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2021 Utah Greater Sage-grouse Lek Counts: What do they mean?

By Avery Cook and Heather Talley, Utah Division of Wildlife Resources

The life history of the greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) is tightly woven around leks and leks are a visible center of important sage-grouse habitats. Leks are associated with critical nesting and early brood rearing habitats, and generally located within nesting habitat used by nesting sage-grouse hens, with the majority of nesting within 3.1 miles of a lek. Annual counts of male sage-grouse on leks has been shown to accurately reflect population changes. The effectiveness of lek counts as population index and relative ease of data collection leads to lek counts forming the basis of most sage-grouse management and population monitoring.

Photo of male sage-grouse at a lek. Courtesy of UDWR.

The Utah Division of Wildlife Resources (UDWR) maintains lek records extending back to 1959. The UDWR focused tremendous energy and resources into locating sage-grouse leks and defining populations during the 1960s and 1970s. Over the time period for which data is available there is a consistent cyclic behavior with a peak and trough every 8 to 10 years. Since 1959 we have seen an increase in the number of sage-grouse counted in Utah, however the raw counts are confounded by increasing levels of effort put into counting known leks and searching for unknown leks. To compensate for additional effort increasing raw counts, average males per lek is also calculated and provides an index of population change less impacted by counting effort. Records of lek locations and counts form one of the most extensive and continuous monitoring systems for this species across its range. While ground searching for new leks continues, the majority of work is directed toward monitoring known leks.

Range wide loss of sagebrush habitat and concomitant decreases in populations has led to a number of petitions for listing under the Endangered Species Act. Sage-grouse were found warranted but precluded from listing in March of 2010, then in in October of 2015 were found not warranted for listing. However, they are still vulnerable to habitat loss and other factors and remain a Wildlife Species of Concern in Utah. As a Species of Concern considerable management time, effort and funding is dedicated to conservation of sage-grouse.

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Although of tremendous effort has been invested in lek searches, there are many areas of the state that remain relatively poorly surveyed for the existence of sage-grouse leks. Leks also have the potential to shift locations over time in response to vegetation and population changes making continued lek searches necessary for ongoing monitoring of sage-grouse populations. Ground searches are conducted by UDWR employees, researchers, agency partners, private landowners, and others. New leks found via ground based searches are incorporated into the state lek database as an active lek once reported and verified in a second year

In addition to ground based searches aerial lek searches have enabled a more systematic search for leks in remote and poorly accessible throughout the state. Aerial searches allow leks to be found in remote areas, in areas with impassable roads, or areas that are otherwise inaccessible. Aerial searches also allow a large area to be surveyed more thoroughly than is possible via ground based searches. Aerial surveys also reduce the time necessary to obtain permission to access private lands or other limited access areas.

In 2021, 357 sage-grouse leks were visited in Utah's Sage-grouse Management Areas (SGMAs, Figure 1). Of these leks, 184 had at least one male counted. Across all leks counted within SGMAs there was a high count of 2127 males, for an average of 11.6 males per lek (Figure 2). Within SGMAs 27 leks counted were classified as undetermined. These undetermined leks contributed 83 males to the total count. There were not any male sage-grouse counted on undetermined leks outside of SGMAs (Figure 3).

Statewide lek counts within SGMAs were down 2.2% from 2020 counts, with 2126 male sage-grouse counted on 183 leks within SGMAs. This continues the overall trend of declining population totals since the last peak in 2015. Although populations increased slightly in 2020 over 2019, and 2021 counts are still slightly above 2019 if current patterns matched past cyclic behavior, Utah populations should have increased this year. The peak years and low continue to decrease with each cycle of the populations – the low years are lower and the high years do not reach the previous peaks. Previous low years in 2002, 2011 and 2019 had 3,034, 2,710 and 2,094 males counted respectively. At the same time, Utah increased counting effort visiting 192 leks in 2002, 266 leks in 2011, 305 in 2019, and 357 in 2021. Effort is increasing each year, with accompanying decrease in males per lek and total males; with equal effort across years we would likely see a steeper decline in long term sage-grouse counts.

However, population changes were inconsistent across the state with 4 SGMAs showing increases in counts and 7 showing decreases. An additional 103 male sage-grouse were counted outside of SGMAs for total of 2229 male sage-grouse counted state-wide. Statewide 385 leks were counted at least once with males being detected on 196 leks.

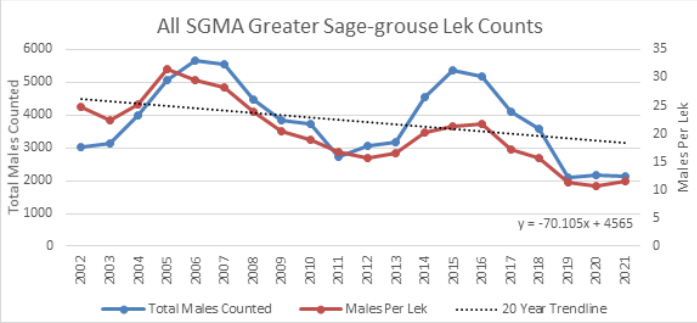

Figure 1. Total high count for all Sage-grouse Management Areas within Utah over the past 20 years and males counted per lek for leks with males present. The trend line is fitted to total males counted and represents an overall annual change across two population cycles.

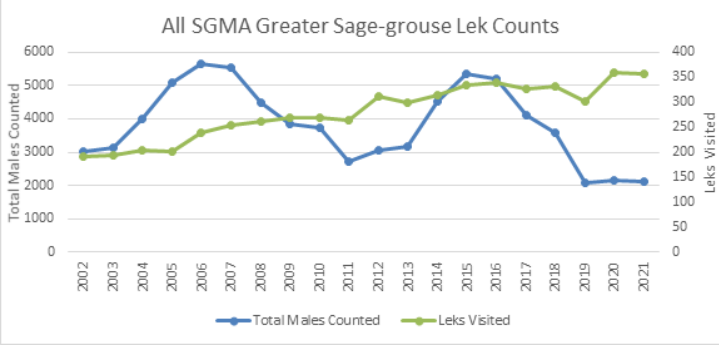

Figure 2. Number of leks visited each lekking season in Utah relative to the total number of males per lek. More leks are being counted to maintain the same overall total male counts.

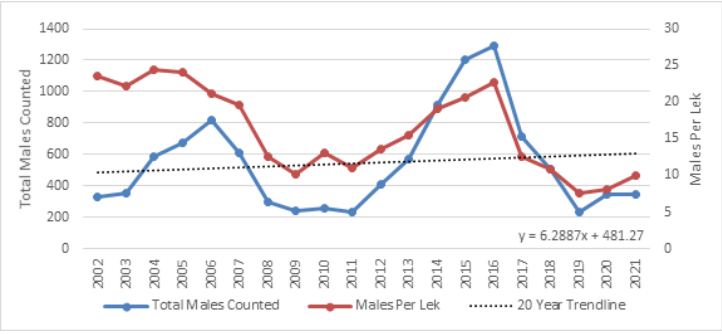

Figure 3. Average males per lek for all leks with at least one male counted and total number of males counted outside of Sage-grouse Management Areas. Trend line represents a linear regression for total males counts from 2001 to 2020.to 2021.

Continued on Page 3.

2021 Utah Greater Sage-grouse Lek Counts: What do they mean? cont.

Outside of designated SGMAs 30 leks were visited, of those male sage-grouse were detected on 13. A total of 103 male sage-grouse were counted, for an average of 7.9 males per lek. From 2020 to 2021 the Non-SGMA counts decreased by 35.2%. Counts were up over the past 20 years, increasing at an average annual rate of 2.6% per year (Figure 3). Systematic greater sage-grouse aerial lek searches are conducted annually to document new or previously unknown leks. Surveys are conducted by a contractor using infrared imaging from a fixed wing aircraft. In 2021, five mornings were spent searching Rich-Morgan-Summit SGMA and adjacent area for sage-grouse leks using IR fixed wing surveys. Surveys were conducted in low density areas.

The Utah office of the Bureau of Land Management adapts management actions based on a set of adaptive management triggers developed and evaluated in conjunction with the UDWR. In 2021 lek counts tripped Hard Triggers in the Bald Hills (Figure 4), Box Elder (Figure 5), Panguitch, and Parker Federal Population Areas (Figure 6), and a soft trigger in the Hamlin Valley Federal Population Area.

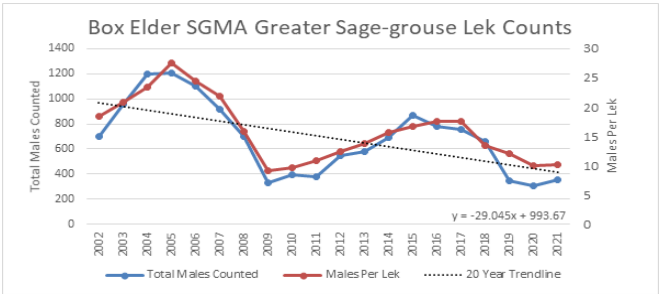

Figure 4. Average males per lek for all leks with at least one male counted and total number of males counted within the Box Elder Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2002 to 2021.

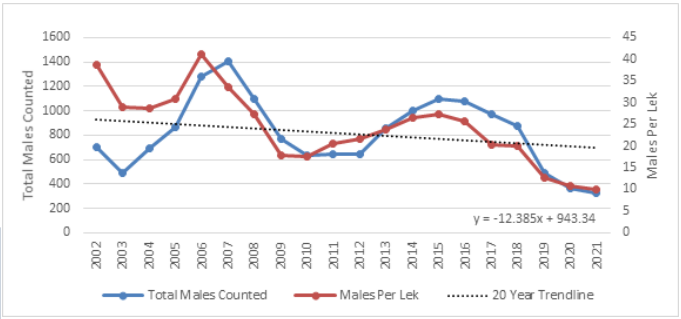

Figure 5 (to the right). Average males per lek for all leks with at least one male counted and total number of males counted within the Parker Mountain-Emery Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2002 to 2021.

What are BLM Adaptive Management Triggers?

By Terry Messmer, Utah State University

The Utah state of the Bureau of Land Management meets with the Utah Division of Wildlife Resources to review and discuss management actions when a Utah sage-grouse population hits an adaptive management population trigger. The triggers were jointing developed and are based on metrics of males per lek on trend leks (MPL) in each federal population area and overall population change (lambda) for all leks within federal Priority Habitat Management Area (PHMA) in each federal population area. It is important to note that the BLM population areas are similar to Utah Sage-grouse Management Areas; however, there are differences in area and leks included. Hitting a soft or hard trigger, does not necessarily result in an immediate change in management as a number of factors to include drought can affect sage-grouse populations (see 2019 Utah Conservation Plan for Greater Sage-grouse; https://wildlife.utah.gov/greater-sage-grouse.html).

Soft Triggers

1a) 4 consecutive years of 10% or greater annual decline in average males per lek in each year, based on "trend leks"

OR

1b) 6 consecutive years of declining average males per lek in each year, based on "trend leks"

OR

1c) 40% or greater decline in average males per lek in any single year, based on "trend leks" for the 4 years covered by lambda values in soft trigger question 2

OR

1d) 50% or greater decline in average males per lek in a 4 consecutive year period, based on "trend leks"

AND

2) Lambda of less than 1 in 4 consecutive years, based on all leks in the PHMA.

Hard Triggers

a) 4 consecutive years of 20% or greater annual decline in average males per lek in each year, based on "trend leks"

OR

b) Average males per lek, based on trend leks, drops 75% below the 10-year rolling average males per lek in any single year (not a 75% decrease, but a decline under 25% of the 10-year rolling average)

OR

c) Lambda of less than 1 in 6 consecutive years, based on all leks within the PHMA

OR

d) Lambda of less than 1 in 8 years of a 10 year window, based on all leks within the PHMA

Translocating Sage-grouse to North Dakota

By Dave Dahlgren, Utah State University

Translocations have become an important management option for declining sage-grouse populations. Utah's own Strawberry Valley, Anthro Mountain, and Sheeprocks populations have benefited from this practice. Augmenting struggling grouse populations has many issues, such as the high mortality rate of birds released into a novel environment, the large movements of females translocated prior to nesting, in other words during the lekking period (which is related to their high mortality), the lack of fidelity the translocated grouse have to their new home, and the potential impacts of removing grouse from the source population.

The North Dakota sage-grouse population lies at the northeastern edge of the species distribution in western North America and has experienced declines like many other areas. The West Nile Virus had significant impacts in the mid-2000s, and the population declined precipitously after that. North Dakota Game and Fish Department (NDGF), with the encouragement of the Western Association of Fish and Wildlife Agencies (WAFWA), began discussing the idea of translocations, and plans were made to start releasing grouse in the spring of 2017. NDGF approached me to provide a graduate student as part of the project. NDGF and USU teamed up with Dr. Peter Coates with U.S. Geological Survey (USGS) for project planning and implementation.

Along with the translocation issues mentioned above, the project design included assessment of artificial insemination (AI) of females prior to release and the development brood translocation methods. A parallel translocation study was taking place in the Bi-State sage-grouse population along the California/Nevada border. These were the first translocation studies that also monitored the source populations to understand potential impacts from removal of female sage-grouse. After discussions with other states, the Wyoming Game and Fish Department (WGFD) stepped up and offered to provide the source population for augmentation to North Dakota from the Stewart Creek area just north of Rawlins, Wyoming (see Figure 1).

In 2017, 40 pre-nesting female sage-grouse were radio-marked and translocated from Wyoming to North Dakota. Lek counts in North Dakota in 2016 were extremely low, and even lower during the 2017 lekking period. The 40 females were divided into thirds, with one group receiving AI, one group receiving a sham (no semen included) AI, and one group receiving no treatment prior to release. We also trapped and radio-marked 20 females within the source population for monitoring of reproduction and survival. With concerns for a lack of males on leks, a quick decision was made to radio-mark and translocate 20 male sage-grouse to North Dakota, in addition to the 40 females that had already been released. Unfortunately, there was a severe drought in southwest North Dakota in 2017 that caused high female mortality and low reproductive success.

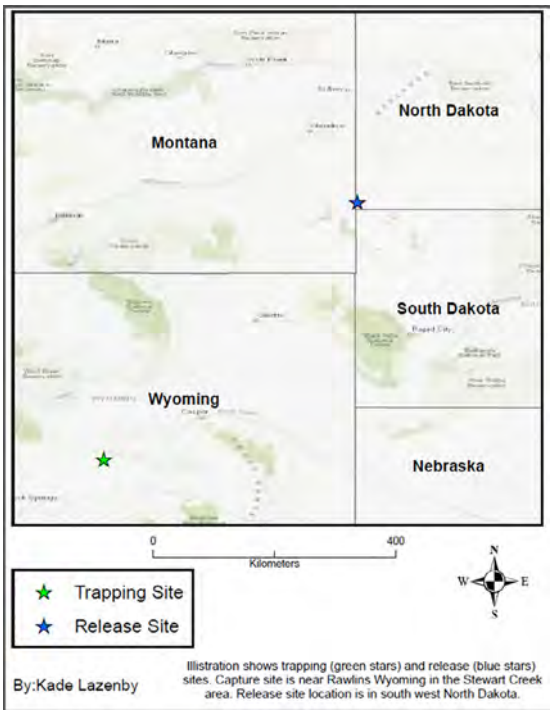

Figure 1. Study area locations. Illustration shows trapping (green stars) and release (blue stars) sites. Capture site is near Rawlins, Wyoming in the Stewart Creek area. Release site location is in south west North Dakota. Figure courtesy of Kade Lazenby.

In the spring of 2018, 20 males and 20 pre-nesting females (same 1/3 division of females for AI assessment) were radio-marked and released in North Dakota. Twenty-seven pre-nesting females were trapped and released in the source population. A portion of those females were meant to boost the sample of females monitored within the source population and some were trapped with the intent to translocate them later in the summer, if they had successful nests, as brood females with their chicks. In June, we recaptured and translocated 4 brood females that had been radio-marked previously. We also trapped 2 brood females that had not been marked during the spring. All 26 chicks with brood females were trapped, radio-marked, and released with their brood female. We developed a brood transport box with two compartments, one for the brood female and one for the chicks, with removal divider (see Figure 2). Once at the North Dakota site, the brood transport box was positioned within a small release pen, the divider removed so that the chicks and brood female could interact, and a door to the chick compartment was remotely opened so that the brood female had to walk past her chicks to leave the brood box. Each brood was monitored in nearby ground blinds and once the female and chicks were acting like a normal brood, a large door was opened allowing the brood female and chicks to leave the brood release pen together (see https://youtu.be/qDilS_s1VJQ for a video of a brood release). Of the 6 broods released in 2018, 5 were highly successful while one brood suffered exposure when the brood female became separated from her chicks. We adjusted the brood pen and added 50+ foot guide fencing expanding out from the release pen to help keep the brood together spatially as they moved farther from the release pen. These adaptations worked well once implemented.

In 2019, due to the success of brood translocations in 2018 and the lack of success from our AI preliminary assessment, we focused on brood translocations. Twenty males were trapped and translocated during the lekking period. We captured, radio-marked, and translocated 10 brood females with 40 chicks total during the brooding period in June and early July. An additional 9 non-brooding females were captured, marked, and translocated in late July. This resulted in more success, especially for the broods that were translocated. We also started to find reproductive success for translocated females from previous years that survived to 2019.

In 2020, due to COVID restrictions, we did not trap and translocate males in the spring. However, we were able to capture, radio-mark, and translocate 19 brood females with 108 chicks total. We also trapped, radio-marked, and released 20 more pre-nesting females within the source population. Translocated broods continued to be successful with about 50% brood survival and multiple chicks recruited into the North Dakota population.

Preliminary analyses have shown the following:

- Females translocated as broods showed far less movement post-release and higher survival than females translocated in the spring.
- Brood translocations allow for higher nest initiation and success rates by leaving the females in the source population and only translocating them after the chicks have hatched and grown a little.
- Population analyses have shown stability to the North Dakota population due to translocation efforts.
- There were no negative impacts to the source population by removing individuals for translocation, and by moving broods far less reproductively active females are taken away further decreasing the probability of negative impacts to the source population.

Overall, the North Dakota translocation project has been highly successful and led to the development of a new technique that shows promise for future translocations. As sage-grouse populations continue to become more isolated and decline, translocations will become a more frequently needed management option to help conserve the species. This project has built upon previous translocation studies to help increase the probability of success in the future.

Acknowledgements: the primary funding for this project came from NDGF, while WGFD also contributed support for monitoring of the source population.

Figure 2. Brood transport and release box with two compartments separated by a removable divider and a remote release door where the brood-female is forced to move past her chicks before leaving the box. Photos courtesy of Dave Dahlgren.

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If it's not good for communities, it's not good for wildlife.

New Graduate Student to Study Wildlife Crossing Structure

By Blake Ledbetter, Utah State University

My current project is focusing on the Wildlife Crossing structure over I-80 at the summit of Parley's Canyon to document species crossings, the timing, behavior, and nature of those crossings all while comparing the success of this crossing to other crossings that have been built. An additional part of his study is to find if this structure is effective in mitigating wildlife-vehicle collisions in this section of the canyon.

I started my wildlife journey in my hometown at Haywood Community College (a small college nestled in the Smoky Mountains of western North Carolina) and moved on from there to get my B.S. in Wildlife and Fisheries Science from The University of Tennessee. Shortly after, I earned my Associate Wildlife Biologist certification and got accepted as a Master's candidate in the Wildlife Resources Department at Utah State University majoring in Wildlife Biology. Working with a wide variety of species from Douglas squirrels in Washington to Elk in North Carolina all the way down to endangered bats in Louisiana, I never really stayed in one place for too long. I held onto my passion for wildlife the whole way and never took life too seriously!

Utah's Community-Based Conservation Program Mission

Utah's Community-Based Conservation Program is dedicated to promoting natural resource management education and facilitating cooperation between local communities and natural resource management organizations and agencies.

www.utahcbcp.org

New Staff Member Joins the Community-based Conservation Program

By Rae Ann Hart, Utah State University

Time sure flies! After 34 years, it is time for me to retire from Utah State University and move on to other pursuits. I will miss working with all of you and wish you the best for the future.

Please welcome Angie Jensen to the Community-Based Conservation Program team. She will begin October 25 and brings a wealth of experience that will benefit the program. Angie has worked at Utah State University and also runs a small business. You can contact Angie at angie.jensen@usu.edu or 435-797-2556.

Photo of Angie Jensen, new member of the Community-based Conservation Program team.