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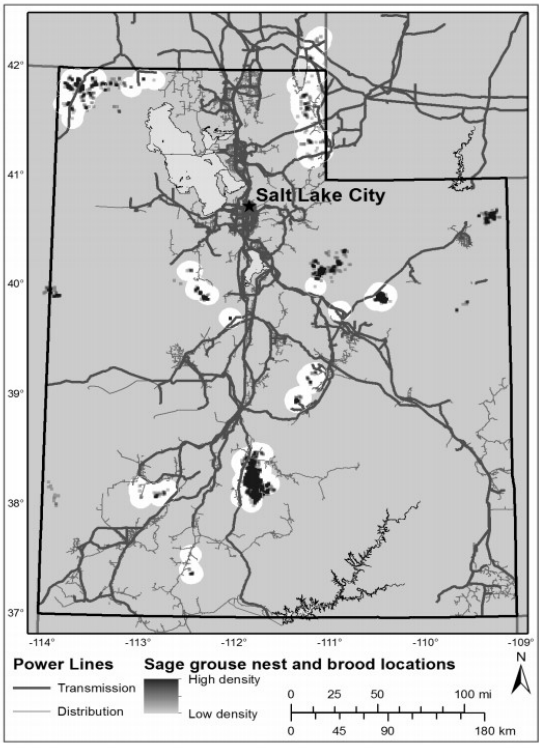
Long-term Research Sheds New Light on Power Line and Sage-grouse Interactions

By Michel Kohl, Utah State University

In the western U.S., electric power transmission and distribution lines (power lines) occur in sagebrush landscapes within the range of the greater and Gunnison sage-grouse. With the decades long decline of sage-grouse attributed habitat loss and fragmentations, policy makers expressed concerns that power lines placed in sagebrush habitats were contributing to the species declines because of increased predation risks associated with predators that perch on the power lines.

The U.S. Fish and Wildlife Service and the Avian Power Line Interaction Committee (APLIC), a collaborative of electric utilities, resource agencies, and conservation organizations, recommended the use of various buffer distances as best management practices (BMPs) between tall structures and occupied sage-grouse habitats to mitigate the potential impacts.



Densities of sage-grouse nest and brood locations relative to power lines in Utah.

Researchers from Utah State University (USU), Brigham Young University, and APLIC have now shed new light on the questions regarding sage-grouse and power line interactions and added more certainty for BMPs for sage-grouse that inhabit the state of Utah. According to Sherry Liguori, APLIC and a member of the research team, "because of the lack of research, there remains no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range. The lack of research has also confounded the difficulty in assessing effects of power lines on sage-grouse and impeded the construction of new power lines to serve the growing demand for energy," she concluded.

To complete the work, the researchers evaluated the effects of power lines on sage-grouse breeding ecology within Utah, portions of southeastern Idaho, and southwestern Wyoming using data collected 1998-2013. The study was recently published in the open access journal PLOS One. Over-

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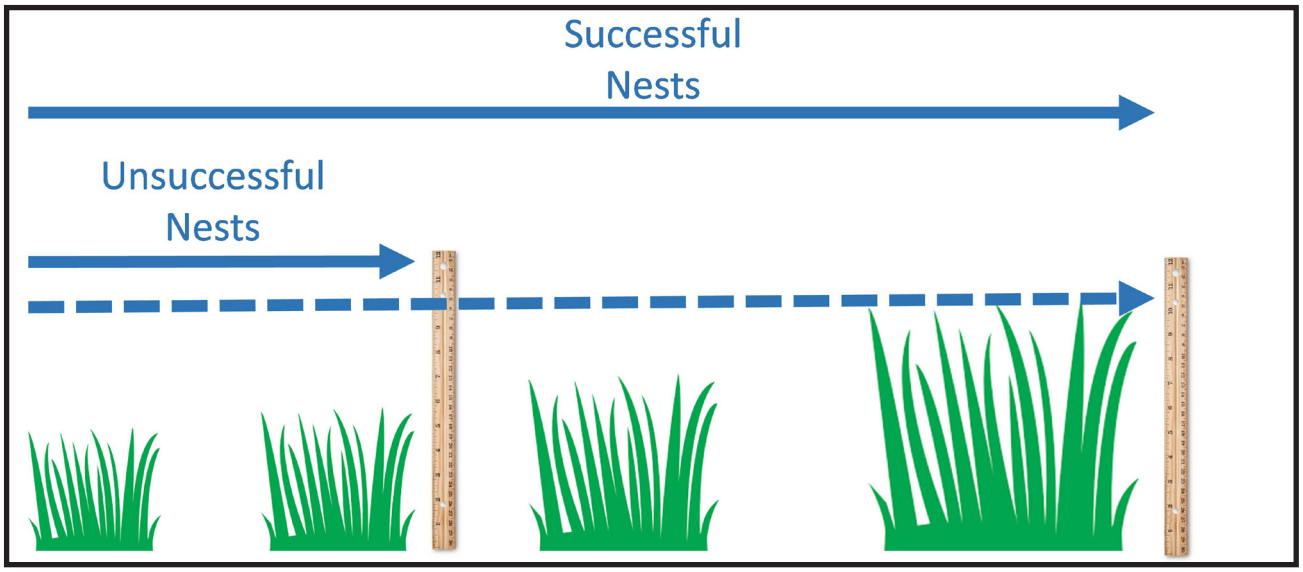
In This Issue

Livestock Grazing and Sage-grouse: Science, Policy, and the 7-inch Rule

By David Dahlgren, Utah State University Extension

A new USU Extension Fact Sheet published in April 2019 shed new information on livestock grazing and sage-grouse (https://digitalcommons.usu.edu/extension_curall/1966/). This fact sheet addressed recent changes in the scientific understanding of the relationship between grass height and sage-grouse nest survival. In the past, the available published research seemed to support a general "7-inch Rule." This rule was incorporated into sage-grouse policy and plans for managing grass height in sage-grouse nesting habitat. The 7-inch Rule stated that, on average, grass stubble height should be at least seven inches within nesting habitat. However, research published in 2016 and 2017 demonstrated that past research supporting the 7-inch Rule unintentionally included a bias when analyzing the relationship of grass height to sage-grouse nest survival. The bias was based on grass phenology (i.e., the timing of grass growth during the growing period). At the time a nest failed (e.g., predation, abandonment) researchers would measure the vegetation at a nest site within a few days. The same measurements were taken within a few days of a nest successfully hatching. The problem is that failed nests occur earlier in the growing season when grasses would inherently be shorter compared to later in the season when a nest hatches, thus creating a bias in plant phenology when past studies analyzed the relationship of grass height to nest survival. See the figure below for a visual demonstration. The full article can be freely downloaded at the website referenced above.



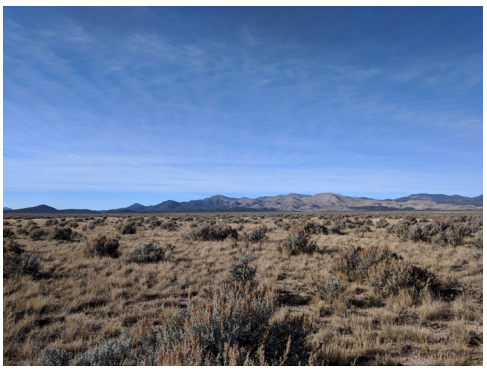
A simple demonstration of how sampling bias can affect grass height measurements within past nest survival studies. In this graphic time is represented horizontally increasing from left to right, demonstrating the seasonal growth of grasses over time. The solid lines represent when most studies completed vegetation sampling at nest sites to obtain grass heights. The dashed line represents when an unsuccessful nest "would" have had the grass measured if it had been successful.

Do Sage-grouse Respond to Thermal Variability on the Landscape?

By Aidan Beers, Graduate Student, Utah State University

Across the West, climate change is likely to have impacts at ecosystem and landscape scales, driving community disassembly and species range shifts and extirpations. But in many cases, the mechanisms by which those changes are likely to occur are not well explored, limiting our ability to accurately forecast, plan for, and mitigate impacts on vulnerable western systems across time and space. Sagebrush systems, especially in the semi-arid southern Great Basin, are among the most likely to shift in response to climate change. That leaves sagebrush obligates like the greater sage-grouse vulnerable to the direct effects of warming and the more extensive threat of habitat loss and fragmentation. Though typically measured and modeled at very broad spatial scales, temperature can vary at fine scales and animals can take advantage of that to find refuge from extreme temperatures, cold or hot. To understand how a charismatic, potentially threatened species like the sage-grouse will respond and survive, it is therefore essential to understand how individuals respond to temperature and where they are likely to seek that thermal refuge on the landscape. We have deployed dozens of temperature data loggers in Utah and Nevada at sites along the sage-grouse southern range margin. This will give us a clearer picture than is currently available of how temperature varies in sage-grouse habitat at fine scales in time and space. Paired with data from sage-grouse marked with global positioning system radio transmitters at those sites, we will attempt to describe impacts of thermal extremes on sage-grouse habitat selection and movements. This will help us determine how habitat suitability varies in time and space and vulnerability of sage-grouse to climate change impacts.

So far we have almost a year of data stored and will begin analyzing it after we collect the data loggers from the field this fall. We expect that we will be able to detect significant differences in temperatures across the landscape and hope to link that directly with sage-grouse choices in a way that has never been done before. We will publish the results in my PhD dissertation and a peer-reviewed journal.



Photos showing research area and temperature data logger. Courtesy of Aidan Beers.

Long-term Research Sheds New Light on Power Line and Sage-grouse Interactions, cont.

all, power lines negatively affected sage-grouse leks count trends within 1.6 miles of the power lines studied and the distance from a power line had no affect on lek persistence. Female sage-grouse avoided transmission lines during the nesting and brooding seasons at distances of 0.6 of a mile and nest and brood success were negatively affected by transmission lines up to distances of 1.5 and 0.6 miles. The smaller voltage distribution lines that deliver power to the consumer including homes and small structures did not appear to affect sage-grouse habitat selection or reproduction.

According to Terry Messmer, the lead researcher who conceptualized the research design, "Our analyses demonstrated the value of sagebrush cover in mitigating potential power line impacts. Managers can minimize the effects of new transmission power lines by placing them in existing anthropogenic corridors and/or incorporating buffers at least 1.6 miles from active leks." He added, that "given the uncertainty we observed in our analyses regarding sage-grouse response to distribution lines coupled with their role in providing electric power service directly to individual consumers, we recommend that buffers for these power lines be considered on a case-by-case basis. Furthermore, siting new power lines in exiting transmission to avoid important habitats and habitat reclamation may reduce the potential impacts of new power line construction" he concluded.

For more information, you can view the article for free at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0209968

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

WDARM LWG Landowner Appreciation Dinner

By Lorien Belton, Utah State University

West Desert landowners got a chance earlier this year to hear from some of the researchers associated with the West Desert Adaptive Resources Management (WDARM) local working group. Because the sage-grouse in the Sheeprocks area often use private lands, especially for nesting and brood-rearing, access to those lands is important to being able to have a good understanding of what is happening with the birds. With the permission of many local landowners, Utah State University (USU) researchers have been able to trap and radio-mark local sage-grouse, release translocated birds, and track the birds and their broods on a wide variety of land ownerships in the Sheeprock area.

At a dinner on January 24th this year, Melissa Chelak, a USU PhD student studying the population dynamics of sage-grouse in the Sheeprocks, presented research study results to 20 local landowners. She showed maps of bird movements and seasonal habitat usage, and shared what she has learned about nest and brood success. She also explained how her sage-grouse tracking links to other research, like predator surveys. Landowners had a chance to ask questions and pose additional potential questions for research.

In addition to the sage-grouse population research, presentation, recreation researchers also were able to share their results. Ben Muhlestein, a master's student at USU with the Institute of Outdoor Recreation and Tourism, shared his research results from a 2018 survey of recreationists coming to the Sheeprocks. The recreation project didn't require access to any private lands, but because recreation often impacts private resources, the landowners were interested to hear what had been learned.

Landowner-specific presentations are an important element of WDARM's work. Landowner participation, through allowing access to their properties for research, is a deeply critical element of the group's efforts to understand and conserve local sage-grouse. However, many landowners are unable to attend the regular meetings where frequent research updates occur. While daytime sage-grouse meetings are a critical way to achieve improved agency coordination, they can be inconvenient for landowners with other daytime obligations. Offering an evening meal and relevant updates is just a small way to thank landowners who have contributed to the research efforts, and provide a more convenient way for them to participate in sage-grouse conversations.

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.

This publication is issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Kenneth L. White, Vice President for Extension and Agriculture, Utah State University.

www.utahcbcp.org

What's New in the Revised State Sage-grouse Plan?

Here are just a few of the many new features of the state sage-grouse plan:

- Mesic or wet meadow areas are now a specific focus for habitat improvement.
- Opportunity areas remain, but are no longer mapped: the concept of areas that can be improved to become functional sage-grouse habitat still remains a key part of Utah's sage-grouse strategy, but on-the-ground assessments are the only way to determine whether an area is appropriate for treatment.
- The previous plan used the word "other" for some habitat that wasn't seasonally specific; now that is called 'transitional" habitat, and mostly refers to migration corridors.
- The plan now includes an explanation of how Utah's compensatory mitigation program works.
- Maps are now online, so they can be kept updated if anything changes. These maps will be used by the Division of Wildlife Resources (DWR) and other Utah state agencies, the U.S. Forest Service, the Bureau of Land Management, and the Natural Resources Conservation Service for their work relating to greater sage-grouse in Utah.

For additional information on the plan, reach out to Ben Nadolski with DWR or visit the Utah Division of Wildlife Resource's website at https://wildlife.utah.gov/sage-grouse/Utah_Greater_Sage-grouse_Plan.pdf.