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SATELLITES AND SAGE-GROUSE: TRACKING THE GROUSE WHO TRACK THE GREEN WAVE ON RANGELANDS GRAZED BY LIVESTOCK

By Hailey Peatross Wayment, David Stoner, Eric Thacker, and Terry Messmer, Utah State University.

Annually, the seasonal flush of nutrient rich vegetation in the Intermountain West that tracks both temperature and moisture up mountain slopes has become known as the “green wave.” Research has reported that native ungulates, such as mule deer and elk, follow this green wave of abundant food. Both mule deer and sage-grouse appear to synchronize birthing and nest initiation to match the period half way between the start of spring and the peak of the growing season, which provides highly nutritious food that is increasing on a daily basis. In Utah, sage-grouse



Figure 1. Sage-grouse range is often also grazed by livestock. Photo courtesy of Todd Black.

broods have been reported to follow the elevational wave of succulent vegetation (i.e., the green groceries) to minimize variation in forage quality through the brood-rearing season.

Over 80% of the sage-grouse range is actively grazed by livestock. Given that grazing can keep grasses in a perpetual state of growth, effectively extending the growing season, the question of whether herbivory by large-bodied ruminants, such as cattle, can provide more green groceries for sage-grouse and other wildlife through grazing is important to address. Although the concept of using cattle or other grazers to enhance sage-grouse habitat is controversial, the literature suggests that plant growth can be enhanced by managing the duration and intensity of grazing. The hypothesis that surgical use of livestock grazing can stimulate production and extend nutritional value of grasses has been proposed by wildlife managers and livestock producers, but remains largely untested.

To open up mature dense stands of sagebrush to promote forb and grass production in high elevation grasslands, Desert Land and Livestock, a

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ASPERGILLOSIS AND SAGE-GROUSE: A POSSIBLE CONSERVATION IMPLICATION FOR CONIFER TREATMENTS?

By Melissa Chelak and Terry Messmer, Utah State University

The removal of conifers that have expanded into sagebrush (*Artemisia* spp.) habitats historically once occupied by sage-grouse (*Centrocercus* spp.) has become the new conservation standard for much of the western U.S. Research completed and published by the Utah Community-Based Conservation Program at Utah State University has confirmed sage-grouse immediately used areas cleared of conifers (https://utahcbcp.org/publications/Cook_et_al-2017-Wildlife_Society_Bulletin.pdf) and the birds selecting those areas experienced increased nest and broods success in the West Box Elder Sage-grouse Management Area (SGMA; <https://www.sciencedirect.com/science/article/pii/S1550742416300835?via%3Dihub>).

In Utah alone, thanks to the Utah Department of Natural Resources Watershed Restoration Initiative (<https://naturalresources.utah.gov/watershed-restoration-initiative>), the Natural Resources Service Sage-grouse Initiative (<https://www.sagegrouseinitiative.com/>) and their public and private partners, over 500,000 acres of sage-grouse habitat have been restored by conifer removal treatments. Much of this work consists of chaining and brush-hogging (<https://www.partnersinthesage.com/conifer-removal>). In the case of brush-hogging, the tree is ground down into a mulch which is left on the landscape to decay over time while providing soil insolation.

However, a possible unexpected conservation implication for sage-grouse of leaving conifer mulch on the soil surfaced in the Sheeprock SGMA might occur where high volumes of mulch, under optimal spring moisture conditions, could provide a source for *Aspergillus*, a fungal infection of the lungs caused by an inoculation of *Aspergillus* spp. spores. Wild birds that are infected by the pathogen's spores die from the resulting infection.

In May 2018, researchers recovered the intact carcass of an adult female greater sage-grouse that had been marked with a radio-transmitter in March 2017. The female was translocated from south-central Utah to the SGMA as part of an augmentation program to prevent local species extirpation. The recovered carcass was necropsied by Utah Veterinary Diagnostic Laboratory, and the necropsy revealed that the female died from *Aspergillus*. This was the first reported case of aspergillosis in wild sage-grouse populations since the 1950s.

Given the conservation status of sage-grouse, the occurrence of disease in wild sage-grouse populations is a range-wide concern. However, unlike West Nile Virus (WNV), *Aspergillus* spp. spores are not spread by an active vector, so there is a low risk of the pathogen contributing to extirpation or population declines. However, if environmental factors in areas inhabited by small, isolated sage-grouse populations such as the Sheeprock SGMA could create conditions for the pathogen to propagate, the circumstances contributing to potential outbreaks should be evaluated.

A paper documenting this field observation has been accepted for publication by the Western North American Naturalist. The authors suggested, as with WNV and other diseases, that managers continue monitoring sage-grouse populations for disease and any individuals' carcasses or remains containing airsacs and lungs be sent for necropsy. This may be particularly important in areas where landscape-level conifer removal treatments are being proposed. Given that this is one observation, it does not imply a change in strategies is needed for current conifer expansion management, but rather it documents and highlights an occurrence of a fungal infection to monitor in populations.



Photos courtesy of Melissa Chelak. Photo to the left shows conifer mulch left after brush-hog treatment. Photo above shows the Sheeprocks area.

SAGE-GROUSE LOCAL WORKING GROUPS GO VIRTUAL IN RESPONSE TO THE PANDEMIC

By Lorien Belton, Utah State University

As with everything else in our lives these days, USU Extension's Community-Based Conservation Program Adaptive Resources Management Sage-grouse Local Working Groups have changed in response to the pandemic. You've probably already noticed, but here's the detail.

Regular meetings: We have moved, for the time being, to exclusively online meetings. All local working groups will be meeting on approximately the same schedule as before. These video meetings can also be called into with just your phone if your internet connection is down, slow, or you are away from your desk. The meetings still provide a venue for policy updates, opportunities to comment as a team on relevant local or regional plans and proposals, research updates, personnel news, local sage-grouse population updates, federal initiatives, project discussions, and much more.

Field tours: Summer field tours are on hold, because despite the reduced risk of virus transmission outdoors, University-related travel and programming is still under cautious guidelines, and protocols are in development for how to ensure everyone's health when we do re-open. We are considering hybrid and virtual tour options for this season, so if you have a great spot that you'd like to share that might even normally not be a great place to take a big group (think places with super rough roads or other access challenges, no bathrooms, really far out in the middle of wonderful nowhere, etc., but that would be wonderful to share with a group), please contact one of us and we will work with you to find ways to present that location to others without them actually making the journey. We know that nothing truly replaces being in a place and seeing it yourself, but we're going to find the next best option, and figure out how to share it with you! Our contact information is printed below.

New, broader learning and connection opportunities: In addition to our regular local meetings, we plan to begin presenting selected topics relevant to sage-grouse on a statewide basis. These could involve research information, management strategies, or policy updates. These should allow for more people around the state to learn, and reduce the burden on presenters who might otherwise need to present repeatedly to multiple groups. If locally-specific conversations would be valuable on these topics, we can still add those discussions to the virtual local working group meetings.

We miss being in the room with you all, and look forward to a time when in-person meetings are possible and safe for everyone. Until then, we'll see you on the screen, finding new ways to bring you the information and connections you need.

Contact information for each local working group:

- Carbon (CaCoARM) Castle Country is facilitated by Lorien Belton, lorien.belton@usu.edu
- Color Country (CCARM) is facilitated by Nicki Frey, nicki.frey@usu.edu
- East Box Elder (EBARM) is facilitated by Dave Dahlgren, dave.dahlgren@usu.edu
- Morgan - Summit (MSARM) is facilitated by Lorien Belton, lorien.belton@usu.edu
- Parker Mountain (PARM) is facilitated by Dave Dahlgren, dave.dahlgren@usu.edu
- Rich County CRM is facilitated by Dave Dahlgren, dave.dahlgren@usu.edu, and Dallen Smith, dallen.smith@usu.edu
- Southwest Desert (SWARM) is facilitated by Nicki Frey, nicki.frey@usu.edu
- Strawberry Valley (SVARM) is facilitated by Lorien Belton, lorien.belton@usu.edu
- Uintah Basin (UBARM) is facilitated by Lorien Belton, lorien.belton@usu.edu
- West Box Elder CRM is facilitated by Danielle Kunzler, westboxcrm@gmail.com
- West Desert (WDARM) is facilitated by Lorien Belton, lorien.belton@usu.edu

Map of Utah's Sage-grouse Management Areas.



SATELLITES AND SAGE-GROUSE: TRACKING THE GROUSE WHO TRACK THE GREEN WAVE ON RANGELANDS GRAZED BY LIVESTOCK



Figure 2. We are monitoring female sage-grouse radio-marked with global-positioning satellite transmitters to determine how they respond to livestock and grazing. Photo courtesy of Hailey Wayment.

200,000 acre private ranch located in northeastern Utah, combined sagebrush treatments with a high-intensity-low frequency rest and deferred-rotation grazing system. Preliminary data suggested that the increase in forbs and grasses following range treatments provided greater forage for livestock, but may have also improved sage-grouse brooding habitat. Nesting sage-grouse depend on forbs and insects during the incubation period, and newly hatched chicks are almost entirely dependent on these same food items until approximately 6 weeks of age. What remains to be determined is whether the intensity and duration of grazing has facilitative or competitive relationships with sage-grouse especially during the critical brood rearing life phase.

To answer these questions, we are monitoring female sage-grouse radio-marked with global-positioning satellite (GPS) transmitters on Desert Land and Livestock (Figure 2). We are obtaining six daily locations of GPS radio-marked females. Marked sage-grouse are being located using radio telemetry to determine habitat-use patterns, seasonal movements, nesting and brood success, survival rates, and behavior when livestock are present.

We are also assessing changes in vegetation quality across space and time by estimating the Instantaneous Rate of Green-up (IRG), a metric derived from a time series of the Normalized Difference Vegetation Index (NDVI) satellite data. Changes in NDVI across the study area will be correlated with grazing dates, livestock stocking rates, frequency of use, periods of rest, temperature, precipitation, sage-grouse nest initiation rates, nest hatch dates, brood movements, and brood success rates (Figure 3). We will assess how green-up rate, order, and duration differs with respect to grazing management and annual climatic conditions. We will then evaluate differences in sage-grouse behavior and reproduction with observed difference in NDVI in each study area.

Completion of this project will provide new information regarding sage-grouse behavioral responses to the presence of cattle and the effects of livestock grazing on the vegetation composition and structure of these important ecosystems. This research will provide land managers, both private and public, with the information to better understand the relationship between rangeland cattle grazing and sage-grouse.

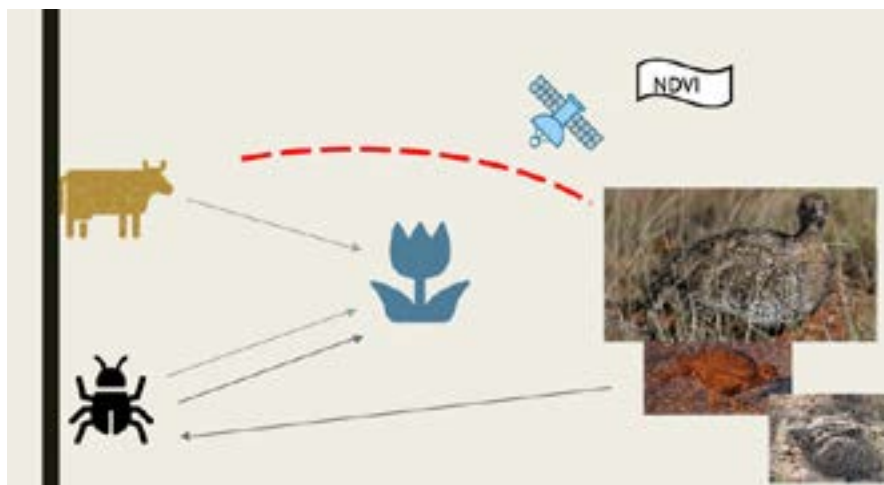


Figure 3. We are also assessing changes in vegetation quality across space and time by estimating the Instantaneous Rate of Green-up (IRG), a metric derived from a time series of the Normalized Difference Vegetation Index (NDVI) satellite data. Changes in the study area NDVI will be correlated with seasonal dates, with livestock stocking rates, frequency of use, periods of rest, temperature, precipitation, sage-grouse nest initiation rates, nest hatch dates, brood movements, and brood success rates.

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.

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