). 2006. Ecology and management of sage-grouse and sage-grouse habitat. An Issue Paper by the Society for Range Management, Wheat Ridge, Colo.

Young, J.R., C.E. Braun, S.J. Oyler-McCance, J.W. Hupp, and T.W. Quinn. 2000. A new species of sage-grouse (Phasianidae: *Centrocercus*) from southwestern Colorado. Wilson Bull. 112:445-453.

BUDGET

BUDGET (YEAR 1)

NOTE: All numbers should be entered without commas.

SALARIES: 12000 X 13.1 1572
(Fringe Percentage)
TRAVEL: 1260
COMMODITIES: 250
CONTRACTUAL: 0
TOTAL: 15082

BUDGET (YEAR 2)

NOTE: All numbers should be entered without commas.

SALARIES: 0 * 0 0
(Fringe Percentage)
TRAVEL: 0
COMMODITIES: 0
CONTRACTUAL: 0
TOTAL: 0

BUDGET (YEAR 3)

NOTE: All numbers should be entered without commas.

SALARIES: 0 * 0 0
(Fringe Percentage)
TRAVEL: 0
COMMODITIES: 0
CONTRACTUAL: 0
TOTAL: 0

TOTAL BUDGET FOR THREE YEARS: 15082

Leveraged funds, in-kind support from Partners and other sources (list partner(s) and amount(s)).

PI salary for 1 month = $7,363
Fringe = $7,363 x 20.3% = $1,495
Unrecovered indirect costs = $15,082 x 26% = $3,921
Indirect costs on salary and fringe = $8,858 x 26% = $2,303
Total cost share = $15,082
Additionally, funds are being requested from the Gunnison Sage-grouse Conservation Trust Funds, Gunnison County, Colorado (Approved for $17,344) and the Colorado Wildlife Conservation Grant Program, Colorado Division of Wildlife (Request pending for $17,344).
Funds obtained from these sources will be used to hire additional 2-person sampling crews which will allow us to increase our sample size and cover more of the historic sagebrush treatments in the Gunnison Basin.
Funds requested from these sources show leveraging of the project and do not constitute cost share and will not be documented as such.