Stoller-ESER-124

Annual Report of Surveys for Historical Sage-Grouse Leks on the Idaho National Laboratory Site

Quinn R. Shurtliff and Jericho C. Whiting

December 2009

Annual Report of Surveys for Historic Sage-Grouse Leks on the Idaho National Laboratory Site

Quinn R. Shurtliff and Jericho C. Whiting

December 2009

S.M. Stoller Corporation
120 Technology Drive
Idaho Falls, ID 83401

Prepared for:

U.S. Department of Energy-Idaho Operations Office
Environmental Surveillance, Education and Research Program
Contract No. DE-AC07-06ID14680

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

Populations of greater sage-grouse (*Centrocercus urophasianus*) have experienced distribution-wide declines over the past several decades (Connelly and Braun 1997; Connelly et al. 2004). These reductions are correlated with extensive degradation and loss of sagebrush habitat (*Artemisia* spp.) upon which sage-grouse are highly dependent (Patterson 1952; Leonard et al. 2000). As a result, greater sage-grouse have been petitioned multiple times since 1999 for protection under the Endangered Species Act of 1973 (Connelly et al. 2004). Although the most recently completed review by the U.S. Fish and Wildlife Service (January 2005) states that greater sage-grouse is "not warranted for listing," careful monitoring of populations will play a critical role in land-use decisions and management of this species to avoid the possibility of a future listing.

In Idaho, the number of sage-grouse is relatively high on the Upper Snake River Plain compared with other locations within the state; yet these southeastern Idaho populations have also declined in recent decades (Leonard et al. 2000). The Upper Snake Local Working Group (2009; hereafter USLWG) reports an average of 40-50 percent decline in sage-grouse populations based on long-term averages of lek route data. Populations in this region appear to be stable since 1996 (USLWG 2009).

A large proportion of relatively undisturbed sagebrush habitat is located on the Idaho National Laboratory Site (INL Site), 2,316 km^2 of land located in the upper Snake River Plain of southeast Idaho that is administered by the United States Department of Energy (DOE). In 1975, the INL Site was designated a National Environmental Research Park (Reynolds and Trost 1980). Between 1978 and 1980, Connelly (1980) used both fixed wing aircraft and four-wheel drive vehicles to identify 59 sage-grouse leks located on or near the INL Site (then called the Idaho National Engineering Laboratory or INEL). Based on lek census data, Connelly (1980) determined that sage-grouse populations across the INL Site were stable or increasing at that time.

To properly manage greater sage-grouse populations in southeast Idaho, it is essential that populations are monitored so that appropriate corrective action can occur if this species begins to decline. After the work of Connelly (1980), little monitoring of sage-grouse populations on the INL Site occurred until 1995 when DOE-funded contractors began surveying two lek routes near the southeastern and southwestern borders. These lek routes have since been monitored annually. In addition, the Idaho Department of Fish and Game (IDF&G) has monitored a lek route along the northern border for several years. Currently, 26 sage-grouse leks are known to be active on the INL Site (Figure 1). In addition, there are 61 leks documented either by Connelly (1980) or the IDF&G that were historically active, but for which the current status is unknown.

Because the only reliable data for estimating long-term population trends is information on lek attendance, activity, and distribution (Connelly et al. 2004), our long-term objective is to conduct a multi-year survey of historic leks that were previously identified by the IDF&G and Connelly (1980) to determine if those sites are still used by sage-grouse. Herein, we report results from the first year of lek surveys that were conducted during spring 2009.

2. METHODS

Lek surveys were conducted on and adjacent to the INL Site in Bingham, Butte, Clark, and Jefferson counties of southeast Idaho (Figure 1), the habitat and topography of which have been described elsewhere (Connelly et al., 1988). Most historic lek sites were arbitrarily grouped into 15 zones with 2-7 sites per zone (Figure 1). The largest zone comprised the area around the National Security Test Range (NSTR). Although 61 historic sites are documented, we surveyed only 57 because the remainder had either been displaced by human activity or a known active lek was in close proximity. For example, two of these sites, north of zone M (Figure 1), are located in what is now a large gravel pit. An active lek is already known to occur in the gravel pit, and so these two sites were not included in the survey. A historic site south of zone M was also not included because it is located in a large clearing near a known active lek. One historic site in the southwest corner of the INL Site (labeled T1/T12) was not included in a zone because it is located on a road and was easily monitored while driving between zones.

During each visit to a lek site, the following data were collected: date, time, wind speed, temperature, percent cloud cover, estimated area of the lek, and the number and sex of grouse observed. Because the probability of observing grouse on a lek decreases 90 minutes after sunrise (Jenni and Hartzler 1978, Connelly et al. 2003), we report the number of minutes before or after sunrise that the survey was conducted. Sunrise times were based on estimates for Arco, ID, and were obtained from http://www.sunrisesunset.com/. We also photographed each site and searched for sign (e.g., feathers, tracks, and scat) that grouse had recently visited the area.

We plotted historic lek coordinates in ArcGIS and then transferred those coordinates to a hand-held GPS unit that was later used to find the precise location of the leks on the INL Site. Before approaching a lek, we used binoculars to search the site for sage-grouse. Next, we attempted to detect sage-grouse strutting using both the unaided ear and a parabolic microphone. If no grouse were detected, we walked ~100 m from the center of the lek in each of the cardinal directions, and then listened again for male calls for two minutes using the parabolic microphone. If strutting grouse were heard, we attempted to locate the new lek by walking or driving towards the call. When sage-grouse were observed or flushed from areas other than those identified as historic lek sites, we recorded GPS coordinates and estimated the number of males and females. In most cases, we returned to these new sites another day in an attempt to document activity at leks.

Two sets of criteria have been set forth for determining whether a lek should be designated active. Connelly et al. (2000*a*) suggested a lek be designated active only if it is attended by ≥ 2 male sage-grouse in ≥ 2 of the previous 5 years. More recently, the IDF&G issued criteria that allow a lek to be designated active if it has been attended by ≥ 2 males during a single breeding season (Idaho Department of Fish and Game, unpublished document). Using these new criteria, acceptable documentation includes observations of birds using the site or evidence of recent grouse activity (e.g., fresh droppings, feathers). If there are insufficient data for a lek to be designated active, it is given a status of inactive or unknown. Acceptable evidence that a lek is inactive includes (1) an absence of ≥ 2 males male during 2 or more surveys, (2) surveys were separated by ≥ 7 days, (3) the weather was clear or partly cloudy and winds were < 10 km/h, and (4) there was no obvious disturbance. If the data are insufficient to classify a lek as

either active or inactive, it is given an unknown status. Since the present report only contains data from the first year of a multi-year survey, we adopted the IDF&G criteria for designating lek status. For our data, if a surveyed lek met all of the above criteria, but the sky was mostly or fully cloudy (no rain), we still assigned it an inactive status. If no grouse were detected at a lek that was visited >90 minutes after sunrise, the lek was given an unknown status.

3. RESULTS

From March 20 to May 8, 2009, we visited 57 historic lek sites 1 to 3 times (88 total visits) between 0615 and 0945 hours. Surveys were performed, on average, 55 minutes after sunrise (SD = 47 min., range = 34 to 161 min.); however, 25 surveys (28%) occurred > 90 min after sunrise (range = 91 to 161 min). The mean wind speed was 4.7 km/h (n = 71; SD = 5.0) when recorded precisely (during 17 surveys the wind speed was recorded as a bracketed number: 8-16 km/h), with a maximum of 18.7 km/h. Mean temperature was 2.8° C (SD = 3.9°, range = -3.9° to 14.4°). We did not detect sage-grouse during surveys conducted in connection with the most extreme weather events, such as when it was raining (n = 3) or when the wind speed was > 6 km/h (n = 19). However, the median wind speed when grouse were detected (2.1 km/h) was similar to the wind speed when grouse were not detected (3.2 km/h). Furthermore, there was no difference in mean temperature between grouse-detected and grouse-not-detected groups (mean was 2.8° C for both groups).

We detected sage-grouse, either visually or audibly, on or near 14 historic and 2 previously undocumented leks (T8 and T13 were undocumented; Table 1, Figure 2). Ten sites wherein grouse were detected had been visited 2 or 3 times, and we detected sage-grouse more than once at 6 of the 10 sites. At least two males were detected on all but one (N5) of the 16 sites during the survey period. Of the 43 leks where sage-grouse were not detected, 18 (42%) were surveyed twice.

Based on our results, we classified each lek according to the IDF&G criteria (Table 2). At lek N5, only one male was observed even though the site was surveyed 3 times (Table 1). As such, there were insufficient data to give N5 an active status. We designated the other 15 leks where sage-grouse were detected (including 2 that were previously undocumented) as active. In addition, we designated 6 leks as inactive and 37 as unknown (Table 2, Figure 2). Lek J1 was the only lek for which data were not collected. Consequently, it was classified as status unknown.

4. DISCUSSION

It has been nearly 30 years since most of the historic leks surveyed in this report have been monitored. Given that all leks originally identified by Connelly (1980) and the IDF&G (Figure 2) were once active, the low number of historic leks with sufficient data to be designated active (i.e., 23% - not including the previously undocumented leks) may be an indicator of substantial population declines in recent decades. Decreasing sage-grouse numbers have been reported in southeast Idaho (Connelly et al. 2000*b*, Leonard et al. 2000) since the 1970s. However, recent reports indicate that population levels are stable (USLWG 2009). Possibly, sage-grouse numbers declined throughout the 1980s and 1990s to current levels, and have remained at the current low levels over the past decade.

There are at least two alternative reasons why we may not have identified more active leks. First, although sage-grouse numbers are likely lower than in the late 1970s, there is a high probability that some leks that were assigned an inactive or unknown status are actively used by grouse, but that we failed to detect them. Nearly 60% of leks with an unknown or inactive status were surveyed only once. Of the 10 active leks that were visited more than once (22 total surveys), grouse were not detected during 6 visits (27%). If the detection rate for each survey is similar among active and inactive/unknown-status leks, we may expect that 27% of the latter that were surveyed only once may indeed be active. An extrapolation based on this logic suggests that sage-grouse would have been detected on an additional 7 leks if 2-3 surveys would have been performed at each site. Therefore, perhaps up to 20 leks (35% of total) may be active, which is still low but substantially higher than the 13 (23%) active sites that we confirmed. Unfortunately, the number of historic leks that need to be surveyed, the short amount of time in which to collect data, and variable weather conditions restrict the number of visits that can be made. However, assuming that populations are stable, we expect that at least 7 additional leks will be found to be active when data are combined after 2-3 years of surveys.

A second factor that may have contributed to low detection rates is slight variation in the consistency of our survey methods. Connelly et al. (2003) suggested that lek data collected >90 minutes after sunrise should not be included in an analysis because most male strutting has ceased by that time. If our purpose was to compare data from different years or to document trends from year to year, it would be important to follow this guideline and discard data collected after 90 minutes. However, our objective was simply to determine which historic leks are active. As such, although surveying a lek more than 90 minutes after sunrise may reduce the probability of observing grouse, any grouse that are detected adds to the number of leks classified as active. One study carried out over 3 years in Montana found that the majority of males left leks between 90 and 120 minutes after sunrise (Jenni and Hartzler 1978). Thus, grouse may still be on a lek if the survey time is only slightly more than 90 minutes. At two of our active leks, grouse were observed more than 90 minutes after sunrise (Table 1). In future years, we will attempt to standardize lek survey times so that all surveys are conducted within 90 minutes after sunrise.

During the spring of 2010, we will again survey all historic leks, including the two that were newly identified in 2009. Ultimately, once all active sites are identified, our broader objective will be to quantify the number of males visiting leks from year to year (i.e., lek census) to predict population trends on the INL Site. The ability to compare contemporary lek activity with historic patterns, coupled with annual lek census data of all known active leks, will provide officials valuable information to make informed decisions regarding the management of this species on the INL Site.

5. LITERATURE CITED

Connelly, J. W. Ecology of sage grouse on the INEL site. 1980. Project No. W-160-R-7. April 1, 1979 to March 31, 1980.

Connelly, J. W., and C. E. Braun. 1997. Long-term changes in sage grouse *Centrocercus urophasianus* populations in western North America. Wildlife Biology 3:229-234.

Connelly, J. W., H. W. Browers, and R. J. Gates. 1988. Seasonal movements of sage grouse in southeastern Idaho. Journal of Wildlife Management 52:116-122.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000*a*. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Connelly, J. W., K. P. Reese, R. A. Fischer, and W. L. Wakkinen. 2000*b*. Response of a sage grouse breeding population to fire in southeastern Idaho. Wildlife Society Bulletin 28:90-96.

Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of greater sage-grouse habitats and populations. Station Bulletin 80, College of Natural Resources Experiment Station, Moscow, Idaho.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Jenni, D. A., and J. E. Hartzler. 1978. Attendance at a sage grouse lek: implications for spring censuses. Journal of Wildlife Management 42:46-52.

Leonard, K. M., K. P. Reese, and J. W. Connelly. 2000. Distribution, movements and habitats of sage grouse *Centrocercus urophasianus* on the Upper Snake River Plain of Idaho: changes from the 1950s to the 1990s. Wildlife Biology 6:265-270.

Patterson, R. L. 1952. The sage grouse in Wyoming. Sage Books, Inc. Denver, CO, USA, pp. 341

Reynolds, T. D., and C. H. Trost. 1980. The response of native vertebrate populations to crested wheatgrass planting and grazing by sheep. Journal of Range Management 33:122-125.

Upper Snake Sage-grouse Local Working Group. June 2009. Plan for increasing sage-grouse populations. Pp. 63. Available at: http://fishandgame.idaho.gov/hunt/grouse/conserve_plan/upsnake_workplan.pdf

Table 1. Lek survey data from 2009, where at least one sage-grouse was detected. Although grouse were not detected during every survey, they were detected at least once at all sites listed. Sites T8 and T13 have not been documented previously as active leks.

Lek group	Lek #	Date	Min. (+/-) from Sunrise	Wind Speed (km/h)	Temp (C)	Grouse Present	Observed	Males	Females	Easting	Northing
B	3	24-Apr	49	3.2	7.2	Yes	3	2	1	341256	4835955
B	3	8-May	34	3.5	-2.8	Yes	6	5	1	341256	4835955
C	2	27-Apr	44	2.1	2.2	Yes	21	18	3	344537	4840856
E	4	14-Apr	129	5.6	4.4	Yes	2	?	?	355340	4831131
E	4	4-May	154	2.6	3.3	No	0	0	0	355340	4831131
G	1	10-Apr	1	2.6	3.3	Yes	0	3	0	380890	4837742
G	1	30-Apr	23	0	-2.8	No	0	0	0	380890	4837742
G	2	13-Apr	70	4.7	5.6	Yes	0	3	0	383387	4840981
G	2	30-Apr	76	1.9	-2.8	Yes	7	5	2	382100	4839989
J	3	21-Apr	17	0	6.7	Yes	24	22	2	336904	4811869
K	1	17-Apr	43	2.3	1.1	Yes	5	0	0	342041	4815692
K	3	17-Apr	-22	4.2	-1.1	Yes	2	2	0	344937	4816207
L	4	22-Apr	-5	4.3	6.1	Yes	18	16	2	331686	4811942
N	3	20-Mar	124	8-16	1.7	Yes	>85	?	?	356068	4875331
N	3	2-Apr	82	8-16	1.7	No	0	0	0	356068	4875331

Table 1. (Continued).

Lek group	Lek #	Date	Min. (+/-) from Sunrise	Wind Speed (km/h)	Temp (C)	Grouse Present	Observed	Males	Females	Easting	Northing
N	4	20-Mar	69	8-16	1.7	Yes	21	7	14	357165	4873404
N	4	2-Apr	35	8-16	1.7	Yes	6	6	0	357165	4873404
N	4	13-Apr	6	8-16	1.7	Yes	2	2	0	357165	4873404
N	5	20-Mar	24	8-16	1.7	Yes	1	1	0	359221	4872641
N	5	7-Apr	61	8-16	-1.1	No	0	0	0	359221	4872641
N	5	13-Apr	36	8-16	1.7	No	0	0	0	359221	4872641
NSTR	7	22-Apr	9	0	4.4	Yes	3	3	0	366099	4844300
T1/T12		6-May	21	5.3	4.4	Yes	0	1	?	329437	4815907
T1/T12		20-Apr	93	0	11.7	Yes	1	1	0	329437	4815907
T	13	21-Apr	-21	0	1.1	Yes	6	6	0	334412	4813852
T	13	22-Apr	-24	0	2.8	Yes	5	5	0	334412	4813852
T	8	13-Apr	-24	0	3.9	Yes	8	?	?	378430	4838326
T	8	30-Apr	11	0	-2.8	Yes	17	15	≥ 3	378430	4838326

Table 2. All historical and newly discovered leks and their designated status after surveys in 2009. Status designations are based on criteria set by the Idaho Department of Fish and Game in 2009.

Historic Lek	Status	Historic Lek	Status
A1	Unknown	K1	Active
A2	Unknown	K2	Unknown
A3	Unknown	K3	Active
B1	Unknown	L1	Inactive
B2	Unknown	L2	Unknown
B3	Active	L3	Unknown
C1	Unknown	L4	Active
C2	Active	M1	Inactive
D1	Unknown	M2	Inactive
D2	Unknown	M3	Unknown
D3	Unknown	M4	Unknown
E1	Inactive	M5	Unknown
E2	Unknown	M6	Unknown
E3	Unknown	N1	Unknown
E4	Active	N2	Unknown
F1	Unknown	N3	Active
F2	Unknown	N4	Active
G1	Active	N5	Unknown
G2	Active	N6	Unknown
G3	Unknown	N7	Unknown
H1	Inactive	NSTR1	Unknown
H2	Unknown	NSTR2	Unknown
I1	Unknown	NSTR3	Unknown
I2	Unknown	NSTR4	Unknown
I3	Inactive	NSTR6	Unknown
J1*	Unknown	NSTR7	Active
J2	Unknown	NSTR8	Unknown
J3	Active	T8	Active
J4	Unknown	T13	Active
		T1/T12	Active

*This lek was not surveyed in 2009.

Figure 1. Known active and historical leks on and near the INL Site in southeast Idaho prior to the 2009 lek surveys. The heavy black line represents the boundary of the INL Site. The white dotted line is the boundary of the National Security Test Range (NSTR). Roads are identified with faint white lines. Historic leks originally identified by Connelly (1980) are red and those identified by the IDF&G are yellow. The 26 currently known active leks (blue dots) were grouped into 15 routes (A-N and NSTR) for the surveys documented in this report.

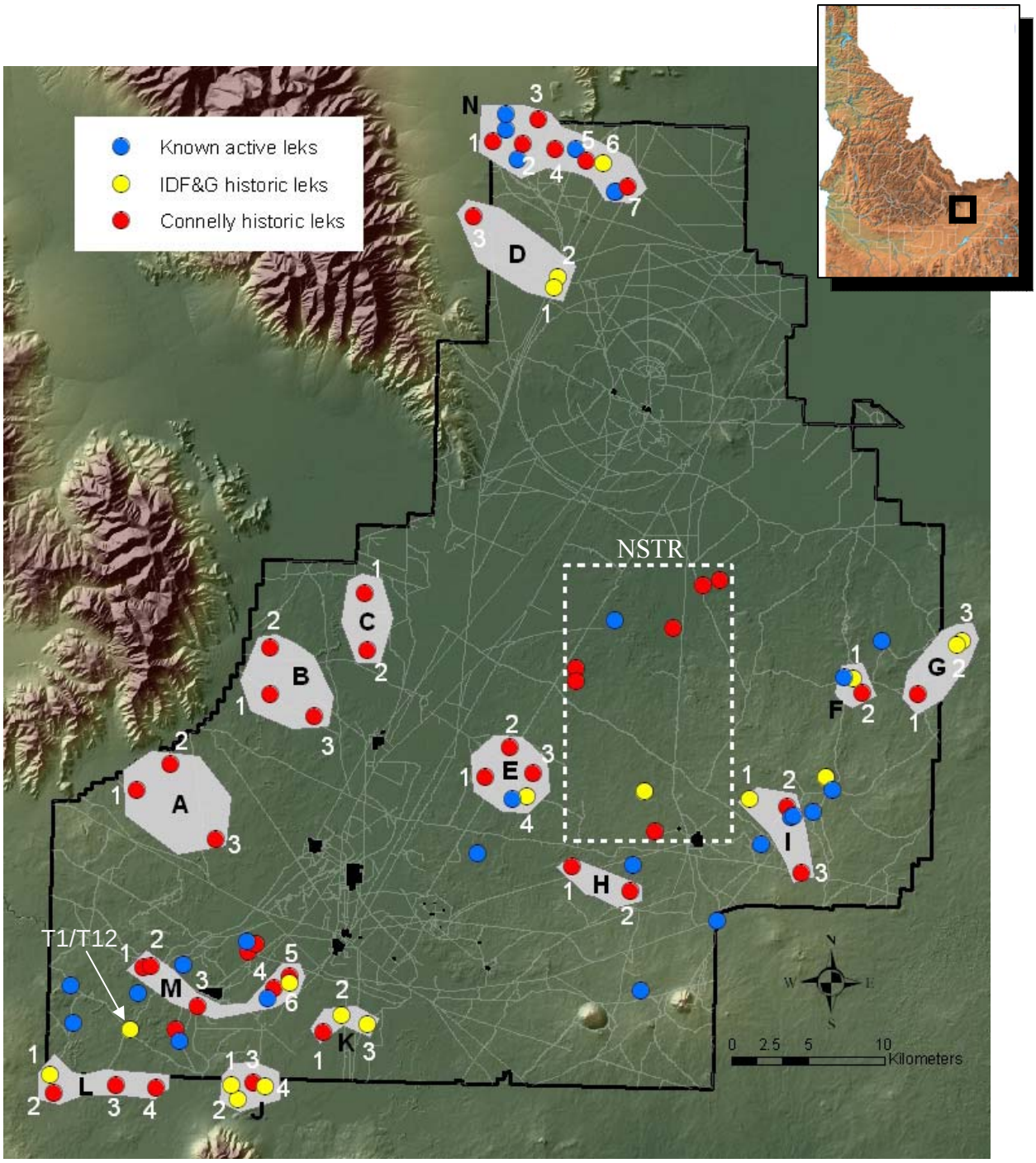

Figure 2. Current distribution of known and historic leks on the INL Site after completion of the 2009 lek surveys. Historic leks originally identified by Connelly (1980) are red and those identified by the IDF&G are yellow. Leks known to be active prior to 2009 are indicated by blue dots whereas the 15 active leks identified in the current study are marked with a circled crosshair. In several instances, the location of leks identified in the current study was shifted slightly from its historical coordinates, as is evident when the crosshairs do not line up directly with the underlying dot. The two previously undocumented leks, T8 and T13, are identified.