

2012 Annual Report

Factors Influencing the Ecology of Greater Sage-Grouse Inhabiting the Bear Lake Plateau and Valley, Idaho-Utah



Cooperators

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Utah Division of Wildlife Resources

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Introduction

Greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse), the largest grouse species in North America, was designated as a candidate species in March 2010 by the U.S. Fish and Wildlife Service (USFWS) for protection under the Endangered Species Act (ESA) of 1973 (USFWS 2010). In the 12-month finding, the USFWS determined that sage-grouse range wide warranted protection under the ESA but their listing was precluded because of higher conservation priorities.

Sage-grouse occupy sagebrush-steppe (*Artemisia* spp.) ecosystems throughout their current range (Patterson 1952, Connelly and Braun 1997). Sagebrush is important as both a source of food and cover (Patterson 1952, Connelly et al. 2000). To complete their annual life cycle they require a large expanses of sagebrush habitat (Dalke et al. 1963, Connelly et al. 1988, Leonard et al. 2000, Connelly et al. 2000). Schroeder et al. (2004) estimated that sage-grouse currently occupy about 668,412 km², < 60% of the presettlement range, which includes 11 states and 2 Canadian Provinces. Declines in sage-grouse populations have mainly been attributed to habitat loss and degradation of the sagebrush-steppe ecosystem (Braun 1998, Connelly et al. 2004, Knick and Connelly 2011).

Sage-grouse populations inhabiting the Bear Lake Plateau and Valley of Idaho and Utah are included in the Wyoming Basin sage-grouse population (Connelly et al. 2004). The southwestern subpopulation includes southwestern Wyoming, northwestern Colorado, northeastern Utah, and southeastern Idaho (Miller and Eddleman 2001, Connelly et al. 2004). The Bear Lake Plateau and Valley population occurs at the edge of the Wyoming Basin in the southeastern subpopulation. Populations of sage-grouse at the edge of the range-wide distribution, such as the Bear Lake Plateau and Valley population, often depend on dispersal from connecting leks to sustain the genetic variation of these populations (Knick and Hanser 2011).

Because sage-grouse are capable of migrating considerable distances (Patterson 1952, Connelly et al. 1988), the sage-grouse inhabiting the Bear Lake Plateau and Valley are believed to use habitats in three states. Pilot research conducted in 2010 confirmed that the population uses seasonal habitats in three states, however the magnitude and importance of the interchange is uncertain (C.J. Cardinal, Utah State University, unpublished data). Obtaining this information could be paramount to the conservation of the Bear Lake Plateau and Valley sage-grouse population if the seasonal movements include multiple states where they are subjected to the jurisdiction of different state laws and management plans.

Purpose and Study Objectives

Little is known about the ecology, seasonal movements, and habitat-use patterns of the sage-grouse populations that inhabit the Bear Lake Plateau and Valley relative to existing or potential land uses for application to management. Migration information is important to delineate population dynamics (e.g., a meta-population, source-sink, and other spatial complications), identify essential habitats, and determine the potential effects of land-use on species conservation.

The purpose of this research is to describe the ecology, seasonal movements, and habitat-use patterns of sage-grouse that inhabit the Bear Lake Plateau and Valley relative to existing land-uses. Because the Bear Lake Plateau and Valley is subject to both natural and anthropogenic barriers and

fragmentation, defining population vital rates, seasonal movement, and habitat-use relative to land use and jurisdictional boundaries of this population will be important as the basis for management cooperation between Idaho, Utah, and Wyoming. Sage-grouse land use research will also define the core use areas of important seasonal and temporal habitats in the Bear Lake Plateau and Valley. This could be important for targeted conservation efforts in the future.

Study Area

The Bear Lake Plateau and Valley Study Area (BLPV) consists of over 400,000 acres in Bear Lake County, Idaho, Rich County, Utah, and Lincoln County, Wyoming. The elevation of the study area ranges from 5900-8200 feet. The BLPV is comprised of many different land ownership and management entities. This area is mostly of private land, with some patches of public Forest Service, U.S. Fish and Wildlife, Bureau of Land Management, and state-owned land. Vegetation is dominated by sagebrush (*Artemisia* spp.) grassland plant communities.

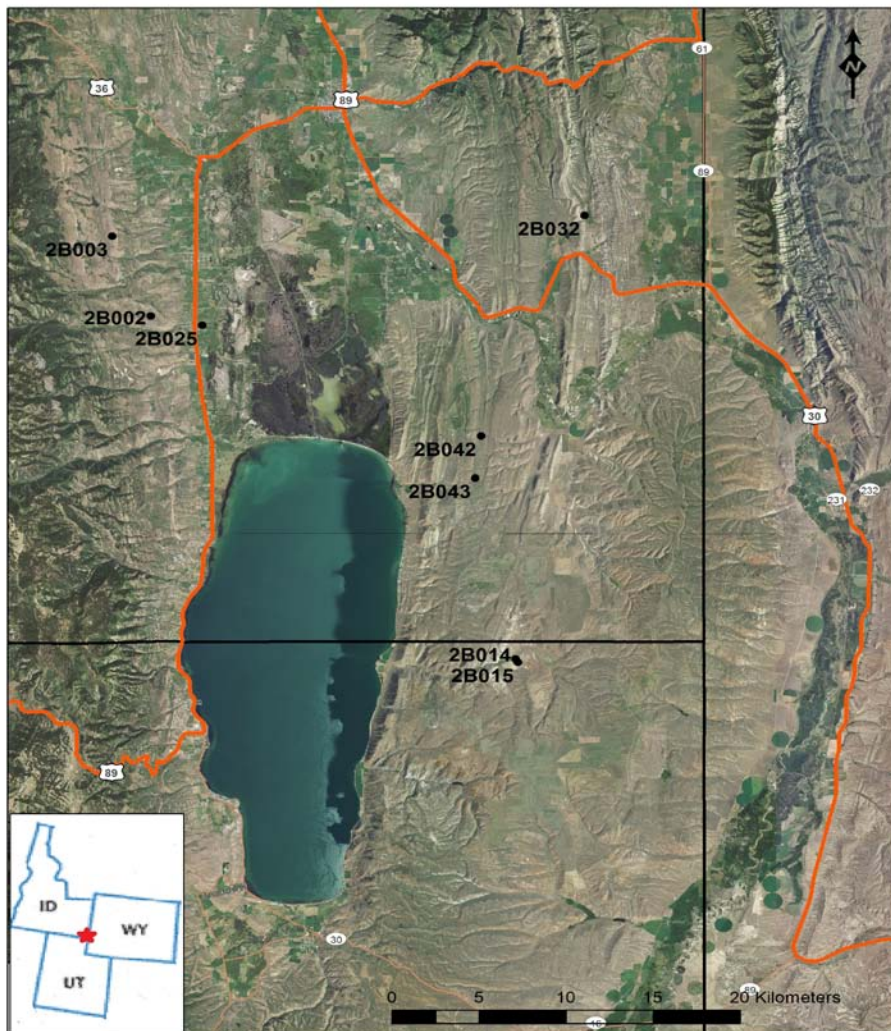


Figure 1. Bear Lake Plateau and Valley Study Area

Methods

Sage-grouse were trapped on and near leks during the spring of 2012. Spotlights were used to locate roosting grouse, and they were captured using a dip net, and fitted with radio-collars (Connelly et al. 2003). Radio collared sage-grouse were located using telemetry at least once a week between May and August, and once a month between September and April from 2010 to 2012. Radio-collared females were located on nests by approaching and observing them under the same bush for several days. Nest success was measured by monitoring nest incubation time, and locating nest remains after success or failure. Brood success was determined by walking up to females and counting the number of chicks, or by using night spotlighting.

Nest and brood vegetation was measured in 2011 and 2012. A Robel pole was used to measure visual cover at nests, and four 15 meter line intercept transects at 90 degree angles from the nest were used to measure vegetation cover. Along these transects herbaceous cover was measured using Daubenmire frames. The aspect and the slope were also recorded. Brood sites were measured using the line-intercept method at four 10 meter transects at 90 degree to measure shrub cover, and Daubenmire Frames were used to measure ground cover (grass, forb, bare ground, litter, rock) at four locations along these transects. Random vegetation points were measured to compare selected habitats to habitat points in the study area (Connelly et al. 2003).

Habitat fragmentation will be measured using GIS and remote sensing technology. Sage-grouse habitat use, production, and seasonal movements will be plotted relative to anthropogenic landscape features (Connelly et al. 2011). These metrics will be used to develop indices of habitat fragmentation to determine if the fragmentation observed constitutes functional habitat loss (USFWS 2010). Sage-grouse movements will also be plotted relative to natural landscape barriers to determine how habitat-use is affected in this area.

Results

Captures

The 2012 snow melt came much earlier this year than the previous year. We were able to get into the study site at the beginning of March to start trapping. The capture distribution from the 2012 trapping season can be found in Table 1. We captured 37 new birds- 13 females and 24 males. In addition, we captured 4 males with dead collars and recollared these as well. With the collars deployed, the season started with 47 cocks and 30 hens alive (Table 1).

Lek Count

This spring we assisted Idaho Dept. of Fish and Game in their lek routes. We also investigated some leks that have not been observed in recent years. High lek counts can be found in Table 2. We also surveyed historic leks to determine their status. A map showing the relative location of leks surveyed and their status can be found in Figure 2.

Table 1. Distribution of sage-grouse captured Spring 2012 in the Bear Lake Plateau and Valley.

	Adult	Yearling
Bloomington (2B025) / Paris (2B003)		
Female	1	0
Male	5	4
Eden (2B014 and 2B015)		
Male	5	1
Indian Creek (2B042 and 2B043)		
Female	6	1
Male	3	2
Sheep Creek (2B032)		
Female	4	1
Male	7	1
TOTAL		
Female- 13	11	2
Male- 28	20	8

Nesting

At the beginning of the season, we started with 30 hens on air. As of July 1st, 23 hens on were alive. We found 17 nests during the 2012 spring and summer. Of the 17 completed nests, 7 were successful hatches and 12 were failures. Of the 7 dead hens, 4 were killed on nest, and 3 were killed post- nest failure. Of the nest failures it appeared that 5 depredations resulted from avian predators, and 7 depredations resulted from mammalian predators.

Broods

Of the 7 successful nesting hens, 5 were observed to have chicks up to 50 days old. These broods ranged from 2-4 chicks. Twenty-eight unbanded hens were also observed to have broods around the study area.

Table 2. Lek counts for the Bear Lake Valley and Plateau.

Lek	Date	Males	Females
2B002	04/07/2012	10	2
2B003	04/21/2012	23	0
2B012	03/29/2012	6	9
2B014	04/28/2012	43	7
2B015	04/28/2012	38	5
2B023	04/04/2012	0	0
2B024	04/04/2012	0	0
2B025	03/05/2012	39	2
2B032	03/29/2012	34	41
2B033	04/04/2012	0	0
2B038	04/25/2012	0	0
2B039	04/25/2012	0	0
2B040	04/25/2012	0	0
2B042	04/04/2012	16	6
2B043	03/29/2012	33	45



Figure 2. Lek status in the Bear Lake Valley and Plateau, 2012.

Mortalities

During 2012, there have been 12 mortalities- 6 from mammalian predators (5 hens, 1 cock), and 6 from avian predators (2 hens, 4 cocks). The majority of the male mortalities happened during April and May when the cocks were in their breeding plumage. The hen mortalities occurred during May and June, and of the 7 hens killed, 4 mortalities occurred on nests. In addition to the mortalities, 3 collars were slipped by males during the spring.

Movements

As during previous years, sage-grouse were found to move between states to different leks. This is mostly observed in males and females on the east side of the lake moving between Idaho and Utah. During 2012, sage-grouse were found to cross natural and anthropogenic barriers including Bear Lake, Bear River, highways, and residential areas. This spring, we observed our first sage-grouse to permanently relocate from the west side of the lake to the east side (Figure 3).

2012- 2013 Plan of Work

For the remainder of the fall, random transects will be surveyed to determine sage-grouse presence or absence in areas. These data will be used to create a habitat fragmentation index to determine if the fragmentation observed constitutes functional habitat loss. Remote sensing images of the area obtained over the last 30 period will be analyzed to determine land use changes and classify habitat and non-habitat in the Bear Lake Plateau and Valley Study Area. These areas will be compared to location and presence/absence data. Data input and analysis will be completed this fall and the graduate student thesis presenting these results will be completed in the spring. We will also fly the area in the spring with fixed-wing aircraft to survey for possible new leks.

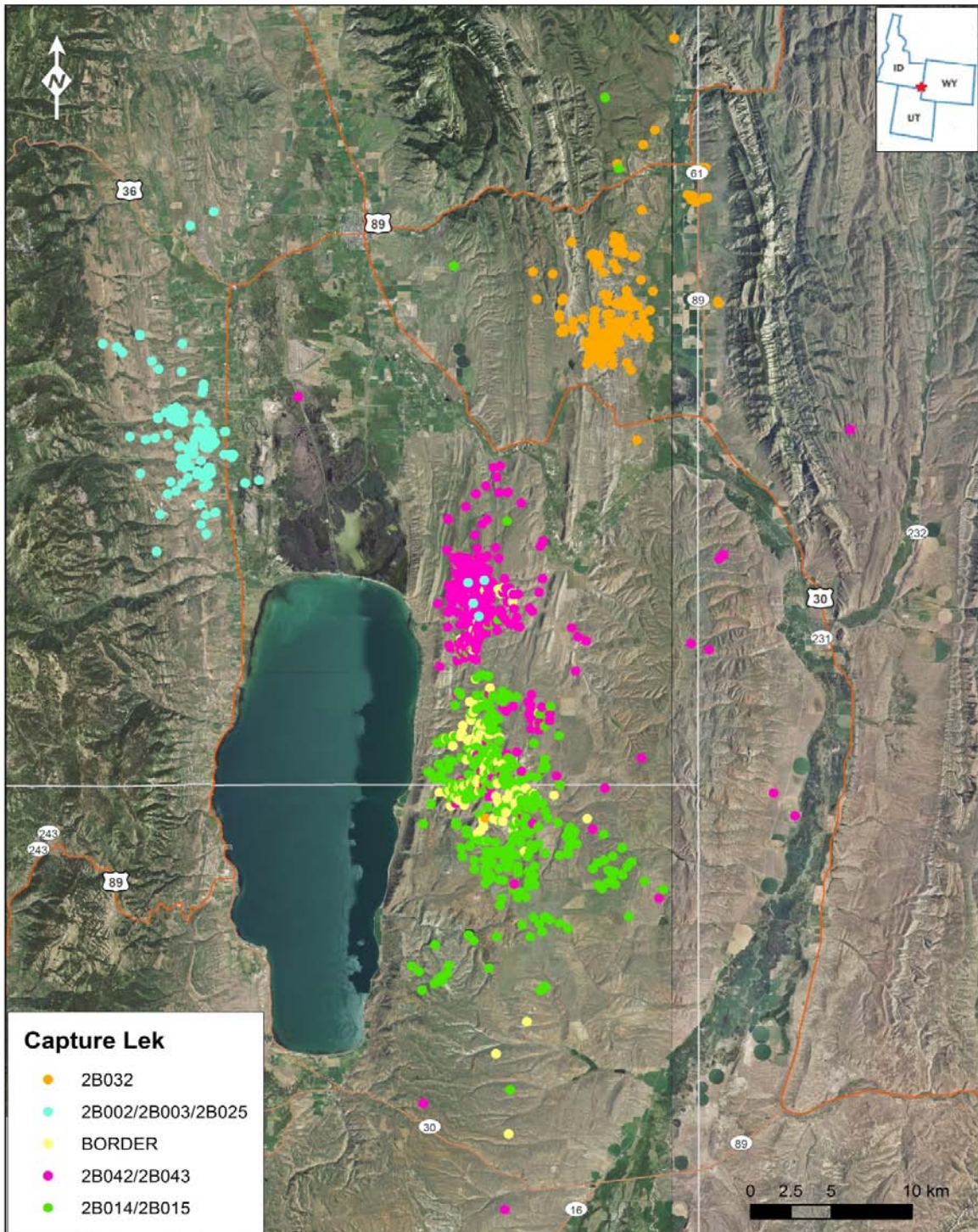


Figure 3. Sage grouse locations collected from March 2010 to June 2012 on the Bear Lake Plateau and Valley study area.

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