

NEVADA SAGE-GROUSE CONSERVATION PROJECT

W-64-R-10 Federal Aid Grant

Nevada Department of Wildlife

Governor's Sage-grouse Conservation Team
Bi-State Local Area Conservation Planning Group
Elko County Sage Grouse POD
Lincoln County Technical Review Team
North Central Local Area Conservation Planning Group
South Central Local Area Conservation Planning Group
Washoe-Lassen-Modoc Local Area Conservation Planning Group
White Pine County Local Area Conservation Planning Group



Photo by Tim Torell

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Nevada's Sage-grouse Conservation Project is a collection of jobs ranging from survey and inventory to conservation planning, research and project coordination. This document reports on all elements of the project.

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EXECUTIVE SUMMARY

The Nevada Sage-grouse Conservation Project consists of 4 primary elements including Survey and Inventory, Conservation Planning and Implementation, Research, and Coordination and Administration. This progress report details work accomplished on all of the jobs within each element. Although Federal Aid is a major funding component of the overall project, significant efforts from federal agencies and conservation organizations are also directed toward sage-grouse conservation. In addition, funds from the Nevada Question 1 Bond Initiative and other Nevada Department of Wildlife (NDOW) funds (e.g. Habitat Conservation Fee and Upland Game Stamp) are utilized to augment sage-grouse conservation planning and projects. The distribution of W-64-R-10 grant expenditures for state fiscal year 2010 is depicted in Figure 1.

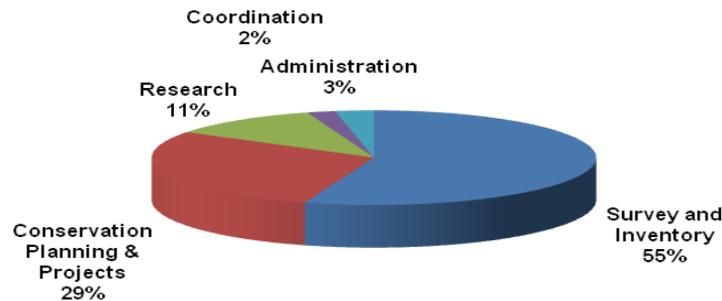


Figure 1. Distribution of W64-R-10 grant expenditures in fiscal year 2010.

Sage-grouse lek surveys continues to be a priority activity for the Nevada Department of Wildlife each spring. An average of 898 leks has been surveyed annually over the last five-year period. During the 2010 spring breeding season, 7,399 sage-grouse were counted on 420 active leks resulting in an average of 17.5 males per active lek. This attendance rate represents a 10.8% increase over the 2009 average attendance of 15.8 males per active lek. However, from 2002-2008, the average lek attendance rate was 20.1 bird per active lek and the 2010 figures are 13% below that average. During the last ten-year period, the highest attendance rate was recorded in 2005 at 26.6 males per active lek. In many areas throughout Nevada, the 2005 attendance was the highest ever recorded.

To measure demographic parameters such as production and nest success, sage-grouse wings are collected during the hunting season through wing barrel placement and through deposit at regional offices. During the 2009 hunting season, a total of 2,680 wings were collected. This represents a 61% increase over the 2008 collection of 1,662 wings. Last season's collection was also 20% greater than the previous ten-year average of 2,229 wings. The 2009 statewide production value (# of chicks per hen) was 2.10. This was an improvement over the 2008 production value of 1.69 and represents the second year of improved production compared to the all time recorded low of 0.58 in 2007. In addition, nest success values were much improved in 2009 with estimated nest success at 57.6%. This value is the highest nest success value since 2002 when this parameter was initially recorded. The 2009 nest success value represents a 33% increase over the 8-year average of 43.2%

NDOW continues to radio mark sage-grouse in order to better understand habitat selection, seasonal use areas and movement patterns between seasonal habitats. Similar information gained from research projects being conducted by universities or other agencies was also used to better determine features of sage-grouse habitat. In fiscal year 2010, NDOW

conducted capture and telemetry follow-up operations in Lander, White Pine and Elko Counties. A total of 59 sage-grouse were captured in FY10 as part of these population delineation projects. Telemetry devices were attached to 43 birds consisting of 13 males, 23 females (including 8 juvenile hens) and 7 that were unknown (young of the year). Leg bands were attached to all of the captured birds. In addition to birds caught in FY10, 45 birds caught and radio-collared in FY08 and FY09 were also monitored in FY10. NDOW is utilizing the services of the Great Basin Bird Observatory (GBBO) for much of the follow-up work in White Pine County. Information from these projects will be used to alter PMU boundaries as necessary and develop a Habitat Categorization map (habitat value) for sage-grouse across Nevada.

The Governor's Sage-grouse Conservation Team (SGCT) held a total of 5 meetings in fiscal year 2010. Staff personnel spent time coordinating and facilitating meetings as well as developing agendas. The "Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and Their Habitats" was completed in May of 2010 and made available at the Nevada Department of Wildlife's website located at <http://www.ndow.org/wild/conservation/sg/>. This document required a considerable amount of staff time to develop, distribute for review and gain approval from the SGCT; however, the document provides a standardized approach for dealing with energy and infrastructure development within Nevada.

Conservation planning and implementation of projects continues to occur at a local level with benefits to sage-grouse and other wildlife. Most restoration or habitat enhancement projects are funded through multiple sources and the Sage-grouse Conservation Grant (W-64) is one of those sources. The following is a synopsis of projects where this grant contributed funding; however, there are several other projects that benefit sage-grouse, but did not receive W-64 funding.

- White Pine Range Sage-grouse Habitat Enhancement in White Pine County
 - 1,000 acre treatment area
 - Funding: \$26,860.10 (75% W-64 grant, 25% Question 1)
- China Camp Sage-grouse Habitat Enhancement
 - 700 acre treatment area
 - Funding: \$40,080 (\$20,090 in FY10)
- Roberts Creek Mountain Wildlife Habitat Enhancement
 - 3,000 acre treatment area
 - Funding: \$12,586.56 (\$7,380 W-64 grant funding, \$5,206.00 Wildlife Heritage Trust Account)

Regional and staff personnel also contributed to coordination and planning projects for fiscal year 2011 during the 2010 reporting period. Examples of these projects include the following:

- Stocks Creek/Holloway Meadow Restoration in Humboldt County (Santa Rosa PMU)
- Eagle Butte Wildlife Habitat Enhancement Project in Lander County (Toiyabe PMU)
- Battle Mountain Meadow Restoration in Lander County (Battle Mountain PMU)

Additionally, this grant allowed NDOW to provide funding for research currently being conducted in the Virginia Mountains located in Washoe County in 2010. This population of sage-grouse is relatively small and somewhat isolated, yet is considered self-sustaining. Several threats face this population including suburban development, dispersed recreation and energy development. It is important to better understand seasonal use patterns and movement between seasonal habitats in order to help conserve this population and offer management decisions. For the past two years, researchers have monitored a total of 39 nests including 18 in 2009 and 21 in 2010. Of these, 28 nests failed. Apparent nest success (defined as ≥ 1 chick

hatching) for the radio-monitored birds was 22.2% ($n = 4$) in 2009 and 33.3% ($n = 7$) in 2010. These rates are lower than other published rates in Nevada of 40.2% (Rebholz et al. 2009) and 51% (Coates and Delehanty 2010). Vegetative characteristics were also measured at nest sites. Sagebrush species accounted for 28.2% of nest shrub selection and 45.5% of those nests were successful. Rabbitbrush made up 23.1% of nests and of these 77.8% were successful. Nests not associated with shrubs were not successful (0%) and 15.4% were found in this category. Remote video cameras were placed at nest sites during the nesting period to help determine nest fate. Among 22 video monitored nests, 11 failed due to the following: common raven (*Corvus corax*) 26.7% ($n = 4$); American badger (*Taxidea taxus*) 13.3% ($n = 2$); bobcat (*Lynx rufus*) 13.3% ($n = 2$); coyote (*Canis latrans*) 13.3% ($n = 2$); and abandonment following injury 4.6% ($n = 1$).

SURVEY AND INVENTORY

Lek Monitoring

State: Nevada Grant Title: Nevada Sage-grouse Conservation Project

Grant No.: W-64-R-10 Sub-Grant Title: Survey & Inventory
Sub-Grant No.: 1 Project Title: Population Monitoring, Delineation and Demographics

Project No.: 1 Job Title: Lek Monitoring

Period Covered: July 1, 2009 – June 30, 2010
Report by: Shawn Espinosa, Larry Gilbertson, Curt Baughman, Tom Donham, Jeremy Lutz, Ken Gray, and Mike Podborny

SUMMARY

Lek counts continue to be an important duty within the Nevada Department of Wildlife's (NDOW) annual work program. These surveys are emphasized in the *First Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California* (Plan). Within the Nevada portion of the planning area, NDOW field biologists, Bureau of Land Management (BLM) and U.S. Forest Service (USFS) personnel, and volunteers collected data both from the ground using accepted protocols and air using a helicopter. Lek count data were also provided by biological consultants conducting resource evaluations for some of the many proposed transmission line and renewable energy projects. The following information was provided to report progress in achieving objective #1 identified in the Grant Agreement, which states: "Conduct lek counts to determine population health and estimate the size of sage-grouse populations within distinct Population Management Units (PMUs)". Cumulative lek count data was reported within this section by Local Area Conservation Planning group for consistency with the Plan.

During the 2010 spring breeding season, 7,399 sage-grouse were counted on 420 active leks resulting in an average of 17.5 males per active lek. This attendance rate represents a 10.8% increase over the 2009 average attendance of 15.8 males per active lek. However, from 2002-2008, the average lek attendance rate was 20.1 bird per active lek and the 2010 figures are still 13% below that average. During the last ten-year period, the highest attendance rate was recorded in 2005 at 26.6 males per active lek. In many areas throughout Nevada, the 2005 attendance was the highest ever recorded.

	# Males	Leks Surveyed	Active Leks	AVG/active lek
2002	5,198	648	335	15.5
2003	4,624	380	248	18.6
2004	6,813	487	309	22.1
2005	8,843	635	332	26.6
2006	9,580	881	448	21.4
2007	11,040	1,013	545	20.3
2008	7,671	923	483	15.9
2009	7,954	930	505	15.8
2010	7,399	742	420	17.5

Table 1. Lek count summary from 2002 – 2010.

In state fiscal year 2010, **\$184,668.62** was expended on population monitoring efforts in Nevada. This work consists of the observation and classification of Greater Sage-grouse on leks during the spring using various methodologies including ground based and aerial counts, collection and analyses of sage-grouse wings during various sage-grouse seasons, and population delineation which often involves capture, radio-marking and follow-up activities. The level of effort to collect data on sage-grouse leks has increased incrementally and, in some cases, substantially since the inception of the conservation planning effort for sage-grouse in 2000. The original projected cost identified in the annual grant agreement was **\$208,000.00** resulting in a remainder of **\$23,331.38**. One reason for the 11% savings was that there was less contracted aerial services (helicopter) used during FY10 to survey sage-grouse leks.

OBJECTIVES

The primary objective of this monitoring was to document and analyze data pertaining to sage-grouse breeding activity. These data contribute to an understanding of population dynamics including, but not limited to, numerical trends, population status, distribution patterns and habitat selection. Lek site attributes can be used in an attempt to predict suitability indices to direct future searches for undocumented grounds, thus furthering the scientific description of the species' range in Nevada. Biologists use the data to calculate minimum spring breeding population estimates for many of the 64 identified PMUs. These estimates and trend analyses will be used to evaluate population viability, effectiveness of management practices and prioritization of conservation planning and achievement efforts. However, these population estimates were not statistically valid and merely represent a "best guess" as to what a population size might be. Comparisons from year to year should be viewed with this in mind as survey efforts change from year to year and some assumptions could be incorrect. Because there is such a large number of PMUs, data in this report will be summarized by Local Area Conservation Planning group for reading ease.

FINDINGS

WASHOE-LASSEN-MODOC

The Washoe-Lassen-Modoc planning area consists of 5 PMUs of which two are shared with California (Buffalo/Skedaddle and Vya). In many cases, sage-grouse utilize habitats in both states, thus data collected from leks in California are provided to present a more accurate representation of the populations within each PMU.

Within the Buffalo/Skedaddle PMU, a total of 19 leks were visited of which 17 were active during the spring 2010 breeding period. A total of 462 males were counted resulting in an average of 27.2 males/active lek. Twenty visits were conducted, meaning that almost all leks were visited only once during the spring breeding period. Lek counts were conducted by California Department of Fish and Game and Nevada Department of Wildlife biologists as well as volunteers. This is the largest PMU within the planning area at approximately 1.6 million acres.

The largest PMU within the Nevada portion of the planning unit is the Massacre PMU at approximately 1.26 million acres. This PMU likely harbors the largest sage-grouse population of the 5 PMUs within the planning area. During the 2010 spring breeding season, a total of 48 site visits were made to 34 leks and 562 male sage-grouse were counted on 22 active leks. There are a total of 27 leks considered active within the entire PMU. A considerable amount of volunteer time is dedicated to counting leks within this PMU each year.

The Sheldon PMU is managed by the U.S. Fish and Wildlife Service and is a National Wildlife Refuge. This PMU is just under 500,000 acres in size and contains 16 active leks. In the spring of 2010, 8 site visits were made to 8 leks of which all were active. A total of 219 males were counted on these 8 active leks resulting in an average of 27.4 males/active lek. A majority of the lek counts were conducted by U.S. Fish and Wildlife Service personnel in 2010.

A total of 20 site visits were made to 14 leks within the Vya PMU during the spring of 2010. Of these, 12 were found to be active and a total of 285 males were counted on these leks yielding an average of 23.8 males/active lek. There are a total of 18 active leks within the PMU, which is approximately 500,000 acres in size. A majority of the PMU is within Nevada; however, the California portion contains approximately 7 active leks.

The smallest PMU in the planning area is the Virginia/Pah Rah PMU at 355,000 acres collectively. These two PMUs, combined as one, are positioned in proximity to the Reno-Sparks and North Valleys areas of southern Washoe County and are subject to suburban development, infrastructure (transmission lines), dispersed recreation, increased frequency of human caused wildfire and potential renewable energy development. Cumulatively, these factors have diminished suitable sage-grouse habitats and sage-grouse population size. Eleven lek visits were made to 4 leks of which 3 were active during the 2010 spring breeding season. A total of 83 males were observed on these 3 leks resulting in an average of 27.7 males per active lek.

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks Surveyed	# of Birds Counted	Avg. # of Birds/Active Lek
Buffalo/Skedaddle	74	19	17	462	27.2
Massacre	72	34	22	562	25.6
Sheldon	75	8	8	219	27.4
Virginia/Pah Rah	6	4	3	83	27.7
Vya	37	14	12	285	23.8
TOTAL:	264	79	62	1611	26

Table 2. 2010 lek count effort for the Washoe-Lassen-Modoc local conservation planning area.

A total of 79 leks were surveyed during the spring of 2010 within these 5 PMUs with 62 leks classified as active. A total of 1,611 males were observed on these leks for an average of 26 males/active lek. In comparison, 105 leks were visited in 2009 with 2,064 males observed on 81 active leks resulting in an average of 20 males/active lek. These data suggest an improvement as the average number of males increased by 25% from 2009 to 2010; however, statistically sound sampling techniques were not utilized.

BI-STATE PLANNING AREA

The Bi-State planning area, like Washoe-Lassen-Modoc, is also a region where population management units (PMUs) are shared between Nevada and California. Five of the PMUs in this region are shared between the two states while one is entirely within California (South Mono PMU). The PMU boundaries were delineated to account for the movement of birds across state lines.

Overall male sage-grouse attendance on known leks increased from 2009 to 2010 for the Bi-State plan area. A total of 753 males were observed on 29 active leks resulting in an average attendance of 26.0 males per active lek (see Table 3 for PMU breakdown). In comparison, an average of 20.4 males was observed on 27 active leks in 2009. The 2010 attendance represented a 27.5% increase over the 2009 attendance rate. The greatest

increases in attendance were observed in the Bodie Hills and South Mono PMUs at 35.9% and 27.9% respectively. Contrastingly, lek attendance rates within the Nevada portion of the Desert Creek/Fales PMU decreased by 17.1% from 2009 to 2010. Male lek attendance rates improved slightly (3%) within the California portion of this PMU. Only two leks were monitored in the Mount Grant PMU in 2010; however, attendance at these leks increased slightly from 2009. In the Pine Nut PMU, numbers for the only known reliably active lek (Mill Canyon Dry Lake Bed) appear stable at low levels with 14 males documented in 2010, equaling average attendance for this lek.

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks	# of Males Counted	Avg. # of Males/Active Lek
Desert Creek/Fales	24	9	7	83	11.9
NV Portion	(19)	(6)	(5)	(51)	(10.2)
CA Portion	(5)	(3)	(2)	(32)	(16)
Mt. Grant (NV)	12	2	2	51	25.5
Pine Nut (NV)	8	1	1	14	14
White Mountains	5	0	0	0	0
Bodie Hills (CA)	19	11	8	297	37.1
South Mono (CA)	22	14	11	302	27.5
TOTAL:	92	37	29	753	26.0

Table 3. 2010 lek count effort for the Bi-State local conservation planning area.

In March of 2010, the USFWS found that Greater Sage-grouse warranted listing under the Endangered Species Act; however, the listing was precluded by other higher priority species. The Bi-State sage-grouse population was considered a distinct population segment (DPS) and was given higher priority than the Greater Sage-grouse rangewide (listing priority number=3). Considering the isolation of some of the Bi-State sage-grouse populations and declines within Nevada PMUs (e.g. Pine Nut and Sweetwater/Desert Creek portions of the Desert Creek PMU) and some portions of California such as Fales and Parker, there is substantial concern over the long-term viability of these populations. At the same time, populations in the Bodie Hills and South Mono PMUs appear to be doing well currently and the long-term viability of these populations is somewhat stable. Precluding development in key areas, removing encroaching pinyon and juniper and maintaining or improving brood rearing habitats remain the most important conservation actions within this planning area.

NORTH CENTRAL PLANNING AREA

The North Central planning area is composed of Churchill, Pershing and Humboldt Counties. There are 19 Population Management Units (PMUs) within this planning area, many of which encompass isolated, dry, single ridge mountain ranges with small populations of sage-grouse. Some PMUs can be considered disconnected with other major sage-grouse populations lying to the north, west and east. However, the planning area contains some very important PMUs in Nevada with significant populations of sage-grouse located in the Lone Willow and Santa Rosa PMUs.

In Humboldt County, there are four main PMUs with sustainable populations of sage-grouse. These include the Santa Rosa, Lone Willow, Pine Forest and Black Rock PMUs. The largest populations occur in the Santa Rosa and Lone Willow PMUs. The early portion of the lek monitoring period was very dry which provided fair to good access to several lek locations by vehicle. Like 2009, as the breeding season progressed, heavy rain, wind and cold temperatures

hampered lek counts. Two volunteers assisted the area biologist with lek counts during 2010. Funding for aerial surveys was once again provided through the BLM's Challenge Cost Share program and some additional funding for helicopter surveys was provided by the U.S. Forest Service. Table 4 shows the results of lek count work conducted during 2010.

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks Surveyed	# of Birds Counted	Avg. # of Birds/Active Lek
Santa Rosa	125	106	37	414	11.2
Lone Willow	93	1	1	16	N/A
Pine Forest	13	12	5	71	14.2
Black Rock	25	22	9	125	13.9
Jackson	7	0	0	0	0
TOTAL:	263	141	52	626	12.0

Table 4. Results of Humboldt County lek counts conducted in 2010.

In the Black Rock PMU, 22 leks were visited once each via helicopter. A total of 125 sage-grouse were observed on 9 active leks averaging 13.9 birds per active lek during the spring of 2010. In comparison, a total of 163 sage-grouse were observed on 8 active leks resulting in an average of 20.4 birds per active lek in 2009. These data indicate that lek attendance decreased by 32% from 2009 to 2010. However, considering only one visit was conducted via helicopter, this conclusion is suspect.

Twelve leks were surveyed in the Pine Forest PMU during the spring of 2010. All of these leks were surveyed using a helicopter and 5 were found to be active. A total of 71 sage-grouse were observed resulting in an average of 14.2 birds per active lek. In comparison, 109 birds were observed on 6 active leks in 2009, yielding an average of 18.2 birds per active lek. This represents a 22% decrease in lek attendance from 2009 to 2010. The sage-grouse season for this unit was closed in 2010.

The Santa Rosa PMU is the largest PMU within the North Central planning area at almost 940,000 acres. There is a total of 125 known lek locations within this PMU. During the spring 2010 breeding period, 106 leks were surveyed of which 37 were found to be active. A combination of ground and aerial visits resulted in the observation of 414 sage-grouse for an average of 11.2 birds per active lek. In comparison, 478 sage-grouse were counted on 39 active leks in 2009, resulting in an average of 12.3 birds per active lek. These findings represent a 10% decrease in lek attendance from 2009 to 2010. This may have been a result of poor recruitment of young in 2009 as suggested by the wing collection data (see page 15).

Due to lack of funding, no helicopter routes were conducted in the Lone Willow PMU in 2010. Two visits were made to the lone trend lek within this PMU with the peak count being 16 male sage-grouse. This 480,000 acre PMU contains 93 known leks of which 33 are classified as active.

Leks in 6 different PMUs in Pershing County were counted during the spring of 2010 with leks only being active in one PMU. A total of 34 leks were surveyed with the only active leks being found in the Sonoma PMU. Seventy-five sage-grouse were counted on 7 active leks in this PMU for an average of 10.7 sage-grouse per active lek. In 2009, 17 leks were classified as active. The reduction in lek activity is of particular concern within these smaller, relatively isolated PMUs including the East Range, Eugene, Humboldt, Majuba and Trinity PMUs. Vast portions of the Majuba and Trinity PMUs were burned during the Poker Brown fire (1999) which consumed approximately 232,000 acres. This fire essentially type converted this area from a Wyoming sagebrush and salt desert shrub community to one dominated by cheatgrass. The Eugene PMU also experienced a large wildfire in 2007 and lek surveys did not detect a single

bird in 2009 or 2010. The future viability of sage-grouse populations within these PMUs is bleak and extirpation is likely.

Two PMUs (Desatoya and Clan Alpine) were surveyed in Churchill County during the spring of 2010. Twenty-five site visits were made to 11 known leks that were counted at least one time each. Of those, 9 were found to be active and 178 sage-grouse were observed resulting in an average of 19.8 birds per active lek. In comparison, the 2009 average attendance was 25 birds per active lek, reflecting a 21% decrease in lek attendance. Of the 11 known leks surveyed, 10 are within the Desatoya PMU and 7 were surveyed only with the use of a helicopter in 2010. This population of sage-grouse continues to remain stable, but the decreased attendance is somewhat concerning. A two day hunting season has been held in this PMU for the last four years. The decrease could be attributed to the relatively poor recruitment in 2009 as suggested by the wing collection data (see page 15). The small population in the Clan Alpine PMU is also thought to be stable at a low level, but because of the small population size (only one known active lek); the population is susceptible to poor habitat conditions or potential stochastic events such as wildfire. Hunting seasons have been closed in this PMU for over a decade.

When considering the North Central Planning Area as a whole, a total of 176 leks were visited and 879 sage-grouse were observed on 68 active leks during the spring of 2010. In 2009, 235 leks were visited and 1,321 sage-grouse were counted on 105 active leks. The reduction in effort and numbers of birds observed is mainly attributable to the lack of effort in the Lone Willow PMU which harbors one of, if not the largest sage-grouse population in this planning unit. Lek counts were conducted in 13 of the 19 PMUs within the planning area in 2010. No lek location data exists for at least 4 of the 6 remaining PMUs within this planning area including the Limbo, Sahwave, Nightingale and Eden Valley PMUs.

SOUTH CENTRAL PLANNING AREA

The South Central planning area consists of Lander, Eureka, and Nye Counties and includes 10 Population Management Units (PMUs). During the 2010 spring breeding season, 1,176 male sage-grouse were observed on 56 active leks (see Table 5 for complete lek count effort) for an average of 21.0 males per active lek. This represents a 24% increase over the 2009 average attendance of 16.9, but about the same attendance level as that of 2008 (n=20.8).

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks Surveyed	# of males Counted	Avg. # of males/Active Lek
Battle Mountain	7	0	0	0	0.0
Fish Creek	6	0	0	0	0.0
Shoshone	15	6	5	98	19.6
Cortez	28	11	8	152	19
Three Bar	51	11	10	171	17.1
Diamond	35	4	1	17	17.0
Toiyabe	68	7	7	164	23.4
Reese River	44	3	3	102	34.0
Monitor	69	41	22	472	21.5
Kawich	0	0	0	N/A	N/A
TOTAL:	323	83	56	1,176	21.0

Table 5. 2010 lek count effort within the South Central local conservation planning area.

The PMUs contained mostly within Lander County include the Battle Mountain, Fish Creek, Shoshone and Toiyabe PMUs. The Toiyabe and Shoshone PMUs harbor the largest sage-grouse populations in Lander County and are also the largest in size at approximately 1.1 million and 660,000 acres respectively. No lek counts were conducted in the Battle Mountain or Fish Creek PMUs due to limited helicopter availability.

In the Shoshone PMU, 21 visits were made in 2010 to 6 lek locations of which 5 were classified as active. A total of 98 males were counted on these leks resulting in an average of 19.6 males per active lek. Eleven visits were made to 2 trend leks within this PMU with peak counts of 80 males, resulting in an average of 40 males per trend leks. In comparison, the 2009 average for these leks was 21 males/lek and reflects a 90% increase in attendance.

Within the Toiyabe PMU, 17 visits were made to 7 leks, all of which were active. A total of 164 males were observed on these leks for an average of 23.4 males per active lek. There are 3 trend leks within this PMU and all were visited at least twice. Average male attendance at these leks was 24 males/lek in 2010. This represents a 13% increase over the 2009 average attendance of 21.3 males/lek.

There are essentially four PMUs in Nye County: Reese River, Monitor, Kawich and the Quinn PMUs. The Reese River and Monitor PMUs harbor the largest sage-grouse populations in the County with 12 and 24 known active leks respectively. There are no known leks in the Kawich PMU and the Quinn PMU was placed under the responsibility of the Lincoln County Technical Review Team. Both the Reese River and Monitor PMUs are very large at 1.1 and 3.2 million acres respectively. During the 2010 spring breeding season, a total of 82 site visits were made to 41 different leks in the Monitor PMU. Twenty-two active leks were surveyed and the peak count totals for these leks was 472, resulting in an average of 21.5 males/lek. In the Reese River PMU, 15 site visits were made to 3 leks which were all active. A peak total of 102 male sage-grouse were observed on these leks yielding an average of 34 males/lek. There are 14 leks that have been identified as trend leks in the Reese River and Monitor PMUs and 12 were surveyed at least 3 times in 2010. The peak counts across these 12 leks provided an average of 32.7 males/lek. This represented an 8.3% increase over the 2009 average of 30.2 males/lek.

There are three PMUs that are, for the most part, within Eureka County (Cortez, Diamond and Three Bar) and contain 114 known leks of which 42 are classified as active. During the spring 2010 breeding season, 29 leks were visited of which 20 were active. A total of 357 males were observed on these leks, resulting in an average of 17.9 males per active lek which represented a 23% increase over the 2009 average attendance of 14.5. This increase was similar to the overall increase noted for the entire planning area of 24%. Currently, there are 10 comparable trend leks in Eureka County which were all counted between 4 and 12 times each during the 2010 spring breeding season. Peak lek counts resulted in a total of 170 males counted on these leks for an average attendance of 17 males/lek. This represents a 7% increase over the 2009 average attendance of 16 males/lek. Many of the trend leks in these three PMUs are intensively monitored as part of a larger ongoing research project being conducted by the University of Nevada, Reno (Falcon to Gonder Transmission Line Study).

ELKO COUNTY

Elko County has the highest density of leks of any county in Nevada and continues to harbor some of the largest sage-grouse populations in the state. However, large wildfires that occurred from 1999-2007 reduced the amount of suitable habitat for the species substantially. There are a total of 10 PMUs within this planning area with three having between 65 and 86 active leks each. Personnel from various agencies including Elko NDOW, USFS, and BLM field offices, as well as volunteers, assist with lek monitoring efforts each year. NDOW personnel normally focus on trend ground counts and ground-truthing of existing leks in the database while

accompanying BLM personnel with directed efforts towards checking leks for activity associated with burned areas or in areas that have little historic data available.

Throughout Elko County, a total of 443 lek visits were made to 295 separate lek locations during the spring of 2010 and 2,562 males, representing peak or single counts for each lek. These figures resulted in an average of 16.4 males per active lek and represented a 12% increase over the 2009 average attendance of 14.6 males per active lek. The survey methods employed during lek visits consists of helicopter routes (multiple leks counted from the air in one morning), lek routes (multiple leks counted from the ground) and lek counts (single lek observed during one morning). See Table 5 for lek count effort, by PMU, in Elko County for 2010.

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks Surveyed	# of males Counted	Avg. # of males/Active Lek
Desert	46	12	10	233	23.3
East Valley	15	3	2	14	7.0
Gollaher	123	68	14	124	8.9
North Fork	127	75	59	940	15.9
O'Neil Basin	157	62	25	366	14.6
Ruby Valley	79	13	6	95	15.8
Snake	61	19	10	198	19.8
South Fork	65	23	15	216	14.4
Tuscarora	75	16	14	376	26.9
Islands	24	4	1	0	0.0
TOTAL:	772	295	156	2,562	16.4

Table 6. Lek count effort and results from the 2010 spring breeding season in Elko County.

NDOW personnel monitored 14 trend leks in Elko County which were checked between one and 7 times each during March, April and early May. Peak male attendance for all leks combined was 599 resulting in an average of 43 males per lek. This represented an 8% increase from 2009 values, but was equal to the 2008 average attendance. Peak counts of males were observed in early May on 7 of these leks, 6 peaks in April and just one in March. A continued effort will be made in Elko County to ground truth questionable leks. Recently burned leks will continue to be monitored to evaluate if they persist or are abandoned due to lack of suitable habitat.

LINCOLN COUNTY TECHNICAL REVIEW TEAM

The Lincoln County LACP consists of three separate PMUs: Lincoln, Steptoe/Cave, and the Quinn. The Quinn PMU is mostly within Nye County, but planning and implementation activities rest with this local working group. Very little data currently exists regarding recent sage-grouse activity within the Quinn PMU. On the other hand, intensive efforts to survey leks and the use of telemetry marked sage-grouse in the Lincoln PMU has greatly contributed to a useful dataset and allowed the documentation of previously undiscovered lek locations.

Within the Lincoln and Steptoe/Cave (south) PMUs, 36 lek visits were made to 24 leks in 2010, ranging from 1 to 3 visits per lek. A total of 185 male sage-grouse were counted on 18 active leks during the 2010 spring breeding season. This resulted in an average of 10.3 males per active lek and reflected a 10% decrease over the 2009 value of 11.5. After what was considered better production in 2008 and 2009, the sage-grouse population was expected to show some improvement for this planning area. Spring conditions were much more extreme

than normal for this region with snow and cold temperatures lingering much longer than expected. This led to poor access to many lek sites throughout the spring breeding season.

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks Surveyed	# of Birds Counted	Avg. # of Birds/Active Lek
Lincoln	23	19	13	117	9.0
Steptoe/Cave	7	5	5	68	13.6
TOTAL:	30	24	18	185	10.3

Table 7. 2010 lek count effort and results within the Lincoln LACP.

Mid-summer brood surveys conducted in 2010 do not suggest that a population increase is on the horizon, at least for the Lincoln PMU. Greater disturbance in the area from dispersed recreation, an apparent increase in the raven population, and adverse weather conditions coupled with the lack of moisture at key times are thought to be negatively affecting this sage-grouse population. In addition to these threats, utility scale wind energy development slated for Table Mountain and the White Rock Mountains has the potential to introduce additional disturbance and provide infrastructure for avian predator perching and nesting. Transmission lines and roads that would be associated with this development have great potential to further fragment sage-grouse populations in this area and affect movement patterns of birds from a seasonal perspective.

WHITE PINE COUNTY LACP

The White Pine planning area mainly resides within the confines of White Pine County, with some minor exceptions. The majority of three PMUs (Butte/Buck/White Pine, Schell/Antelope, and Snake Valley) are within White Pine County. Two other PMUs (Diamond and Steptoe/Cave) are partially within White Pine County.

Lek counts and surveys in 2010 were impacted by lingering snow-cover, poor access and poor weather. Numerous personnel from 7 different agencies and organizations again participated in lek surveys. This included USGS, which initiated a long-term study of leks along the Southwest Intertie Transmission Line Corridor. Twenty-nine comparable leks were monitored in 2010 and 355 males were observed for an average of 12.2 males/lek. In 2009, 375 males were counted on those same leks for 12.9 males/lek. This represented a 5% decrease in lek attendance. Overall in 2010, 68 leks were checked and 891 males were observed for an average of 13 males/lek or 17 males/active lek. In 2009, 137 leks were visited and 1,028 males were observed for an average of 7.5 birds/lek or 13.4 birds/active lek. Of the 12 potential new leks discovered in 2009, most were revisited in 2010 and 6 were verified as active. The largest count obtained on a lek in 2010 was 71 males.

PMU	Total Known Leks	# of Leks Surveyed	# of Active Leks Surveyed	# of Birds Counted	Avg. # of Birds/Active Lek
Butte/Buck/WP	88	34	30	669	22.3
Schell/Antelope	32	15	11	104	9.5
Steptoe/Cave	18	9	6	76	12.7
Spring/Snake	15	9	6	35	5.8
TOTAL:	153	67	53	884	16.7

Table 8. Lek count effort for White Pine County in 2010

Population Demography

Report by: Shawn Espinosa

OBJECTIVES

This section describes work conducted to achieve objective #2 stated in the Grant Agreement for Sub-grant I, Project #1 which states, "Determine age structure, sex ratios, and nest success values for various sage-grouse populations through collection and analysis of wings from hunter harvested sage-grouse..."

SUMMARY

Each year, regional biologists with the Nevada Department of Wildlife deploy wing barrels at strategic locations within areas open to sage-grouse hunting to collect sage-grouse wings. Additionally, hunters are also encouraged (through the Nevada Hunt Book and annual Upland Game Season brochures) to deposit one wing from each bird harvested in wing barrels or at regional offices. Approximately 75 wing barrels are placed annually. Annual collections of wings and information pertaining to harvest continue to be an important function that provides valuable information on production, nest success and population performance. The information gained from the collection of wings, as well as upland game questionnaire data, help determine if hunting season strategies meet the guidelines suggested by the Western Association of Fish and Wildlife Agencies (Connelly et al. 2000) for sage-grouse.

Wing barrels are equipped with large envelopes with questionnaire labels affixed to them. Questionnaires ask several questions relative to each person's hunting experience, but the most important information gained from these envelopes is the location of harvest. This allows biologists to organize wings by Population Management Unit. After the hunting season, wings are analyzed at an annual Wing Bee where biologists gather from around the state to classify wings. The Braun (1970) wing key for age and sex classes of sage-grouse is used to classify wings.

During the 2009 hunting season, a total of 2,680 wings were collected. This represents a 61% increase over the 2008 collection of 1,662 wings. Last season's collection was also 20% greater than the previous 10-year average of 2,229 wings. The results of the 2009 Wing Bee are summarized in Table 9 below.

2009 SAGE-GROUSE DEMOGRAPHY ESTIMATED VIA HUNTER HARVESTED WINGS						
AREA (PMU)	ADULTS		JUVENILES		TOTAL SAMPLE	CHICKS /HEN
	Males	Females	Males	Females		
Western Region						
Sheldon NWR	9	38	35	58	140	2.45
Buffalo/Skedaddle	13	13	20	25	71	3.46
Massacre	36	57	47	76	216	2.16
Vya	9	6	7	8	30	2.50
Santa Rosa	22	82	46	66	216	1.37
Lone Willow	93	133	177	213	616	2.93
Desatoya*	10	39	27	25	101	1.33
Pine Forest	0	9	11	15	35	2.89
Black Rock	5	4	11	9	29	5.00

2009 SAGE-GROUSE DEMOGRAPHY ESTIMATED VIA HUNTER HARVESTED WINGS (continued)						
AREA	ADULTS		JUVENILES		TOTAL SAMPLE	CHICKS /HEN
	Males	Females	Males	Females		
Eastern Region						
Desert	0	0	0	0	0	N/A
Tuscarora	1	5	17	13	36	6.00
Northfork	31	79	77	87	274	2.08
Island	1	3	7	2	13	3.00
O'Neil	7	18	16	18	59	1.89
Snake	6	23	8	8	45	0.70
Gollaher	3	17	4	8	32	0.71
Ruby Valley	8	17	8	8	41	0.94
Southfork	3	21	32	35	91	3.19
East Valley	Season Closed					
Diamond	7	7	13	13	40	3.71
Cortez	6	6	8	9	29	2.83
Three Bar	9	37	22	49	117	1.92
Shoshone	1	5	4	4	14	1.60
Toiyabe	18	43	30	36	127	1.53
Butte/Buck/WP	5	15	23	21	64	2.93
Schell/Antelope	3	9	2	1	15	0.33
Spring/Snake	Season Closed					
Steptoe/Cave	3	0	0	0	3	N/A
Southern Region						
Monitor	8	44	43	41	136	1.91
Reese River	1	14	5	6	26	0.79
Totals**:	326	760	722	872	2,680	2.10

Table 9. Wing-Bee Results from the 2009 Nevada sage-grouse hunt.

* 2007 represented the first year that the Desatoya PMU has had an open sage-grouse season since the 1998 season (8 years).

**Includes total wings classified during the 2009 Wing Bee. Some PMUs were not represented in this table.

The 2009 statewide production value (# of chicks per hen) was 2.10. This is an improvement over the 2008 production value of 1.69 and represents the second year of improved production compared to the all time recorded low of 0.58 in 2007. In addition, nest success values were also much improved in 2009 with estimated nest success at 57.6%. This value is the highest nest success value since 2002 when this parameter was initially recorded and represents a 33% increase over the 8-year average of 43.2%.

Predictions for sage-grouse production and recruitment in 2010 across Nevada are mixed and difficult to summarize. Throughout much of northern Nevada, cold temperatures lingered until early June with bouts of rain, snow and some significant wind events. This could have had negative effects to early nesters, potentially decreasing nest success and brood size. The northern Great Basin received 87% of average precipitation through June 2010 with some fairly sizeable storms late in the spring. Production in this region of Nevada is expected to be average. Northeastern and eastern Nevada experienced 92% and 112% of average annual rainfall respectively. Early reports suggest that successful hens had sizeable broods (≥ 4), but

that nest success was relatively poor. An important mitigating factor relative to nest success that continues to have a negative effect on this parameter is the effectiveness of ravens as nest predators coupled with their increasing population.

SAGE-GROUSE PRODUCTION (chicks per hen)						
LAST FIVE YEARS						
AREA	2005	2006	2007	2008	2009	AVERAGE
Sheldon PMU	1.24	2.82	0.38	3.26	2.45	1.96
Massacre PMU	1.10	1.27	0.57	2.21	2.16	1.38
Vya PMU	0.79	0.25	2.00	N/A*	2.50	1.17
Santa Rosa PMU	1.67	0.67	0.39	1.85	1.37	1.03
Lone Willow PMU	1.70	0.90	0.81	2.11	2.93	1.71
Snake PMU	1.10	1.21	0.49	0.74	0.70	0.94
Elko County	1.69	1.61	0.67	1.28	1.90	1.32
Eureka County	2.17	1.21	0.55	1.55	2.28	1.46
Lander County	5.13	1.25	0.32	1.58	1.54	1.65
White Pine LACP	1.64	1.92	0.67	1.52	1.96	1.66
Nye County	2.57	2.18	0.67	1.42	1.56	1.57
Statewide Average	1.69	1.13	0.58	1.69	2.10	1.40
Sample Size	2,984	2,813	1,496	1,662	2,680	2,387
Statewide Harvest	3,176	3,710	4,897	5,775	8,944	5,300
% of Harvest in Sample	94%	76%	31%	29%	30%	52%

Table 10. Five-year production values for sage-grouse via analysis of wings.

* indicates inadequate sample size to calculate a reasonable estimate.

The effort to collect and properly analyze sage-grouse wings has increased substantially in this decade compared to prior decades. Biologists have relied upon the strategic placement of sage-grouse wing barrels and hunter education to increase the proportion of wings collected in relation to the total statewide estimated harvest. Actual harvest data are derived from the annual Upland Game and Waterfowl Harvest Questionnaire, thus the calculated number of birds harvested from questionnaire data is merely an estimate.

Population Delineation

Reports by: Shawn Espinosa, Curt Baughman, Ken Gray, Jeremy Lutz, Mike Podborny and John Boone (GBBO)

OBJECTIVES

This section describes the work conducted to help achieve objective #5 identified in the Grant Agreement for Sub-grant I, Project #1. The statement basically identified three different objectives related to radio marking efforts and includes the following:

- Verify and/or refine population management unit boundaries that were delineated based on little information or biologist judgment;
- Determine migratory nature of specific populations; and
- Determine response of sage-grouse populations to various treatments or conservation efforts.

SUMMARY

The attachment of radio transmitters to sage-grouse is a technique widely used to delineate a population's seasonal distribution and movement corridors. Standard (VHF) transmitters require regular ground and aerial follow-up, which is labor and equipment intensive.

During state fiscal year 2010, the Nevada Department of Wildlife conducted capture operations in Lander, White Pine and Elko Counties. Follow-up efforts were accomplished in several areas of White Pine County, Lander County and Elko County (summaries provided below). A total of 59 sage-grouse were captured in FY10 as part of these population delineation projects. Telemetry devices were attached to 43 birds consisting of 13 males, 23 females (including 8 juvenile hens) and 7 that were unknown. Leg bands were attached to all of the captured birds. In addition to birds caught in FY10, 45 birds caught and radio-collared in FY08 and FY09 were also monitored in FY10. NDOW is utilizing the services of the Great Basin Bird Observatory (GBBO) for much of the follow-up work in White Pine County. Other sage-grouse captures and seasonal habitat delineation projects took place in Eureka County but work was done by the University of Nevada at Reno and data were not available for this report.

Elko County

Willow Creek Reservoir Leks #01, #06 and #19

Nine radio-marked sage-grouse remained alive as of July 1, 2009 from capture operations conducted in the spring months of both 2008 and 2009. The 9 remaining grouse consisted of 6 females and 3 male sage-grouse. By the end of the reporting period, 3 of the radio-marked grouse ended up as mortalities while 2 other transmitters could not be found and most likely stopped working. No cause of death could be determined on any of the 3 birds that died.

Since July 1, 2009 a total of 15 surveys has been directed at monitoring these sage-grouse. Survey efforts have included 5 ground surveys and 11 fixed-wing aerial surveys. The degree of movement to winter range was far less this year when compared to last year's winter movement. No sage-grouse were documented in the Rock Creek and Antelope Creek confluence area (approximately 22 miles south of the capture locations) whereas last year, 3 female sage-grouse moved to this area for the winter. This may be due to the fact that the

winter was relatively mild with less snow accumulation. Summer use areas remained similar for most birds to that of the previous year. The one exception was the hen that summered in the area around Tuscarora ended up summering in the Lewis Creek drainage which represented an approximate 13-mile difference. This hen died in late July so it is possible she could have moved to the Tuscarora area later in the summer. There was one male that moved 14 miles from his July 2010 location (the top of the Winters Creek drainage) to his August 2010 location (the head of the McCann Creek drainage).

All birds, males and females, attended the same leks as the year before. No grouse were documented visiting multiple leks. In April of 2010, a hen nested within 200 feet of where she nested in the spring of 2009. When this nest was predated she moved approximately 1,200 feet and re-nested.

Follow-up monitoring not only shows that these sage-grouse exhibit movements consistent with migratory populations, but also shows that, despite the fact that over 80% of the area burned, none of the burns were used by hens during any part of their life cycle. One male appeared to make limited use of the burns around Willow Creek Ridge during the summer months. Significant areas of sagebrush are recovering within the Willow Creek Ridge area. It will be interesting to see if these birds start making use of these restored habitats in the near future. In the meantime it is critical to protect the remaining few pockets of sagebrush winter habitat. This study should continue in order to potentially document sage-grouse use in the seeded areas that are showing recovery. These data will help justify future sagebrush seedings within sage-grouse habitat.

Flat Creek

A sage-grouse trapping effort was conducted in the Flat Creek area north and east of the Jarbidge Wilderness area during 2009. The area is important for summering sage-grouse with broods. In 2008, the East Slide Rock Ridge fire burned through this area taking out most of the sagebrush component. The spring of 2009 was one of the wettest on record and a flush of grasses and forbs in the burned area resulted.

The intent of this radio-marking effort was to obtain a better understanding of how the sage-grouse would use the habitat after the fire. The hope was to gain more knowledge regarding the leks used by birds found in this area as well as where the birds would attempt to winter after much of the sagebrush community was removed due to the fire. Although the sample size was extremely low, it was hoped that we also might learn about mortality rates for these birds.

Three males and 2 female sage-grouse were captured and outfitted with VHF radio collars in August and September of 2009. Six telemetry flights were conducted and several ground follow-ups were made. Unfortunately as of June 30, 2010 only one of the 5 radio-marked birds remain alive. Two males died on winter range in December on the lower reaches of Deer Creek in Idaho. This area was part of a previous burn. The third male died near a lek near Devils Table. This male was the only sage-grouse of the 5 that moved south from the original capture location. He spent time in Camp Creek before he went to Devils Table for the lekking season. A ground follow-up was made, but cause of death could not be determined. One of the 2 remaining hens died in June near Cherry Creek. She had spent most of her time on the Flat Creek Bench where she was captured.

No new leks were documented through follow-up monitoring of these grouse. The male that made it through the spring was associated with the NW Devils Table lek and the 2 hens were associated with the Pole Creek #9 lek. It is not clear if the other males that died in the winter succumbed to conditions brought on from lack of sagebrush due to fire. Other than the 1 male that went south of the project area, it appears these birds rely on habitat in Idaho for much of the year.

Lander County

Bates Mountain

Wind energy exploration was initiated on Bates Mountain (Simpson Park Range, Lander County) in 2008 with the erection of one meteorological (Met) tower and the clearance of 3 other sites. Two Met towers have been erected to gather wind data, but both towers have failed and have fallen down during the winters of 2008 and 2009. In order to obtain some baseline information on the high density sage-grouse population that inhabits this mountain, a radio-marking project was initiated. This is the second year of this effort, which was initially designed to show sage-grouse distribution on Bates Mountain in relation to Met-Tower sites. This study was redesigned in 2009 with the same intention of learning about distribution but was expanded in order to document seasonal movements and limiting factors for sage-grouse in this PMU.

In late August of 2009, a 2-night trapping effort resulted in the capture of 41 sage-grouse. All 41 grouse were caught on top of Bates Mountain, located on the south end of the Simpson Park Mountains within the Toiyabe PMU. Each sage-grouse was leg banded and 25 birds were outfitted with VHF radio transmitters. The captured grouse consisted of 12 adult females, 5 adult males, 7 juvenile females and 1 juvenile male. Following capture, 8 aerial telemetry flights and 4 ground telemetry surveys were conducted.

The majority of the collared sage-grouse left the upper elevations of Bates Mountain between September and October of 2009. Dispersal of the collared sage-grouse was unevenly distributed across the landscape with birds moving to the northwest of Bates around Callaghan Mountain in the Toiyabe Range and ~25 miles to the south around Wallace Canyon in Monitor Valley. During December through February, very little winter movement was documented until March when birds started to concentrate around known lek sites. From March until May of 2010, the birds generally stayed within a 2-mile radius of lek locations. No difference in movement patterns was documented between successfully bred hens and unsuccessfully bred hens based on nest initiation information.

By May of 2010, 5 out of the 9 female sage-grouse were documented on nests. Out of the 5 nests, 2 were successful at hatching a brood, but by the end of July 2010 only 1 female was successfully documented rearing a brood of 4 chicks to adulthood. Of the nests that were unsuccessful (n=3), no exact cause of failure could be documented, but avian predation by ravens is thought to be the primary factor.

A trail camera was setup on one nest (frequency 158.077) to determine factors associated with nest success. The camera was carefully placed under sagebrush close to the nest and special attention was given in the placement of the camera as to not draw any attention from predators to the area. Fortunately, this was one of the successful hens and no nest predators were documented. A note of interest that was documented on the camera during the 17 days it was deployed was that when livestock were in close proximity to the nest, the female would leave the nest exposing her eggs. The hen left the nest on 3 different occasions, leaving her eggs exposed anywhere from one to 4 hours.

Between October 2009 and January 2010, 10 mortalities were documented from telemetry flights of which no direct causes could be determined. The mortality locations were found on Bates Mountain and surrounding areas. One hypothesis is that sage-grouse on Bates Mountain begin to move to their winter locations after September and thus make themselves more vulnerable to predation. From January through July of 2010, an additional 4 mortalities were documented. These were found around lek locations as well as nesting areas around the base of Bates Mountain. By the end of June 2010, 11 out of the original 25 collared sage-grouse were alive and were found on or around Bates Mountain.

Over the last 2 years, a total of 55 sage-grouse has been caught and banded on Bates Mountain. A letter was placed inside wing collection envelopes at the Grass Valley and Hwy 50 exit wing barrel in 2009 and 2010. The letter was to inform sage-grouse hunters of this project as well as ask for their cooperation to identify general locations of where birds were harvested and obtain band numbers if present. No reports of banded birds have been documented yet.

White Pine County

In the second year of four separate studies, follow-up monitoring, as well as additional captures, radio marking and banding of sage-grouse occurred during fiscal year 2010 in White Pine County. One of the studies is being conducted to learn more about sage-grouse use of properties acquired by the Southern Nevada Water Authority for transfer of water to Las Vegas. The Nevada Department of Wildlife (NDOW) has utilized the assistance of the Great Basin Bird Observatory (GBBO) in conducting 3 studies to gain pre-treatment habitat use data in areas where pinyon and juniper tree removal projects are being planned in existing sagebrush habitat. A fifth project is being conducted in association with NDOW's Steptoe Valley Wildlife Management Area to gain knowledge of habitat use that could influence land management on and around the area. The relatively high mortality rates documented in most of these studies correlate with declining lek counts in the same general areas.

North Spring Valley

During FY 2010, VHF telemetry monitoring continued on an adult female sage-grouse (radio-marked in April of 2008), a yearling female and an adult male (radio-marked in September 2008) and a yearling female and adult male (radio-marked in March of 2009). These grouse were captured near leks that were chosen for their location close to areas scheduled for pinyon and juniper tree removal. Up to 15 telemetry surveys were conducted on these grouse during FY 2010. These grouse mainly utilized portions of North Spring Valley north of the Henriod Ranch, including private meadows in the valley bottom. The males made summer movements to higher elevations of the Schell Creek Range where they were documented as mortalities in July and October 2009 respectively. Females showed strong fidelity to North Spring Valley. The female that was radio-marked in April 2008 finally lost transmitter function in December 2009. A second female was documented as a mortality on private meadows in August 2009 and the third hen remained alive through December 2009 when the study ended. The most noteworthy movement during this study was from a female that survived through 2008 and was documented 25 miles to the north in Elko County during February 2009. This bird returned to the lek where it was captured and remained in north Spring Valley through December 2009. Over the course of the entire study, radio-marked grouse mainly used habitats associated with North Spring Valley and the Schell Creek Range with minor use of the Antelope Range. Areas slated for pinyon and juniper removal (low to moderate tree densities) were utilized by these sage-grouse.

South Spring Valley

The Southern Nevada Water Authority (SNWA) continued telemetry surveys and capture efforts in FY10 with the assistance of NDOW personnel. Telemetry surveys were conducted on 25 sage-grouse during FY10 including 7 grouse that were radio-marked in September 2009. Six of the 7 birds were captured on or near private meadows in north Spring Valley and one was captured near SNWA owned property in south Spring Valley. All follow-up surveys were conducted from the ground. Up to 41 surveys were conducted on radio-marked grouse.

Over the course of this survey, grouse initially trapped on leks led to the identification of summer habitats that were predominantly located on private ranch meadows, most of which are owned by SNWA. Additional sage-grouse were then trapped on these ranches and tracked to

winter and breeding areas. Birds were tracked to several known leks as well as 2 undocumented leks. One male frequented two separate leks that were located 9 miles apart on both sides of south Spring Valley. During the winter months these sage-grouse have utilized sagebrush bench areas that are spread over 70 miles in Spring Valley. Only minor interchange of sage-grouse was observed between north and south Spring Valleys. Movement of sage-grouse to higher elevation summer habitats was nearly nonexistent. Within the portions of Spring Valley that were studied, private ranch meadows and alfalfa fields provide the vast majority of habitat for late brood rearing.

South Steptoe Valley

In April and May of 2008, a total of 25 sage-grouse were captured in the south Steptoe Valley area. Of these birds, 6 were radio-marked consisting of one female and 5 males. Monitoring of these grouse continued through FY09. Six additional grouse were radio-marked in March 2009 consisting of 4 adult males, 1 adult female and 1 juvenile female.

During FY10, 5 surviving grouse were monitored including 3 adult males and 2 adult females. Both females ranged in north Cave Valley from Bullwhack Summit to areas south of the Cave Valley Ranch and Patterson Pass. One sage-grouse was alive at the conclusion of the study in December 2009 and the transmitter failed on the other, which was captured in April 2008. Two of 3 males utilized the west side of north Cave Valley including upper elevations of the Egan Range. The third returned to high elevation areas on south Ward Mountain where it was found dead in September 2009. Over the entire study, males chose independent summer, fall and winter habitats within 22 miles of the leks where they were collared. Use areas included south Steptoe and north Cave Valleys, a 23 mile long section of the Egan Range and portions of the south Schell Creek Range on the east. Only 3 females were radio-marked. Two of these ranged south of the leks into Cave Valley and the third utilized habitat in the south Schell Creek Range east of the horse and Cattle Camp Loop. Very little use was documented on the bench areas west of the leks where pinyon and juniper tree removal is planned.

Steptoe Valley/SVWMA

Building upon the single female sage-grouse that was captured and collared in FY08, 8 additional sage-grouse were captured in FY09. Monitoring continued on 6 grouse in FY10. These included one adult female and 5 adult males. The lone female was the original hen captured at the beginning of the study. She was documented dead in August 2009 and appeared to have died on nesting/early brood rearing range close to where she had nested for 2 consecutive years. Of the 5 males, 2 were dead or missing in August 2009 and a third was documented dead in January 2010. One of the remaining males was alive at the end of FY10 and the other was missing (collar expired) in May 2010. Telemetry follow-up over the entire survey revealed a somewhat sedentary population that mainly utilized habitats associated with Steptoe Valley Wildlife Management Area (SVWMA) and the adjacent west bench of the Schell Creek Range. The Comins Lake Meadow has been shown to be an important area for late brood rearing. Only 2 males ranged into the far reaches south Steptoe Valley. One of these males utilized more than 20 miles of the west Schell Creek bench. The lone female was especially sedentary and appeared to have a home range of approximately 6 square miles. During this study a radio-marked male led to the discovery of a lek located just above the north end of SVWMA. A priority for spring 2011 will be the radio-marking of females near this lek. Follow-up monitoring could provide insights into habitat use of SVWMA with implications for management of the area.

CONSERVATION PLANNING

Governor's Strategic Planning

State: Nevada Grant Title: Nevada Sage-grouse Conservation Project
Grant No.: W-64-R-10 Sub-Grant Title: Conservation Planning
Sub-Grant No.: II Project Name: Statewide Planning
Project No.: 1 Job Title: Statewide Strategic
Planning
Job No.: 1
Period Covered: July 1, 2009 – June 30, 2010
Report by: Shawn Espinosa

OBJECTIVES

The major objective of the Nevada Governor's Sage-grouse Conservation Team (SGCT) is to address threats or develop guidance at a statewide level and to assist local working groups with the implementation of prioritized projects. Other objectives include completing the Second Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California and developing semi-annual workshops.

SUMMARY

The Governor's Sage-grouse Conservation Team (SGCT) held a total of 5 meetings in fiscal year 2010. Staff personnel spent time coordinating and facilitating meetings as well as developing agendas. Minutes are also developed for each meeting. The following were some major topics discussed during the meetings:

- Energy and Infrastructure Development Standards for Greater Sage-grouse;
- Sage-grouse petition (litigation) updates;
- NRCS Sage-grouse Initiative;
- Nevada Partnership for Resource Conservation and Development (NV PCD);
- Priority sage-grouse habitat mapping; and
- Pursuing Candidate Conservation Agreements with Assurances for sage-grouse.

The "Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and Their Habitats" was completed in April of 2010 and made available on the Nevada Department of Wildlife's website located at <http://www.ndow.org/wild/conservation/sq/>. This document required a considerable amount of staff time to develop, distribute for review and gain approval from the SGCT; however, the document provides a standardized approach for dealing with energy and infrastructure development within Nevada.

A total of **\$18,640.00** was identified to complete two specific jobs under the Conservation Planning portion of this grant: Statewide Governor's Sage-grouse Conservation Team Strategic Planning and Sage and Columbian Sharp-tailed grouse Technical Committee (Tech Committee). In SFY10, **\$11,782.53** was expended on the Nevada Governor's Sage-grouse Conservation Team – Strategic Planning related assignments. The total for conducting work on both jobs was **\$21,360.70**, which represents an over-expenditure of **\$2,720.70**. The over-expenditure was mainly due to the large amount of work related to completing the Nevada Energy Standards document discussed above.

Sage and Columbian Sharp-tailed grouse Technical Committee

State: Nevada Grant Title: Nevada Sage-grouse Conservation Project

Grant No.: W-64-R-10 Sub-Grant Title: Conservation Planning
Sub-Grant No.: II Project Job Title: Statewide Planning
Project No.: 1 Job Title: Sage and Columbian Sharp-tailed grouse Technical Committee

Job No.: 2

Period Covered: July 1, 2009 – June 30, 2010
Report by: Shawn Espinosa

SUMMARY

The Upland Game Staff Specialist devoted time, working with other state wildlife agency leads for sage-grouse, to develop a recommendation to the Western Association of Fish and Wildlife Agencies (WAFWA) – Bird Conservation Committee addressing proper sagebrush habitat management. More specifically, the recommendation was aimed at constructing a guidance document or decision support tool for managers working within sagebrush and sage-grouse habitat. The recommendation, as provided to the WAFWA – Bird Conservation Committee is provided below.

“The WAFWA Sage and Columbian Sharp-tailed Grouse Technical Committee recommends that a subcommittee of Technical Committee members and federal partners (see preliminary list below) develop a "Sage-grouse Habitat Management" decision support guide for field managers who are responsible for conserving and enhancing sage-grouse habitat. Specifically, this recommendation would result in a science-based decision support tool that considers current habitat condition and habitat potential and recommends appropriate management approaches in the context of sagebrush community and sage-grouse ecologies. As a first step, the subcommittee would detail specific decision support components and work with contracted assistance (hired through WAFWA) to draft and edit the guide. An iterative drafting and reviewing process would span approximately 8-10 months. Funding in support of contracted services would be requested from federal and state partners who would benefit from the guide including, but not limited to: Natural Resources Conservation Service (NRCS), Bureau of Land Management (BLM), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS) and WAFWA. In support of this, we ask that the WAFWA directors, collectively, send a letter to these federal agencies identifying the importance and application of this guide and request funding assistance for its completion.”

In addition to this work, staff also assisted with the development of other Recommendations and Informational Notes for the WAFWA – Bird Conservation Committee. Six Recommendations and two Informational Notes were developed including the following:

- Recommendation 1 – Hunting Greater Sage-grouse
- Recommendation 2 – Process for updating Management Guidelines for Sage and Columbian Sharp-tailed Grouse.

- Recommendation 3 – Sagebrush Habitat Management Guidance
- Recommendation 4 – Development of Guidelines to Conserve Sage-grouse Populations Affected by Energy Development
- Recommendation 5 – Updated WAFWA MOU
- Recommendation 6 – Workshop Rotation
- Informational Note 1 – NASECA Status Report
- Informational Note 2 – GS-3C Research Collaborative

Each of these items took a considerable amount of time to review and develop final products. They are expected to play an important role in the future management for sage-grouse and sage-grouse habitat conservation.

The Upland Game Staff Specialist and a Regional Game Biologist attended the 27th Western Agencies Sage and Columbian Sharp-tailed Grouse Workshop held in Twin Falls, Idaho from June 7-10, 2010. The workshop provided two days of paper presentations on the subject species and their habitats as well as a one-day field trip in south-central Idaho focused on the rehabilitation efforts within the Murphy Complex fire.

A total of **\$18,640.00** was identified to complete two specific jobs under the Conservation Planning portion of this grant: Statewide Governor's Sage-grouse Conservation Team Strategic Planning and Sage and Columbian Sharp-tailed grouse Technical Committee (Tech Committee). In SFY10, **\$9,578.17** was expended on Tech Committee related assignments and attending the annual workshop. The total for conducting work on both jobs was **\$21,360.70**, which represents an over-expenditure of **\$2,720.70**. The over-expenditure was mainly due to the large amount of work related to completing the Nevada Energy Standards document discussed previously.

Local Area Conservation Planning & Implementation

State: Nevada Grant Title: Nevada Sage-grouse Conservation Project

Grant No.: W-64-R-10 Sub-Grant Title: Conservation Planning
Sub-Grant No.: II Project Job Title: Local Area Conservation Plans
Project No.: 3 Job Title: Local Sage-grouse Conservation
Planning and Implementation

Job No.: 1

Period Covered: July 1, 2009 – June 30, 2010
Report by: Shawn Espinosa, Steve Foree and Curt Baughman

OBJECTIVES

The following objectives were identified in the W-64-R-9 Grant Agreement for this particular job:

- Complete any unfinished population management unit plans, revise existing plans and refine projects identified within those plans; and
- Assist with and/or conduct implementation of suggested projects within completed plans.
-

The following summaries describe the work accomplished during state fiscal year 2009 including project implementation, population management unit planning and major habitat issues.

Elko County LACP

SUMMARY

The Northeastern Nevada Stewardship Group and its Sage-grouse POD subcommittee serves as the local working group for this particular region. Since the completion of the Tuscarora PMU/Watershed Assessment, the group has shifted focus to a similar assessment for the North Fork PMU. This is a very large PMU and likely harbors the largest sage-grouse population in Nevada. Great Basin Ecology, Incorporated is currently working on this assessment. Additionally, the group is also progressing on the development of a database to help track management actions, restoration and enhancement projects within Elko County.

During the winter of 2009-2010, the BLM – Elko District and NDOW worked cooperatively on several projects to assist with restoration of previously burned areas. More specifically, the BLM initiated the Tuscarora Sage-grouse Habitat Restoration Project utilizing American Recovery and Reinvestment Act (ARRA) funding. This project consists of 8 treatment areas including the following: Owyhee Bluffs, Guard Corral, Izzenhood Basin, Rooster's Comb, Rock Creek Ranch, Middle Rock Creek, Northwest Sheep and Lower Rock Creek (Figure 2). The current value of some of these areas for sage-grouse varies; however, treatments in less important areas have the potential to provide significant information regarding the most appropriate methods for restoration in this region of Nevada.

In the spring of 2010, herbicide applications (Imazapic and Glyphosate) were conducted in the Rooster's Comb (500 acres) and Lower Rock Creek area (875 acres), which included 407 acres of private lands area that was funded by NDOW.

A total of 2,886 acres of rangeland drill seeding was completed on the Owyhee Bluffs, Guard Corral and Lower Rock Creek project areas. Most of the seed mixes contained a myriad of grass mixes and some shrubs including Siberian Wheatgrass, Indian Ricegrass, Russian Wildrye, Sandberg's Bluegrass, Needle and Thread Grass, Spiny Hopsage, Shadscale and Wyoming Big Sagebrush.

In conjunction with seeding projects, a series of harrowing projects are being conducted in the Rock Creek Ranch (3096 acres) and Middle Rock Creek (250 acres) project areas. These areas are being harrowed after sagebrush and forb seed has been aerially applied. The objective is to incorporate sagebrush and forbs into existing crested wheatgrass seedings, placed after fires that occurred in 1985, 2001 and 2006 to curtail cheatgrass establishment.

Approximately 3,000 Wyoming big sagebrush bare root seedlings were planted in the Rooster's Comb project area. Planting was conducted in early spring of 2010 by a group of volunteers from the Nevada Muley's sportsmen organization, Elko BLM and NDOW personnel. The seedlings were purchased by the Nevada Muley's organization from the Lucky Peak Nursery in Idaho.

Several projects are also planned or nearing implementation using PFW funding available from the USFWS. These projects include riparian pasture fencing, installing native grass seeding and sagebrush plantings in burned areas, juniper removal near brood rearing habitat and spring protection projects. Many of these types of projects will be implemented in 2011.

Lincoln LACP

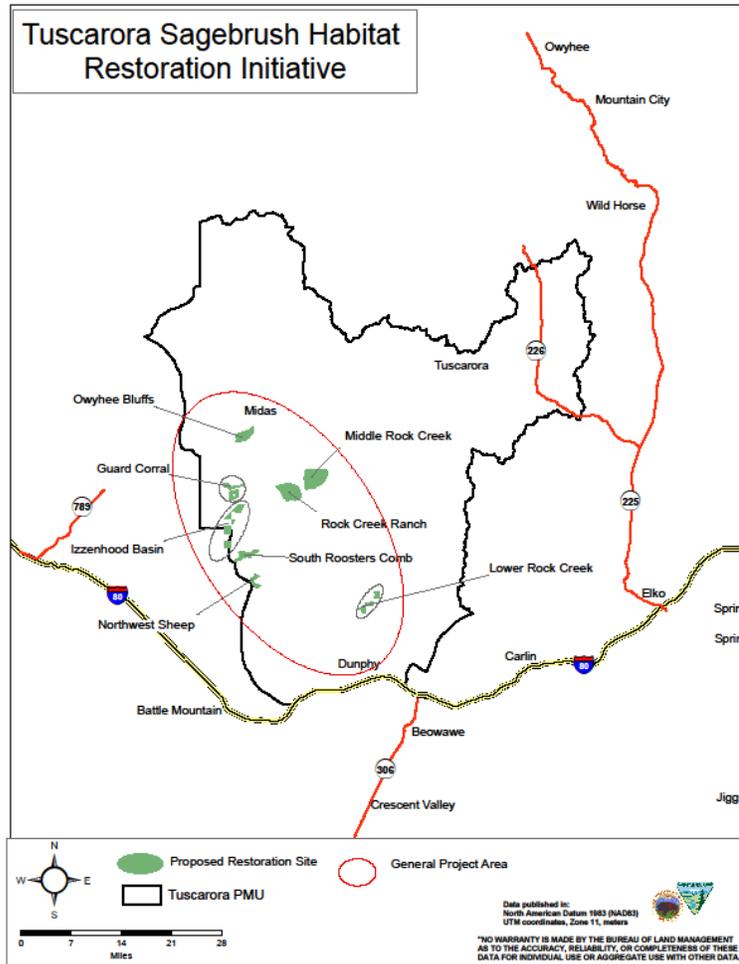


Figure 2. Tuscarora PMU treatment areas.

SUMMARY

No work was accomplished in this local planning area during the grant period.

White Pine LACP

SUMMARY

The White Pine local conservation planning area includes four main PMU groups including the Butte/Buck/White Pine, Schell/Antelope, Spring/Snake Valley and the Steptoe/Cave PMUs. This planning area harbors a moderate sage-grouse population relative to the other six planning areas in Nevada. To a degree, this is a result of the size of the planning area more than bird density. Of the PMU groupings, the Butte/Buck/White Pine PMU group is the largest in terms of area and also harbors the most significant sage-grouse population within the White Pine LACP at 4,789 sage-grouse (2009 minimum spring breeding population estimate).

Projects involving sage-grouse within the planning area involve intensive lek monitoring, telemetry studies and habitat improvement projects. Some of the lek monitoring and telemetry work has been conducted to monitor the effects of different infrastructure projects involving White Pine County including the Southwest Intertie Project (transmission line), Southern Nevada Water Authority groundwater pipeline to Las Vegas and several proposed wind energy facilities. These projects have the potential to negatively affect sage-grouse populations within this planning area.

Several sage-grouse habitat improvement projects have taken place within this planning area with some of these projects continuing for the immediate future. Projects have been initiated by several agencies including the Bureau of Land Management – Ely District (BLM), U.S. Forest Service – Ely Ranger District (USFS), the Nevada Department of Wildlife (NDOW), the Natural Resource Conservation Service (NRCS) and the Eastern Nevada Landscape Coalition (ENLC) in conjunction with private landowners. The following is a brief summary of project work taking place in White Pine County.

White Pine Range:

The White Pine Range Sage-grouse Habitat Enhancement Project was initiated in the Shellback Ridge area of the White Pine Range to remove pinyon and juniper trees encroaching into sagebrush habitats utilized by sage-grouse as breeding, brood rearing and fall habitat (see Figure 3). The project represented a cooperative effort between the U.S. Forest Service, Rocky Mountain Elk Foundation (RMEF) and NDOW. Treatment was conducted by hand (chainsaw crew) utilizing the Great Basin Institute – Nevada Conservation Corps. Trees selected for removal are young regenerating trees that have established within the mountain and Basin big sagebrush habitat. On an average there are about 10-50 trees/acre.

Acres: NDOW funds were used to remove small pinyon and juniper trees over an area approximately 1,000 acres in size. Other funds supplied by RMEF Current acreage were used to treat an additional 1,000 acres. The total project area involves approximately 12,000 acres and treatment will occur over several years.

Funding: The USFS, NDOW and RMEF provided funds for this project. NDOW funding was obtained from the W-64 Sage-grouse Conservation Grant (75%) and matched with the Nevada Question 1 Bond Initiative (25%). Total funding provided by NDOW was \$26,860.10.



Figure 3. Pinyon and juniper tree removal near Tom Plain Spring in the White Pine Range. Photo by: Kathleen Johnson (USFS – Ely District).

Bi-State LACP

SUMMARY

The major threats to the Bi-State population of sage-grouse are pinyon and juniper encroachment into sagebrush and meadow habitats and suburban development. Within the Nevada section of the Bi-State local planning area, the majority of project work involves addressing these matters. Several projects were conducted in SFY10 to reduce pinyon and juniper in the Mount Grant and Pine Nut PMUs and discussions with private landowners occurred regarding conservation easements or agreements with the Desert Creek PMU to protect certain areas from development.

Within the Mount Grant PMU, authorization was received to move forward with the China Camp Sage-grouse Habitat Enhancement project from the Nevada State Historic Preservation Office. The project had been held up for an extended period of time due to archaeological issues. This project will reduce pinyon and juniper encroachment within the vicinity of two sage-grouse leks and encompasses approximately 700 acres. NDOW has contributed \$40,080 towards implementation of the project over the past two fiscal years, paid in installments of \$20,090 each fiscal year. The project is expected to be completed in November of 2010.

Several ongoing projects of various scales are also occurring in the Pine Nut PMU. These projects also largely involve pinyon and juniper removal within sagebrush habitats as well as near springs and meadows. The Mill Canyon Project was a large scale project that involved nearly 2,000 acres. Treatment was conducted with the use of a masticator.

Numerous meetings and phone discussions have taken place with a private consultant representing a landowner within the Desert Creek PMU that has important brood rearing habitat for sage-grouse. Considering the nearby development that has already occurred, if this particular area was also developed, the cumulative impacts would be difficult for sage-grouse to

overcome in the long-term and their ability to maintain a viable population would be decreased. This area is one of, if not the most, important brood rearing habitats for this particular PMU. Developing a conservation easement or agreement for this property would help conserve this population and provide some assurances to the U.S. Fish and Wildlife Service that meaningful management actions are taking place on the ground.

North Central LACP

SUMMARY

The North Central planning area is composed of Churchill, Pershing and Humboldt Counties. There are 19 Population Management Units (PMUs) within this planning area, many of which encompass isolated, dry, single ridge mountain ranges with small populations of sage-grouse. Larger populations of sage-grouse can be found in the Lone Willow, Santa Rosa, Desatoya and Black Rock PMUs.

During the last week in June of 2010, the Haypress Meadow Restoration project was finally completed within the Desatoya PMU. This project involved over 4,500 feet of pipe rail fencing constructed around a meadow and spring complex in the upper elevations of the Desatoya Range and encompassed approximately 23 acres. The area is utilized by sage-grouse as early and late brood rearing habitat. The purpose of the project is to protect the area from overutilization by domestic livestock as well as wild horses. The project represented a collaborative effort between the BLM, Smith Creek Ranch and NDOW. The project was completed by NDOW personnel and a significant labor force provided by Nevada Bighorns Unlimited sportsmen's group. All materials were purchased for this project with funding made available through the Nevada Chukar Foundation, Carson Valley Chukar Club and the Nevada Upland Game Stamp program.

Washoe-Lassen-Modoc LACP

SUMMARY

The Washoe-Lassen-Modoc LACP is made up of six Population Management Units including the Vya, Massacre, Sheldon, Buffalo/Skedaddle, Virginia and Pah-Rah PMUs (a single PMU plan was developed for the Virginia and Pah-Rah PMUs) The Buffalo/Skedaddle and Vya PMUs cross state boundaries and are managed jointly with California.

Within the Massacre PMU, the BLM – Surprise Field Office implemented several projects to both improve and restore riparian habitat and also alleviate juniper encroachment into existing sagebrush habitats. Two exclosures were constructed in the Long Valley Allotment within this PMU to improve existing spring conditions and brood rearing habitat for sage-grouse. The Lone Spring exclosure is approximately 4.7 acres in size with new troughs located outside of the exclosure and riparian area for livestock use. The Sand Spring exclosure is much larger at 138 acres and may also provide some nesting habitat improvements for sage-grouse. Two juniper thinning projects were also implemented within this PMU. Juniper was removed across approximately 20 acres within the Willow Creek watershed to improve late summer habitat. In addition to this site, maintenance and new cutting of juniper took place over a 1,260 acre project site near Summit Spring. Both projects took place in the Hays Canyon Range which is considered important brood rearing and summer habitat.

Two other juniper removal and maintenance projects were also conducted in the Vya PMU by the BLM – Surprise Field Office. Approximately 150 acres of maintenance and new juniper cutting was conducted near the Toney Ranch within two miles of an existing lek location with unknown status. The goal of this project is to improve and protect nesting habitat within this

portion of the PMU. Also, 139 acres of maintenance treatments were conducted near the Stateline lek located near the scenic byway. This project will also benefit nesting habitat.

The Nevada Department of Wildlife contracted with the USGS – Western Ecological Resource Center in state fiscal year 2009 to conduct intensive sage-grouse monitoring in the Virginia Range (Virginia/Pah Rah PMU). This population of sage-grouse faces threats from suburban development, wind energy development and a recently constructed 345kV transmission line placed within two miles of a recently discovered lek. Funding for this work was provided by the Nevada Department of Wildlife’s *Wildlife Heritage Trust Account* (\$30,000), the Carson Valley Chukar Club, and the Nevada Chukar Foundation. Future work in FY2010 will be funded in part by the W-64 Segment 10 Grant. Assistance for sage-grouse capture work was provided by personnel of the Nevada Department of Wildlife during FY10. To date, 79 sage-grouse have been captured in the Virginia Mountains consisting of 65 females and 14 males. All 65 female sage-grouse were radio-marked. Intensive follow-up of radio-marked birds has provided valuable information on movement patterns, nest initiation and nest fate as well as habitat selection including nest site vegetative characteristics.

South Central LACP

SUMMARY

The South Central Local Conservation Planning area consists of Eureka, Lander and Nye Counties. There are 10 PMUs within this planning area and most are very remote. Projects were focused on sage-grouse habitat improvement within the Three Bar and Toiyabe PMUs within Eureka and Lander Counties respectively.

A significant amount of work was completed on Roberts Creek Mountain within the Three Bar PMU during the late summer/early fall of 2009. Sage-grouse populations in this area have been affected by pinyon and juniper encroachment, mining and overutilization by livestock in some areas. The University of Nevada Cooperative Extension office in Battle Mountain developed job opportunities for area youth by creating a hand crew to conduct restoration work.

This program, otherwise known as the “Bootstraps” program, provided the labor force for conducting this project. The total treatment area was approximately 2,000 acres and the density of trees varied across the landscape. Documentation regarding the importance of this mountain has been demonstrated through the University of Nevada, Reno and the ongoing Falcon to Gonder Transmission Line research. In FY2010, the majority of work took place in the Vinini Creek and Willow Creek watersheds, which were targeted because of the previous documentation of nesting hens within the area.



Figure 4. Upper Willow Creek watershed before treatment.

Pre and post treatment photos are shown in Figures 4 and 5.

A separate, but similar project began in the spring of 2010 in the northern portion of the Toiyabe PMU on Bald Mountain in Lander County. This project also involved pinyon and juniper thinning and removal on as many as 3,000 acres of an 18,000 acre project area. The work was also conducted by the Bootstraps hand crew. Several springs and surrounding sagebrush on the north side of the mountain have been invaded by pinyon and juniper and have been impacted by wild horses and livestock utilization. Once tree removal work is completed, an enclosure may be constructed to help the springs recover.



Figure 5. Upper Willow Creek watershed post treatment

Expenditures

The original amount identified within the W-64-R-10 Grant Agreement to complete Local Area Conservation Planning and Implementation was **\$120,000.00**. The actual expenditure for planning efforts and implementation of projects was **\$43,248.07**. For some projects, full implementation was not completed during fiscal year 2010. Because the state fiscal year ends on June 30th, the full field season of implementation activities are not realized during a fiscal year.

RESEARCH

Habitat Relationships

State: Nevada Grant Title: Nevada Sage-grouse Conservation Project

Grant No.: W-64-R-10 Sub-Grant Title: Research
Sub-Grant No.: III Project Job Title: Habitat Relationships
Project No.: 1 Job Title: Sage-grouse Habitat Relationships
Job No.: 1

Period Covered: July 1, 2009 - June 30, 2010

Report by: Zachary B. Lockyer, Peter S. Coates, Michael L. Casazza, & David J. Delehanty

SUMMARY

Examining Greater Sage-grouse Nest Predators, Nest Survival, and Habitat Features at Multiple Spatial Scales

Zachary B. Lockyer¹, Peter S. Coates², Michael L. Casazza², & David J. Delehanty³
¹Idaho State University, Pocatello, ID lockzach@isu.edu, ²United States Geological Survey, Dixon, CA, ³Idaho State University, Pocatello, ID

This project is intended to better understand habitat utilization of sage-grouse within the Virginia Range and identify key habitats utilized by the species. Several threats have been realized with regard to this population and more are on the horizon, emphasizing the timing of this project. Research efforts are expected to lead to the identification of factors limiting this population as well as habitat associations including:

1. seasonal movement patterns of radio marked birds;
2. identification of nest sites and nest initiation rates;
3. determination of nest site characteristics including overstory and understory vegetative characteristics;
4. determination of predation rates of sage-grouse nests and identification of predatory species responsible;
5. determination of survival rates of adults and juveniles; and
6. recruitment rates.

Since the inception of the project in 2009, researchers have monitored a total of 39 nests including 18 in 2009 and 21 in 2010. Twenty-eight of the nests failed. Apparent nest success, defined as ≥ 1 chick hatching, for the radio-monitored birds was 22.2% ($n = 4$) and 33.3% ($n = 7$) in 2009 and 2010, respectively. These rates are lower than other published rates in Nevada of 40.2% (Rebholz et al. 2009) and 51% (Coates and Delehanty 2010).

In terms of vegetative characteristics at nest sites, sagebrush species account for 28.2% of nest shrub selection and 45.5% of those nests were successful. Rabbitbrush made up 23.1%

of nests and of these 77.8% were successful. Nests not associated with shrubs were not successful (0%) and 15.4% were found in this category.

Remote video cameras were placed at nest sites during the nesting period to help determine nest fate and address objective #4. Among 22 video monitored nests, 11 failed due to the following:

- Common raven (*Corvus corax*) 26.7% (n = 4);
- American badger (*Taxidea taxus*) 13.3% (n = 2);
- Bobcat (*Lynx rufus*) 13.3% (n = 2);
- Coyote (*Canis latrans*) 13.3% (n = 2); and
- Abandonment following injury 4.6% (n = 1)

This research project has already provided NDOW with useful information regarding seasonal habitat and nest site selection. Lack of appropriate nesting habitat, due to recent wildfire, and predation appear to be key factors limiting the potential of this small sage-grouse population. In addition to this information, sage-grouse were found to be utilizing areas not previously identified as use areas. This project is expected to continue for the next two years.

Expenditures

A total of \$37,187.66 was expended on this project in SFY2010. The USGS – Dixon Field Station is currently under contract with NDOW to conduct research and monitoring relevant to this project. Over two fiscal years, NDOW and the Wildlife Heritage Trust Account program have provided \$70,000 to the project. A total of \$46,600 was identified in the W-64-R-10 Grant Narrative for this project leaving a remainder of \$9,412.34.

Mortality Relationships

Harvest Impacts: Eureka County

State:	<u>Nevada</u>	Grant Title:	<u>Nevada Sage-grouse Conservation Project</u>
Grant No.:	<u>W-64-R-10</u>	Sub-Grant Title:	<u>Research</u>
Sub-Grant No.:	<u>III</u>	Project Name:	<u>Mortality Relationships</u>
Project No.:	<u>2</u>	Job Title:	<u>Harvest Impacts</u>
Job No.:	<u>1</u>		
Period Covered:	July 1, 2009 – June 30, 2010		
Report by:	Mike Podborny and Shawn Espinosa		

OBJECTIVES

The objective for this particular job is to better determine harvest rates for certain areas distributed across Nevada to ensure that they are within acceptable levels according to Western Association of Fish and Wildlife Agency (WAFWA) guidelines (Connelly et al. 2000). These efforts will also help determine better population estimate parameters.

SUMMARY

This job is being conducted in conjunction with ongoing research performed by the University of Nevada, Reno (UNR). The intent of the research is to determine the effects of a utility scale transmission line (345 kV), constructed in 2005, on sage-grouse demographic parameters and vital rates as a function of distance from the line. UNR captures and marks sage-grouse in both the spring and the fall and NDOW has assisted with each fall capture. All birds are marked with leg bands and a proportion are radio-marked with VHF telemetry devices. This opportunity lends itself to a fairly simple mark-recapture effort with regard to determining a population estimate for this area, mainly because of the fall hunting season, and presents an opportunity to determine harvest rates. The Guidelines to Manage Sage-grouse Populations and Their Habitats (WAFWA Guidelines) (Connelly et al. 2000) suggests that harvest rates should not exceed 10% of the estimated fall population and that populations should not be hunted where ≤ 300 birds comprise the breeding population (i.e., ≤ 100 males are counted on leks) [C.E. Braun, Colorado Division of Wildlife, unpublished report].

The 2009 fall capture effort was conducted for three nights in mid-September. Twenty sage-grouse (19 new; 1 recapture) were caught consisting of 9 adult females, 1 adult male, 6 female chicks (which included a recaptured bird) and 3 male chicks. Information gained from these individuals has allowed researchers to estimate nest initiation rates, nest fate, vegetative characteristics associated with the nest and survival rates, among other population dynamic variables.

The ability to mark and recapture male sage-grouse has allowed for the estimation of the male segment of the sage-grouse population (see Table 10 below). Male population estimates have decreased by 66% since the inception of the study in 2003 and are 68% below the 7-year average of 568. To determine harvest rates, wing collection data was utilized from the three Populations Management Units (PMUs) that the study area was within. For the first 6 years of the study, harvest of adult males was well within accepted guidelines ($\leq 10\%$ of the estimated fall population). The 2009 harvest of 12% represents the first year that harvest was greater than 10% of the estimated male population (n=184).

It is important to note that the male population estimate is derived from 11 different leks within the study area and the number of active leks within all three PMUs is much greater than

that (n=42); therefore, the actual male population is much higher than that reflected in Table 1. Using the wing data and population estimates demonstrate that actual harvest removes less than 6% of the adult males each year on average which is within accepted guidelines and is likely an overestimate of harvest. This provides some evidence that the effects of hunting are minimal to large, contiguous populations.

Year	Male Population Estimate	Standard Error	Adult Male Harvest	% of Adult Males Harvested
2003	538	131	36	6.7%
2004	492	71	29	5.9%
2005	560	77	24	4.3%
2006	862	141	36	4.2%
2007	857	148	41	4.8%
2008	480	96	41	8.5%
2009	184	35	22	12.0%
Averages	568	100	32.7	5.75%

Table 11. Annual estimates of the male population of sage-grouse within the Falcon to Gonder Transmission Line Study area.

Actual band recovery from hunter harvested birds provides a more reliable approach to estimating harvest rates. Cumulatively, over the course of the study, if we assume that reported recovery is at or near 100%, harvest of male sage-grouse is less than 1% of the estimated population and female harvest is less than 2% of the actual population (Figure 6).

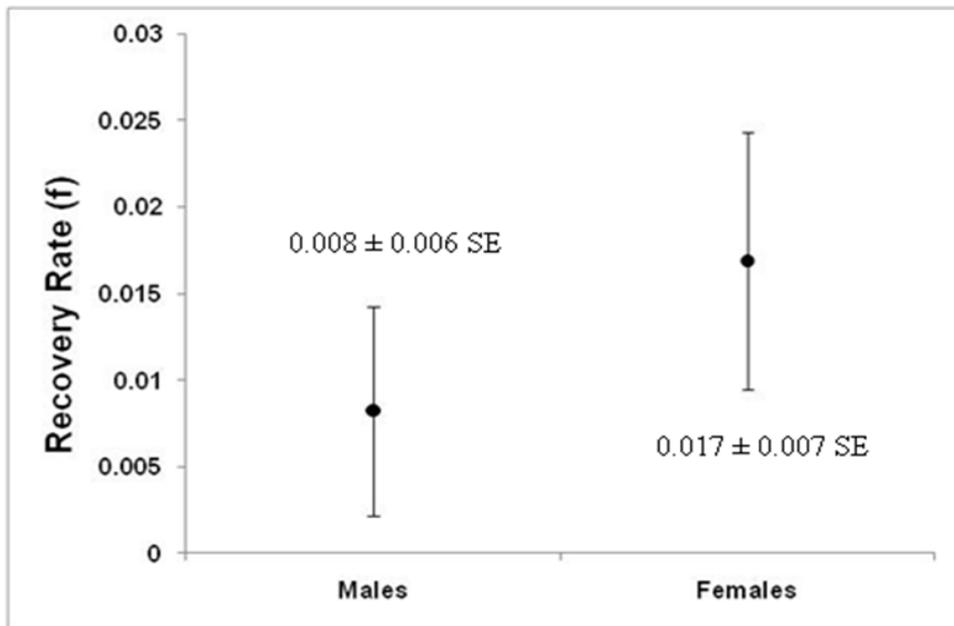


Figure 6. Estimates of average recovery rates for male and female sage-grouse in Eureka Co., Nevada, derived from combined live-dead analysis of banding (male) and radio-telemetry (female) data collected from 2003-2010.

COORDINATION

State: Nevada Grant Title: Nevada Sage-grouse Conservation Project

Grant No.: W-64-R-10 Sub-Grant Title: Coordination
Sub-Grant No.: IV Project Job Title: Project Coordination
Project No.: 1 & 2 Job Title: Intra & Inter-agency Coordination

Period Covered: July 1, 2009 – June 30, 2010
Report by: Shawn Espinosa

OBJECTIVES

The objective of this particular job is to ensure consistent monitoring efforts for the species across agencies and keep personnel abreast of pertinent planning and implementation efforts by coordinating within and amongst state and federal agencies.

SUMMARY

Intra and Inter-agency coordination (both federal and state agencies) is often a difficult, but very important component of proper management of sage-grouse and their habitats. Over 80% of Nevada is federally administered public land making it imperative that the Nevada Department of Wildlife work with the Bureau of Land Management and the U.S. Forest Service on a consistent basis with regard to land use planning, habitat enhancement or restoration projects and certain consumptive multiple uses of these lands. Statewide coordination meetings are held annually with the Bureau of Land Management and US Forest Service to discuss projects, management techniques and National Environmental Policy Act documentation necessary to conduct certain projects. Additionally, the Natural Resource Conservation Service (NRCS) has created a "Sage-grouse Conservation Initiative" and has dedicated significant funding to management practices and projects that benefit sage-grouse and assist private landowners. Increased coordination with this agency will be required to ensure that efforts are warranted and will actually benefit the species on a local level.

A total of **\$6,836.00** was expended on coordination in state fiscal year 2010. The W-64-R-10 Grant Agreement identified a budgeted amount of **\$10,000.00** leaving a remainder of \$3,164.00 in savings. As in the past, many tasks that would have been coded to this job were likely germane to other jobs such as Statewide or Local Conservation Planning. Some examples include final development of the "Nevada Energy and Infrastructure Standards to Conserve Greater Sage-grouse and Their Habitats" and revision of statewide Habitat Restoration Values (R-values) which will assist in leading to a statewide Habitat Categorization Map as identified in the above document.

ADMINISTRATION

OBJECTIVES

This project provides oversight regarding personnel assignments, proper tracking of time spent on projects identified within the W-64-R-10 Grant Agreement and administrative issues regarding the development and implementation of contracts or agreements.

SUMMARY

The majority of tasks associated with “administration” involve grant preparation, job progress report writing and working with NDOW’s Fiscal Service Section to develop required work programs to acquire spending authority, especially for certain projects. Other miscellaneous items such as budget development, tracking, and cost accounting are also some responsibilities associated with this job title. The administrative costs for this project amounted to **\$9,490.95** in state fiscal year 2010. The original budget identified in the W-64-R-10 Grant Agreement was **\$12,000** resulting in a difference of **\$2,509.05**.