

2006 Annual Report

Factors Affecting 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 km² 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 km², (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 will evaluate 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.

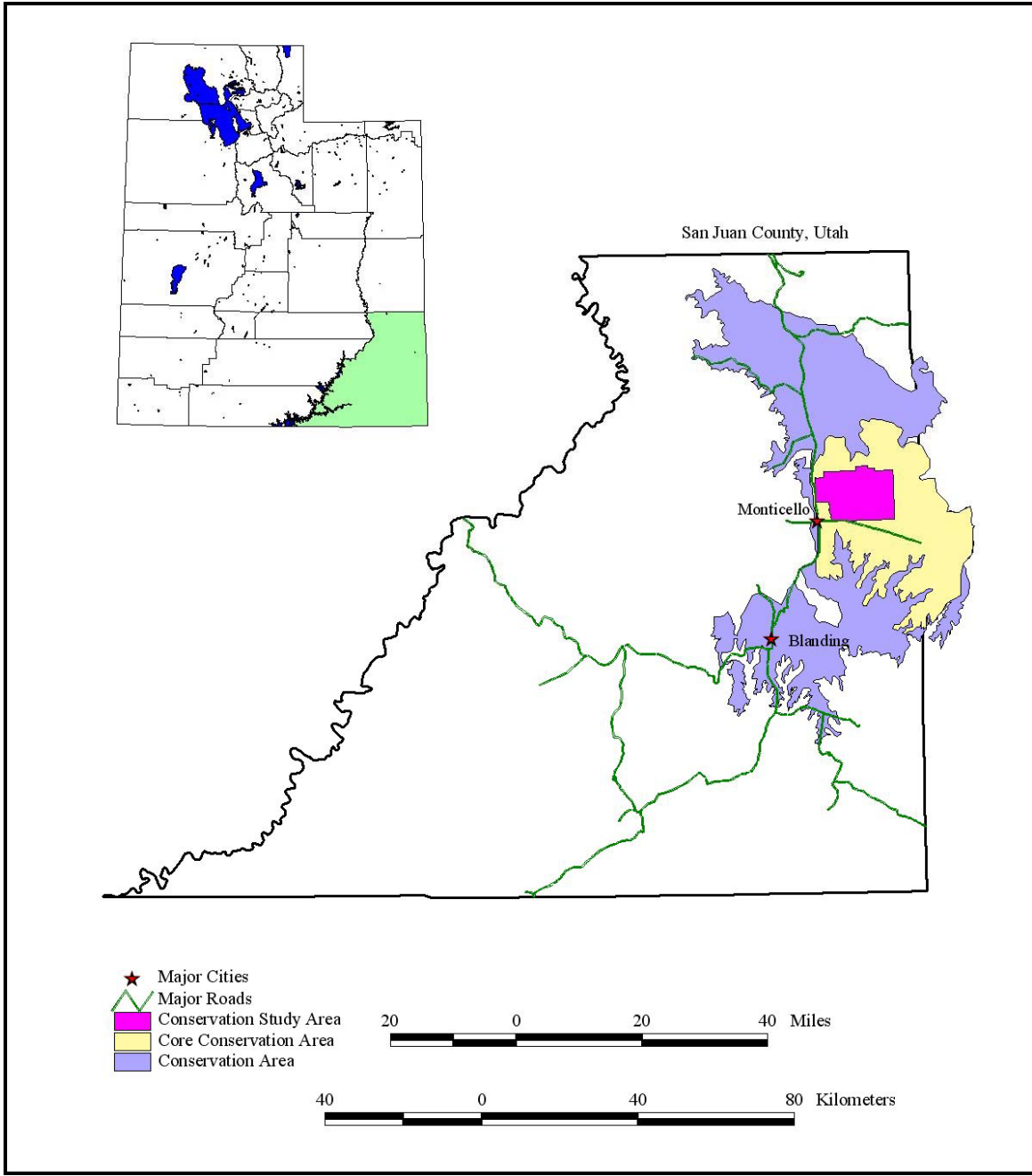


Figure 1. Gunnison sage-grouse Conservation Area, San Juan County, Utah (Lupis 2005).

Monticello/Dove Creek Local Working Group

The San Juan County and Dove Creek Local Working Groups met jointly 3 times in 2006. The group does not currently have elected chairs. Partners in the group include Utah State University Extension (USUEXT), Colorado State University Extension, Utah Division of Wildlife Resources (UDWR), Colorado Division of Wildlife (CDOW), Bureau of Land Management (BLM), U. S. Forest Service (USFS), Utah Farm Bureau Federation (UFBF), San Juan County Extension, San Juan County, and The Nature Conservancy (TNC). The existing local working groups in Monticello and Dove Creek officially became one organization, and are now considered the Monticello/Dove Creek Local Working Group (LWG). The LWG has been working towards meeting objectives outlined in the Rangewide Plan (RCP) for Gunnison Sage-grouse and have been reporting on their activities, prioritizing strategies and actions, and ranking threats identified in that document. USUEXT, the UDWR, 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 USU, is working on these projects. These projects are discussed in further detail in this report. Appendix A contains a lek count summary for the Utah population.

2006 Research Activities

Experiment 1:

Title : 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.

We identified 12 treatment and 4 control sites within CRP habitat and within rangeland habitat. Treatment and control plot assignments were randomly assigned within blocks, with each block containing one of each of the treatments and a control (Appendix B).

Within each plot permanent vegetation transects were established, resulting in 4-20 meter vegetation transects radiating from the center of the plot, with 2 transects in each of the grazed and ungrazed sides of the plots. We used the line intercept method to measure the percentage of ground surface occupied by each plant, density of cover, individual species, and groups of species. Sagebrush density was measured using the belt transect method. The belt transect was measured as 0.5 meters on both sides of the original 20 meter line intercept transect. 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 will be 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 20m transect line resulting in the clipping of ten frames on each transect. A sample of each species was collected and pressed and photographed.

Experiment 2:

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

Pilot Raptor and Corvid Power Line Surveys (2006)

From mid-January to early April, 2006 we monitored raptor and corvid activity and use of 15 km (9 mi) of utility line containing 98 power poles that border the northern tier of the Gunnison Sage-grouse (GUSG) conservation study area. Observations included species, numbers, date and time, perch locations, feeding forays, and mortalities.

To initiate this work, we spray painted each utility pole we intended to monitor with an identification number that is visible from the roadway. The identification number was correlated to a GPS location. We spent at least 4 hours a day, 4 days a week monitoring the entire line; 2 hours in the morning and 2 hours in the afternoon.

The morning monitoring period was from 0800-1100 and the afternoon period from 1400-1700. During this period we recorded the species observed near the line or perched on the utility lines by pole number. If a bird was perched on the line, it was recorded to the nearest pole. The starting point for each survey was randomly selected by flipping a coin to determine which end of the route will be sampled first (east or west end). Once the starting point was determined, the location and time started was recorded on a data sheet. Five minutes were spent at the starting point, at each mile point, and at the end, observing and recording any birds observed or perched on the lines. While driving to the mile points any birds observed using the area to the side and front of the vehicle or perched on poles or lines were also recorded. To avoid disturbing any perching birds, alternative routes were used to arrive at the starting points. Because of severe winter weather road conditions, we were not able to complete some surveys. A total of 85 surveys were conducted and 68 were completed to the end. The incomplete surveys were discarded from the data set. The easternmost end of the utility line constitutes the most rugged terrain and was the area that became impassable after a winter storm.

Preliminary Results

In 2006, we recorded 11 different species of raptor and corvids in the study area (Table 1). We recorded 172 events of birds perched on utility poles during the survey period. Golden eagles (*Aquila chrysaetos*) and common ravens (*Corvus corax*) were the most common perching birds. Other species recorded included bald eagle (*Haliaeetus leucocephalus*), prairie falcon (*Falco mexicanus*), Ferruginous hawk (*Buteo regalis*), rough-legged hawk (*B. lagopus*), red-tailed hawk (*B. jamaicensis*), merlin (*F. columbarius*), northern harrier (*Circus cyaneus*), American crow (*Corvus brachyrhynchos*), and black-billed magpie (*Pica hudsonia*).

Table 1: Species observed perched on structures near the survey line (i.e., fences, other utility poles, trees), survey poles, on the ground, and flying near the survey route, San Juan County, 2006 (This includes 143 total survey hours).

	American Crow	Merlin	Black-billed Magpie	Red-tailed Hawk	Golden Eagle	Northern Harrier	Rough-legged Hawk	Bald Eagle	Prairie Falcon	Ferruginous Hawk	Common Raven
Perched on Poles	2	1	1	13	100	3	2	1	3	1	45
Perched Nearby	0	0	4	3	16	3	0	4	1	0	26
Ground	10	0	10	2	15	15	0	3	1	0	254
Flying	99	0	28	2	95	63	1	11	2	4	351

During the pilot surveys in 2006, 45 of the utility poles surveyed were fitted with cone-type perch discouragers. All of the utility poles in the survey area were also equipped with anti-electrocution insulation covers on top of the poles. We recorded 93 birds perched on poles without cones and 79 on poles equipped with cones. For all eagles, we recorded 53 perched on poles without cones and 47 on poles with cones.

2007 Plan of Work

Experiment 1:

Title: The role of irrigation in creating mesic environments, enhancing vegetation diversity, and arthropod abundance in CRP and native rangeland in San Juan County, Utah.

We will use 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 will be used to distribute water to each site for irrigation. Treatment sites will be irrigated with a rain bird sprinkler with a 20m spraying radius. Within both CRP and rangeland fields, 4 sites will have 2 inches of water applied weekly, 4 sites will have 2 inches of water applied every 2 weeks, 4 sites will have 2 inches of water applied every 3 weeks, and 4 sites will not receive any water and act as control sites. Treatment and control plots will be randomly assigned within blocks, with each block containing one of each of the treatments and a control.

Irrigation of the sites will begin in early May 2007 and continue through mid-July. This time period coincides with peak nesting and brood-rearing periods. Given that there will be site specific differences, we will conduct tests during the first 2 weeks of May to standardize the capacity of the pumps at each treatment site. During this period we will measure the amount of water distributed on each site by time. These experiments will allow us to establish a standard rate of flow.

Vegetation Measurements:

The same transects lines that were established in 2006 will be used. The same survey methods will also be used with the addition of the measurement of vegetation height. The height of the vegetation will be measured at each meter point of the line transect.

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 will be opened in sequence with the traps remaining open for 3 days before they are collected. The trapping periods will be from May 21-25, June 2-4, and June 12-16.

Sage-grouse Use Surveys:

Pellet Counts

All treatment and control sites will be surveyed for Gunnison Sage-grouse use through pellet count transects. There will be 20 transects 2 m apart in each site. The transects will be walked and the researcher will record the pellet type (cecal or regular pellet), number of pellets or cecal droppings per cluster, and map the location of the pellet using a GIS system. Roost piles will be counted separately and will equal 1 cluster occurrence. Once a pellet has been counted it will be removed from the site.

Bird Dog Surveys

Bird dog surveys will be conducted in mid-July and early-August. Each site will be surveyed twice annually using 1-2 dogs in the morning. The grouse will be classified as chick, hen, male, or unknown. Broods are classified as a hen with any number of chicks. If more than one hen is observed with multiple chicks, the number of broods will equal the number of hens.

Experiment 2:

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

Main Power Pole Perch Discourager Study (2007-2008)

In January 2007 the utility line monitored will be modified using 5 different types of perch discouragers: 3 physical discouragers (cones, spikes, and triangles), and 2 different arrangement of a hazing deterrent (FireFlies). The FireFly arrangement will consist of displaying single or paired fireflies suspended above selected utility poles.

Because of the difficulty encountered in surveying the easternmost section of this line, we will drop approximately 1.5 miles of the survey route. This area also had the fewest perching events. The remaining section of utility line being surveyed is approximately 7.5 miles long, runs east and west, and consists of 84 poles.

In the 2006 pilot study, all of the perching events recorded were associated with the actual utility pole. Thus for this evaluation, each pole will be considered a separate experimental unit. We have divided the line into 14 blocks consisting of 6 poles each. Within a block, each pole has been randomly assigned to a treatment or control. This results in 14 replications of each treatment and control. Poles assigned as control will not be fitted with a discourager.

The surveys will begin in January and finish the end of May. The power line will be surveyed twice a day, 5 days a week. The morning monitoring period will be from 0800-1100 and the afternoon period from 1400-1700. We will walk the entire power line once a week to search for evidence of raptor predation events. Any remains, castings, and pellets will be recorded and collected. Any sage-grouse activity (tracks, pellets, sightings) will be noted.

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

We are proposing to monitor the line for at least 2 years (Jan through May 2007 and 2008) to account for annual variation in raptor or corvid densities. 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. If at the end of this period, we report significant and consistent differences in perching events by treatments, we may recommend that the initial perch discouragers and deterrents arrangement be re-randomized and the monitoring be continued an additional year to further validate these observations.

Presentations

Abstract for a presentation given at the Utah Chapter of the Wildlife Society meeting held in March, 2006.

Gunnison Sage-grouse (*Centrocercus minimus*) Use of Artificial Wet Meadow Areas in San Juan County, Utah.

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Research has shown that wet meadow areas are an important habitat requirement for sage-grouse broods, especially in the first few weeks of life. Wet areas typically provide higher abundance and diversity of forbs and arthropods important for the diet of young grouse chicks. The San Juan County Gunnison Sage-grouse Working Group (SWOG) has suggested that the lack of wet meadow areas could be a limiting factor in brood habitat needs and a potential reason for low sage-grouse numbers and low recruitment of the birds. Artificial wet meadow habitats will be created through a series of small check dams utilizing existing drainages in Conservation Reserve Program (CRP) fields within the study area. This study will compare vegetative and arthropod characteristics of control and treatment sites over a period of 4 years. Pre-treatment data will be collected at treatment and control sites in the early spring, summer, and late summer. To minimize impacting the already low population of grouse in the area, individual grouse will not be radio-collared and monitored but any grouse use (determined by pellet counts and or grouse observations) of these sites will also be noted.

Publication

Lupis, S. G., T. A. Messmer, and T. A. Black. 2006. Gunnison Sage-grouse Use of Conservation Reserve Program Fields in Utah and Response to Emergency Grazing: A Preliminary Evaluation. *The Wildlife Society Bulletin* 34:957-962.

Little information is available on the use of areas enrolled in the Conservation Reserve Program (CRP) by Gunnison sage-grouse (*Centrocercus minimus*) or the impacts of grazing on their habitat selection and movement patterns. Using radiotelemetry, we monitored 13 Gunnison sage-grouse in San Juan County, Utah, USA during 2001–2002 to determine their use of CRP. Additionally, in 2002 some of the CRP land used by the birds in 2001 was grazed under a drought emergency declaration. This afforded us an opportunity to monitor their response to livestock grazing. Although Gunnison sage-grouse used CRP for nesting, brood-rearing, and summer habitat, it was not selected in greater proportion than its availability ($P=0.10$) on the landscape. Bird-use sites in the CRP did not entirely meet habitat guidelines recommended by the Gunnison sage-grouse Rangewide Steering Committee (2005). Most of the sage-grouse we monitored avoided CRP fields when livestock were present. The one exception to this was a hen with a brood. We believe long-term maintenance of CRP in San Juan County will result in achieving habitat conditions that are more desirable for Gunnison sage-grouse. Future livestock management practices in areas used by Gunnison sage-grouse should incorporate short-term, high-intensity deferred-grazing rotations.

Literature Cited

Lupis, S.G. 2005. Summer ecology of Gunnison Sage-grouse (*Centrocercus minimus*) in San Juan County, Utah. Thesis, Utah State University, Logan, USA.

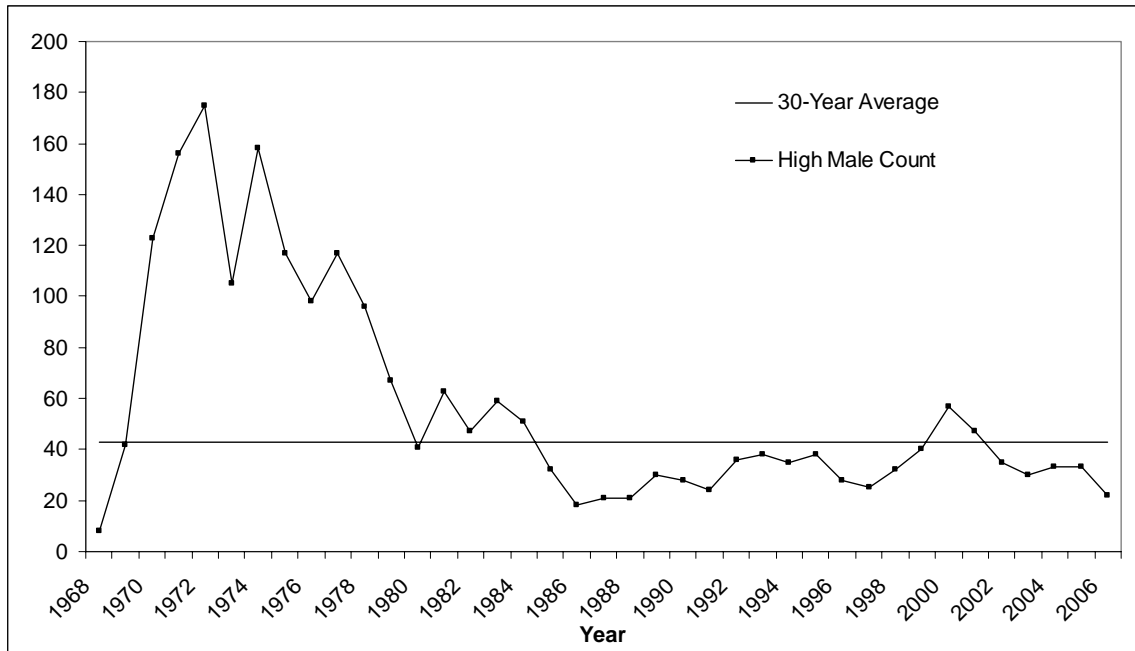
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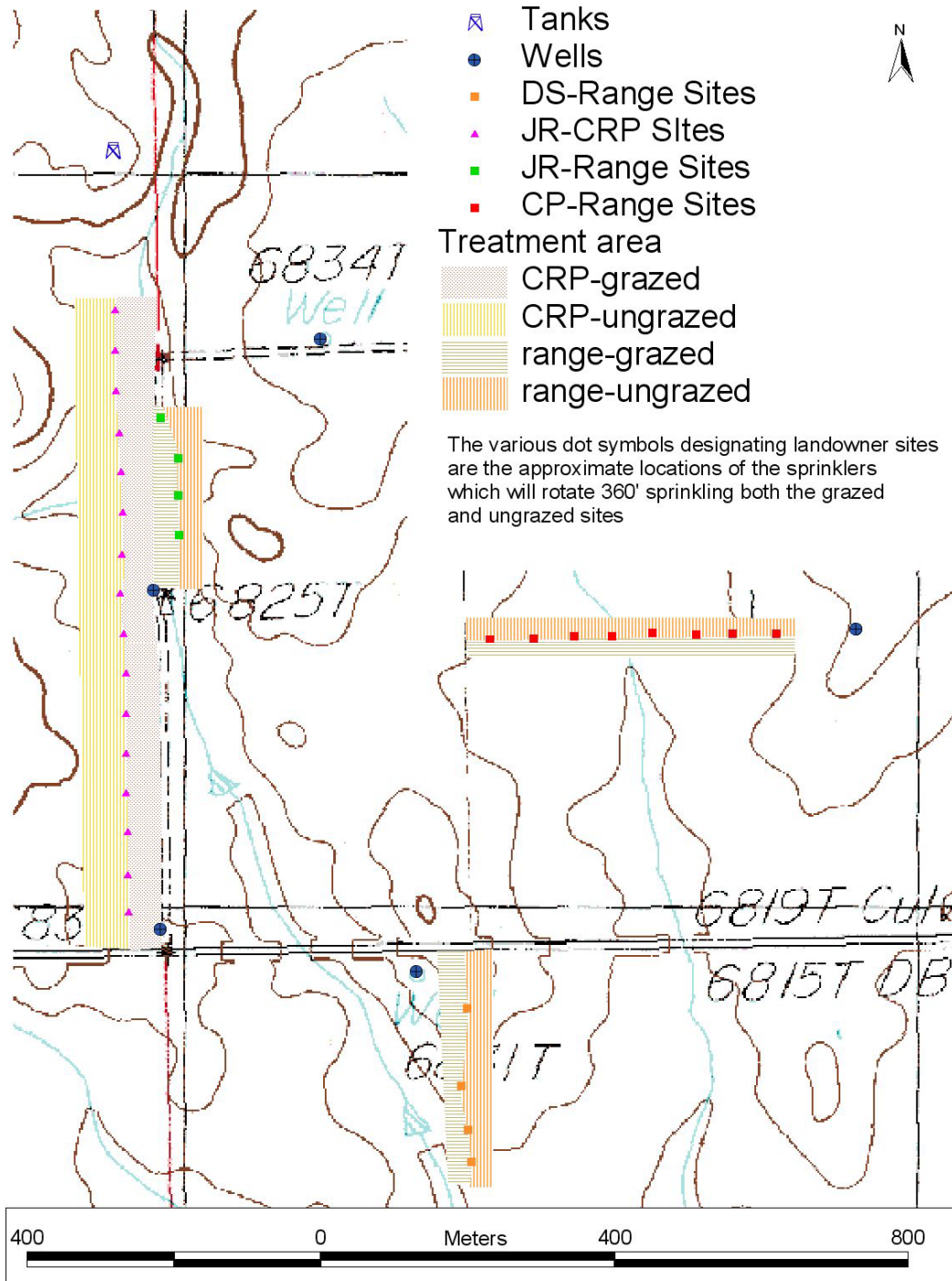
Appendix A

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.