2007 Annual Report

Gunnison Sage-grouse (*Centrocercus minimus*) Conservation in Utah

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Executive Summary

Gunnison Sage-grouse (*Centrocercus minimus*) are believed to have originally occupied 76,521 km^2 of sagebrush (*Artemisia* spp.) habitat in northeastern Arizona, northwestern New Mexico, southwestern Colorado, and southeastern Utah (Gunnison Sage-grouse Rangewide Steering Committee 2005). Currently, populations occupy 4,787 km^2, (8.5% of the original range) in Colorado and Utah (Figure 1). The recently completed Gunnison Sage-grouse Rangewide Conservation Plan (RCP) (RSC 2005) identifies a number of factors contributing to the decline and various conservation strategies that may assist in species conservation.

In 1996, in response to local concern about sage-grouse populations in the area, the San Juan County Gunnison Sage-grouse Local Working Group (SWOG) was formed. In 2000, the group published the San Juan County Gunnison Sage-grouse Conservation Plan (SWOG 2000), which identified desired vegetative and sage-grouse population conditions for the local area and listed strategies specific to Utah. In 2006, SWOG merged with the Dove Creek, Colorado local working group to form the Monticello/Dove Creek Local Working Group (LWG). The merger took place in response to treatment of sage-grouse in Dove Creek and Monticello as one distinct subpopulation in the RCP. The local working group in Dove Creek published a local conservation plan in 1997. This new group is currently working to implement the RCP.

Research conducted in San Juan County in 2000-2004 assessed both Gunnison Sage-grouse ecology and habitat use. This information has not been synthesized to determine if the existing habitat conditions approximate those stated in the Plan. We will synthesize this information as a means of providing the Monticello/Dove Creek LWG with information they can use to guide future conservation actions. Additional vegetation information will be gathered to further map and assess habitat quality and availability in regard to the standards set in the local plan(s) and the RCP and to develop a steady-state-transition model and ecological site description.

Additionally, the effects of several of the strategies proposed in the RCP, the San Juan County Plan, and the Dove Creek Plan on Gunnison Sage-grouse have not been evaluated. We are evaluating three specific conservation strategies that have been identified: 1) the role of irrigation in creating mesic or wet meadow environments in Conservation Reserve Program (CRP) and native rangeland on sage-grouse productivity potentials as measured by changes in vegetation structure and composition, arthropod abundance and diversity, and bird use; 2) the role of dormant season cattle grazing of CRP and native rangeland on vegetation diversity, arthropod abundance, and sage-grouse use; and 3) the effectiveness of devices installed on vertical structures to reduce or eliminate perching sites for potential grouse avian predators.

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Monticello/Dove Creek Local Working Group

The Monticello/Dove Creek local working group met 3 times in 2006. The group does not currently have elected chairs. Partners in the group include USUEXT, Colorado State University Extension, DWR, Colorado Division of Wildlife, BLM, USFS, UFBF, San Juan County Extension, San Juan County, and TNC. In 2006, the group reformed, combining the existing local working groups in Monticello and Dove Creek into one organization. The group has been working towards meeting objectives outlined in the Rangewide Plan for Gunnison Sage-grouse and has been reporting on their activities, prioritizing strategies and actions, and ranking threats identified in that document. USUEXT, the DWR, the BLM, and several private landowners in Utah are working together on a flagship project investigating the use of wet meadows in Conservation Reserve Program (CRP) fields by sage-grouse and the efficacy of perch deterrents or discouragers to migrate avian predation on sage-grouse. Phoebe Prather, a PhD student at Utah State University (USU), is working on these projects. Lek count data suggest the population is stable to declining (Appendix A).

2007 Research Activities

Experiment 1: The role of irrigation in creating mesic environments, enhancing vegetation diversity, and arthropod abundance in Conservation Reserve Program (CRP) fields and native rangeland in San Juan County, Utah.

Methods

We used a sprinkler irrigation system to create wet meadow habitat conditions on 12 rangeland and 12 CRP sites that were identified in the summer of 2006. Three groundwater wells in relatively close proximity to the identified treatment sites were used to distribute water to each site for irrigation. Treatment sites were irrigated with a rain bird sprinkler with the potential for a 20m spraying radius. Within both CRP and rangeland fields, 4 sites had 0.5 inches of water applied weekly, 4 sites had 0.5 inches of water applied every 0.5 weeks, 4 sites had 0.5 inches of water applied every 3 weeks, and 4 sites did not receive any water and acted as control sites. Treatment and control plots were randomly assigned within blocks, with each block containing one of each of the treatments and a control (Appendix B). Irrigation of the sites began in late May and continued through the end of July. This time period coincided with early and late brood-rearing periods. Dormant season fall cattle grazing occured on half of each site during October.

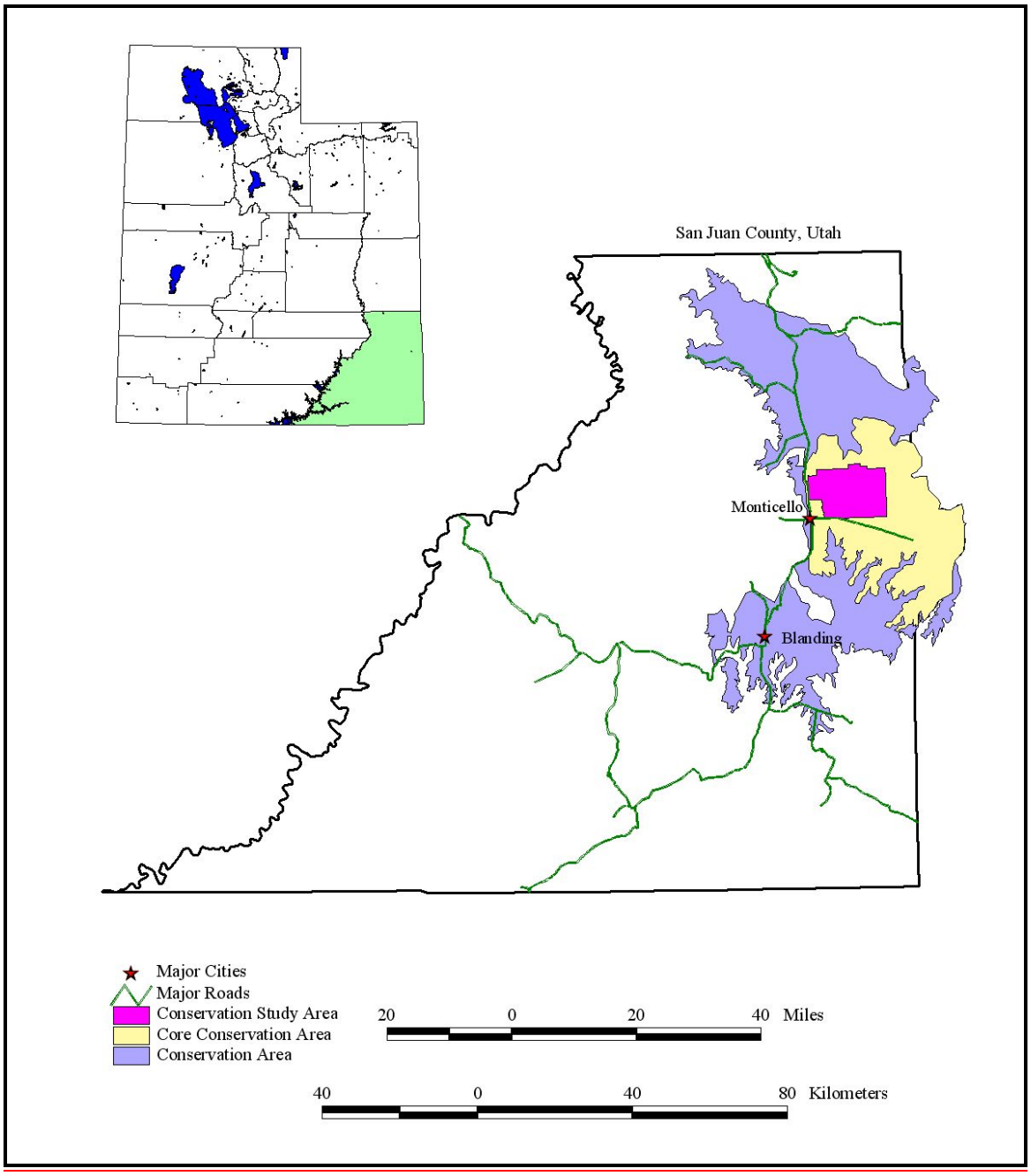

Figure 1. Gunnison sage-grouse Conservation Area, San Juan County, Utah (Lupis 2005).

Vegetation Measurements

Within each plot permanent vegetation transects were established, resulting in 2-30 meter vegetation transects radiating from the center of the plot, with 1 transect in each of the grazed and ungrazed sides of the plots. We used Daubenmire frames located every 3-meters to measure the frequency, percent cover, and height of individual species and groups of species. The line intercept method was used to measure shrub cover. Vegetation was clipped and weighed to measure the forage production of each site using a 0.5m x 1m frame. All vegetation within the frame was clipped, stored in paper bags, and dry weighed. The clipped vegetation was separated into the categories of perennial grasses, annual grasses, and forbs. The frames were placed at random locations along the main 30m transect line resulting in the clipping of twenty frames.

Arthropod Sampling

Distance Sampling and WebSim techniques were used to develop a trapline schematic. The resultant design is a trapping web of 60 individual pitfall trap arranged at varying distances from a 10m main line. Each range and CRP site will contain 2 trapline arrangements, split between the grazed and control sides. The traplines were opened in sequence with the traps remaining open for 3 days before they were collected. The trapping period occurred from May 29 to June 5.

Sage-grouse Use Survey

All treatment and control sites were surveyed for Gunnison Sage-grouse use through standardized pellet count transects. There were 20 transects 2 m apart in each site. Each transect was walked and the ground was searched for fecal and cecal pellets. If pellets were found they were counted, mapped, and removed from the site to prevent recounting. The counts were conducted by Phoebe Prather (Research Assistant) and Andy Olivarez (technician).

Results

Vegetation

CRP

The weekly irrigated grazed CRP plots exhibited greater percent cover of forb cover (Table 1-4). These data should however be consider preliminary and may reflect individual site variation during the first year of the experiment.

Table 1. Average percent canopy cover of sites watered once a week, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	0	24.5	15.6	5.4	4.4
Grazed- July	0	22.0	16.7	4.4	10.2
Ungrazed- June	0	36.3	2.1	0.6	2
Ungrazed- July	1	29.6	6.2	0.8	9.1

Table 2. Average percent canopy cover of sites watered once every two weeks, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	6.6	25.4	7.2	1.9	4.0
Grazed- July	6.55	21.0	8.0	0.5	6.4
Ungrazed- June	15.2	22.8	19.5	2.3	2.2
Ungrazed- July	10.8	20.6	23.4	2.3	0.3

Table 3. Average percent canopy cover of sites watered once every three weeks, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	0	21.3	28.1	0.8	0.3
Grazed- July	0	15.3	24.6	0.3	1.1
Ungrazed- June	0	34	3.7	1.7	2
Ungrazed- July	0	31.8	3.8	0.4	0

Table 4. Average percent canopy cover of control sites, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	0.3	21.6	11.5	0.9	4.0
Grazed- July	0	21.2	8.1	0.8	6.4
Ungrazed- June	17	19.3	6.2	1.9	11.4
Ungrazed- July	16.4	23.4	13	4.5	16.7

Range

Range site vegetation data are presented in Tables 5-8. These data are preliminary and may reflect individual sites differences as opposed to specific treatment effects.

Table 5. Average percent canopy cover of sites watered once a week, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	17.1	14.9	3.4	1.7	0
Grazed- July	21	15.1	5.6	2.3	0
Ungrazed- June	18.3	11.3	4.8	1.3	0
Ungrazed- July	13.1	7.3	8.3	2.5	0

Table 6. Average percent canopy cover of sites watered once every two weeks, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	16.2	15.3	1.5	1.2	6.3
Grazed- July	11	14	0	1.4	6.3
Ungrazed- June	14.4	13.1	1.1	1.3	0
Ungrazed- July	16.0	10.4	0.3	1.3	0

Table 7. Average percent canopy cover of sites watered once every three weeks, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	13.1	13.1	4.2	2.1	5.8
Grazed- July	14.2	13.1	4.1	2.8	5.8
Ungrazed- June	16.0	12.2	0.3	1.6	0
Ungrazed- July	18.7	9.2	0	3.0	0

Table 8. Average percent canopy cover of control sites, 2007.

	Sage	Perennial Grass	Annual Grass	Forb	Shrub
Grazed- June	8.7	6.6	7.5	2.3	8.8
Grazed- July	6.7	9.7	6.5	3.4	8.8
Ungrazed- June	13.1	8.7	16.5	2.6	7.6
Ungrazed- July	14.2	8.2	9.8	3.2	7.6

Arthropods

Three technicians and the Ph.D. student spent the month of May digging holes and setting 3,840 pitfall traps. This job proved to be more challenging than anticipated was not completed until May 29. This was after the first trapping period identified in the research proposal. As a result we only completed one trapping period from 30 May to 5 June. This trapping period filled the slot of the second trapping period described in the research proposal. After the completion of the trapping period it was realized that it would not be possible to complete another trapping period due to time constraints and lack of technician help. Dr. Tim Graham of the USGS in Moab provided help during the one trapping period that was successfully completed and agreed that during the next two summers two sampling periods will be sufficient and not alter the data.

Sage-grouse

Pellet surveys were conducted on three occasions May 25, June 20, and July 27. No pellets, tracks, or grouse were recorded on the study plots during the surveys. There were also no incidental observations of pellets or sage-grouse during daily research activities. Because there were no signs of grouse bird dog surveys were not conducted.

Irrigation

Irrigation of the study plots was initiated on May 22, 2007 and continued through August 3, 2007. The plots that were irrigated weekly over the 11 week period received the equivalent of an additional 5.5 inches of rainfall as measured on test gauges. The plots irrigated every two weeks or 6 times over the 11 week period received the equivalent of 3 inches of additional rainfall. The plots irrigated every three weeks or 4 times over the 11 week period received the equivalent of 2 inches of additional water. All plots were watered for an eight hours period. All plots were irrigated diurnally to avoid the hottest parts of the day.

Cattle Grazing

Cattle grazed the sites over a period of two weeks in late October and early November. Supplements were used to encourage the cattle to spread out over the area. We achieved a utilization of 60%.

Summary

Problems Addressed

Irrigation

Several problems were encountered during the irrigation process. This season one generator was used to operate three different ground water pumps. This complicated the timing of the watering schedule because the generator had to be moved from site to site. Several times the trailer used to move the generator would not connect to the truck and cause problems with keeping to the watering schedule. To remedy these problems I will have three generators that will remain at each well allowing me to use all three wells simultaneously.

Water pressure proved to be an issue as well. Rainbirds often only sprayed 5 to 10 meters. But even this reduced pressure caused problems with the irrigation line. Black poly pipe has proven to be an unsatisfactory material for the area. As the pipe heats up in the sun it begins to move like a snake, bending and winding along the ground, and expanding and contracting at the hose clamps. As a result, when the water is turned on the pipe often separated at the hose clamps. During attempts to repair the line it was discovered that often the pipe, because it was no longer straight, would not reach. I would then have to cut small segments from extra pipe and try and create a repair patch. In an attempt to prevent this from happening I would walk the line before turning on the water and tighten every hose clamp. But even the next day connections would be loose again. Other than reconstructing the line out of metal pipe I have not thought of a solution for this problem and will have to continue walking the line to tighten hose clamps.

2008 Plan of Work

Irrigation and vegetation measurements will be conducted in the same manner as the 2007 summer season. Irrigation will begin in the beginning of May. Two arthropod trapping periods will occur over a period of three weeks during the end of May and beginning of June. Fall cattle grazing will occur during October of 2008.

Experiment 2: The effects of perch discouragers on raptor and corvid use of utility poles.

Methods

In January, 2007 a 11 km (7.5 mile) section of an electric distribution line consisting of 84 poles (Figures 2) were modified using 5 different types of perch discouragers (Figures 3-8): three physical discouragers (cones, spikes, and triangles), and 2 different arrangements of a hazing deterrent (FireFlies). The FireFly arrangements consist of displaying a single or paired fireflies suspended above randomly selected utility poles.

Figure 3. One Fire Fly

Figure 4. Two Fire Flies

Figure 5. Cones

Figure 6. Triangles

Figure 7. Spikes

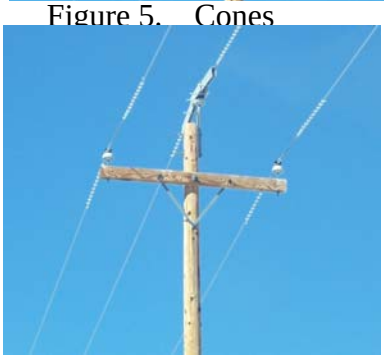

Figure 8. Control

Each pole was considered a separate experimental unit. The line was divided into 14 blocks consisting of 6 poles each. Within a block, each pole was randomly assigned to a treatment or control. This resulted in 14 replications of each treatment and control. Poles assigned as a control were not fitted with a discourager.

The surveys began 29 January and finished 27 April, with a total of 56 survey days and 112 surveys. The power line was surveyed twice a day, five days a week. The morning

monitoring period was from 0800-1100 and the afternoon period from 1400-1700. The entire power line was walked once a week to search for evidence of raptor predation events. Any remains, castings, and pellets were recorded and collected. Any sage-grouse activity (tracks, pellets, sightings) was noted.

The starting point for each survey was randomly selected by flipping a coin to determine which end of the route was sampled first (east or west end). To avoid disturbing any perching birds, alternative routes to arrive at the starting points were used. Once the starting point was determined, the location and time started were recorded on a data sheet. Five minutes were spent at the starting point and at each mile point observing and recording any birds seen. While driving to the mile points the speed of the vehicle was kept between 10-15 mph and any birds observed using the area or perched on poles or lines were recorded. A single bird could be recorded more than once if it continued down the line perching on different poles. Observations included species, numbers, perch locations, feeding forays, and mortalities. Birds flying within a quarter mile of either side of the power line, on the ground, or perched on trees, fence posts and poles associated with different power lines were recorded. The exact positions of birds perched on individual poles within the study power line were recorded. For data analysis, only observations of birds perched on study poles will be used.

Figure 2. Photograph of the survey area and associated habitats. This line is located within 2 miles of occupied Gunnison sage-grouse habitat.

Results

During the 2007 survey period (January-April), we recorded seven species of raptors and two species of corvids within the area of the study powerline (Table 1). Golden eagles (*Aquila chrysaetos,* GOEA) were the most common perching birds. Other species recorded included Bald eagles (*Haliaeetus leucocephalus,* BAEA), Ferruginous hawks (*Buteo regalis,* FEHA), Rough-legged hawks (*B. lagopus,* RLHA), Red-tailed hawks (*B. jamaicensis,* RTHA), Northern harriers (*Circus cyaneus,* NOHA*)*, Merlins (*Falco*

columbarius, MERL), Black-billed magpies (*Pica hudsonia*, MAGP), and common ravens (*Corvus corax*, CORA).

Seven of the nine species recorded in the area were observed perching on the study power poles (Table 9). We recorded 883 events of birds perched on structures during the surveys. Of these, 406 events (46%) were on study poles (Table 10).

Table 9. Number of bird sighting per species (not individual birds) recorded in area during the 2007 survey period (January-April) in San Juan County, Utah.

	CORA	NOHA	RTHA	FEHA	GOEA	BAEA	RLHA	MAGP	MERL	UNKN	Total
Perched on Study Pole	39	8	37	2	288	15	16	0	0	1	406
Perched on other pole	10	0	13	2	18	6	0	1	1	0	51
Perched on fence	199	3	6	1	19	5	1	5	4	1	244
Perched on corral	41	0	1	0	0	0	0	0	0	0	42
Perched on tree	50	0	13	0	49	9	0	2	14	0	137
Perched on other	3	0	0	0	0	0	0	0	0	0	3
Flight	549	89	4	4	112	19	3	7	20	0	807
Ground	481	16	4	3	48	11	0	2	23	0	588
Total	1372	116	78	12	546	65	20	17	62	2	2290

Table 10. Percent of birds perched on study poles versus other structures during 2007 survey period, San Juan County, Utah.

Structure	Percentage
Study Pole	46
Other Pole	6
Fence	28
Corral	5
Tree	16

Although we have not conducted any statistical analysis, our raw data summary suggests that the discouragers have not been effective at deterring raptors or corvids from perching on the study poles (Table 11). This trend is apparent for each species (Table 12).

Table 11. Percentage of bird observations perched on each discourager type and control poles from January-April, 2007.

Discourager Type	Perched %
Control	21
Cones	15
Spikes	15
Triangles	18
2 Fire Flies	12
1 Fire Fly	19

Table 12. Number of bird observations (not individual birds) per species on each discourager type and control poles from January-April, 2007.

	GOEA	NOHA	RLHA	CORA	RTHA	BAEA	FEHA	UNKN	Total
Control	66	1	3	7	7	1	0	0	85
Cones	42	0	2	6	7	2	0	0	59
Spikes	35	1	4	13	6	2	1	0	62
Triangles	51	3	4	8	3	3	0	0	72
2 Fire Flies	35	1	2	1	7	3	0	1	50
1 Fire Fly	59	2	1	4	7	4	1	0	78
Total	288	8	16	39	37	15	2	1	406

Sage-grouse Activity

The only sage-grouse activity observed along the study power line was the discovery of a dead sage-grouse on the road on January 31 during the afternoon survey near pole number 65. The cause of death of the sage-grouse is unknown.

Pellets and remains under the power line were collected each week. Approximately 85 pellets were collected. These pellets have not yet been analyzed, but upon preliminary examination it appears that most consist of bone and fur of lagomorphs. Lagomorphs were present during all of the surveys. Complete analysis of pellets will occur this fall.

Discussion

Although our current data set suggests that there is no treatment effect, we will continue the work through 2008 to increase sample size and determine if there may be any annual variation.

Installation of the discouragers on the study poles was not completed until the end of January 2007. The Fire Flies proved unable to withstand the winter conditions in Monticello and often broke. If newer versions of the fire flies are to be tested in 2008, we recommend this work be completed by the first week in January. We also recommend any modifications to the existing discouragers be completed at this time.

2008 Plan of Work

We are proposing to monitor the line for one more year (January-April, 2008) to account for annual variation in raptor or corvid densities and increase sample size. Using these data we will compare corvid and raptor use perching events to determine if any use differences exist by treatment type and/or species.

Presentations

Abstract for a presentation given at the Utah Chapter of the Wildlife Society meeting held in March, 2007.

Raptor and Covid Use of Utility Poles: An Assessment of the Efficacy of Perch Deterrents

*PHOEBE R. PRATHER, Jack H. Berryman Institute, Department of Wildland Resources, Utah State University, Logan, UT 84322-5230

Studies have shown that the increase of man-made structures, such as fence posts, power poles, and windmills, has lead to an increase of raptor and corvid visitation to an area, increased foraging and predation efficiency with the availability of perch sites, enhanced nesting and roosting sites, and have allowed access to habitats that do not naturally support elevated perches. One priority management need presented in local and rangewide conservation plans is an evaluation of the effects of human infrastructure, such as powerlines on Gunnison Sage-grouse populations. Methods to minimize the negative impacts of powerlines include retrofitting these structures with perch discouragers to deter raptors and corvids from perching. This study will test the efficacy of five different perch discouragers mounted on power poles along a 7.5 mile stretch of powerline located within the range of the Gunnison Sage-grouse population in San Juan County, Utah. The objective of the study is to determine which perch deterrents may be more effective in preventing or reducing perching by raptors and corvids.

Abstract for a presentation given at the Utah Sage-grouse Summit in March, 2007.

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

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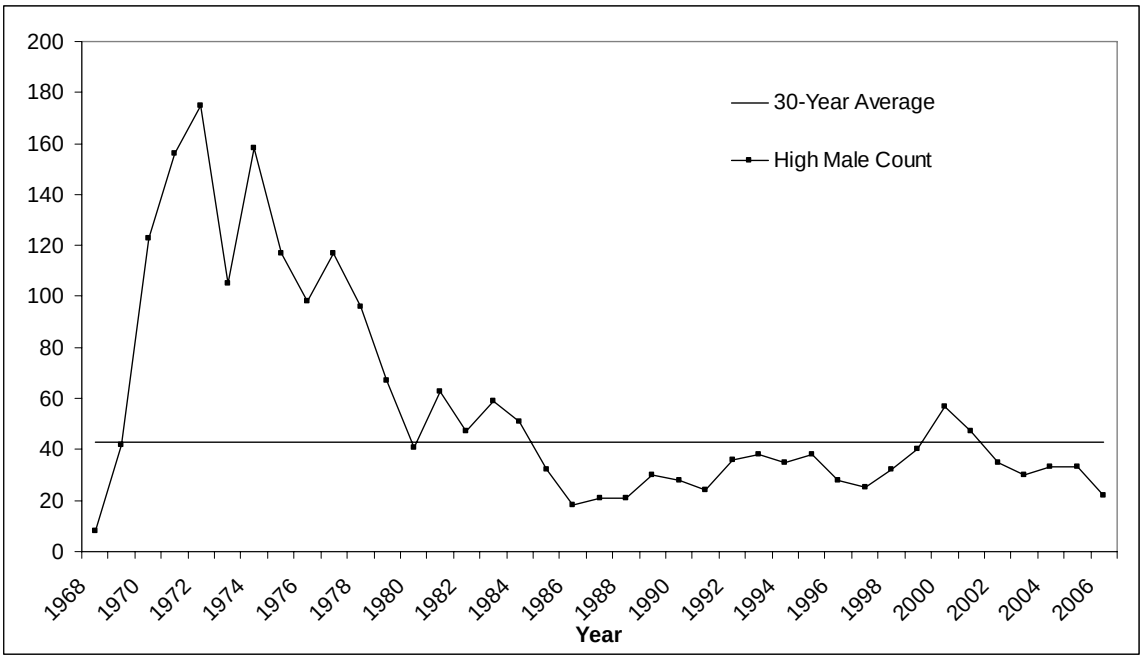
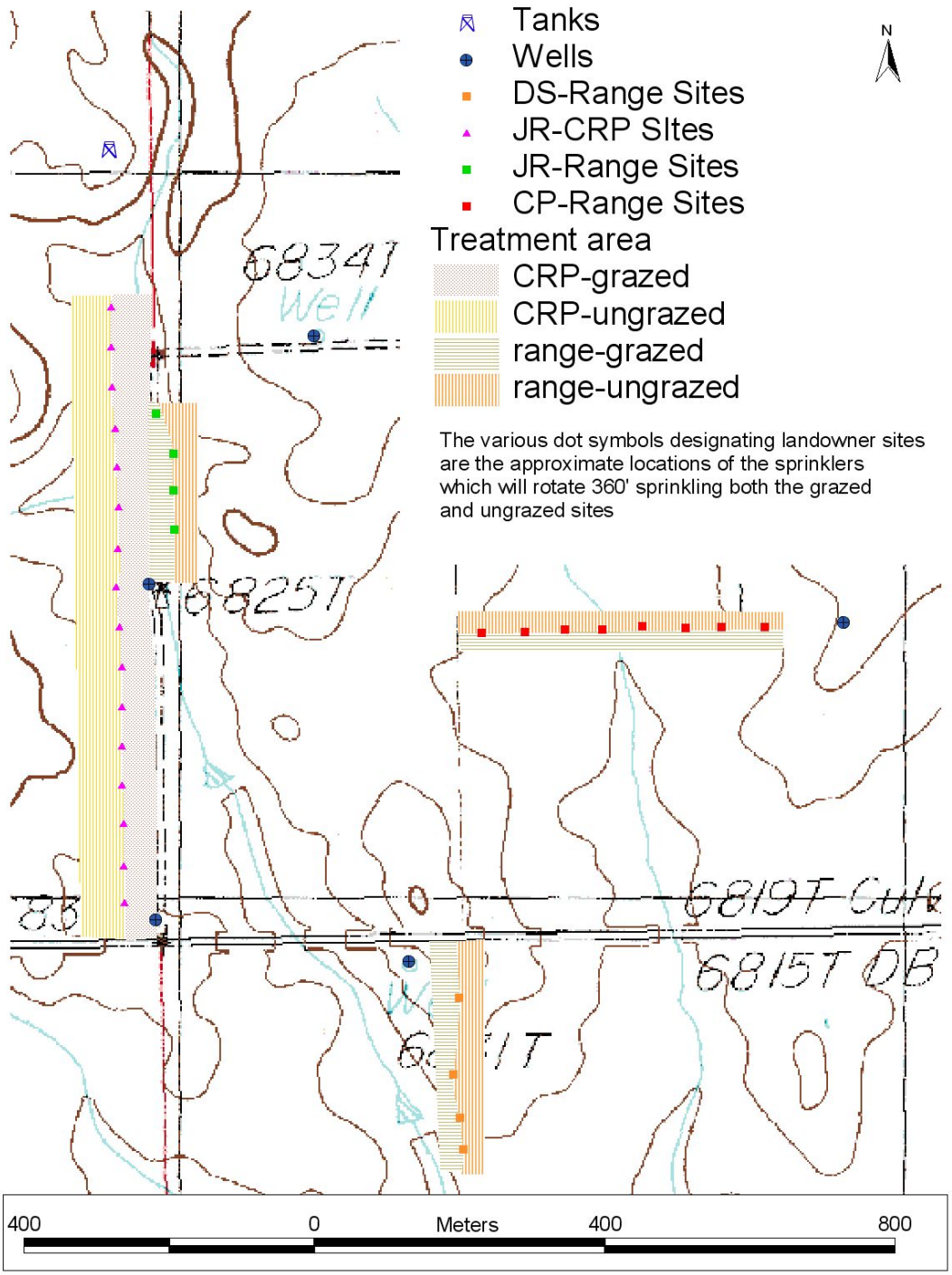
Appendix A

Lek Count Trend

The UDWR annually counts the number of strutting Gunnison Sage-grouse males on leks in San Juan County as a way to index population size and track trends in the population. Each year, three counts are made and the highest counts for each lek are summed for a total. Lek counts have been conducted in San Juan County since 1968. In this report, we present the high male count across all leks from 1968-2006. Also displayed is the 30-year average, for reference.



Appendix B



Map of research plots inside study area.