

Gunnison Sage Grouse

Centrocercus minimus

Conservation Plan

San Juan County, Utah

May 2000

PREAMBLE

The Gunnison sage grouse (Centrocercus minimus) inhabits a limited area in Colorado and Utah. San Juan County is the only county in Utah where a Gunnison sage grouse populations are currently known to occur. On January 26, 2000, the U.S. Fish and Wildlife Service received a petition from the American Land Alliance requesting an emergency endangered species listing for the Gunnison sage grouse. The petitioners cited increasing habitat fragmentation, reduced and limited population distributions, and low and declining localized populations as the primary reasons justifying an emergency listing. Also in January, the U.S. Fish and Wildlife Service began preparing a draft candidate and listing priority assignment form for Gunnison sage grouse. If approved, the species would be placed on a candidate list.

In 1972, a total of 175 males were counted strutting on leks in San Juan County. By 1999, this had dropped to 43. In 1972, the sage grouse population in San Juan county was estimated to be between 583 and 1,050 birds. In 1999, the estimated population was between 143 and 258 birds.

The San Juan County Gunnison Sage Grouse Working Group (SWOG) was formed in 1996 for the purpose of developing a conservation plan that could be implemented by state and federal wildlife resource agencies, private landowners, and local governments to benefit sage grouse populations in the county. Implementation of the conservation Plan will ensure local ownership in future management and land-use decisions; respect private property rights; and embrace community economic, cultural, and social values. This document identifies the conservation strategies that have been and will continue to be implemented by private and public partners in San Juan County to restore Gunnison sage grouse habitats and populations. Since SWOG was formed, the number of strutting sage grouse males counted on the leks in 1999 (n = 43) has increased by 72% over 1997 (n = 25) counts.

This Plan has been initiated to conserve the species by reducing threats to the Gunnison sage grouse, stabilizing the population, and maintaining its ecosystem. This document's primary purpose is to conserve this species by implementing voluntary conservation actions described in this Plan.

Table of Contents

	Page
PREAMBLE	i
TABLE OF CONTENTS	ii
LIST OF TABLES AND FIGURES	iv
I. PLAN BACKGROUND	1
A. Introduction and Purpose	1
B. Plan Area Description and Boundary	1
C. Plan Process	1
D. Policies	2
E. Definitions of Terms	3
F. List of Acronyms and Abbreviations	6
II. PLAN DEVELOPMENT- HABITAT CONSERVATION ASSESSMENT	7
A. Species Description	7
B. Sage Grouse Status and Distribution	7
Gunnison sage grouse distributions and population estimates	7
C. Factors Contributing to the Decline of Gunnison Sage Grouse Populations	11
Land use changes	11
Livestock grazing	15
Water and wet meadows	15
Conversion of lek sites	16
Drought	16
Predation	16
Pipeline developments	17
Highways and other roads	18
Lack of management	18
Weeds	18
D. Goals and Objectives	18
Goals	18
Population objectives	18
Habitat objectives	19

III.	PLAN IMPLEMENTATION - CONSERVATION STRATEGIES	20
A.	Desired Plan Outcomes	20
B.	Habitat Enhancement Accomplishments	20
C.	Priority Conservation Strategies	21
D.	Summary of Priority Implementation Actions By Conservation Strategy	23
	Develop Public Support and Funding Base for the Conservation Plan. .	23
	Monitoring and Evaluation	23
	Species Protection and Population Enhancement	24
	Restoring and Improving Habitat Quality	25
	Reducing Physical Disturbances	25
E.	Implementation Schedules	26
V.	SIGNATURES	33
VI.	REFERENCES	36
VII.	APPENDICES	37
A.	San Juan County Gunnison Sage Grouse Working Group Members	37
B.	San Juan County Gunnison Sage Grouse Conservation Area Vegetation Classifications.	37
C.	Habitat Mixture Seeded on CRP Land in San Juan County Gunnison Sage Grouse Conservation Plan Area.	40
D.	Appendix D	41

List of Tables and Figures

Table 1. Gunnison sage grouse lek counts (maximum numbers of males observed) in San Juan County, 1970-99	9
Table 2. Land use and vegetation changes in the San Juan County Gunnison Sage Grouse Conservation Area, 1984-1998.	14
Figure 1. Gunnison sage grouse Conservation Area. San Juan County, Utah.	5
Figure 2. 1984 Core Area vegetation types from LandSat 30m TM imagery.	12
Figure 3. 1993 Core Area vegetation types from LandSat. 30m TM imagery.	13
Figure 4. Colorado Plateau Sage Grouse Data	22

I. PLAN BACKGROUND

A. Introduction and Purpose

The San Juan County Gunnison Sage Grouse Working Group (SWOG) was formed in 1996 to identify and implement community-based conservation strategies to reverse the decline of sage grouse populations in the county. From the onset, SWOG has sought wide local citizen involvement. SWOG consists of public management agencies, private landowners, local citizens, and private conservation groups. A list of SWOG members can be found in Appendix A.

B. Conservation Area Description and Boundary

San Juan County is located in southeastern Utah and consists of 7,821 square miles (Figure 1). Approximately 6% of the county (324,921 acres) consists of 208 privately-owned farms which are engaged in agriculture. In 1994, agriculture enterprises in San Juan County generated over \$13 million in income, slightly over 10% of the county's total personal income. In 1996, San Juan County ranked 5th among all Utah counties in total grain production with over 48,000 acres harvested.

The San Juan County Conservation Area (CA) boundary was delineated using current and historic habitats, sage grouse observations, and an assessment of the potential for remaining sagebrush areas in the county to provide suitable habitat. The CA encompasses rural areas, rural residential dwellings, and agricultural croplands. While it was necessary to include these areas because of their habitat potential, however, we make no inferences regarding any changes in existing land use. Individual landowner participation, although strongly encouraged by SWOG, is strictly voluntary.

C. Plan Process

SWOG recognizes that most of the Gunnison sage grouse in the county depend heavily on private lands for habitat. Thus, the San Juan County Gunnison Sage Grouse Conservation Plan (Plan) is committed to conserving and enhancing Gunnison sage grouse populations that occur on privately-owned land in the county and contribute to the economic viability of farms, ranches, and the local community. This Plan consists of two parts. The first part is the Habitat Conservation Assessment. The Assessment describes SWOG's current understanding about the status of sage grouse distributions, habitat conditions, and factors that may be affecting sage grouse populations in the county. Additional research is being planned to refine this information. The second part is the Conservation Strategy. The Strategy identifies the Plan goals and objectives, conservation actions, implementation schedules and responsibilities, evaluation guidelines, and monitoring requirements.

The Plan identifies conservation strategies to be implemented in guiding and coordinating management efforts across jurisdictional/land ownership boundaries to improve sage grouse

habitat conditions and reverse the decline of Gunnison sage grouse populations in the county. The Plan is designed to be adaptive. New information obtained or issues identified, will be used to update the document and guide future implementation. This includes the results of ongoing management and research activities implemented in the county to conserve the grouse or its habitat where it occurs

D. Policies

Central to this conservation planning effort is the involvement and cooperation of local landowners, citizens, community leaders, and resource agencies. SWOG agrees to work collectively to implement appropriate management actions and activities that represent the interests of all stakeholders. The Plan establishes a framework for coordinated management and community-based grassroot support for the conservation of the species. SWOG agrees to:

- C strive for the long-term commitment of its members to fund, support, collect, analyze, and use the data and/or information collected regarding the development and implementation of the Plan to guide resource management decisions.
- C ensure maximum opportunity for public involvement in the planning and decision making process.
- C create an atmosphere of cooperation among all stakeholders by maintaining an open dialogue.
- C implement actions identified in the Plan in a manner that achieves sage grouse population and habitat objectives and contribute to a stable and diverse economic base in San Juan County.
- C integrate public and private natural resource agency and organization efforts to achieve maximum efficiency and benefits in implementation of conservation actions identified in the Plan.

E. Definitions of Terms

Big sagebrush - includes *Artemisia tridentata* - big sagebrush; *Artemisia tridentata ssp. vaseyana* - mountain big sage; *Artemisia tridentata ssp. Wyomingensis* - Wyoming big sagebrush.

Black sagebrush - *Artemisia nova*

Breeding complex - All lands within two miles of a known lek site. These areas provide nesting sites and early brood rearing areas. Desired conditions include a canopy cover of 20-40% big sagebrush with an average height of 16 inches, 30% minimum grass canopy cover, and 10% minimum forb canopy cover.

Brooding complex - All lands contained within a four mile radius of lek sites that include riparian zones and wet meadows. The residual height of the vegetation in wet meadow areas is greater than four inches between June 15 - July 31 on most (75%) of the area used as brood rearing habitat.

Brush management - Actions or activities conducted by SWOG to enhance sage grouse habitat by either increasing or decreasing sagebrush canopy cover. Actions or activities may include chemical treatments, planting, burning, and livestock grazing.

Buffer conservation area - This includes 155,000 acres of San Juan County that may offer potential sage grouse habitat but is not currently known to be occupied (Figure 1).

Conservation easement - A non-possessing interest held by one person, group, or entity in land of another whereby the first person or entity is accorded partial use of the land for specific purposes. An easement restricts but does not abridge the rights of the fee owner to the use and enjoyment of the land. Conservation easements may be implemented by SWOG to protect or maintain habitat conditions of known Gunnison sage grouse lek sites and priority brood rearing areas.

Core conservation area - This includes 65,000 acres of habitat currently known to be occupied by sage grouse. This area includes all active and historic lek sites, nesting, wintering, and brood rearing areas (Figure 1).

Corridors - These include areas that provide suitable habitat or exhibit the potential for the development of a suitable habitat that would serve as a travel corridor allowing birds to disperse between areas they presently occur. Corridors serve to reduce the effects of habitat fragmentation and allow for immigration and emigration between sub-populations and lek sites.

Fee title - The purchase of property and all associated property rights.

Lek or Lek Site - A specific area where sage grouse gather for display and mating in the spring. These areas are usually open areas that exhibit vegetation that is shorter than the surrounding habitats. Lek sites are usually found on broad ridges, benches, or valley floors where visibility and hearing acuity is excellent.

Lek Count - The high count of male sage grouse taken at 7-10 day intervals between late March and mid-May on all leks sites within the same lek area on the same day.

Livestock grazing management - The use and management of domestic livestock grazing to enhance sage grouse habitat conditions and/or reduce disturbance during critical nesting or brood rearing periods.

Off-Highway Vehicle (OHV) - Any motorized means capable of or designed for travel on or immediately over land, water, or other natural terrain. Includes jeeps, 4-wheel drive vehicles, motorcycles, All Terrain Vehicles (ATV's), and snowmobiles.

Predation management - Lethal and nonlethal actions or activities conducted by the proper authority with the permission of the land owner or manager that are designed to reduce the impact of a specific predator or groups of predators on adult sage grouse, their nests, eggs, and/or young.

Strutting ground - see Lek

Wintering complex - All uplands available to sage grouse during the winter in conservation areas that remain relatively free of snow. Important areas during winters of deep snow are drainages and other sites that exhibit tall sage brush, southerly or westerly aspects on slopes greater than 5%. Other areas used during the winter include ridge tops and low sites (<5% slope) that are free of snow. Desired conditions for winter habitat include a minimum of 15% canopy cover of big sagebrush vegetation that averages 12 inches in height on southerly and westerly aspects. Big sagebrush in drainages should exhibit a minimum of 30% canopy cover and averages 20 inches in height. Small areas that exhibit more dense sagebrush canopy cover (40% with an average height of 16 inches) should be interspersed throughout the wintering area on south and west slope aspects.

Figure 1. Gunnison sage grouse Conservation Area. San Juan County, Utah.

F. List of acronyms and abbreviations

ATV - All Terrain Vehicle
APHIS - Animal and Plant Health Inspection Service
BI - Jack H. Berryman Institute
BLM - Bureau of Land Management
BMP's - Best Management Practices
CA - Conservation Area
CRP - Conservation Reserve Program
FSA - Farm Services Agency
GIS - Geographic Information System
GPS - Global Positioning System
NGO - Non-Governmental Organization
NRCS - Natural Resource Conservation Service
OHV - Off-Highway Vehicle
RMEF - Rocky Mountain Elk Foundation
PJ - Pinyon-Juniper
Plan - The San Juan County Gunnison Sage Grouse Conservation Plan
SWOG - San Juan County Gunnison Sage Grouse Working Group
TM - Thematic
UDWR - Utah Division of Wildlife Resources
USU - Utah State University
USDA WS - Wildlife Services
USFWS - U.S. Fish and Wildlife Service
USFS - U.S. Forest Service

II. PLAN DEVELOPMENT - HABITAT CONSERVATION ASSESSMENT

A. Species Description

Research conducted in the Gunnison Basin of Colorado and San Juan County in Utah has confirmed that two species of grouse inhabit both states. Sage grouse populations inhabiting the sagebrush regions north of the Colorado River in Utah have been taxonomically classified as the Greater sage grouse (*C. urophasianus*). Most sage grouse populations that occur south and east of the Colorado River are believed to be Gunnison sage grouse. Gunnison sage grouse birds are significantly smaller in size (males are 3.5 to 5.0 lbs. vs. 5.5 to 7.2 lbs.; females are 2.4 to 3.1 lbs. vs. 3.3 to 4.0 lbs.) than the sage grouse that are found north of the Colorado river in Utah. They also differ in bill shape and size, tail patterns (large, more distinct white barring of tail feathers), breeding behaviors, specialized featheration, and genetic composition. The mating behavior of Gunnison sage grouse differs markedly from that of the larger bodied sage grouse in northern Utah.

B. Sage Grouse Status Distribution

Sage grouse populations are restricted to the sagebrush rangelands of western North America. The distribution and abundance of sage grouse have dramatically declined. Sage grouse once inhabited sagebrush rangelands in 15 states and 3 Canadian provinces. Currently, populations exist in 10 states and 1 province.

In Utah, sage grouse inhabit sagebrush habitat of the Colorado plateau and the Great Basin geographic regions from 6,000 to 9,000 ft. in elevation. The largest populations of Greater sage grouse are found in Rich County, the Park Valley area of Box Elder County, on Diamond and Blue Mountains in Uintah County, and on the Parker Mountain in Wayne County. Other smaller populations are found scattered in central and southern parts of the state. The Utah Division of Wildlife Resources (UDWR) believes that all of Utah's 29 counties at one time provided sagebrush habitat suitable for sage grouse. Pioneer journals indicate that sage grouse were abundant throughout Utah in the early 1800's.

Today sage grouse in Utah occupy only 50% of their previous habitat and are one-half as abundant as they were prior to the 1850s. In 1996, UDWR biologists counted 126 sage grouse leks. An average of 10 males were counted per ground; down 51% from the long term averages. The reason for these declines have been attributed to land use practices that reduced, eliminated, or fragmented suitable sagebrush habitats.

Gunnison sage grouse distributions and population estimates

Gunnison sage grouse inhabit a limited area in Colorado and Utah. Range wide, breeding populations are estimated at 3,000 to 4,000 birds. San Juan County is the only county in Utah currently known to support a breeding population of Gunnison sage grouse. Although a few

birds are known to use habitats in Grand County, this is believed to be restricted to wintering birds that wander in from Colorado .

In the last 30 years, Gunnison sage grouse populations in San Juan County have declined (Table 1). Annual counts of strutting grounds or lek sites provide the best evidence of the declines. Beginning in 1970, UDWR biologists have monitored 7 lek sites in the county. In 1999, 43 birds were counted on 4 leks. No birds were counted on the other 3 historic lek sites. These lek sites were converted from sagebrush rangelands to cropland. After the conversion, the birds did not return to use the sites.

Lek counts provide wildlife managers with an estimate of the minimum breeding population. Studies have documented that during the breeding season the sex ratio of a sage grouse population is approximately 2 females for every male. If the number of males is known then it is possible to estimate minimum population size. It is important to understand that a count will never represent all the males in a population and any calculated population size may be lower than the actual population. The UDWR estimates that they are able to count 50% of the males in a population through lek counts, and that males represent 50% of the population. The formulas used by the UDWR can be manipulated to represent 75-90% of the males in a population being counted on the leks. Based on the 1999 lek counts, the UDWR estimated that the entire spring sage grouse breeding population in San Juan County consist of 143-258 birds. This is down 75% from 1972. In 1972, the UDWR estimated spring breeding populations between 583-1,059 birds.

Table 1. Gunnison sage grouse lek counts (maximum numbers of males observed) in San Juan County, 1970-99

<u>Year</u>	<u>Counts by Leks</u>							<u>Total</u>
	Barton	Adams	Hick- man Flats	Seep Wash	Roring	East Seep	Dodge Point	
1970	0	14	9	8	49	43	0	123
1971	6	32	2	4	51	61	0	156
1972	12	27	6	7	59	64	0	175
1973	0	19	7	0	48	31	0	105
1974	0	19	4	21	41	52	0	137
1975	0	16	21	2	27	49	0	115
1976	2	7	33	0	24	32	0	98
1977	0	9	50	0	18	40	0	117
1978	0	8	45	0	13	30	0	96
1979	0	6	39	0	5	17	0	67
1980	0	0	28	0	4	9	0	41
1981	0	3	39	0	0	21	0	63
1982	0	0	27	0	2	18	0	47
1983	0	0	35	0	9	15	0	59
1984	0	0	28	0	10	13	0	51
1985	0	0	16	0	7	9	0	32
1986	0	0	3	0	9	6	0	18
1987	0	0	3	0	10	8	0	21
1988	0	0	4	0	11	6	0	21
1989	0	0	3	0	16	11	0	30
1990	0	0	4	0	15	9	0	28
1991	0	0	5	0	11	8	0	24

1992	0	0	6	0	16	14	0	36
1993	0	0	3	0	17	18	0	38
1994	0	0	0	0	18	17	0	35
1995	0	0	8	0	16	14	0	38
1996	0	0	0	0	14	14	0	28
1997	0	0	6	0	13	6	0	25
1998	0	0	13	0	15	4	0	32
1999	0	0	9	0	22	7	5	43
<hr/>								
30 Year Ave.	3	11	15	6	19	22	5	57

C. Factors Contributing to the Decline of Gunnison Sage Grouse Populations

Conversion of suitable sagebrush habitats to other uses, habitat fragmentation, the timing, intensity and duration of livestock grazing, and the deterioration of sagebrush habitats due to lack of management, noxious weed invasion, fire suppression, pesticide and herbicide use, and drought have been implicated as the primary reasons for sage grouse population declines in the West. Habitat loss and fragmentation also may increase sage grouse populations' susceptibility to predation, accidents, and other mortality factors. Although some sage grouse populations are hunted in Utah, Gunnison sage grouse populations have not been hunted since the mid-1970's. In the following section, we discuss in more detail some of the factors that may have directly affected Gunnison sage grouse populations in San Juan County.

Land use changes

Vegetation within the CA sagebrush habitats (230,000 acres), were mapped in 1998 using GIS technology. A Landsat 30 m resolution thematic (TM) scene from 1984 (Figure 2) was compared to 1993 imagery that was updated to reflect 1998 land use to determine if the landscape spectral images had changed (Figure 3). Changes in spectral imagery between the two years would be reflective of vegetation changes. SWOG selected 1993 base imagery because it would be representative of a post-Conservation Reserve Program (CRP) landscape. This imagery was updated to reflect 1998 land use by establishing randomly selected training sites in 1998 in each of the major cover types and conducting a supervised classification. We selected 1984 as the base for comparison. This was the first year that 30 m resolution Landsat imagery was available for purchase and it also represented pre-CRP conditions. In addition, sage grouse numbers declined dramatically after 1984. Nineteen major vegetation/landscape types were classified in the CA (Appendix B).

Major land use changes have occurred during 1984 and 1998 (Figures 2 and 3, Table 2). Significant changes included declines in non-irrigated agricultural land, black sage, water areas, pinyon-juniper, and sagebrush areas exhibiting <15% canopy cover. Landscape vegetation/land use types that increased included irrigated agriculture, rangelands, sagebrush areas exhibiting 15-25% and >25% canopy cover (Table 2).

Our analyses suggest that although the amount of rangeland acreage has increased in the CA because of CRP, the grass cover on CRP lands prior to 1998 have not provided important sagebrush habitats. Additionally, the increase in big sagebrush canopy in other areas may have resulted in a reduction in the quality and quantity of residual herbaceous cover that is important for sage grouse production and survival. Residual herbaceous cover (grasses and forbs) in sagebrush areas is necessary to conceal nests and nesting hens, broods, and provide habitat for insects upon which the chicks depend.

Figure 2. 1984 Core Area vegetation types from Landsat 30m TM imagery

Figure 3. 1993 Core Area vegetation types from LandSat. 30m TM imagery.

Table 2. Land use and vegetation changes in the San Juan County Gunnison Sage Grouse Conservation Area, 1984-1998.

Land use/vegetation	1984 Acres	1998 Acres	% change
Surface Water	320.7	204.4	-36%
Wet Meadows	3,560.3	3,706.9	+4%
Irrigated Agriculture	762.1	2,143.9	+181%
Non-irrigated	110,330.0	30,789.9	-72%
Urban	403.4	314.9	-22%
Pinyon-juniper	21,543.8	23,100.6	+7%
Black Sage	5,499.9	3,726.9	-32%
PJ/Mtn. Shrub	6,883.6	5,558.8	-19%
Big Sage >25% cover	7,881.9	42,943.8	+445%
Big Sage 15-25% cover	11,909.9	22,825.5	+92%
Big Sage <15% cover	16,488.6	7,482.7	-55%
Mountain Shrub	12,876.4	862.7	Different Polygons
Sage CRP mixture	-	9,071.1	
CRP >70% cover	-	6,708.1	
CRP 40-70% cover	-	14,212.2	
CRP 15-40% cover	-	13,283.2	
Rangeland	14,507	23,798.5	-64%
Unknown	0	10,558	
Cloud cover	2,357.2	0	
Bare Ground	9,502.9	8,214.6	-14%
TOTAL	224,828	229,507	

Livestock Grazing

Livestock grazing has long been the primary use of the lands northeast of Monticello, Utah. Prior to the 1970's, thousands of domestic sheep used that area in the spring and fall for interim grazing. At the same time, cattle also were being grazed.

This area, known as the "Flats," is still extremely important to many San Juan County ranchers. It represents the largest chunk of private land in the entire county. The sheep are gone, but cattle graze there for a period of time in the spring and fall as they move from the winter to the summer range, and back again. It provides an important link in the production system of many local cattle operations.

Research suggests that livestock grazing may conflict with sage grouse nesting and brood rearing if the seasons of use overlap. Sage grouse typically begin nesting in late April to early May with peak hatching occurring in late May to early June. This period is also critical for local ranchers. Heavy livestock-use of sage grouse nesting areas can result in competition. During the spring grazing period, livestock may remove grasses which provide cover for nesting grouse and habitat for insects which are needed by young grouse. Heavy livestock use of sage grouse nesting and brood rearing areas in the fall may reduce the vegetation available for nesting or brood cover in the following spring.

The magnitude of these potential conflicts can be exacerbated if existing livestock intensity of use and the timing and duration of grazing negatively impacts the quality and quantity of nesting and brood rearing habitats. Currently, little is known about where Gunnison sage grouse nest and raise their broods in San Juan County. This information is needed before SWOG can implement conservation strategies that will benefit Gunnison sage grouse and minimize the impacts on local ranching operations.

In view of this lack of information, the suggested conflict between grazing and the sage grouse reproduction cycle must be reviewed very carefully. A blanket decision to eliminate grazing for a three month period of time in the spring over wide areas could have disastrous economic impacts for many landowners. Key areas could be identified for seclusion, but the choice of these lands must be justified. Each specific lek and nesting ground needs to be evaluated on an individual basis. With the development of new water sources and minimal fencing, many of the potential problems could be managed.

Water and wet meadows

A reduction in water areas in the CA also may have impacted sage grouse production and survival. Hens select drainage channels and wet meadows in sagebrush habitats that exhibit abundant forbs and frequent moisture as brood rearing sites. The vegetation in these areas provide habitat for insects. The location of these sites near dense sagebrush affords the hens and chicks escape cover.

In the past many landowners in the area did not have automatic control valves on the wells used to fill their livestock watering tanks. Consequently, the tanks would overflow creating wet meadow sites below the tanks. Landowners reported frequent observations of sage grouse broods in these areas. With more efficient watering, the seasonal wet meadows have disappeared. Lastly, several smaller impoundments and larger reservoirs in areas have either silted in or been washed out. The loss of these reservoirs also has reduced the availability of wet meadow sites.

Conversion of lek sites

Current and historic lek sites occur in areas dominated by big sagebrush. The conversion of sagebrush to agricultural use has eliminated suitable vegetation cover at 3 leks. These leks are no longer used.

Drought

San Juan County also experiences periodic droughts. Sage grouse production is directly affected by drought. While sage grouse are not limited by free standing water in most cases, they are limited by vegetation growth and insects lost during drought conditions. Research on sage grouse suggests that both nesting success of females and brood survival tend to decline during years with below-normal precipitation. These reported affects can be magnified if sagebrush habitats also are converted to other uses during drought periods.

Predation

Predation on Gunnison's sage grouse is a naturally occurring dynamic process which has helped to shape both predator and prey communities over time. However, due to changes in predator hierarchy and composition, habitat quantity and quality, and prey abundance, predation may have significant impacts on remanent populations occupying fragmented habitats. Such may be the case for the Gunnison sage grouse. SWOG recognizes that improving habitat conditions in conjunction with predation management can protect and increase sage grouse populations.

Predation of adult sage grouse by golden eagles, and ravens and magpies on nest and sage grouse chicks is well documented and believed to be impacting the Gunnison birds that inhabit the county. Increasing eagle, raven, and magpie populations in the west, in combination with favorable environmental conditions, have contributed to dramatic increases in the numbers of golden eagles, ravens, and magpies observed in the CA over the last 30 years.

The impacts of high densities of golden eagles on resident wildlife species is most pronounced in areas where the birds winter. When eagles are concentrated on winter ranges and prey is reduced, larger, slower flying species such as the Gunnison sage grouse are at increased risk of predation. Resident eagles may also take grouse during nesting and brood rearing periods.

Eagle damage management involves two specific strategies:

- C Identification and reduction or modification of habitat conditions which facilitate eagle depredation situations. Management actions include the enhancement or maintenance of suitable escape cover and the removal of environmental conditions which attract eagles (i.e., carrion, and vegetation or structures such as unused telephone or utility poles that may function as roosting sites or hunting perches).
- C Relocation of eagle abundance in key habitats by harassment, trapping and relocation, supplemental feeding, etc.

All eagle, raven, and magpie damage management activities will be conducted consistent with existing laws, regulations, and permits under the supervision of the Utah state director for USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services (WS).

Predation is of concern primarily during the nesting season. Ground nesting birds are subject to nest destruction or direct predation while incubating their eggs and caring for flightless juveniles. When identified, predators may be removed from breeding complexes prior to the nesting season to decrease predation risks. Potential sage grouse predators occurring in the core area during the nesting season may include coyote, red fox, striped skunk, ground squirrels, and raccoon. Coyote and red fox numbers may also be reduced on key wintering areas.

USDA/APHIS Wildlife Services has the statutory authority to cooperate with “... states, local jurisdictions, individuals, and public and private agencies, organizations, and institutions...” for the control of wildlife damage. Wildlife Services will cooperate in the protection of Gunnison’s sage grouse through agreements with private landowners and SWOG.

Although predator management may be necessary for the maintenance and enhancement of sage grouse populations, SWOG will conduct an evaluation of the need for predator control prior to implementation. SWOG also realizes that substantial improvements of sage grouse habitats, which include escape cover, and may reduce the need for wide-scale predator management.

Pipeline development

The development of pipelines is becoming more common in sage grouse habitats. Pipeline development can have a negative impact on sage grouse during the breeding, nesting, and early brood rearing periods if not properly managed. However, reseeded construction areas with desirable forbs and grasses can be beneficial to sage grouse, especially if the width of the area disturbed is minimal (< 100 yards) and the roads and trails used during construction and maintenance are closed and reseeded after construction. In addition, tapping water pipelines during the spring and early summer to create wet meadows in brood areas may enhance sage grouse brood survival and overall production.

Highways and roads

A Gunnison sage grouse male was observed by a member of SWOG as being hit by a car in 1998. Sage grouse prefer to walk to reach usable habitats throughout the year, except when snow cover increases their conspicuousness. Increased traffic volumes on highways and off-road vehicle use (OHV's) could contribute to increased mortality of adults and young during the spring-fall periods. The development of a San Juan County access management plan could benefit sage grouse, other wildlife, and enhance trespass management efforts on private lands in the CA.

Lack of management

Within CA sagebrush habitat, there are areas where the vegetative components other than sagebrush may be needed for sage grouse production and survival. As sagebrush cover increases to over 30%; competition for water, sunlight, and nutrients may decrease production of desirable herbaceous understory species. In these areas, sagebrush may need to be removed and the sites reseeded to suitable grass and forb mixtures.

Weeds

The most immediate concern in terms of undesirable plants encroaching on sage grouse habitat is the spread of cheatgrass. Cheatgrass invasions in other states have increased the fire frequency to the point that sagebrush stands have been eradicated. Thus, any sagebrush sites treated to open the canopy cover must be immediately reseeded with desirable grasses and forbs to reduce weed invasions.

D. Goals and Objectives

Goals

- C Ensure long term conservation of Gunnison sage grouse within its historic range in San Juan County and assist in the development and implementation of range wide conservation efforts.
- C Preservation and enhancement of personal income on privately-owned agricultural lands that constitute Gunnison sage grouse habitat in San Juan County.

Population objectives

- C Estimated spring breeding population - To reestablish a minimum estimated spring breeding population of 500 birds with 6-8 active lek areas each containing a 3 year count averages of 20-25 birds per lek. This increase would be measured from 1997 population estimates. All current identified lek sites would be protected from future risk through leases, conservation easements, or in fee title. The intent is to achieve this population goal in 15 years.

Habitat objectives

- C Breeding complexes - To reestablish desired vegetation conditions on 50-75% of the area located within 2 miles of known lek sites within the core area. Desired conditions include a canopy cover of 20-40% big sagebrush with an average height of 16 inches, 30% minimum grass canopy cover, and 10% minimum forb canopy cover. The desired habitat conditions will be achieved within 10 years.
- C Brood rearing complexes - To reestablish desired vegetation conditions on 50-75% of the areas located within 4 miles of known lek sites within the core area within the next 10 year periods. Desired conditions include a canopy cover of 20-40% big sagebrush with an average height of 16 inches, 30% minimum grass canopy cover, and 10% minimum forb canopy cover. The height of the vegetation in wet meadow areas is to be greater than 4 inches between June 15-July 31 on over 75% of the area used as brood rearing habitat.
- C Wintering complexes - To reestablish desired vegetation conditions on 50% of the areas located within the 65,000 acre core area, and 25% of the vegetation conditions within the buffer areas, over the next 10 year period. Desired conditions for winter habitat include a minimum of 15% canopy cover of big sagebrush vegetation that averages 12 inches in height on southerly and westerly aspects. Big sagebrush in drainages should exhibit a minimum of 30% canopy cover and average 20 inches in height. Small areas that exhibit denser sagebrush canopy cover (40% with an average height of 16 inches) should be interspersed throughout the wintering area on south and west slope aspects.
- C Corridors - To reestablish and maintain contiguous travel corridors consisting of big sagebrush exhibiting >25% canopy coverage between breeding, brood rearing, and wintering complexes in the core area. This will be achieved within the next 15 years.

III. PLAN IMPLEMENTATION - CONSERVATION STRATEGIES

A. Desired Plan Outcomes

Implementation of the Plan will result in a broad base of local support necessary to coordinate management across land ownership and jurisdictional boundaries to ensure survival of the Gunnison sage grouse and the economic viability of San Juan County. To achieve this outcome, the Plan has been designed to be a dynamic document that will be formally reviewed annually and updated as new information becomes available. Annual progress reports will be provided to SWOG members including USFWS Ecological Services Offices located in Salt Lake City, Utah and Grand Junction, Colorado.

The success of this Plan will be measured by changes in habitat conditions and Gunnison sage grouse population numbers in San Juan County. Another measure of success will be increased participation of local landowners, the community, and public and private resource management and conservation agency and organization efforts in conservation actions, and activities designed to achieve Gunnison sage grouse population and habitat objectives and maintain agricultural profitability.

The Plan is intended to augment the efforts of the Colorado Gunnison Sage Grouse Working Group. Completion of the Colorado and San Juan County sage grouse conservation plans will reduce the risk to the species while ensuring local control over management decisions regarding the species. SWOG will be responsible for implementing, monitoring, and updating the Plan. The monitoring and evaluation will be conducted by the Utah State University Extension Service, College of Natural Resources, Jack H. Berryman Institute, and the Utah Division of Wildlife Resources.

B. Habitat Enhancement Accomplishments

In the late 1980s many landowners within the CA enrolled their lands in CRP. Most of the decline in non-irrigated agricultural land can be explained by CRP. In 1993, over 43,000 non-irrigated croplands were converted to CRP grasslands. Also, during this period, an additional 10,000 acres of cropland was converted to rangeland.

Many of CRP contracts in the county expired in 1995. Based on new national CRP eligibility requirements, many of these lands and other agricultural lands located in the county would not have been eligible for enrollment in the program. SWOG worked with the Natural Resource Conservation Service (NRCS) state and technical committees to have San Juan County designated as a state conservation priority area under CRP because of Gunnison sage grouse. Designation as a state conservation priority area meant that lands submitted for CRP enrollment consideration in the county did not have to meet the CRP erodibility index requirements to be considered eligible for the program. However, with the designation, landowners could still enroll these lands if they opted to implement committee approved wildlife conservation seedings and practices.

As of February 2000, a total of 36,825 acres of private land within the 65,000 acre core area had been enrolled in CRP. Approximately 32,667 acres were enrolled as a result of the Gunnison sage grouse conservation priority initiative. The UDWR, in conjunction with NRCS, developed a sage grouse seed mixture for use in San Juan County (Appendix C). The total cost of reseeding these areas to the sage grouse seed mixture was \$531,688. The UDWR and private landowners each paid \$132,921 of this amount. Farm Services Agency (FSA) cost-shared for the remaining \$265,844. The total cost of establishing the CRP program in San Juan County was \$1,222,728. This includes the seed cost and \$691,042 that was spent to prepare the land for reseeding. Half of the costs of land preparation was paid for by the landowners (\$345,521) and half was cost-shared by FSA. CRP leases generate in excess of \$1,000,000 in annual income for participating landowners.

C. Priority Conservation Strategies

The strategies identified in the Plan will be implemented and evaluated by SWOG. Although the strategies may be applied to approximately 230,000 acres identified as potential sage grouse habitat, priority will be placed on areas within the 65,000 acre core conservation area which are or have been inhabited by grouse and used as nesting, brooding, wintering, and lek sites (Figure 4).

Figure 4. Colorado Plateau Sage Grouse Data

D. Summary of Priority Implementation Actions By Conservation Strategy

C Develop Public Support and Funding Base for the Conservation Plan.

Action: **Communicate Conservation Plan goals, objectives, and accomplishments to other stakeholders in the agricultural, natural resource, and legislative community.**

Strategies: Publish a San Juan County Gunnison Sage Grouse Conservation Plan informational brochure for public distribution.

Host media interviews with SWOG representatives from the agricultural and wildlife conservation communities.

Organize and conduct an annual San Juan County Gunnison Sage Grouse Conservation Festival to draw attention to the plight of the birds and the efforts of the local community to restore the populations.

Develop a series of promotional items that carry a designer logo. These promotional items will be sold at local and regional retail outlets to increase the visibility and support of the county conservation efforts and generate revenue to support Plan implementation.

C Monitoring and Evaluation

Action: **Seek endorsement and funding of the San Juan County Gunnison Sage Grouse Conservation Plan through the Utah Department of Natural Resources Endangered Species Mitigation Fund, the Utah Legislature, and other sources.**

Strategies: SWOG will meet as a working group every 6 months to review Plan progress and implementation.

SWOG partners will contact their legislative representatives regarding the process and send letters of support to the executive director of the Department of Natural Resources, the Utah Governor's Office, and Utah's congressional delegation.

SWOG representatives will testify before the appropriate Utah Legislature committees about the San Juan County Conservation Plan to increase legislator awareness and support for similar efforts in other areas of Utah.

Action: **Monitor impacts of conservation strategies on sage grouse habitat and population.**

Strategies: SWOG will initiate an ongoing research program to monitor annual sage grouse population numbers and trends, monitor sage grouse habitat use, nest success, and mortality, and identify land uses action which may conflict with the goals and objectives of the Plan. This work will begin in 2000.

This research program will establish permanent vegetation transects to monitor habitat responses on CRP and other managed sites to determine progress toward desired habitat conditions.

C Species protection and population enhancement

Action: **Monitor landscape sage grouse habitat conditions to include land use and vegetation changes in the conservation area.**

Strategy: USU will update the existing GIS land use database of the CA landscape vegetation and habitat conditions every 5 years. This update will allow SWOG to compare pre- and post-Plan time periods to inventory and map habitat changes that resulted because of conservation strategy implementation.

Action: **Delineate and map all lek sites within the conservation area, monitor numbers of strutting cocks, estimate population numbers and trends, and determine priority brood rearing and wintering complexes.**

Strategy: Conduct annual lek, brood, and winter surveys. Priority areas identified will be added to the SWOG GIS data base. GPS locations of all nesting, brood rearing, and wintering complex will be recorded and sites delineated on the SWOG GIS data base.

Action: **Increase the abundance and distribution of Gunnison sage grouse.**

Strategies: Enhance sage grouse habitat conditions (See restoring and improving habitat quality section).

Implement a predation management program.

Reintroduce sage grouse obtained from Colorado into restored habitats.

C Restoring and Improving Habitat Quality

Action: **Develop a vegetation management Plan for the core area.**

Strategies: Identify and GIS map existing and potential nesting, brood rearing, wintering areas, and travel corridors to include land ownership.

Work with SWOG partners to manage core and buffer areas to achieve defined sage grouse habitat objectives.

Work with SWOG partners to develop and implement grazing management plans to achieve Gunnison sage grouse habitat objectives.

Work with the USU County Extension Office and the Utah Department of Agriculture and Food to identify and manage noxious weed species to improve sage grouse habitat and livestock productivity.

Action: **Protect critical lek, nesting, brood rearing, and wintering areas.**

Strategies: Secure or acquire important habitats through fee title from willing sellers, land exchanges, conservation easements, tax incentives, voluntary cooperative agreements, CRP leases, grazing lease agreements, etc.

C Reducing Physical Disturbance

Action: **Disturbance that negatively impacts sage grouse will be identified and managed. This includes predation management, recreation use, construction and surface disturbances, and other uses that may conflict with critical biological periods.**

Strategies: Delay or modify construction start up dates or hours to minimize impacts in sage grouse nesting and brood rearing areas.

Designate OHV use areas and other requirements.

Manage off-road travel in key sage grouse areas.

Implement predation management in key nesting, brooding rearing and wintering area.

E. Implementation Schedules and Responsibilities

San Juan County Gunnison Sage Grouse Working Group (SWOG) Conservation Strategies.

Conservation and Management Strategies	Examples of ways to accomplish	Implementation Schedule	
		When	Who
Develop Public Support and Funding Base			
Provide information to the public, landowners and others that identifies sage grouse habitat needs, conditions, and sage grouse population levels. Identify concerns and opportunities to improve conditions for sage grouse in this area.	Maps, newspaper articles, videos.	2000 - ongoing	SWOG, UDWR, USU, BI
	Meetings with interested landowners.	2000 - ongoing	
	Publish a San Juan County Gunnison Sage Grouse Conservation Plan Brochure.	2000 - ongoing	
Work with interested parties, landowners, and others to bring about a better understanding of sage grouse needs, including the value and importance of sage grouse and sage grouse habitat, and provide a basis for sharing ideas and reaching agreement on ways to improve sage grouse habitat and increase populations.	Meetings with interested landowners, government/regulatory entities (e.g. countries).	2000 - ongoing	SWOG
	Developing management plans, cooperative agreements, etc.	2000 - ongoing	SWOG
	Distribute information on: importance of sage grouse; availability of incentive programs, BMPs, effects of certain land uses on grouse.	2000 - ongoing	SWOG, UDWR, USU Extension, NRCS
	Coordinate sage grouse conservation actions with management plans for other wildlife species in San Juan County.	2000 - ongoing	SWOG, UDWR, USU Extension
	Continue to work with other groups: Nature Conservancy, Envision Utah, RMEF, Soil Conservation Districts, Utah Farm Bureau, etc., in Colorado to further sage grouse conservation efforts region wide.	2000 - ongoing	SWOG, UDWR, NRCS, Private Landowner, USU Extension, BLM, NRCS, FWS
	Communicate with other sage grouse working groups.	2000 - ongoing	SWOG

Conservation and Management Strategies	Examples of ways to accomplish	Implementation Schedule	
		When	Who
Incorporate economic, social, and cultural values into conservation practices.	Communication with San Juan County Commission and Communities.	2000 - ongoing	SWOG
	Encourage voluntary compliance and participation.	2000 - ongoing	SWOG
	Involve landowners and local communities in all aspects of sage grouse conservation.	2000 - ongoing	SWOG
	San Juan County Sage Grouse Festival and promotional items.	2001-2002 - ongoing	SWOG, Utah Tourism, USU Extension, San Juan County Commissioner, UDWR
Maintain local control.	The Sage Grouse Working Group (must include landowners and local residents) and will act as advisory body to the County Commission and agencies.	2000 - ongoing	SWOG
	Provide for continual public input and involvement.	2000 - ongoing	SWOG
Develop, improve, and encourage credibility and success.	Seek outside scientific review of projects.	As opportunities arise	USU Extension, UDWR, BI
Seek endorsement and funding for conservation Plan	Meet with Utah legislature and congressional representatives.	2000 - ongoing	SWOG, UDWR, USU Extension
	Meet with Utah Department of Natural Resources.	2000 - ongoing	SWOG, UDWR, USU Extension

Conservation and Management Strategies	Examples of ways to accomplish	Implementation Schedule	
		When	Who
Monitoring/Evaluation			SWOG
SWOG will meet every 6 months to review Plan implementation and progress	Meetings will be held in San Juan County with the working group and the landowners.	2000 - ongoing	UDWR, USU Extension, BI
Identify important sage grouse habitat, limiting factors, and activities that have the potential to impact sage grouse or their habitat. Identify and evaluate critical sage grouse habitats.	Habitat mapping and monitoring.	2000 - ongoing	
	Meetings with interested landowners.	2000 - ongoing	
	Joint-interagency/landowner evaluation, information sharing.	2000 - ongoing	
Continue to gather or initiate the collection of basic resource data to better understand and document conditions for sage grouse, including response habitat.	Hire a graduate student to collect baseline habitat and population data.	2000 - ongoing	SWOG, UDWR, USU, BI, WS, USFWS, BLM
	Habitat mapping and monitoring.	2000 - ongoing	
	Meetings with interested landowners.	2000 - ongoing	
	Joint-interagency/landowner evaluation, information sharing.	2000 - ongoing	
Species Protection and Population/Habitat Enhancement			
Develop and encourage incentives for landowners and others to avoid or mitigate loss of sage grouse habitat.	Land exchanges.	2000 - ongoing	UDWR, FWS, SWOG, BLM, FS, Nature Conservancy, UDWR, NGOs
	Conservation Easements/Leases.	As opportunities arise	UDWR, NGOS
	Transferrable development rights.	As opportunities arise	UDWR, NGOS
	Payment for non-use.	2000 - ongoing	UDWR, FWS, SWOG, NGOS
	Application of specific land-use practices that benefit grouse.	2000 - ongoing	Landowners
	Reintroduce sage grouse to restored habitats.	As opportunities arise	UDWR, NRCS, SWOG, Private Landowner

Conservation and Management Strategies	Examples of ways to accomplish Implementation Schedule	Implementation Schedule	
		When	Who
Enhance and restore historic and existing sage grouse habitat to offset loss of habitat elsewhere.	<p>Reseeding or reclaiming areas, creating or protecting wet meadow areas, and implementing vegetation treatments (i.e., prescribed burning, Dixie harrowing, etc) to rejuvenate habitats and maintain leks.</p> <p>Reintroduce sage grouse into restored habitats.</p>	<p>Ongoing</p> <p>As opportunities arise</p>	<p>SWOG, UDWR, NRCS, USFWS Landowners, BLM</p> <p>UDWR</p>
<p>Prevent loss and fragmentation of habitat from construction of roads, utilities.</p> <p>Identify changes to county land use regulations which would benefit sage grouse.</p>	<p>Relocation or modification of new utility lines, roads, development, etc. in key grouse habitat and provide recommendations to the county or lead agency.</p> <p>Pipeline or power line modifications.</p> <p>For example: seek a county resolution that supports and encourages the use of conservation easements, mitigation of non-critical habitat areas, and preventing loss of critical habitat.</p>	<p>As opportunities arise</p> <p>Ongoing</p> <p>Ongoing</p>	<p>SWOG, San Juan County Commissioner</p> <p>BLM, UDWR, San Juan County Commission</p> <p>SWOG, San Juan County Commission</p>
Restoring or Improving Habitat Quality			
Enhance existing riparian areas by creating or enhancing small wet areas to benefit sage grouse nesting and brood rearing habitat.	<p>Design and implement livestock grazing management practices to benefit riparian areas.</p> <p>Modify or adapt pipelines/springs to create small wet areas.</p>	<p>2000 - ongoing</p> <p>As opportunities arise</p>	<p>USU Extension, UDWR, FWS, NRCS</p> <p>Pipeline Companies, UDWR, BLM, FWS, and landowners</p>
Reduce or modify situations that cause predation.	<p>Modify power lines and wood fence posts (to remove raptor perches) in critical sage grouse areas.</p> <p>Cut pinyon-juniper trees near leks and elsewhere within potential sage grouse habitat to remove raptor perches.</p>	<p>As opportunities arise</p> <p>2000 - ongoing</p>	<p>UDWR, BLM, SWOG, USDA, Wildlife Services, FWS</p> <p>UDWR, BLM, SWOG, USDA, Wildlife Services, FWS</p>

Conservation and Management Strategies	Examples of ways to accomplish	Implementation Schedule	
		When	Who
Develop and use Best Management Practices to guide land uses to increase sage grouse populations and improve sage grouse habitat.	Implement local guidelines that describe:	2000 - ongoing	SWOG, UDWR, BLM, USU Extension, NRCS
	Livestock grazing practices that benefit sage grouse.	As opportunities arise	SWOG, UDWR, BLM, USU Extension, NRCS
	Living with sage grouse in your backyard (control of dogs, etc.).	Ongoing	SWOG, UDWR, BLM, USU Extension, NRCS
	Restoring and rehabilitating riparian areas.	As opportunities arise	SWOG, UDWR, BLM, USU Extension, NRCS
	Proper land treatment design and construction that reduce impacts to sage grouse (e.g., how and where to Plan projects).	As opportunities arise	SWOG, UDWR, BLM, USU Extension, NRCS
	Land development options.	As opportunities arise	SWOG, UDWR, BLM, USU Extension, NRCS
Improve sage grouse habitat quality and improve vegetation cover, especially forbs and grasses in sage grouse areas.	Developing and using sound grazing management practices.	2000 - ongoing	NRCS, USU Extension, UDWR Landowners
	Planting and re-seeding with a high proportion of forbs.	2000 - ongoing	SWOG
	Designing vegetation treatments in sage grouse areas to be compatible with sage grouse needs.	2000 - ongoing	UDWR, NRCS
	Improving ground cover in sage grouse areas.	2000 - ongoing	UDWR, NRCS, BLM, Landowners
	Managing big game to avoid degrading sage grouse habitat or recovery.	2000 - ongoing	UDWR
	Integrating weed management with grouse needs.	2000 - ongoing	USU Extension, BLM, Landowner, NRCS

Conservation and Management Strategies	Examples of ways to accomplish	Implementation Schedule	
		When	Who
Increase opportunities for over-winter survival, escape cover near leks, nesting cover.	Improve quality of sagebrush dominated habitats by grazing management.	2000 - ongoing	SWOG, NRCS, UDWR, USU Extension
	Avoiding treatment projects that remove large strands of sagebrush in critical areas.	As opportunities arise	SWOG, NRCS, UDWR, USU Extension
	Developing recommendations for managing sagebrush community as a whole, considering all uses.	Ongoing	SWOG, NRCS, UDWR, USU Extension
Reducing Physical Disturbance to Sage Grouse/Predation Management			
Mitigate or reduce conflicts with sage grouse during critical biological periods and in critical habitats.	Delay or modify construction start up dates or hours to minimize impacts in sage grouse nesting and brood rearing areas.	2000 - Ongoing	San Juan County Commission
	Designate OHV use areas and other requirements.	As opportunities arise	San Juan County Commission
	Manage off-road travel in key sage grouse areas.	2000 - Ongoing	San Juan County Commission
	Implement predation management in key nesting, brooding rearing and wintering area.	As opportunities arise	USDA Wildlife Services, UDWR
	Restrict public observation/lek viewing to 1 or 2 leks with 20-25 breeding males. All lek viewing would be conducted in accordance with established protocols to avoid disturbance	2000 -Ongoing	Landowners, UDWR, BLM

V. SIGNATURES

By signing below, the following parties have agreed to voluntarily work toward implementation of the provisions contained in the San Juan County Gunnison Sage Grouse Conservation Plan.

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner Date

Landowner	Date
Landowner	Date
Landowner	Date
Landowner	Date
San Juan County Commission	Date
U. S. Department of Interior U.S. Fish and Wildlife Service	Date
Utah Department of Natural Resources Division of Wildlife Resources	Date
Utah State University Extension Service	Date
U.S. Department of Agriculture Natural Resources Conservation Service	Date
U.S. Department of Interior Bureau of Land Management	Date
U.S. Department of Agriculture Animal and Plant Health Inspection Services/Wildlife Services	Date
U.S. Department of Agriculture Farm Services Agency	Date
Utah State University Extension Service	Date

Utah State University, College of Natural Resources

Date

Jack H. Berryman Institute, Utah State University

Date

VI. REFERENCES

- Beck, J. L. and D. L. Mitchell. 1997. Brief guidelines for maintaining and enhancing sage grouse habitat in private lands in Utah. Utah Division of Wildlife Resources Report. Salt Lake City, Utah 9 pp.
- Braun, C. E., T. Britt. And R. O. Wallestad. 1977. Guidelines for maintenance of sage grouse habitat. Wildlife Society Bulletin 5:99-106.
- Commons, M. L. 1997. Movement and habitat use by Gunnison sage grouse (Centrocercus minimius) in southeastern Colorado. M.S. Thesis. University of Manitoba, Winnipeg. 108 pp.
- Dunn, P.O. and C.E. Braun. 1986. Late summer-spring movements of juvenile sage grouse. Wilson Bulletin 98-83-92.
- Klebrenow, D.A. 1969. Sage grouse nesting and brood habitat in Idaho. J. Wildl. Manage. 33:649-662.
- Wallestad, R.O. 1971. Summer movements and habitat use by sage grouse broods in Central Montana. J. Wildl. Manage. 35:129-136.
- Young, J.R., J.W. Hupp, J.W. Bradbury, and C.E. Braun. 1994. Phenotypic divergence of secondary sexual traits among sage grouse, *Centrocercus urophasianus*, populations, Anim. Behav. 1994: 47:1353-1362.

VII. APPENDICES

A. San Juan County Gunnison Sage Grouse Working Group Members

Bureau of Reclamation
Farm Services Agency
Natural Resource Conservation Service
San Juan County Commission
San Juan County Extension Office
San Juan County Landowners
Utah Division of Wildlife Resources
Utah State University Extension Service
Utah State University College of Natural Resources
Jack H. Berryman Institute
U.S.D.A. Wildlife Services
U.S. Fish and Wildlife Service

B. San Juan County Gunnison Sage Grouse Conservation Area Vegetation Classifications

1. **Surface Water**--class includes areas of open water.
2. **Wet meadows**--class includes drainages, ephemeral streams, creeks, springs, and other riparian areas. Commonly associated plant species include; *Carex spp.*, *Typha spp.*, *Scirpus spp.*, *Salix spp.*, *Artemisia tridentata*, and other forbs and grasses.
3. **Irrigated agriculture**--class includes irrigated agriculture fields, mainly alfalfa, *Medicago spp.*
4. **Non-irrigated agriculture**--class includes those fields in some sort of dry land farming.
5. **Urban**--class includes urban areas.
6. **Pinyon/Juniper**--class includes those areas where pinyon (*Pinus edulis*) and/or Utah Juniper (*Juniperous, osteosperma*) comprise more than 15% of the total vegetation in a given area. Commonly associated plant species include: *Artemisia tridentata*, *Chrysothamnus spp.*, *Quercus gambelii*, *Gutierrezia sarothrae*, *Purshia tridentata*, *Amelanchier alnifolia*, *Opuntia spp.*, *Cordylanthus wrightii*, *Poa spp.*, *Aristida spp.*, *Bromus tectorum*, *Stipa spp.*, *Oryzopsis hymenoides*, *Aster spp.*, and Crypto-gramic crust.
7. **Black Sage**--class includes those areas where *Artemisia nova* is the dominate vegetation. Commonly associated plant species include: *Artemisia tridentata*, *Chrysothamnus spp.*, *Gutierrezia sarothrae*, *Atriplex canescens*, *Opuntia spp.*, *Cordylanthus wrightii*, *Poa spp.*, *Bromus tectorum*, *Agropyron cristatum*, *Agropyron smithii*, *Ceritoides lanata*, *Aster spp.*, and Crypto-gramic crust.

8. **Pinyon/Juniper-mountain shrub**--class includes those areas which contain less than 15% Pinyon pine (*Pinus edulis*) and/or Utah Juniper (*Juniperous, osteosperma*) and greater than 25% shrubs. Commonly associated plant species include; *Artemisia tridentata*, *Cercocarpus montanus*, *Chrysothamnus spp.*, *Quercus gambelii*, *Gutierrezia sarothrae*, *Purshia tridentata*, *Amelanchier alnifolia*, *Opuntia spp.*, *Cordylanthus wrightii*, *Ceritoides lanata*, *Wyethia amplexicalis*, *Poa spp.*, *Aristida spp.*, *Bromus tectorum*, *Stipa spp.*, *Oryzopsis hymenoides*, *Agropyron cristatum*, *Agropyron smithii*, *Aster spp.*, and Crypto-gramic crust.
9. **Big Sage >25% canopy cover**--class includes those areas where big sagebrush (*Artemisia tridentata*) is the dominate vegetation type. Commonly associated plant species include; *Chrysothamnus spp.*, *Artemisia nova*, *Gutierrezia sarothrae*, *Atriplex canescens*, *Purshia tridentata*, *Opuntia, spp.*, *Cordylanthus wrightii*, *Ceritoides lanata*, *Wyethia amplexicalis*, *Poa spp.*, *Aristida spp.*, *Bromus tectorum*, *Bromus carinatus*, *Stipa spp.*, *Oryzopsis hymenoides*, *Agropyron cristatum*, *Agropyron smithii*, *Aster spp.*, and Crypto-gramic crust.
10. **Big Sage 15-25% canopy cover**--class contains those areas where big sagebrush (*Artemisia tridentata*) comprises at least 15% of the vegetation but not more than 25% of the total vegetation type. In some cases this class may be invading some Conservation Reserve Program (CRP) fields. Commonly associated plant species include; *Chrysothamnus spp.*, *Artemisia nova*, *Gutierrezia sarothrae*, *Atriplex canescens*, *Purshia tridentata*, *Opuntia spp.*, *Cordylanthus wrightii*, *Ceritoides lanata*, *Poa spp.*, *Aristida, spp.*, *Bromus tectorum*, *Bromus carinatus*, *Stipa spp.*, *Oryzopsis hymenoides*, *Agropyron cristatum*, *Agropyron smithii*, *Aster spp.*, and Crypto-gramic crust.
11. **Big Sage <15% canopy cover**---class contains those areas where big sagebrush (*Artemisia tridentata*) comprises less than 15% of the vegetation in a given area. In some cases this class may be invading some Conservation Reserve Program (CRP) fields. Commonly associated plant species include: *Chrysothamnus spp.*, *Artemisia nova*, *Gutierrezia sarothrae*, *Atriplex canescens*, *Purshia tridentata*, *Opuntia spp.*, *Cordylanthus wrightii*, *Ceritoides lanata*, *Wyethia amplexicalis*, *Poa spp.*, *Aristida spp.*, *Bromus tectorum*, *Bromus carinatus*, *Stipa spp.*, *Oryzopsis hymenoides*, *Agropyron cristatum*, *Agropyron smithii*, and *Aster, spp.*
12. **Mountain Shrub**--class is dominated by Gambel's Oak. Commonly associated plant species include: *Pinus edulis*, *Juniperous osteosperma*, *Artemisia tridentata*, *Cercocarpus montanus*, *Chrysothamnus spp.*, *Quercus gambelii*, *Gutierrezia sarothrae*, *Purshia tridentata*, *Amelanchier alnifolia*, *Opuntia spp.*, *Cordylanthus wrightii*, *Ceritoides lanata*, *Wyethia amplexicalis*, *Poa spp.*, *Aristida spp.*, *Bromus tectorum*, *Stipa spp.*, *Oryzopsis hymenoides*, *Agropyron cristatum*, *Agropyron smithii*, *Aster spp.*, and Crypto-gramic crust.
13. **Big Sage CRP mixture**--class contains a fair amount of *Artemisia tridentata*, but is still dominated by some sort of CRP seed mixture mainly, *Agropyron, spp.*, *Bromus carinatus*, and *Medicago spp.* Commonly associated plant species include: *Chrysothamnus spp.*, *Gutierrezia sarothrae*, *Poa spp.*, and *Bromus tectorum*.

14. **CRP >70% canopy cover**--class is dominated by CRP grasses and forbs, mainly *Bromus carinatus*, and *Medicago spp.* Commonly associated plant species include: *Agropyron cristatum*, *Agropyron smithii*, *Agropyron intermedium*, *Chrysothamnus spp.*, *Gutierrezia sarothrae*, *Poa spp.*, *Aristida, spp.*, and *Bromus tectorum*.
15. **CRP 40-70% canopy cover**--class is dominated by CRP grasses and forbs, mainly *Agropyron spp.* Commonly associated plant species include; *Agropyron cristatum*, *Agropyron smithii*, *Agropyron intermedium*, *Bromus carinatus*, *Medicago spp.*, *Chrysothamnus spp.*, *Gutierrezia sarothrae*, *Poa spp.*, *Aristida spp.*, and *Bromus tectorum*.
16. **CRP 15-40% canopy cover**--class is dominated by CRP grasses and forbs, mainly *Agropyron cristatum*. Commonly associated plant species include: *Agropyron smithii*, *Agropyron intermedium*, *Bromus carinatus*, *Medicago spp.*, *Chrysothamnus spp.*, Commonly associated plant *Gutierrezia, sarothrae, Poa spp., Aristida, spp., and Bromus tectorum*.
17. **Rangelands**--class contains various vegetation types but was grazed too close to the ground to allow vegetation to be placed into other classes. Commonly associated plant species include; *Chrysothamnus spp.*, *Gutierrezia sarothrae*, *Opuntia spp.*, *Cordylanthus wrightii*, *Ceritoides lanata*, *Poa spp.*, *Aristida spp.*, *Bromus tectorum*, *Stipa spp.*, *Oryzopsis hymenoides*, *Agropyron cristatum*, *Agropyron smithii*, and *Aster spp.*
18. **Bare ground**--class contains mainly bare ground and rock where vegetation is less than 15% total canopy cover.
19. **Unknown**--class could not be placed into any of the above classes with the few vegetation training sites collected in November 1997.

C. Habitat mixture seeded on CRP lands in the San Juan County Gunnison Sage Grouse Conservation Plan Area.

Species	PLS Lbs/acre
Grasses	
Bluebunch wheatgrass	1.0
Thickspike wheatgrass	1.0
Western wheatgrass	1.5
Crested wheatgrass	0.5
Pubescent wheatgrass	1.0
Legumes/Forbs	
Alfalfa (Rambler)	1.0
Alfalfa (Ladak, Normad)	1.5
Western yarrow	0.12
Lewis flax	0.25
Sainfoin	0.5
Small burnet	2.0
Shrubs	
Wyoming big sagebrush	0.5
Forage kochia	0.5
Total	11.37

