

THE COMMUNICATOR

A QUARTERLY PUBLICATION OF UTAH'S COMMUNITY-BASED CONSERVATION PROGRAM



April 2020

Volume 16, Issue 2

THE MORE YOU KNOW, THE MORE YOU GROW: COMMUNITY-BASED CONSERVATION ADDS NEW KNOWLEDGE TO BETTER INFORM SAGE-GROUSE CONSERVATION

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Utah State University Extension, through the Utah Community-Based Conservation Program (CBCP) and in partnership with the Utah Division of Wildlife Resources, began working with concerned Utah stakeholders in 1996 to organize community-based local working groups (LWGs). The LWG process was initiated to enhance information flow and stimulate local involvement in greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) and Gunnison sage-grouse (*C. minimus*) conservation planning.



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Because of the CBCP LWG efforts, the State of Utah, federal, and private partners have benefitted from increased knowledge about sage-grouse seasonal range, migration routes, and other factors known to be essential to maintenance of the species in Utah and range wide. In 2019, Utah's Strategic Plan for the Conservation of Greater Sage-grouse (Plan) was signed by Governor Herbert. The Plan calls for the protection of high-quality habitats to support Utah's sage-grouse populations and thus eliminate the need for the listing of the species for protection under the Endangered Species Act. Inherent to the success of the Plan has been the communication of new science-based information between the state, federal, and private partners. In this newsletter, we highlight some of the on going efforts to provide the partners with the best science-based information to assist in balancing sage-grouse conservation with local, state, and regional socio-economic needs. The basic tenet of the CBCP process remains, "If it's not good for the community, it's not good for wildlife."



MAPPING STATE-WIDE SEASONAL HABITAT OF SAGE-GROUSE USING GPS-TRACKING DATA AND LONG-TERM NESTING DATA

Michel Kohl, Warnell School of Forestry and Natural Resources, University of Georgia, michel.kohl@uga.edu

The CBCP continues to work on identifying sage-grouse seasonal habitat (nesting, summer, and winter) based on location data obtained from sage-grouse marked with global-positioning-system (GPS) transmitters beginning in 2014 and nesting data from birds marked both with very-high-frequency (VHF) and GPS transmitters between 1998-2018 across the state of Utah (Figure 1). Completion of this project will result in a series of habitat maps representing relative probability of use, as well as categorical designations of habitat and non-habitat for each season. This product is being developed in partnership with the Bureau of Land Management, U.S. Forest Service, and Utah Division of Wildlife Resources. These maps will be a significant improvement of previous mapping exercises because they represent the first time we have incorporated fine-scale vegetation data that has only recently become available. This vegetation data will allow us to produce maps that provide high predictive power, an important consideration as we work toward some of the other products identified in this newsletter. We expect these maps to be completed this summer and updated as new information becomes available.



Figure 1. The capture and radio-marking of greater sage-grouse with rump-mounted GPS transmitters has become the new standard for sage-grouse research in Utah.

PRIORITIZING AREAS FOR CONIFER REMOVAL TO GROW MORE SAGE-GROUSE

Justin Small (Utah State University [WILDOUTDOORS@live.com]), Simona Picardi, and Michel Kohl

The removal of conifer trees that have encroached on sagebrush habitats has been validated as a conservation practice that enhances sage-grouse nest and brood success in Utah and other states (<https://www.sciencedirect.com/science/article/pii/S1550742416300835?via%3Dihub>). However, not all conifer removal treatments result in the same improvements in habitat quality. This is largely because of the wide variation in habitat characteristics (e.g., vegetation) within and between Utah's sage-grouse management areas (SGMAs). To help managers make informed decisions on where to complete conifer treatments to optimize project costs and maximize benefits for sage-grouse, the CBCP is developing a predictive tool that managers can use to compare the costs and benefits of the proposed treatment before the work is started. We are currently focusing on the West Box Elder SGMA, but the analysis will be further extended to other SGMAs throughout the state. The model will be accompanied by a set of illustrative maps showing changes in habitat availability under hypothetical treatment scenarios. We expect this product to be rolled out this fall.

MAPPING HABITAT SUITABILITY OF SAGE-GROUSE AT THE SOUTHERN PERIPHERY OF THEIR RANGE

By Simona Picardi, Utah Community-Based Conservation Program, Utah State University, simona.picardi@usu.edu

The CBCP is also working to update the habitat maps that are currently being used to implement the state-specific guidelines that were published in 2019 (<https://utahcbc.org/publications/DahlgrenEtAl2019UtahSage-grouseGuidelines.pdf>). Utah is located at the southern periphery of the sage-grouse distribution, and therefore the spectrum of environmental conditions available to sage-grouse in this part of their range may not reflect the average habitat conditions across their species range. Sage-grouse in Utah inhabit a wider range of elevational gradients than other populations range-wide and thus their habitat-use patterns can be expected to differ from other population across the species range. From VHF-tracking data obtained from 1998-2013, we are using random forest algorithms to quantify sage-grouse habitat suitability within the environmental context of the state of Utah. The result of this project will be state-wide maps of habitat suitability at the annual as well as seasonal (spring, summer, winter) scale. We expect to have the first draft of analyses and the manuscript ready for review by June 2020 (Figure 2).



Figure 2. Updated greater sage-grouse (*Centrocercus urophasianus*) seasonal habitat maps for Utah. Breeding, summer, and winter seasons estimated using the Resource Selection Function analytic approach using location data obtained from sage-grouse marked with very-high frequency (VHF) radio-transmitters in Utah from 1998–2019. Breeding season habitats were estimated using known nest locations obtained from VHF sampling from 1998-2018. Additional modeled nest locations were extracted from sage-grouse marked with rump-mounted global positioning system (GPS) radio-transmitters from 2013-2019. Summer and winter seasonal habitats were estimated from GPS data throughout Utah from 2013-2019.

ESTABLISHING DISTURBANCE CAPS FOR MANAGEMENT OF SAGE-GROUSE IN UTAH

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Sage-grouse are sensitive to human disturbances in the form of anthropogenic structures and activities (<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0209968>, Figure 3). While the negative effects of disturbance on sage-grouse are recognized, quantitative thresholds defining the density of human structures or intensity of human activities at which sage-grouse begin to respond negatively are unknown. Using lek activity data from 1998-2018, we will quantify disturbance thresholds beyond which sage-grouse breeding activity is disrupted. These thresholds, or disturbance caps, will help managers quantify the expected effects of new development on sage-grouse and establish guidelines for disturbance mitigation in Utah. We anticipate this work will be completed in early 2021.

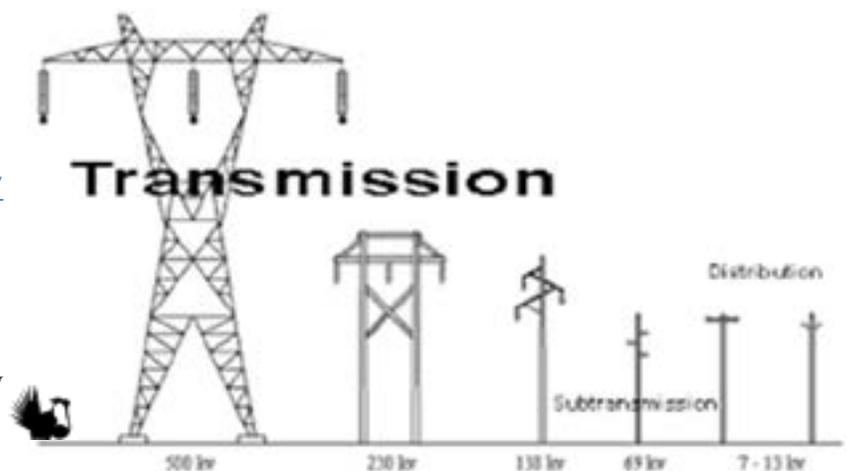


Figure 3. Research completed by the Utah Community-Based Conservation Program provided the state of Utah and its partners with policy guidance regarding the placement of electric powerlines in sagebrush habitats to minimize the impacts on sage-grouse <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0209968>.

SIMONA PICARDI JOINS CBCP TEAM AS HAF SAGE-GROUSE COORDINATOR



Simona Picardi started working at Utah State University as the HAF sage-grouse coordinator in February 2020 after earning her Ph.D. at the University of Florida in 2019. Simona is a quantitative ecologist with an expertise in data management and analysis. Her research interests focus on movement and population modeling of large vertebrates. Before joining USU, Simona worked on quantifying the effect of hunting pressure on the movement behavior of roe deer in the Italian Alps, and on evaluating individual differences in migratory behavior in wood storks in the southeastern U.S. Simona also specializes in teaching data management and computer programming for ecology; she has taught several classes on relational database design and data handling using programming languages such as R and SQL. While at USU, Simona plans to focus on producing sound scientific results in support of management decisions for sage-grouse in Utah and beyond. Specifically, she plans to integrate information from different types of data (telemetry, lek counts, etc.) coming from different sources to better understand how sage-grouse move across the landscape in response to changing conditions, how that affects the viability of their populations, and how future management decisions can be evaluated to maximize benefits to the species.

Announcements

Presentations from the 2020 Bird Damage Management Conference held in Salt Lake City, Utah, this past February are now available. To access the videos, click on the Technical Session Videos link at the top of the conference webpage (<https://conference.usu.edu/blackbirds/>). You will then be asked log in; the password is "Starlings2020" to view the videos.

Don't forget the April 30th deadline to submit information you have on raven damage impacts or control efforts! Local data that comes directly from agricultural producers, counties, etc. would be particularly helpful as the new inter-agency Raven Core Team works to understand the scope of the raven situation range-wide. Comment here: <https://djcase.com/raven>

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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COMPARATIVE EVALUATION OF GREATER SAGE-GROUSE TRANSLOCATION STRATEGIES

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In Utah, sage-grouse have been successfully translocated to augment declining populations. The best-known example in Utah comes from the Strawberry Valley SGMA. But what about using translocations to restore declining sage-grouse populations at the periphery of their range? The sage-grouse population in North Dakota has been steadily declining in the past decades. Beginning in 2017, radio-marked sage-grouse (males, pre-nesting females, and females with broods) have been translocated to North Dakota from Wyoming with the goal of enhancing the viability of North Dakota's population. Telemetry data has revealed a tendency of pre-nesting females to wander more than brood females prior to settlement. This could potentially affect their reproductive outcome as well as their survival, which in turn could determine the effectiveness of translocation efforts in contributing to population growth. We are currently working on analyzing movement behavior of translocated females according to their reproductive status and linking it to potential differences in individual vital rates. We will then examine population-level consequences of these behavioral differences by projecting population dynamics under a scenario where only pre-nesting females are translocated versus a scenario with only brood females. Results of this project will help managers develop the best management practices for different translocation strategies and optimize their decisions for maximum return in terms of population enhancement. We anticipate the initial results of this work will be ready to share by Spring 2021.