BI-STATE SAGE-GROUSE CONSERVATION ACTION PLAN

2017 PROGRESS REPORT

Bi-State Local Working Group
BLM – Bishop Field Office
BLM – Carson City District
California Department of Fish and Wildlife
Natural Resources Conservation Service
Nevada Department of Wildlife
U.S. Fish and Wildlife Service
U.S. Forest Service – Humboldt-Toiyabe National Forest
U.S. Forest Service – Inyo National Forest
United States Geological Survey

Table of Contents

List of Tables

List of Figures

Executive Summary

This Bi-State Action Plan Progress Report for 2017 will summarize project accomplishments, sage-grouse monitoring (lek surveys), ongoing research and monitoring activities including habitat use, demographic rates and translocation success (Parker Meadow), vegetation monitoring and livestock grazing assessments. These activities often build upon work completed during previous years and some represent portions of larger implementation efforts.

During 2017, agencies and project partners addressed various threats associated with conifer encroachment, wildfire, infrastructure, wild horses, livestock management and invasive weeds. Crews completed 10,781 acres of pinyon and juniper removal within the scope of twelve projects in the Bodie Hills, Desert Creek, Mount Grant, Pine Nut and South Mono Population Management Units (PMUs). Maintenance of past conifer projects was implemented across 3,100 acres within the Desert Creek and Pine Nut PMUs and approximately 210 acres of wildfire restoration was conducted in the South Mono PMU in 2017. Within the Bodie Hills, an estimated 4.63 miles of fencing was marked to help reduce mortality. Habitat enhancement was provided by the maintenance of 14 exclosures that encompass approximately 362 acres. Invasive and noxious weed control was implemented on 224 acres within the Bodie Hills, Mount Grant, South Mono and Pine Nut PMUs and an inventory of noxious weeds was completed on an additional 1,447 acres. In addition to these habitat improvement projects, there were a number of accomplishments that helped support the Bi-State sage-grouse conservation effort. Some highlights include:

- Finalization of the Inyo National Forest Land and Resource Management Plan;
- Translocation of sage-grouse into Parker Meadows to augment the existing population;
- Development of three peer reviewed and edited publications; and
- Development of the bistatesagegrouse.com website.

Lek monitoring was conducted across all PMUs within the Bi-State in 2017. In Mono County, which contains the core of the Bi-State sage-grouse population (within the Bodie Hills and Long Valley portion of the South Mono PMU) total sage-grouse male attendance declined by 21.7% from 2016. The decrease was most likely attributed to declines in males counted in the Bodie Hills (down approximately 31 percent from 2016) where personnel had limited access due to heavy snow accumulation during the 2016-2017 winter. An approximate 2% decline was exhibited in the Nevada portion of the Bi-State population from a subset of leks consistently counted. Average male attendance in the Desert Creek population showed a modest increase of 5.5%; whereas the Mount Grant population declined by 19% from 2016. The effects of drought that occurred from 2011-2015 along with a record-setting winter during 2016-2017 have likely effected annual survival, nest survival and brood survival rates that are ultimately reflected in lek counts.

Research and monitoring efforts to better understand habitat use and seasonal movements of birds and demography took place at several study sites within the Bi-State planning area including the Bodie Hills, Long Valley, Sagehen Summit, Parker Meadow (translocation), Desert Creek, Mount Grant and the White Mountains. These research and monitoring activities were carried out by the U.S. Geological Survey, Western Ecological Research Center. In depth information on annual adult, nest and brood survival rates and space use can be found in the report, but some interesting findings

can be summarized. Annual adult survival was generally lower in 2017 than in the previous years of monitoring. Snowfall during 2016-2017 was exceptionally high and especially within the Bodie Hills where snowpack persisted longer than normal and depths were higher than average shrub heights, which may have been associated with the reduced survival. In Parker Meadows, 25 sage-grouse (18 female and 7 males) were translocated from the Bodie Hills during March and April of 2017 in an attempt to increase nesting rates and egg fertility. Of these birds, eight (five females, three males) remained at Parker Meadow at the end of the field season. The five females that remained at the site produced three nests which were all successful, yielding two successful broods. Along with the translocation of adults prior to nesting, three hens with broods were also released into Parker Meadows, one of which was successful to the 50-day post hatch date. Within the Desert Creek and Mount Grant study sites, 37-day nest survival appears consistently higher within Mount Grant [0.47 (95% CI 0.20-0.69)] site compared to Desert Creek [0.21 (95% CI 0.09 – 0.38)]. Alternatively, cumulative brood survival (50 days of age) is higher at Desert Creek [0.64 (95% CI 0.38-0.82)].

Vegetation monitoring of treatment and control sites is being implemented by the Nevada Partners for Conservation and Development (NPCD) within the Nevada Department of Wildlife. In 2017, the NPCD monitored 589 plots across the Bi-State PMUs. Preliminary analyses of the Bison Fire and China Camp (pinyon and juniper removal site) indicates an increase in perennial grass, forb and shrub cover and abundance.

Livestock grazing assessments were provided for the Humboldt-Toiyabe (HT) and Inyo National Forests (INF) by the U.S. Forest Service as well as the Bureau of Land Management's Bishop Field Office and Carson City District Office. Within the HT, 59 grazing allotments contain Bi-State sage-grouse habitat. There are 49 active allotments and 23 associated grazing permits. In 2017, 16 of 59 allotments were inspected with 11 being in full compliance with terms and conditions, and five instances of non-compliance. The Inyo NF manages 28 grazing allotments with Bi-State sage-grouse habitat of which 22 are active and six are vacant. Of the 22 active allotments (meaning there are valid permits), eight were rested in 2017 due to fire recovery or normally scheduled rest-rotation. In the Bishop Field Office (BLM) 21 of 34 grazing allotments were monitored. Eleven of the 34 allotments were not grazed in 2017. Of the allotments inspected, 19 were in full compliance with terms and conditions of the grazing permit while two did not meet terms and conditions due to grazing outside of the permitted season of use. In the Carson District (BLM), 21 allotments contain Bi-State sage-grouse habitat. Fourteen of these allotments are active while seven are inactive.

Accomplishment Summary

Background

In 2004, the first conservation plan for the Bi-State Distinct Population Segment (DPS) was released. This plan identified conservation actions to be completed and summarized the status of the Bi-State Greater sage-grouse (hereafter referred to as "sage-grouse") and the relevant threats. This stakeholder-driven plan was developed by members of the Local Area Working Group (LAWG) including: the Bureau of Land Management (BLM), California Department of Fish and Wildlife (CDFW), Nevada Department of Wildlife (NDOW), U.S. Fish and Wildlife Service (USFWS), the U.S. Forest Service (Humboldt-Toiyabe and Inyo National Forest), the Natural Resources Conservation Service (NRCS) and the U.S. Geological Survey (USGS). From 2004 to 2011, members of the LAWG implemented the plan, completing thousands of acres of habitat improvement projects.

An interagency effort in 2011 resulted in an updated Conservation Action Plan that was released in March of 2012. This Action Plan summarized prior conservation activities and provided a roadmap for future conservation of the Bi-State DPS of greater sage-grouse. Since publication, many of the conservation actions detailed in the Action Plan have been completed. The purpose of this report is to summarize these conservation actions in support of a more comprehensive report of all accomplishments.

On October 28, 2013, the U.S. Fish and Wildlife Service (FWS) proposed to list the Bi-State (DPS) of greater sage-grouse as threatened under the Endangered Species Act and designate 1.8 million acres of critical habitat. In June of 2014, NRCS, USFS, BLM and other Bi-State partners announced a $45 million dollar commitment to implement the 2012 Action Plan over a 10 year period to complete the highest priority actions in the Action Plan (originally known as "the 76 projects").The FWS announced in April 2015 that the Bi-State DPS was no longer warranted for listing under the Endangered Species Act of 1973.

Table 1 provides a summary of the on-the-ground conservation actions that were implemented to improve habitat for the Bi-State DPS and were completed in 2017. Table 2 summarizes other associated actions such as research and monitoring, planning and coordination between agencies.

Table 1. Conservation Actions completed for the Bi-State DPS 2017

RISK ADDRESSED Project Type	# of Projects	Miles, Acres or Sites Treated	Project Locations[1]	PMU: High/ Moderate Threat
CONIFER EXPANSION				**ALL PMUs**
Conifer removal to restore sagebrush	12	10,781 acres	BH, DCF, MG, PN, SM	
Pile-burning in conifer removal areas	1	56 acres	BH	
Maintenance of past conifer removal areas	2	3,100 acres	DCF, PN	
NEPA for future conifer removal in progress	1	4,682 acres	DCF	

WILDFIRE				**ALL PMUs**
Wildfire: rehabilitation	1	210 acres	SM	
URBANIZATION				**ALL** (except MG)
None				
INFRASTRUCTURE				**ALL** (except WM)
Fences: modification, removal, marking	5	4.63 miles	BH	
Roads: permanent closures, seasonal and improvements	5	5 sites	SM	
GRAZING-WILD HORSES				
Pine Nut Herd Management Area EA	1	1 EA	PN	
GRAZING-LIVESTOCK MANAGEMENT				Permitted grazing: Low for all PMUs
Livestock Management (exclosures)	14	362 acres, existing exclosures maintained	BH	
Livestock exclusion (fence construction)	1	0.40 miles	MG	
INVASIVE AND NOXIOUS SPECIES				**PN, MG**
Invasive and noxious weed control- mechanical and chemical	5	224.47 acres	BH, MG, SM, PN	
Invasive and noxious weed inventory	1	1,447 acres	MG	
HABITAT-BASED				**DCF**
Irrigation of wet meadows	3	3 sites	BH, DCF, MG	
Restoration of sagebrush habitat: Trash removal	1	1 site	BH	

1. Population Management Unit (PMU) abbreviations: PN – Pine Nut; DCF – Desert Creek-Fales; BH – Bodie Hills; MG – Mount Grant; WM – White Mountains; SM – South Mono

Table 2. Action Plan accomplishments not included in Table 1

OTHER ACTION PLAN ACCOMPLISHMENTS	DESCRIPTION / MEASURES
Coordinated interagency approach (CIA 1)	• 4 Executive Oversight Committee meetings • 2 Tribal Natural Resource Committee meetings • 2 Local Area Working Group meetings • 2 Technical Advisory Committee meetings • LAWG Field Tour of 9 Mile Ranch • Coordinated tribal youth program (Bridgeport Piute, BLM, H-T)
Science-based adaptive management plan (SAM 1 & 2)	• Funding for Science Advisor has been provided for 2012-2017 (SAM 1) • Conservation Planning Tool has been implemented and continues to be refined (SAM 2)
Improve regulatory mechanisms (IRM 1 & 2)	• The INF is finalizing its Land and Resource Management Plan (Forest Plan). (IRM 1-8).
Small populations (MER 7)	• Translocated adult male and female sage-grouse as well as adult hens

	with broods to augment the Parker Meadows population (MER 7-1).
Research and Monitoring (RAM 1 thru 5)	• Coates, P. S., B. G. Prochazka, M. A. Ricca, K. B. Gustafson, P. Ziegler, and M. L. Casazza. 2017. Pinyon and juniper encroachment into sagebrush ecosystems impacts distribution and survival of greater sage-grouse. Rangeland Ecology & Management 70:25-38. • Prochazka, B. G., P. S. Coates, M. A. Ricca, M. L. Casazza, and J. M. Hull. 2017. Encounters with pinyon-juniper influence riskier movements in greater sage-grouse across the Great Basin. Rangeland Ecology & Management 70:39-49. • Duvall, A. L., A. L. Metcalf, and P. S. Coates. 2017. Conserving the Greater Sage-Grouse: A Social-Ecological Systems Case Study from the California-Nevada Region. Rangeland Ecology & Management 70:129-140. • Lek Camera Project initiated with Gail Patricelli Lab, UC Davis
Maintain and improve stakeholder involvement (MSI 1 & 2)	• Developed and launched www.bistatesagegrouse.com website • Featured on PartnersintheSage.com • Programs for LA, San Diego and Eastern Sierra Audubon • Ag in the Schools programs • Facebook and twitter posts • 5 Volunteer days
Minimize and Eliminate Risks: Wildfire (MER 1-1 thru 1-9)	• Resource Advisor Kits were updated with relevant grouse data • Sage-grouse presentations at all fire refreshers for the INF/Bishop BLM/Carson BLM

76 Projects and the Action Plan

In 2014 the Bi-State Technical Advisory Committee (TAC) evaluated projects in the 2012 Bi-State Action Plan (BSAP) and created a list of 76 projects that were the highest priority to complete. At this time, the boundaries of the conifer projects were drawn based on local knowledge and suspected bird use. In 2014 the USGS produced the Conservation Planning Tool, which ranked the potential conifer projects based on benefit to grouse and cost effectiveness. In 2015, subcommittees of the TAC in the North and South Bi-State used the CPT rank as the basis to re-rank conifer projects and included other information, such as on-the-ground knowledge of an area, logistics of planning and implementation, and professional expertise. At every step, it was assumed that 1) Priorities would change based on new information, and 2) New priorities might occur that were unknown at the time of the 76 projects.

The projects summarized in this report represent the 2017 completion of the highest priority projects in the Bi-State based on the CPT, TAC re-ranking, input from the LAWG and common sense realities of implementing projects.

2017 Bi-State Sage-grouse Lek Monitoring Report

Overview

The core of the Bi-State sage-grouse population resides within the Bodie Hills and South Mono Population Management Units (PMUs) located in Mono County, California. In 2017, total sage-grouse male attendance declined by 21.7% from 2016 in Mono County. The decrease was most likely attributed to declines in males counted in the Bodie Hills (down approximately 31 percent from 2016) where personnel had limited access due to heavy snow accumulation during the 2016-2017 winter. An approximate 2% decline was exhibited in the Nevada portion of the Bi-State population from a subset of leks consistently counted. Average male attendance in the Desert Creek population showed a modest increase of 5.5%, whereas the Mount Grant population declined by 19% from 2016. The effects of drought that occurred from 2011-2015 along with a record-setting winter during 2016-2017 have likely effected annual survival, nest survival and brood survival rates that are ultimately reflected in lek counts.

Lek Status

There are 115 known lek locations within the Bi-State sage-grouse population extent within Nevada and California. Fifty-three of these leks are considered currently active [two or more males observed during two years over a five year period (Connelly et al. 2003)] (Table 3). California recognizes 72 leks within the Bodie Hills, Fales, South Mono and White Mountains Population Management Units (PMUs) of which 35 are considered active. In Nevada, 43 lek locations have been identified with 18 considered active. Lek locations in the Pine Nut PMU require further refinement as many locations are one or two time observations of a small number of birds from aerial survey.

The Bi-State Technical Advisory Committee (TAC) has been developing an integrated lek count database for both Nevada and California. Through this process, the TAC has also established a "peak count" spreadsheet for trend analysis purposes. This dataset includes peak or high male lek count information from the 115 leks across the Bi-State sage-grouse range. In the 2016 Bi-State Action Plan Progress Report, 101 lek locations were reported. The difference does not imply that there were 14 new leks found in 2017, but rather comprehensively accounts for all known leks locations (whether persistent or intermittent, aka "satellite lek"). The majority of the difference in the known lek locations reported in 2016 vs. 2017 was from the Bodie Hills (n=20, 2016 vs. n=31, 2017).

Table 3. Known leks, activity and average lek size (# of males) within the Bi-State sage-grouse conservation planning area.

PMU Name	Known Lek Locations	Active Leks	Average Lek Size
Pine Nut	12	2	3.5
Desert Creek/Fales	19	9	17.3
Nevada	*(14)*	*(6)*	*(17.7)*
California	*(5)*	*(3)*	*(12.5)*
Mount Grant	15	8	14.0
Bodie Hills	31	18	23.8
South Mono	34	14	
White Mountains	4	2	2.0
Nevada	*(2)*	*(2)*	*(2.0)*
California	*(2)*	*(?)*	-
Totals:	115	53	17.1

Population Performance

Nevada Lek Counts

In the Nevada portion of the Bi-State sage-grouse conservation planning area, 23 leks were surveyed from March 11 - May 10, 2017. Of these, 16 leks with at least two males in attendance were surveyed, with the largest number of males observed at the Desert Creek #2 lek (n=58). Lek visits were conducted by the Nevada Department of Wildlife, U.S. Forest Service, U.S. Geological Survey and volunteers. Fifty-seven visits were made to the 23 leks surveyed for an average of 2.5 visits per lek. Average male attendance for 2017 was 13.2 males per lek which was down 9.6% from the 2016 attendance rate of 14.6 males per lek. For comparison purposes, the greatest average lek attendance from 2000 through 2017 was 29.4 males in 2012, while the lowest attendance rate was 10.5 males in 2008.

To accurately depict populations trends, a subset of leks (n=7) within the Nevada portion of the Bi-State planning area with consistent monitoring were used. Average male attendance for these leks was 17.3 males per lek in 2017 compared to 17.7 males per lek in 2016 reflecting a 1.9% decline. Average male attendance for these leks has shown small incremental declines since 2014 (Figure 1). The 2017 attendance rate was 18.4% below the long-term average (2000-2016) of 21.2 males per lek. This is the fifth straight year of below average attendance and the overall trend remains slightly declining. The effects of drought from 2011 through 2015 are likely responsible for this population decline.

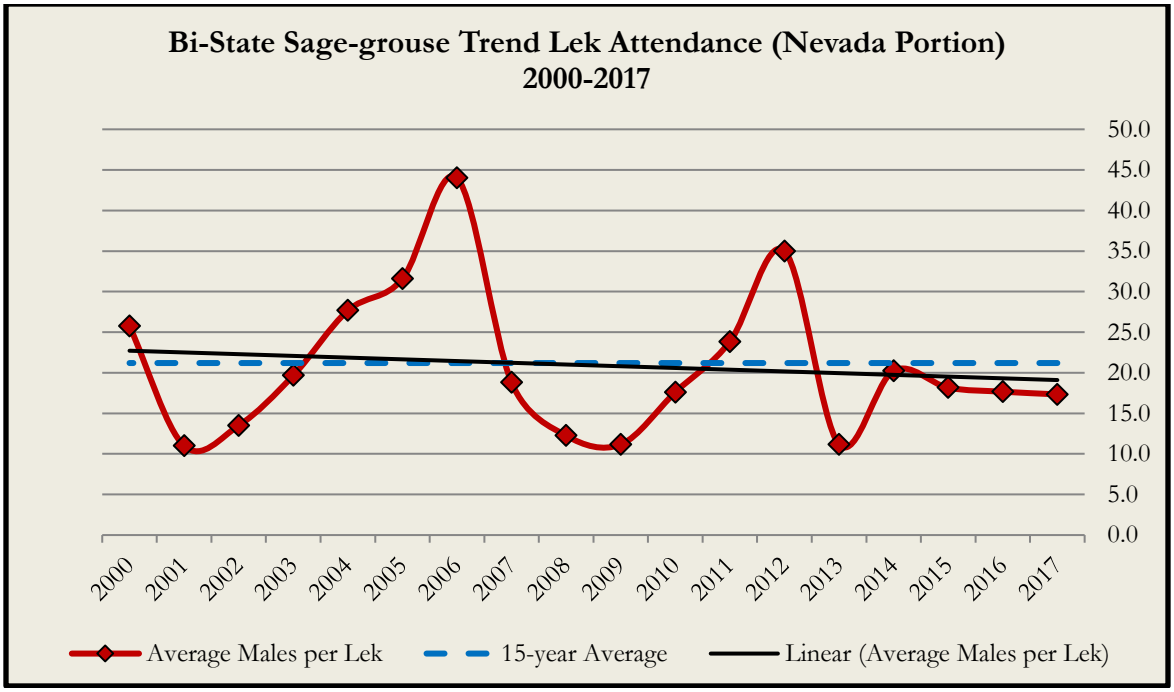

Figure 1. Male lek attendance from a subset of trend leks within the Nevada portion of the Bi-State planning area from 2000-2017.

California Lek Counts

Sage-grouse lek counts were conducted from March 23 – May 15, 2017 via ground survey throughout Mono County by personnel from the California Department of Fish and Wildlife (Department), Bureau of Land Management (BLM), U. S. Forest Service, Los Angeles Department

of Water and Power (LADWP), California State Parks, Mono County and several volunteers. Leks were surveyed from the ground in Long Valley, Granite Mountain, Parker Meadows, the Bodie Hills, and Fales Hot Springs. The Jackass Flat area in the Fales-Desert Creek PMU was surveyed via helicopter by the Nevada Department of Wildlife (NDOW) on March 14, 2017. Sage-grouse leks in the California portion of White Mountains were not surveyed.

The primary method used for obtaining lek counts involved the simultaneous survey of all leks within a breeding complex on a minimum of three separate days spaced over the duration of the survey period. The peak male count was the survey having the highest cumulative number of grouse counted on all leks within a breeding complex on any one day.

From peak counts, a grand total of 466 male sage-grouse were counted on 29 leks surveyed in Mono County during spring 2017 (Table 4). Of the 466 males counted, 58.2% were observed in the Bodie Hills on May 11 and 34.1% were observed in Long Valley on April 20. Thus, 92.3% of all male sage-grouse counted during peak surveys were observed within the core breeding complexes of the Bodie Hills and Long Valley (Table 4). Weather conditions during the survey period were variable, although most surveys were attempted on days with good weather conditions.

Table 4. Peak count survey results from spring 2017. Number of leks counted and date of peak count surveys are provided.

Strutting Area/ Complex Name	Date of Peak High Count	Number of Leks w/ Males	Peak High Male Count	Number Of Unclassified Birds	Percent of Total Males	Percent Change From 2016
Fales/DC PMU						
• Fales	4/14/17	2	27		5.8	-18.2
• Jackass Flat	3/14/17[1]	1	--	20	--	--
South Mono PMU						
• Long Valley	4/2017	10	159		34.1	0.0
• Parker	3/17-4/17	1	6		1.3	+50.0
• Granite Mtn.	4/15-5/24	2	5		1.0	0.0
Bodie PMU						
• Bodie Hills	5/11/17	11	271		58.2	-31.4
Mono All		**29**	**466**	**20**	**100.0**	**-23**

[1]NDOW Helicopter survey

South Mono PMU

A total of five lek count surveys were conducted in Long Valley between April 12 and May 6, 2017. In all, a total of 17 strutting grounds, including nine trend leks and eight satellite grounds, were monitored during the five surveys (Table 4). The peak number of males counted in Long Valley was 159 on April 20, when grouse were counted on 10 of the 17 leks monitored. The 2017 peak count of 159 males matched the peak number of male grouse counted in 2016 and represented a 62% decrease from the historic peak high count in 2012 of 418 males (Figure 2). The 2017 peak count of 159 males is about 22% below the long-term average number of males counted in Long Valley since 1953 (Figure 2).

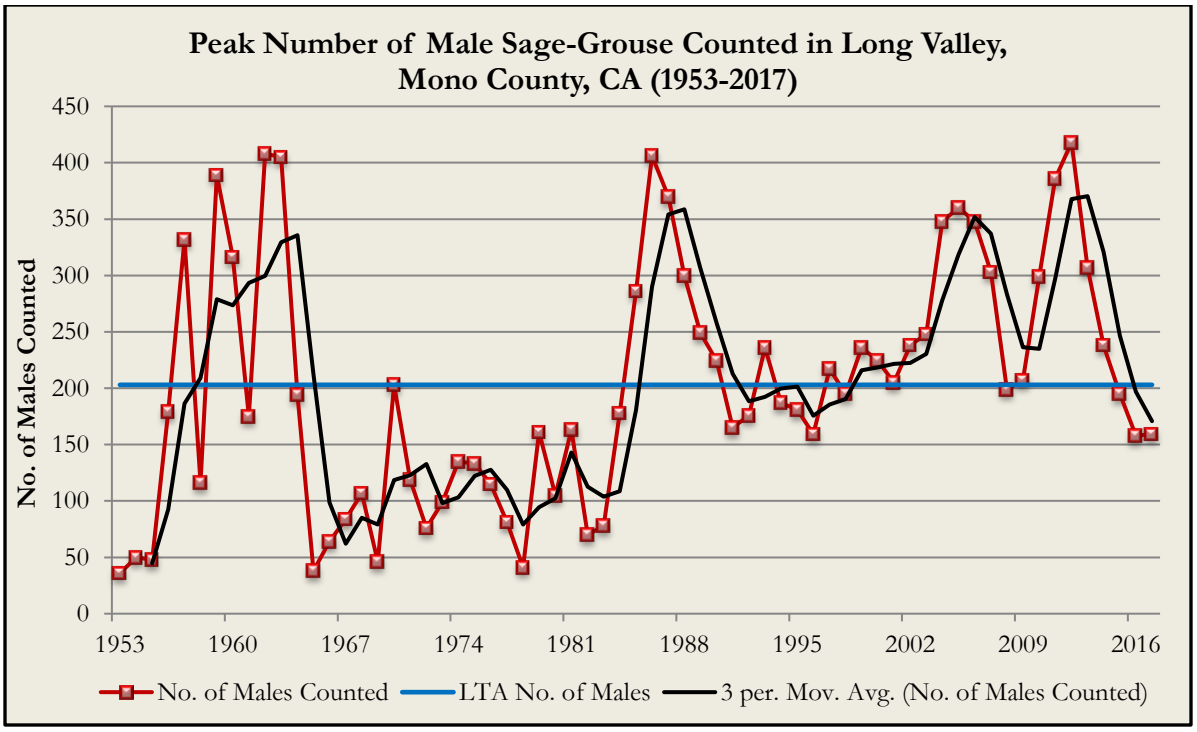

Figure 2. Male sage-grouse lek attendance within the Long Valley portion of the South Mono PMU in Mono County, California from 1953-2016.

A total of five male sage-grouse were consistently observed strutting on private property at Sagehen Meadow in the Granite Mountain portion of the South Mono PMU (Table 4). These birds were observed daily by the property owner between April 15 and May 24, 2017 (Bill Crum, pers. comm.). There were no sage-grouse observed lekking this year at the Gaspipe Springs or Adobe Valley leks.

Bodie PMU

Lek count surveys in the Bodie Hills were conducted between March 23 and May 11, 2017. During March and April, upper elevation leks in the Bodie Hills were not accessible due to deep snow. Therefore, the only surveys that involved the simultaneous count of all leks in the Bodie Hills were conducted on May 3 and May 11 once the upper elevation leks became accessible. In all, a total of 18 strutting grounds, including 8 trend leks, were monitored during the surveys. The peak number of male sage-grouse counted was 271 on May 11 (Table 1). Grouse were counted on 11 of the 18 leks visited on that day. The 2017 peak count of 271 males represents a 31% decrease from 2016 when 395 males were recorded. The 271 males recorded in 2017 were approximately 141% above the long-term average (LTA) number of males counted in the Bodie Hills since 1953 (Figure 3). The peak count of 271 males likely misrepresents the number of males in the Bodie Hills since some leks could not be viewed at their peak due to access issues.

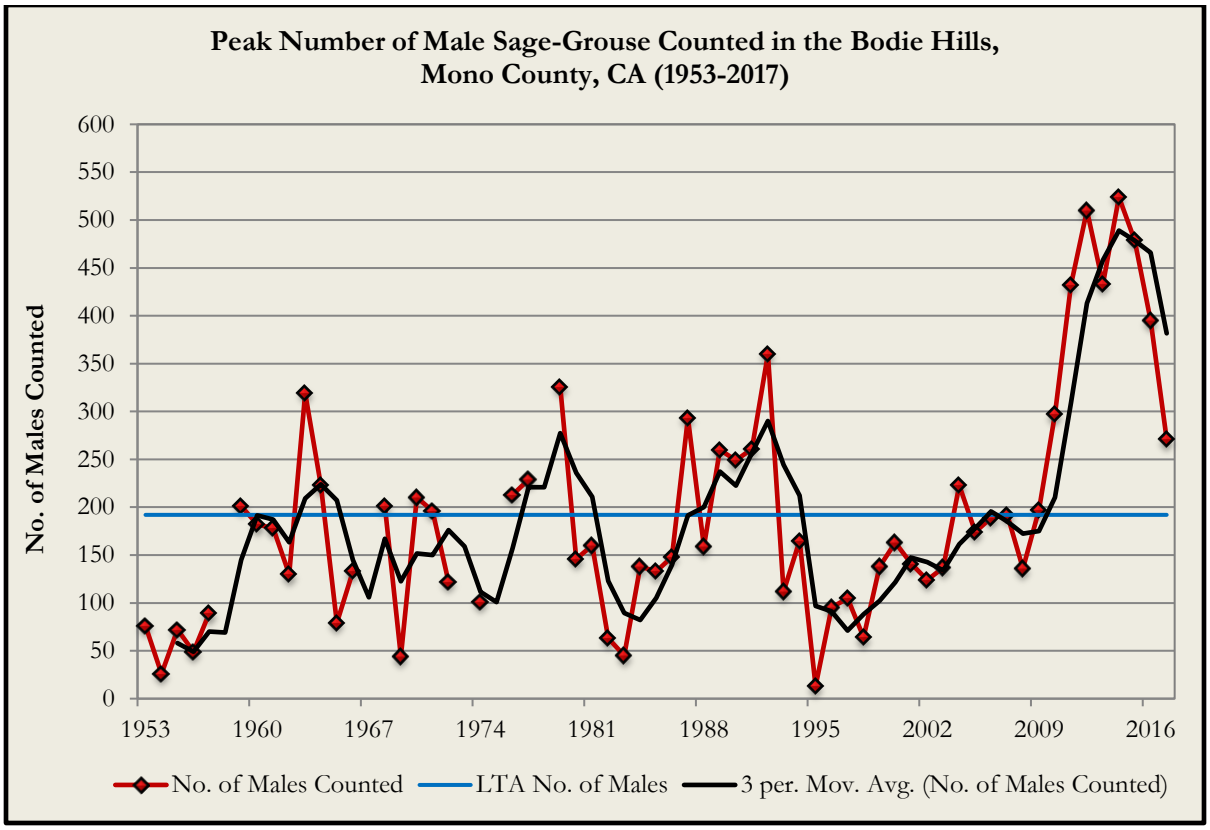

Figure 3. Male sage-grouse lek attendance within the Bodie Hills PMU in Mono County, California from 1953-2016.

Fales/Desert Creek PMU

A peak total of 27 male sage-grouse were counted on the two remaining active leks located within the Fales breeding complex (Table 4). The number of males counted at Fales in 2017 was 20% fewer than in 2016. The peak count comprised a total of 21 males counted on the Wheeler Flat lek three and six males counted on the Burcham Flat 2 lek; no grouse were observed on Burcham Flat lek 4, which is immediately adjacent to a single family home. The number of lekking males at Fales remains very low, but stable.

On April 14, 2017, the Nevada Department of Wildlife (NDOW) conducted a helicopter survey and 20 sage-grouse (unclassified for sex) were counted on the Jackass Flat lek at Fourth of July Spring. Because these birds were unclassified, they were not added to the total number of males observed in Mono County during 2017 lek surveys.

Mono County 2017 Lek Count Summary

A total of 466 male sage-grouse were observed on 29 leks in Mono County during spring 2017 lek surveys representing a 21.7 percent decrease from 2016 in the total number of males observed in peak counts in Mono County. The decrease was attributed primarily to the decline in the number of males counted in the Bodie Hills core population, which was down approximately 31 percent from 2016. However, it is important to reiterate that the peak male count in the Bodie Hills is likely under-represented, since some leks could not be viewed at their peak due to access issues.

Bi-State Sage-grouse Movement and Demographic Report

A cooperative effort to intensively monitor sage-grouse populations throughout the Bi-State planning area was essentially "kicked off" during the fall of 2015 and a full year of demographic data was collected in 2016 and 2017. This involved a collaborative and coordinated effort between several agencies including the U.S. Geological Survey – Western Ecological Research Center (USGS-WERC), Bureau of Land Management (BLM), U.S. Forest Service (USFS), California Department of Fish and Wildlife (CDFW) and the Nevada Department of Wildlife (NDOW) to implement a before-after-control-impact (BACI) study design to monitor sage-grouse response to management actions. In 2017, movement and demographic data were collected in the Bodie Hills (BH), Desert Creek (DC), Mount Grant (MG), Parker Meadows, South Mono (Long Valley - LV) and White Mountains Population Management Units (PMUs). A comprehensive report on the White Mountains PMU will be provided in the 2018 progress report as only preliminary monitoring has been conducted through 2017.

Bodie Hills/Long Valley/Sagehen Summit

The following summary represents data collected during the 2017 field season within the Bodie Hills (BH) PMU and the Long Valley (LV) and Sagehen Summit (SA) portions of the South Mono PMU. In BH, USGS-WERC researchers located 29 nests, monitored 14 broods, and obtained 245 ground telemetry locations. In LV, 21 nests were located, 11 broods were monitored, and 209 ground telemetry locations were obtained. A total of 369 and 240 raptor, raven, and livestock surveys were conducted and 64 and 124 ravens were detected at BH and LV, respectively. Primary data collection efforts include gathering baseline data on space-use, habitat selection, and population vital rates.

Space Use

Capture and marking efforts began at BH in 2014 and monitoring began in 2015. During the fall (September–Oct) of 2014–2016, 55 sage-grouse were radio-marked with VHF transmitters and seven sage-grouse with GPS transmitters at BH. Forty-five sage-grouse were radio-marked with VHF transmitters at LV during the fall of 2015-2016. At SA, one sage-grouse was marked with a GPS transmitter in the fall of 2014, and seven sage-grouse were radio-marked in the fall of 2015. Monitoring at SA has ceased for now, and no subsequent trapping efforts were made in 2016–2017.

An additional 25 sage-grouse were captured and radio-marked at BH (n = 17) and LV (n = 8) with VHF transmitters and seven sage-grouse with GPS transmitters at BH during March-April 2017. A total of 23 radio-collars were deployed on female sage-grouse and two GPS transmitters were placed on male sage-grouse translocated to Parker Meadow in spring 2017. In fall 2017 (September-October), 57 sage-grouse in Bodie Hills (n = 32) and Long Valley (n = 25) were radio-marked and five GPS units were deployed at BH.

In 2015–2017, a total of 132 sage-grouse females within BH (n = 69), LV (n = 50), and Parker Meadow (n = 13) were monitored. From 2015–2017, 1,149 telemetry locations were obtained: 617 at BH, 406 at LV, and 126 at Parker Meadow (Figures 4-6). During winter (December – February) 5,064 GPS locations were obtained, 9,743 during spring (March–May), 7,248 during summer (June–August), and 4,654 during fall (September–November) for a total of 26,709 locations in BH in 2015-2017. At PM, 575 GPS locations were obtained during spring, 1,061 locations during summer and 252 locations during fall for a total of 1,888 locations in PM in 2017.

Survival

At BH, monthly adult survival probability in 2017 was 0.92 (95% CI, 0.86–0.96) and cumulative monthly adult survival probability across all years combined (2015–2017) was 0.96 (95% CI, 0.93–0.97). Annual adult survival probability in 2017 in BH was 0.37 (95% CI, 0.15–0.60) and cumulative annual adult survival probability across all years combined (2015–2017) was 0.57 (95% CI, 0.40–0.70). Unfortunately, there were not enough data to estimate adult survival for each of the four seasons accurately. Instead, survival was estimated for two seasons: Winter/Spring (December 1 to May 31) and Summer/Fall (June 1 to November 30). Average cumulative adult survival for the winter/spring and summer/fall seasons across all years (2015-2017) were 0.70 (95% CI, 0.48–0.84) and 0.80 (95% CI, 0.62–0.90), respectively.

At LV, monthly adult survival probability in 2017 was 0.94 (95% CI, 0.89–0.97) and cumulative monthly adult survival probability across all years combined (2015–2017) was 0.97 (95% CI, 0.95–0.98). Cumulative annual adult survival probability in 2017 was 0.47 (95% CI, 0.23–0.69) and cumulative annual adult survival probability across all years combined (2015-2017) was 0.68 (95% CI, 0.53–0.79). Adult survival in 2017 was lower in than in previous years. Unfortunately, there were not enough data to estimate adult survival for each of the four seasons accurately, so survival was estimated for two seasons; Winter/Spring (December 1 to May 31) and Summer/Fall (June 1 to November 30). Average cumulative adult survival for the winter/spring and summer/fall seasons were 0.81 (95% CI, 0.62–0.92) and 0.84 (95% CI, 0.68–0.92), respectively.

Snowfall in the 2016–2017 was exceptionally high with deep snowpack. In many areas, especially in BH, snowpack persisted into the spring in depths higher than average shrub height. Pulses of severe winter conditions have been associated with reduced female sage-grouse survival, which may explain the low survival estimates of sage-grouse in 2017 in LV and BH (Moynahan and others, 2006, Anthony and Willis, 2009).

Nest Survival

From 2014–2017, 88 nests across the BH-LV-PM study sites were located; n = 48 at BH, n = 37 at LV, and n = 3 at PM. In BH, 28 nests were successful and 20 failed; in LV, 16 were successful and 21 failed. In PM, all three nests were successful. Causes of failure in BH and LV were apparent nest depredation (n = 29), nest abandonment (n = 8) and female mortality (n = 4). Cumulative average nest survival probability for the 37-day egg laying and incubation phase in BH in 2017 was 0.44 (95% CI, 0.21–0.65) and cumulative nest survival probability for all years combined in BH (2014–2017) was 0.49 (95% CI, 0.32–0.64). Cumulative average nest survival probability for the 37-day egg laying and incubation phase in Long Valley in 2017 was 0.25 (95% CI, 0.08–0.47), and cumulative average nest survival probability across all years combined in LV (2016–2017) was 0.30 (95% CI, 0.15–0.46). We were not able to estimate cumulative nest survival for translocated sage-grouse at Parker Meadow due to a low sample size (n = 3), but apparent nest survival was 100%.

Brood Survival

Twenty-four broods were monitored at BH from 2015–2017, of which 11 were successful (≥ 1 chick surviving to 50-days post-hatch). An additional five broods in BH were translocated to Parker Meadow in 2017, and are not included in this section or in the brood survival estimates for BH. The cumulative probability of brood success for the 50-days post-hatch in 2017 was 0.33 (95% CI, 0.11–

0.58), and the cumulative probability of brood success for the 50-days post-hatch across all years combined (2015-2017) was 0.52 (95% CI, 0.33–0.69) during 2017.

In LV, 17 broods were monitored, of which seven were successful and 10 failed. The cumulative probability of brood survival for 50-days post-hatch in 2017 was 0.25 (95% CI, 0.07–0.48) and the cumulative probability of brood survival for 50-days post-hatch across all years combined (2016–2017) was 0.50 (95% CI, 0.28–0.69) during 2017. All of the brooding females monitored, regardless of nest location, moved to the agricultural fields north-northwest of Crowley Lake for the late brood-rearing period. Field crews anecdotally reported a remarkably high abundance of arthropods, especially caterpillars (Order Lepidoptera) and grasshoppers (Family Acrididae), which seemingly supported high densities of sage-grouse in these areas. Brood mixing is known to occur in sage-grouse (Dahlgren and others, 2010) and has been observed in LV. In one instance, a radio-marked female was observed with chicks ranging in age from 20–40 days post-hatch and no other females. The high density of broods, and the occurrence of brood-mixing, made determination of brood fate difficult in some cases.

Parker Meadow (Translocation)

In addition to monitoring efforts in BH and LV, an experimental translocation effort to augment the declining population at Parker Meadows (PM) was conducted. In March and April 2017, 25 sage-grouse (18 females, 7 males) were translocated from leks in BH to PM. In an attempt to increase nesting rates and egg fertility, a subsample of translocated females (n = 4) were artificially inseminated using sperm collected from male sage-grouse lekking in BH. In June 2017, three sage-grouse broods were captured and translocated from BH to PM as part of a pilot study to improve translocation success. Overall, three nests were located, six broods were monitored, and 126 telemetry locations were obtained from translocated individuals at PM, and 67 raven, raptor and livestock surveys were conducted.

Methods

Sage-grouse were translocated mainly from Biedeman and satellites (7.5%), Big Flat (10%), Bridgeport Canyon (15%) and Dry Lakes (6%). Big Flat had a higher count during the translocation period in 2017 (48 males) than in 2016, and several of the birds captured at Bridgeport Canyon were males. After capture, sage-grouse were fitted with VHF necklace-style or GPS transmitters (males only), morphometric measurements were taken, and each grouse was placed in a cardboard box lined with cat litter or paper shop towels to absorb fecal matter and keep their plumage clean. Sage-grouse were transported in cardboard boxes from their capture locations to a processing station at PM, where a subsample of females were artificially inseminated and all sage-grouse were placed in a compartmentalized release box prior to release.

Soft-release of Translocated Sage-grouse

After processing, sage-grouse were placed in a compartmentalized release box. Sage-grouse silhouettes, along with playback of lek sounds were placed near the release site based on design of Rodgers (1992); the purpose of this was to 1) create an "artificial lek" to release sage-grouse into in the event resident males at Parker were absent, and 2) to enhance the appearance of the existing lek to released sage-grouse. The release box was placed at the release site before light and opened remotely by an observer in a blind at 150 ft.

Brood Capture and Experimental Translocation

This effort represented the first known sage-grouse brood translocation ever conducted. As such, a strict experimental design was followed as part of a first year-pilot study, a limited sample of females with broods were translocated from BH to PM before chicks reached an age of 10 days post-hatch. The rationale behind this study was that females with young broods that already succeeded through a critical and risky stage of the breeding chronology gauntlet could provide a greater demographic subsidy compared to females translocated prior to nesting that must initiated and successfully hatch a nest before progressing to the next reproductive stage. Radio-marked females with broods were captured at night using spotlighting methods. Chicks were captured by hand and placed into a small insulated box with a heat source and the female was placed into a separate cardboard box lined with paper towels (Thompson and others, 2015).

The female and chicks were transported to the release site separately to prevent injury to chicks by the female. Prior to release, the female and chicks were placed in a specialized brood release box, where the female was separated from her chicks by a removable plexiglass partition. The partition protected the chicks from potential injury from the female but still allowed audiovisual contact between the female and her chicks. When the box was in place and the female was sufficiently calm, the partition was pulled out of the box, allowing the female to interact with her chicks for a time period of at least two hours prior to release. Cameras were placed inside and around the outside of the box to record release behavior of female and chicks.

The release box was placed on site several hours before sunrise and opened remotely at dawn by an observer in a blind. However, after identifying a flaw in our design, a secondary wire and mesh enclosure was built around the release box for the second and third brood translocations. This secondary enclosure ensured that the female would remain in the immediate vicinity of her chicks until the chicks exited the box and rejoined her. Dried mealworms were placed inside the enclosure to allow the female and chicks forage material directly after release. The secondary enclosure was opened 2-3 hours after sunrise allowing the brood to exit and disperse into brood-rearing habitat.

Results

Five lek counts were conducted at PM during March-May 2017. Prior to experimental translocations, we observed four males and zero females on lek at PM. Following translocation of six males and two females from BH to PM on March 26-27, 2017, the high lek count increased to six males and two females. Although we were not able to identify individual marked birds on the lek, we did observe translocated males joining the lek upon release (in one instance fighting with resident males), and radio-telemetry indicated that two of the translocated males remained at the lek throughout the lekking season. A second translocation of 15 female and two male sage-grouse occurred between 23 April – 1 May, 2017. The high male count decreased after the second translocation, likely due to the phenology of lek activity at PM that had already peaked.

A total of 23 males were captured for semen collection. All males captured were from Biedeman or Bridgeport Canyon leks in BH. Five males (21.7%) produced semen of adequate volume and sperm density to inseminate females. Four females were inseminated from samples obtained from deseminated males and translocated to PM. Most males deseminated did not produce a semen sample of sufficient quality for insemination. The high number of males captured that that did not produce adequate sperm was unusual relative to past desemination efforts with sage and sharp-tailed grouse (S. Mathews, USGS, pers. obs.), and may have been related to persisting winter-like

conditions that delayed onset of female reproductive readiness and corresponding physiological response by males.

Four males perished during transport at the beginning of the project. Necropsy results from the CDFW Wildlife Investigations Laboratory (Rancho Cordova, CA) indicated that all four males died from head and neck injuries likely caused from jumping or attempted flushing while in transport boxes and/or capture injures. To rectify this issue in future efforts, we will use smaller and padded transport boxes designed to better constrain grouse movement during transport along with modifying trapping nets with larger frames and softer mesh. In addition, we will collect semen in the field at location of capture, rather than transporting males to a processing station. This change to our protocol will decrease the amount of time males spend in boxes or obviate the need for transportation, depending on lek conditions.

The remaining males were released onto their respective capture leks after semen collection with no health concerns. In many cases, males that were released immediately rejoined displaying males on the lek. Several males were inadvertently re-captured on subsequent nights, and were released without further handling or transport after a brief inspection of general appearance. Each male was only de-seminated once.

Translocating Sage-Grouse for Nesting

A total of 25 sage-grouse (17 females, 8 males) were translocated from leks in BH to PM during the spring nesting period of 2017. Eight translocated sage-grouse (five females, three males) remained at PM as of the end of the field season (5 August 2017), although three birds in this category were still making exploratory movements at the end of the summer (Table 5.). Of the five females that remained at PM, three initiated nests. All three nests were successful and two of those resulted in successful broods.

Table 5. Summary of 25 sage-grouse translocated to Parker Meadow (PM) in March and April 2017, by capture lek.

Capture Lek	Stayed at Parker	Dispersed (BH or SA)	Missing	Mortalities	**Total**
Biedeman	1	4	1	1	7
Big Flat	2	0	2	0	4
Bridgeport Canyon	0	3	0	2	5
Dry Lakes	4	1	1	1	7
Lower Summers	0	0	0	1*	1*
Racetrack	1	0	0	0	1
Total:	8	8	4	5	25

*Male was observed post release with a broken wing that required humane euthanasia per USGS Field protocol.

Eight (32.0%) translocated sage-grouse left or dispersed from PM. Of these, six returned to BH and two (one male, one female) dispersed to SA. The female that dispersed to SA did not initiate a nest but was observed on one occasion in a flock with several chicks. Three of the females that returned to BH initiated nests shortly after they returned and one of those nests was successfully hatched but did not result in a successful brood.

Translocating Sage-Grouse Broods

Captures were attempted on seven broods and three were successfully translocated from BH to PM. Of the four broods that were not translocated, two were roosting in dense vegetation and the female flushed upon approach, one captured brood did not have the minimum number of chicks (≥ 3) required for a translocation, and one was in poor health when captured. In these instances, we aborted capture when the female flushed and left the area in order to allow the female to rejoin the chicks. Subsequent checks for several weeks following the attempted capture indicated that these broods were unaffected. In another instance where a female did not have the required number of chicks (≥ 3), we released the female with her brood at the capture site, but the female immediately flushed from her chicks. Several days later, the brood was found to have failed. Although the exact cause of the brood failure cannot be determined, we discarded the 3-chick-minimum rule to avoid the risk of causing brood failure by having the female flush after release, and all future broods will be translocated regardless of chick numbers. Finally, another brooding female we captured was found with an anomalous injury, despite a particularly gentle capture in which the female did not struggle or attempt to escape. The female was bleeding from her respiratory tract and exhibited respiratory distress. Although we released this female alive with her chicks at the capture site and a visual location confirmed her to still be alive the next day, she died from this injury several days later.

The broods that were translocated were at six, seven, and eight days post-hatch and brood sizes ranged from 5-6 chicks. Broods translocated were from Biedeman, Racetrack, and 7-troughs areas in BH (see Table 6 for summarized results and comparison to pre-nesting translocated hens). Video footage from the first brood we translocated indicated that the female and chicks may not have left the release box together and this failure was confirmed by a subsequent visual location. To rectify this issue, for the second and third broods, we modified our methodology, building a soft-release pen around the release box. The second and third broods were successfully released with the updated system and camera images indicated that both females left the release enclosure followed with their chicks. These broods stayed within 1.5 km of the release site in brood-rearing habitat at PM, utilizing the same areas resident broods were observed for the 50-day brood-rearing period. Both the second and third broods survived into the late brood-rearing phase, one was successful 50-days post-hatch, the other was successful to 40-days post-hatch.

Table 6. Summary of nests and broods at PM from spring-translocated females and translocated broods during summer 2017.

Nests and Broods	**Season**		Total
	Spring (pre-nesting)	Summer (brood)	
Females translocated	17	3	20
Nest attempts	3	n/a	3
Successful nests	3	n/a	3
Successful broods	2	1 (2*)	3 (4*)
% successful broods per female translocated	11.7	33% (66%*)	15% (20%*)

*considered to be successful if at least one brood member survived to 40 days of age.

Summary of Sage-grouse Handled

Overall, a total of 55 sage-grouse were handled as part of the PM experimental translocation effort. This number includes sage-grouse that were translocated and released at PM, males that were

deseminated and released back at capture sites, and broods that were captured (or attempted capture) but not translocated for various reasons. Six mortalities (11%) were associated with complications from capture or transport. Generally, capture-induced mortalities are not reliably reported in published studies, making comparisons of mortality with other translocations difficult. Given what we have learned during the first year of the translocation, we have identified measures to reduce the number of capture and transport related mortalities in future efforts. Because most of the mortalities occurred in semen donor males, the biggest reduction in mortality can be made by de-seminating males at the capture sites instead of transporting them to a central location. Redesign of transport boxes will also aid in reducing mortality. Perhaps most importantly, placing a greater emphasis on brood-only translocation offers promise in both reducing the number of individuals required to be handled and improving success of the translocation overall. Brood translocations may increase translocation success through bypassing the effects of low nesting success.

Photo of strutting male Bi-State sage-grouse at the Wiley Ditch #3 lek in the Desert Creek PMU in March of 2013 by Shawn Espinosa (NDOW).

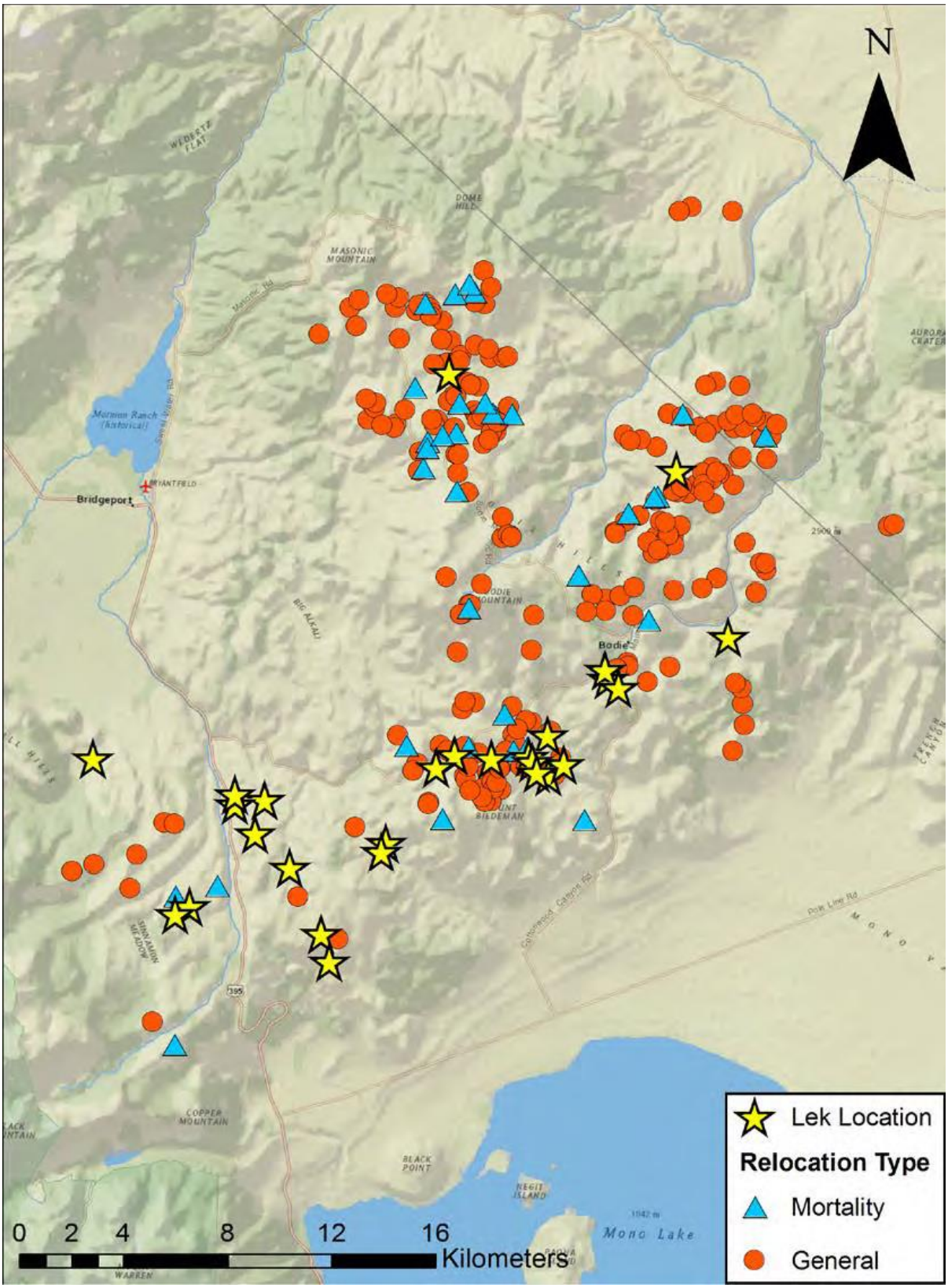

Figure 4. General and mortality telemetry locations of greater sage-grouse in Bodie Hills, CA, 2017.

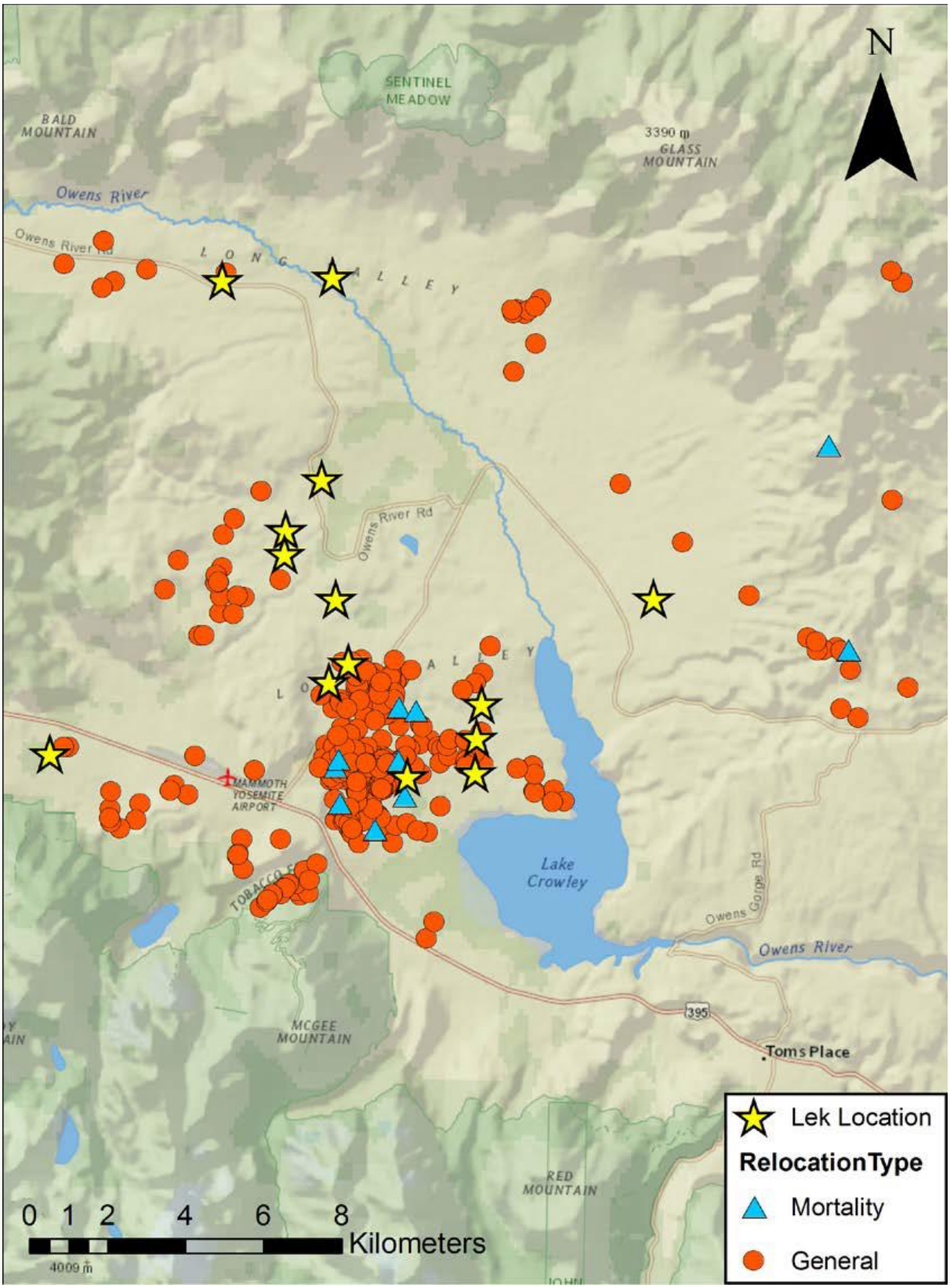

Figure 5. General and mortality telemetry location of greater sage-grouse in Long Valley, CA, 2017.

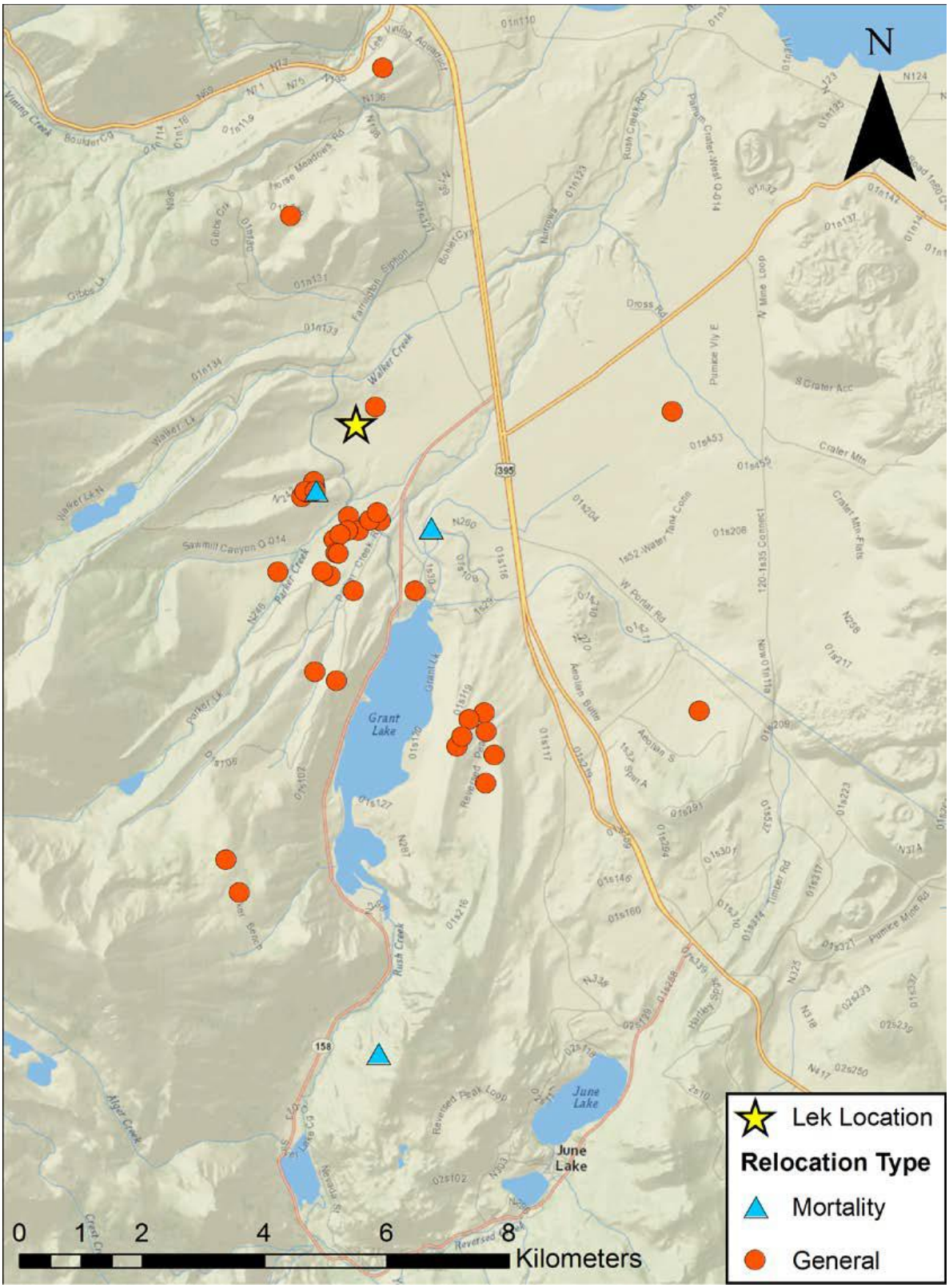

Figure 6. General and mortality telemetry locations of greater sage-grouse in Parker Meadow, CA, 2017.

Desert Creek/Mount Grant

During the fall of 2016, 19 sage-grouse were captured and radio-marked at Desert Creek (DC) along with 23 grouse at Mount Grant (MG). An additional 10 grouse were captured and radio-marked at DC, and 11 at MG in the spring of 2017. With surviving grouse from previous seasons, 40 grouse at DC and 38 grouse at MG were monitored during the 2017 field season. Vital rates were calculated for 2017 as well as cumulatively across all years of the study and are summarized below. The following summarization includes preliminary findings and should be interpreted with caution until more robust statistical analyses are performed with larger sample sizes over multiple years.

GPS transmitters were deployed on 11 sage-grouse during 2013–2014 at MG as part of a pilot study, and then fully began monitoring the MG field site in the spring of 2016. During the fall of 2015, 12 females were captured in MG and 8 in DC. In the spring of 2016, 10 females were radio-marked in MG and 13 in DC. This was in addition to 21 females in MG and 18 in DC captured and marked during the fall of 2016. In the spring of 2017, nine females and one male were captured and radio-marked at DC along with 10 females and one male at MG. In the fall of 2017, 9 females at DC and an additional 15 females and one male at MG were captured and marked. During spring (March–May), summer (June–August), fall (September–November), and winter (December–February) of 2013–2017, 16,916 GPS locations were obtained at MG and DC.

Space Use

Utilization distributions were calculated by season for GPS- and VHF-marked sage-grouse in both DC and MG. The utilization distributions for MG and DC were jointly calculated and presented on the same map (Figure 7). The core area of sage-grouse activity (50% Utilization Distribution or UD) and the population level home range (95% UD) across all seasons was 1,389 ha and 13,013 ha, respectively. During the spring, DC and MG sage-grouse concentrated at Nine-mile Flat, a valley southeast of Bald Mountain and southwest of Mt. Grant. Many birds utilized the area surrounding the East Walker River and Rough Creek and some remained on Mt. Grant. Sage-grouse were primarily located at Nine-mile Flat during the summer as well, with the highest concentrations located near Rough Creek, but there was some light utilization of higher elevation areas such as the Bodie Hills and Mt. Grant. During the fall, sage-grouse once again primarily utilized Nine-mile Flat, but also used Bald Mountain and the Wassuk Range. Sage-grouse again mainly congregated in Nine-mile Flat during the winter; they made less use of Bald Mountain, but made more use of areas within and around the Wassuk Range.

Survival

In 2017, grouse at MG had a monthly probability of survival of 0.98 (95% CI 0.93–0.991), and a cumulative probability of annual survival of 0.75 (95% CI 0.42–0.90). In 2017, none of the female grouse captured in spring (n = 10) died; the only deaths known to occur in 2017 at MG were survivors from previous seasons. At DC, grouse had a monthly probability of survival of 0.98 (95% CI 0.95–0.99), and a cumulative probability of annual survival of 0.67 (95% CI 0.39–0.83).

Cumulatively (from 2015–2017), grouse at MG had a monthly probability of survival of 0.98 (95% CI 0.96–0.994), and an annual probability of survival of 0.80 (95% CI 0.60–0.93). At DC, the cumulative (from 2015-2017) monthly probability of survival was 0.98 (95% CI 0.96–0.991) and the estimated annual probability of survival was 0.75 (95% CI 0.56–0.86).

Nest Survival

In 2017, 10 nests were located by ten females at MG, and 24 nests by 21 females at DC. At MG, nine nests hatched, while ten nests hatched at DC. Nests at MG had a daily probability of survival of 0.996 (95% CI 0.97–0.999), and a cumulative 37-day nest survival probability of 0.86 (95% CI 0.32–0.96). At DC, nests in 2017 had a daily probability of nest survival of 0.95 (95% CI, 0.92–0.97) and a cumulative nest survival probability for the 37-day egg laying and incubation period of 0.17 (95% CI, 0.05–0.36).

Cumulatively (2016–2017), nests at MG had a daily probability of nest survival of 0.98 (95% CI 0.96–0.99), and a 37-day probability of nest survival of 0.47 (95% CI 0.20–0.69). Cumulatively (2016–2017), nests at DC had a daily probability of nest survival of 0.96 (95% CI 0.94–0.97), and a cumulative 37-day nest survival probability of 0.21 (95% CI 0.09–0.38).

Brood Survival

In 2017, nine broods were monitored at MG and nine broods at DC. Of the MG broods, five broods were successful, and four failed. At DC, four broods were successful and five failed. The daily probability of brood survival at MG was 0.99 (95% CI 0.97–0.996) and the cumulative probability of brood survival for the 50-day brood rearing period was 0.58 (95% CI 0.24–0.82). At DC, females with broods had a daily probability of brood survival of 0.99 (95% CI 0.97–0.995) and a cumulative probability of brood survival across the 50-day brood rearing period of 0.52 (95% CI 0.18–0.78).

Cumulatively (2016–2017), females with broods at MG had a daily probability of brood survival of 0.99 (95% CI 0.97–0.993), and a cumulative 50-day probability of brood survival of 0.49 (95% CI 0.23–0.70). At DC, cumulatively (2016–2017), females with broods had a daily probability of brood survival of 0.99 (95% CI 0.98–0.996) and a cumulative probability of surviving the entire 50-day brood rearing period of 0.64 (95% CI 0.38–0.82).

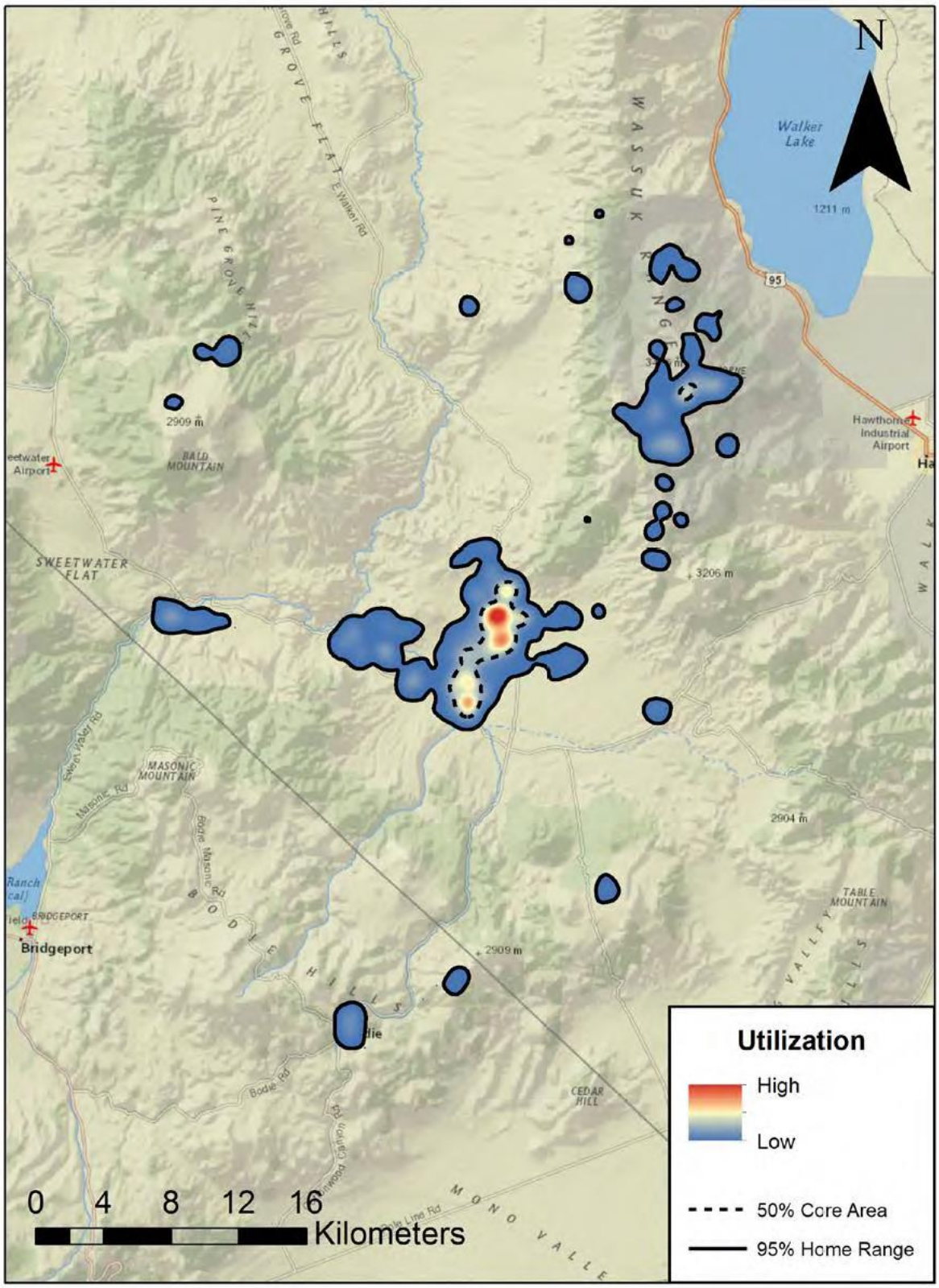

Figure 7. Cumulative utilization distribution greater sage-grouse at the Mount Grant and Desert Creek study areas, NV/CA, during 2015-2017. Utilization distribution was approximated by using kernel density estimators.

Vegetation Monitoring within the Bi-State Conservation Planning Area

The Nevada Partners for Conservation and Development (NPCD) is housed in and coordinated from the Nevada Department of Wildlife (NDOW). The mission of the NPCD is to implement habitat restoration projects and demonstrate the effectiveness of the projects. Currently, the NPCD is working on numerous habitat projects across northern Nevada and in the Bi-State sage-grouse PMUs. At a given habitat project site, the NPCD establishes numerous vegetation sampling locations both within the treatment and also in adjacent areas not intended to be treated. The non-treated sites serve as control sites against which the projects' results may be judged. Sampling is conducted prior to treatments to establish baseline conditions for as many years as possible in an effort to account for interannual climate variation, then the same sites are visited following treatments. The various comparisons between pre- and post- treatment sites as well as comparisons of treated-to-control sites allows for project effects to be determined.

Methods

In order to show project effects on the vegetation, the NPCD is implementing a statistically rigorous and ecologically meaningful monitoring protocol (Laycock 1987; Elzinga et al. 2000; Bestelmeyer et al. 2005; Forbis et al. 2007; Turner et al. 2010). The methods NPCD employs are consistent with the BLM's Assessment, Inventory and Monitoring (AIM) (Taylor et al. 2014), the USGS Chronosequence (Knustson et al. 2009), the BLM's Emergency Stabilization and Rehabilitation (ES&R) and the USFS's Burn Area Emergency Response (BAER) (Robichaud, Beyers and Neary 2000). The NPCD's methods are designed to be simple to replicate and require little or no expensive equipment in an effort to increase the likelihood for ongoing resampling of vegetation survey sites into the future. One requirement is that all personnel know the plant species in the area very well and the NPCD hires crews each year with these skills.

Survey crews navigate to sampling locations using GPS and GIS. Sampling sites consist of three 50 meter transects oriented at 0, 120 and 240 degree compass bearings. Once at the sampling location, all plants found within the perimeter of the site are identified to species. Photographs are taken along each 50-meter transect (Bonham 1989), foliar cover by species is measured via line point intercept along 50-meter transects (Canfield 1941), and the height of shrubs and perennial grasses/forbs is measured along each transect. Gaps in the perennial vegetation canopy are measured and a 2-meter x 50-meter belt transect is measured to count shrubs and trees and place individuals into various size categories (Elzinga, Salzer and Willoughby 2000). The measures employed provide a complete picture of the vegetation including species at each site, all noxious or other nonnative plants, percent cover of all species, structure (height) of the shrubs, and perennial understory and density by species (Daubenmire 1959; Elzinga, Salzer and Willoughby 2000; Bestelmeyer et al. 2005; Forbis et al. 2007).

2017 Results

Through 2017, the NPCD surveyed 589 plots across the Bi-State PMUs (Figure 8). Sampling was initiated in 2011 for several project sites and 85 plots were added in 2017. Several project locations now have rich data sets showing pre- and post-treatment effects. Figures 9 and 10 show pre- and post-treatment photos in the Bison Fire and China Camp project areas. Analyses indicate an increase in both cover and abundance of perennial grass, forb and shrub cover and abundance in much of the burned area of the Bison Fire. The 2014 photo from the Bison Fire shows the growing season immediately following the burn in which few perennial or seeded species are present. The 2016-2017

winter was record-setting in the nearby Sierra and the 2017 photo shows a large increase in cover of seeded and other desirable perennial species. It is likely the increases in perennial vegetation will continue in the Bison Fire reseedings. In China Camp since 2011 there has been an increase in shrub cover and increases in perennial grasses and forbs.

Cheatgrass cover has varied annually at the Bison Fire, China Camp and most of the other Bi-State vegetation plots. The variation does not appear to be tied to removal of conifers. The current analyses indicate that cheatgrass cover in a particular growing season is largely tied to the amount of precipitation that fell the previous fall.

The NPCD is working to provide project effectiveness monitoring at as many projects as is practical. New sampling locations will be added in summer 2018 for upcoming treatments.

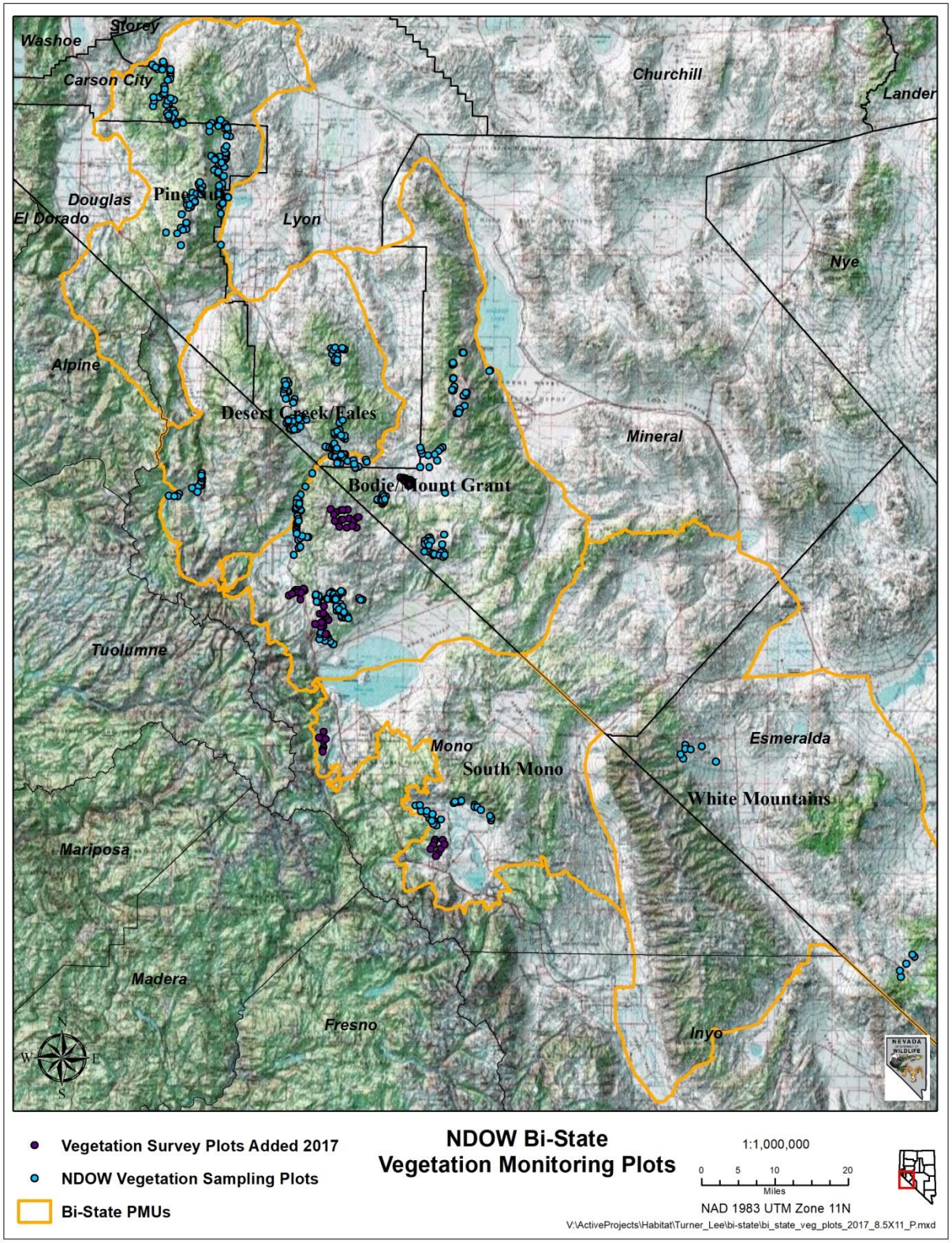

Figure 8. Habitat project effectiveness monitoring plots within Bi-State PMUs.

Figure 9. Bison Fire reseeding project. Top photo shows Plot #8 in 2014 in the growing season following the fire and the reseeding. Lower photo is post-treatment from 2017 showing Plot #8. Analyses indicate an increase in perennial grass, forb and shrub cover.

Figure 10. China Camp Lek sites pinyon-juniper removal project. Top photo shows Plot #1 in 2011 pre-treatment with phase II pinyon and juniper site. Lower photo is post-treatment from 2016 showing Plot #1. Current analyses indicate an increase in perennial grass, perennial forb and shrub cover.

Bi-State Livestock Grazing Assessment

U.S. Forest Service

Humboldt-Toiyabe National Forest

The Humboldt-Toiyabe National Forest manages a total of 59 grazing allotments that contain Bi-State sage-grouse habitat on the Bridgeport and Carson Ranger Districts. These allotments cover approximately 963,000 acres of which 925,000 acres are National Forest lands. There are 49 active allotments and 23 associated grazing permits.

Short-term Monitoring

Sixteen of the 59 grazing allotments with Bi-State sage-grouse habitat were inspected during the 2017 grazing season. Eleven allotments were in full compliance with the term grazing permit and AOI. Five allotments had instances of non-compliance which included:

1. Buckeye - Exceeded 30% herbaceous use at Big Meadow
2. Bull Canyon - Unauthorized use occurred from neighboring allotment. Neighboring permittee removed the unauthorized livestock.
3. Frying Pan-Murphy Creek - Exceeded 30% herbaceous use and 10% streambank disturbance limit at both key areas.
4. Little Walker - Exceeded 30% herbaceous use and 20% streambank disturbance limit on Molybdenite Creek.
5. Wolf Creek - In compliance with term grazing permit & AOI. Notice of noncompliance issued for failure to notify and receive proper authorization for a change in planned use.

These instances of non-compliance were relatively minor. District Rangeland Management Specialists will be meeting with the permittees prior to the 2018 grazing season to discuss ways to remedy the issues that were identified. The allotments will be monitored again in 2018 to determine if the permittees were able to resolve the issues or if further corrective action is necessary.

Long-term Monitoring

In addition to annual inspections, long-term condition and trend monitoring was conducted at 11 sites on five allotments. All but one site were meeting desired conditions. The site that did not meet desired conditions was in an aspen stand on a vacant allotment. No adjustments to grazing use will be made based on long-term monitoring results.

Other Notable Events

Allotments affected by the Slinkard Fire will not be grazed during the 2018 and 2019 grazing seasons. Recovery of the allotments will be evaluated before grazing is reauthorized.

The May 2016 Greater Sage-grouse Bi-state Distinct Population Segment Forest Plan Amendment to the Toiyabe Forest Plan resulted in changes to livestock management direction. The HTNF intends to begin modifying grazing permits in 2018 to make them consistent with the updated management direction.

The Bridgeport Ranger District has initiated an environmental analysis to convert the Cameron Canyon, Dunderberg, Summers Meadow and Tamarack allotments from sheep to cattle allotments. These allotments are currently vacant. If cattle permits are issued, grazing use will be permitted

according to the standards listed in the May 2016 Greater Sage-grouse Bi-state Distinct Population Segment Forest Plan Amendment to the Toiyabe Forest Plan.

Inyo National Forest

The Inyo National Forest manages a total of 28 grazing allotments that contain Bi-State sage-grouse habitat. These allotment are split up between the Mono Lake, Mammoth and White Mountain districts. Of the 28 allotments, 22 are active with a total of 14 permittees and six allotments are vacant. Of the 22 active allotments (meaning there are valid permits), eight were rested due to fire recovery or normally scheduled rest-rotation.

Short-term monitoring

Two allotments were monitored for compliance in 2017 with two locations monitored for each allotment. The Crooked Creek Allotment was well under utilization limits with Cave Fork measuring at 25% utilization and the South Fork of Crooked Creek estimated utilization below 10% as very little grazing was observed. The second allotment measured was Davis Creek at 30% utilization in the upper meadow and 25% in the lower, irrigated pasture.

Long-term Monitoring

No long-term trend monitoring was conducted in sage grouse habitat zones.

Bureau of Land Management

Bishop Field Office

Short-Term Monitoring

In compliance with the Grazing Management Strategy for the Bi-state DPS in the Bishop Field Office, monitoring was conducted on 21 of the 34 grazing allotments within Bi-State sage-grouse habitat during the 2017 grazing season. Eleven allotments were not grazed in 2017. Of those, two remain un-allotted, seven were in non-use due to fluctuations in livestock operations, one was in non-use due to heavy wild horse use, and one due to lack of functional water systems.

Nineteen allotments inspected were in full compliance with the terms and conditions of the grazing permit. The Aurora Canyon and Potato Peak allotments were grazed outside of the permitted season of use. Cattle remained on the allotments past the permitted off date. The total allowable Animal Unit Month (AUMs) were not exceeded, and utilization was below the threshold; however, these allotments will be closely monitored for compliance in 2018. The permittee was sent a letter documenting the unauthorized use.

Long-Term Monitoring

Long–term monitoring was not conducted by the Bishop Field Office in 2017

Other Notable Events

The Slinkard Fire burned portions of the Slinkard, Aristo Ranch, and Dry Canyon allotments. The burned portions of these allotments will be closed for three growing seasons per the Bishop Resource Management Plan.

Carson City District

The Stillwater and Sierra Front Field Offices manage a total of 21 grazing allotments that contain Bi-State sage-grouse habitat on the Carson City District. These allotments cover approximately 671,752 acres of which 582,365 acres are on federally managed lands. Of the 21 allotments, 14 are active and seven are inactive. There are 13 grazing permits associated with the 21 allotments. On Stillwater, there are six grazing allotments, two of these are inactive, and the remaining four are held under two grazing permits. Three of these allotments are grazed by cattle, one is a sheep permit for winter grazing. Of those six allotments administered by the Stillwater Field Office, Belleville has been closed to grazing in a Record of Decision (ROD); Basalt has been vacant of a permittee since 1990; Butler Mountain has had voluntary non-use by the permittees since 2002 due to heavy horse use and lack of feed while the remaining three allotments (East Walker, Lucky Boy and Ninemile) have been grazed within the last five years.

Short-Term Monitoring

As part of the Wild Horse and Burro management program, grazing allotments in the Pine Nut Herd Management Area and Butler Mountain Allotment were monitored for utilization to develop Use Pattern Maps. These maps help determine the need for wild horse gathers in conjunction with aerial flight inventory.

Long-Term Monitoring

Assessment, Inventory and Monitoring (AIM) Core methods have also been collected on East Walker, Lucky Boy, Belleville and Ninemile allotments within the last five years. These plots were collected in conjunction with the Nevada statewide AIM monitoring agreement and as part of an ongoing grazing permit renewal process for the East Walker, Lucky Boy and Ninemile allotments. Frequency plots and photo-plots, two other long term monitoring methods are also being collected as part of this renewal process.

Other Notable Events

Surveys for noxious weeds occurred in the Pine Nut Mountains. Twenty-five acres were identified for treatment in 2017 and treatments were implemented in 2018.

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