Sage-grouse Movements, Productivity, and Habitat Use in the Spread Creek Area, 2016 Report

Principle Investigator: Bryan Bedrosian, Senior Avian Ecologist, Teton Raptor Center, bryan@tetonraptorcenter.org; 307.690.2450

Project Personnel: Katherine Gura, Nick Ciaravella

INTRODUCTION

Greater Sage-grouse (*Centrocercus urophasianus*) are a species of concern for Wyoming and the National Park Service due to negative long-term population trends. Furthermore, sage-grouse within Grand Teton National Park are genetically isolated, which increases the risks to the local population (Schulwitz et al. 2012, Schulwitz 2016). Sage-grouse are negatively affected by noise and disturbance (e.g., Blickey et al. 2012) and the Spread Creek area within Grand Teton National Parks is adjacent to an active gravel extraction facility that annually operates at differing levels of use. Sage-grouse utilize the sagebrush flats within the Spread Creek area for lekking and nesting, thus there is potential for disturbance from the gravel pit operations to sage-grouse movements and demography in this area.

In 2016, we initiated a study to investigate the potential effects of gravel extraction operations at the Spread Creek gravel pit (operated within the Bridger-Teton National Forest) directly adjacent to the sagebrush habitat within the Spread Creek area (Figure 1) in cooperation with Grand Teton National Park and Bridger-Teton National Forest. The pit is expected to have low levels of activity in 2016 and 2017 and increased operations in 2018 and 2019. The study is designed to investigate the movements, habitat use, and nesting demography of sage-grouse across these years to investigate any potential differences between years of low and high levels of pit operations.

RESULTS

Captures

In 2016, we captured ten Greater Sage-grouse from April 12 – May 15, 2016 using spotlighting techniques (Figure 2, Table 1). We outfitted two adult males and three female

grouse with 22g Argos GPS transmitters (Microwave Telemetry; including one re-deployment after a mortality of one of the males). We outfitted four females with 18g GSM GPS transmitters (Ecotone Telemetry) and captured and released one male without a transmitter. Microwave Telemetry Argos transmitters were pre-set to gather hourly locations during daylight hours and Ecotone GSM transmitters were pre-set to gather hourly locations and had an integrated VHF transmitter.

Nests

We located six nests from the seven hens with transmitters, half of which were successful (Table 2, Figure 3). The mean incubation initiation date was May 7th (range = 5/3 – 5/11). Four females incubated the full term of incubation (ca. 28 days), but only three hens were successful in fledging a total of 15 young (range = 3-7). The last hen captured on May 15th did not nest during monitoring. It is likely this female already nested and we captured her after the nest had failed.

Mortalities

We outfitted two adult males with transmitters on the first day of trapping, then targeted only females for transmitters after further consultation with GTNP. One male was found dead three days after capture, likely due to a suspected predation by a Golden Eagle. Also, one hen was found predated by a suspected mammal while incubating, 13 days post-capture. All other grouse are assumed to be alive but the status of some is unknown due to transmitter issues (Table 1).

Transmitters

In 2016, we deployed four Argos transmitters and four GSM transmitters, in part, to test the latter, which have reduced costs. The GSM transmitters were a lighter (18g), lower profile unit that have all had issues charging. There also may be issues with uploading the GSM data via cell networks, but that remains unknown at this time. Other transmitter issues were the backup VHF transmitters in the GSM units. The VHF components were only set to be "on" after sending a signal via the GSM network (and reset to "off" at the first of every month), but most are not communicating and therefore cannot be turned on. One Argos transmitter has also had problems charging, but that unit was the one deployed on the male. Males are roughly twice the size of females and feathers covering the solar panel may be affecting performance of the units in the reduced fall and winter sunlight (Table 3). It is strongly recommended to only use Argos transmitters for this project in the future and to increase the height of the transmitters if used on males. To date, we have gathered 12,769 GPS locations from the eight individuals we have been tracking (excluding the male mortality; Figure 4).

Movements

Sage-grouse breeding in the Spread Creek area have widely dispersed over the year, mostly to other areas of occupied sage-grouse habitat in GTNP north of Ditch Creek including Antelope Flats, Baseline Flats, Moosehead Ranch, and Potholes (Figure 4). Most grouse moved west from the Spread Creek area in the late summer/early fall and two of the remaining three birds online have returned as of November 2016 (Table 4). The adult male left Spread Creek on April 18th and spent the rest of the lekking season at the Moulton lek and was still in that area when his transmitter last checked in, alive, on September 16th. While trapping in mid-April, we regularly saw up to ca. 15 breeding-aged males near the location we observed them strutting. The number of males we observed regularly decreased with time and very few males were observed while trapping in May.

Lek Status

From our initial year, the status of the Spread Creek lek still remains unknown, but there is no doubt that the area is nesting habitat. Our preliminary assessment is that males establish a lek in snow-free areas early in April and breed with hens that initiate incubation early in May. They may then disperse to other leks in the valley. During our trapping efforts, we observed much more grouse sign than anticipated and most sign appeared to be from winter. On peak nights, we observed upwards of 30 individuals roosting in the areas we targeted for trapping (Figure 2).

A notable observation was from a hen that had begun laying eggs and spent several mornings on Uhl Hill in early May prior to incubation (sage-grouse do not incubate until the entire clutch of eggs is laid). It is possible that this female was looking to breed again for fertilization of later laid eggs and the grouse from the Spread Creek lek had already begun to disperse. Additional effort may be warranted in investigating Uhl Hill for sage-grouse breeding activity.

FUTURE DIRECTION

We will continue to monitor the currently marked sage-grouse for the duration of the study. We anticipate the male's transmitter will begin charging again once daylight increases in the spring. However, there are no stored data on the unit during periods of low voltage, so we will be unable to gather data from this individual until the unit charges again. It is possible, though not likely, that the GSM units have been out of cell coverage and been unable to upload data. In the event that this is the case, the data are being stored on the unit until the transmitter can be recovered or enters cell coverage and downloads

the stored data. It is more likely that the units have continual low voltage and are not gathering data.

The Upper Snake River Basin Sage-grouse Working Group has provided funding for an additional six Argos GPS transmitters and trapping time for this study. In the originally proposed budget for this project, we estimated that we would need to replace one transmitter due to predation/failure. We also have one recovered GSM unit that we have sent in for refurbishment, so we have funding to outfit an additional eight sage-grouse with transmitters in 2017. We will target captures slightly earlier in 2017 and plan to outfit six hens and two males with transmitters. Increasing our sample size of females will greatly enhance our inferences for our objectives and outfitting more males will help understand the overall dynamics of the Spread Creek lek.

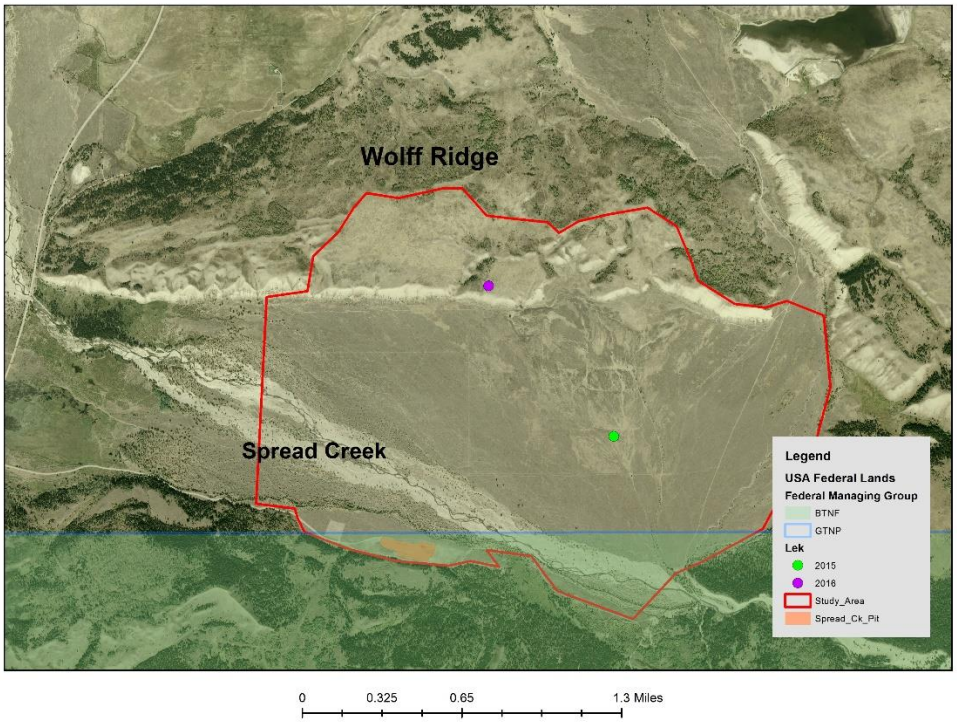

Figure 1. General study area boundary, lek sites, and Spread Creek gravel pit.

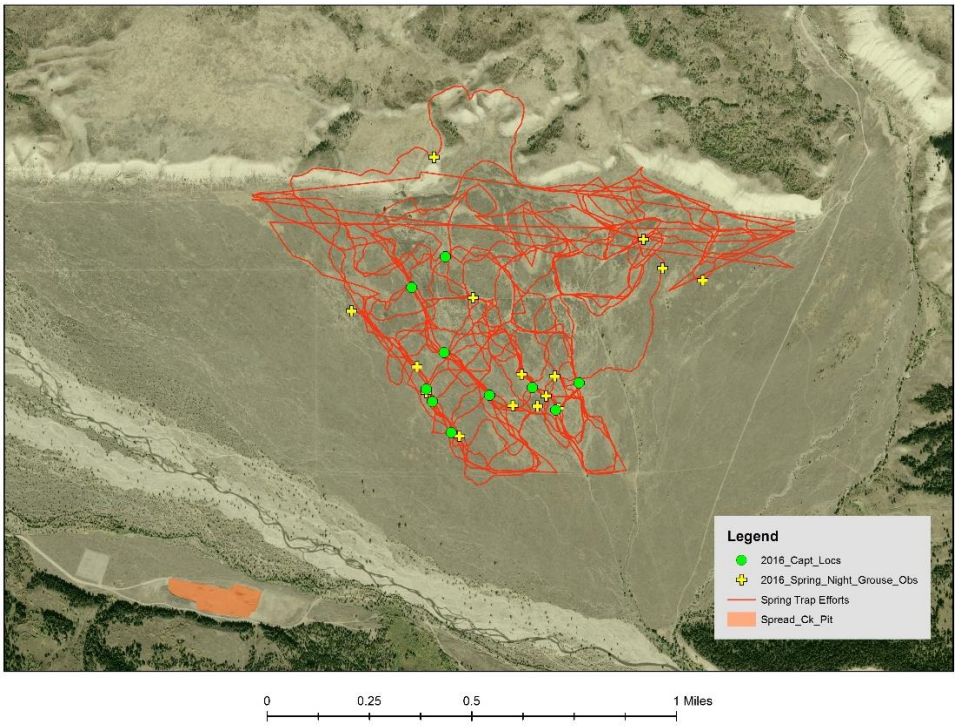

Figure 2. Sage-grouse capture locations, roost sites of non-captured grouse, and tracks of capture efforts in 2016.

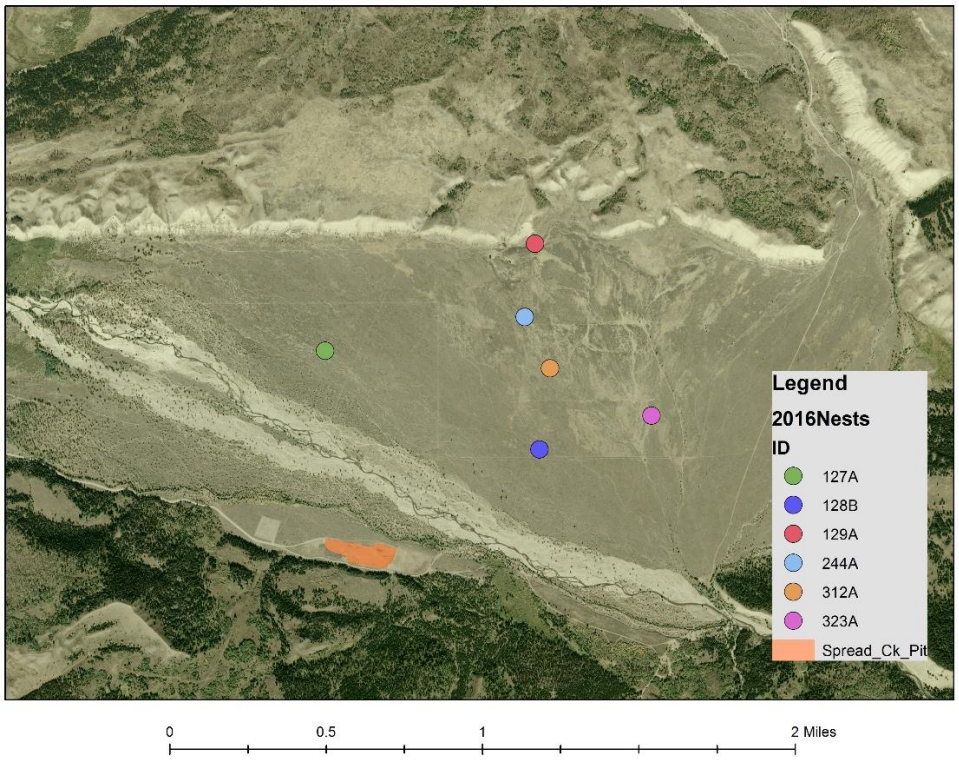

Figure 3. Nest locations of marked sage-grouse in 2016.

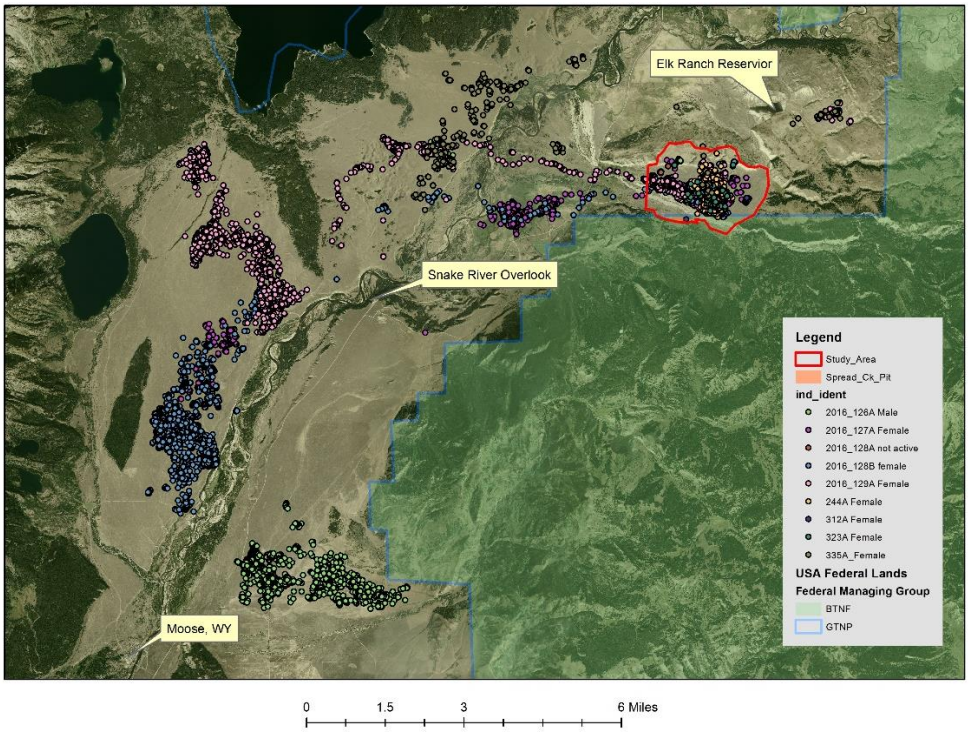

Figure 4. All locations from marked sage-grouse in 2016.

Table 1. Capture information of sage-grouse marked in Spread Creek in 2016.

ID	Gender	Age at Capture	Date Tagged	UTM_X	UTM_Y
126A	Male	Adult	4/12/2016	540551	4847754
127A	Female	Adult	4/12/2016	540522	4848068
128A	Male	Adult	4/12/2016	540527	4848442
128B	Female	Adult	4/20/2016	541053	4847948
129A	Female	Adult	4/20/2016	540477	4847874
244A	Female	Yearling	5/6/2016	540395	4848323
312A	Female	Yearling	5/3/2016	540701	4847900
323A	Female	Adult	5/6/2016	540962	4847842
335A	Female	Yearling	5/15/2016	540870	4847929

Table 2. Nest information for sage-grouse hens marked in Spread Creek in 2016.

ID	2016 Nest	Nest E	Nest N	Success?	Number Hatched	Incubation Initiation	Date Left	Days on Nest
127A	Yes	539439	4848145	No	0	5/3/2016	5/31/2016	28
128B	Yes	540543	4847638	Yes	3	5/11/2016	6/6/2016	26
129A	Yes	540520	4848696	Yes	7	5/4/2016	5/31/2016	27
244A	Yes	540466	4848320	Yes	5	5/6/2016	6/3/2016	28
312A	Yes	540597	4848056	No	0	5/11/2016	5/26/2016	15
323A	Yes	541120	4847812	No	0	5/10/2016	5/13/2016	3

Table 3. Transmitter information and status as of Dec 1, 2016.

ID	Transmitter Type	Last Location	Status as of 12/1/16	Issues
126A	MWT Argos	9/16/2016	Not Functioning	Low Voltage
127A	MWT Argos	11/27/2016	Functioning	
128A	MWT Argos	4/16/2016	Recovered and Redeployed	Mortality
128B	MWT Argos	11/27/2016	Functioning	
129A	MWT Argos	11/27/2016	Functioning	
244A	Ecotone GSM	9/6/2016	Not Functioning	Low Voltage
312A	Ecotone GSM	5/26/2016	Recovered and Refurbished	Mortality
323A	Ecotone GSM	9/6/2016	Not Functioning	Low Voltage
335A	Ecotone GSM	10/16/2016	Not Functioning	Low Voltage

Table 4. Movements in and out of the Spread Creek area by marked sage-grouse in 2016 (as of Dec 1, 2016).

ID	Gender	Date Left	Date Returned	Area Occupied	Notes
126A	Male	4/8/2016	N/A	Antelope Flats	
127A	Female	7/16/2016	9/20/2016	Moosehead	Returned to Spread Ck 9/20-11/1
		11/1/2016	11/25/2016	Baseline Flats	
128A	Male	N/A			Mortality on 4/16/16
128B	Female	7/5/2016	N/A	Baseline Flats	
129A	Female	6/20/2016	10/22/2016	Potholes/N Baseline	
244A	Female	N/A			last loc on 9/6 in Spread Ck
312A	Female	N/A			Mortality on 5/26/16
323A	Female	N/A			last loc on 9/6 in Spread Ck
335A	Female	5/17/2016	N/A	Potholes	last loc on 10/16 in potholes

Literature Cited

Blickley, J.L., D. Blackwood, and G.L. Patricelli. 2012. Experimental evidence for the effects of chronic anthropogenic noise on abundance of Greater Sage-grouse at leks. Conservation Biology. 26:461-471.

Schulwitz S, B. Bedrosian, and J.A. Johnson. 2014. Low neutral genetic diversity in isolated greater sage-grouse (Centrocercus urophasianus) populations in northwest Wyoming. Condor. 116:560–73.

Schulwitz. S. 2016. Informing conservation management using genetic approaches: Greater Sage-grouse and Galapagos Short-eared Owls as case studies. PhD Dissertation. University of North Texas.

Appendices

Sample photos of captured grouse, banding, and transmitters

Example of mortality site

Equipment List:

Item	Quantity	Status
GPS/PTT Transmitters	4	deployed on grouse
GPS/GSM Transmitters	4	Expected delivery on 4/30 - delayed by manufacturer – Deployed on Grouse. One recovered and sent in for refurbishment.
Teflon Harnesses/crimps	9	Deployed on grouse
Spotlights/batteries	2	in-hand
Hand Nets	2	in-hand
Handheld net launcher	1	in-hand
Caller	1	in-hand
150mHz VHF receiver/antenna	1	in-hand
GPS Units	4	in-hand
Bear Spray	4	in-hand