

Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*

May 2018



Sex in the Sagebrush: How New Research Can Help Protect Greater Sage-Grouse Mating Areas

An Iconic Bird Species and its Challenges

If there were a personality award for birds of western North America, the male greater sage-grouse would be a strong contender. With their spiky tail feathers, inflatable chest sacs and elaborate mating dances, these birds are unusual and iconic residents of American sagebrush habitat.

Unfortunately, greater sage-grouse are not as easy to find as they used to be. The birds' population, once estimated at 16 million, is now believed to be less than one million. The population decline is related to their habitat, much of which has been paved over, converted to croplands, degraded by non-native

MANAGEMENT IMPLICATIONS

- Recently published research can help land managers to identify important hubs and pathways of genetic connectivity for greater sage-grouse.
- This knowledge can be used in evaluating proposed development or management actions in terms of how they could disrupt, protect or restore critical places of conservation for greater sage-grouse habitat.
- The genetic evaluation technique, combined with mapping technology, can be used to evaluate land management decisions in terms of their effect on more than 350 species that live in North American sagebrush habitat.



Male and female greater sage-grouse converge on sagebrush mating areas every year (Photo by Rick McEwan, Sage Grouse Initiative).

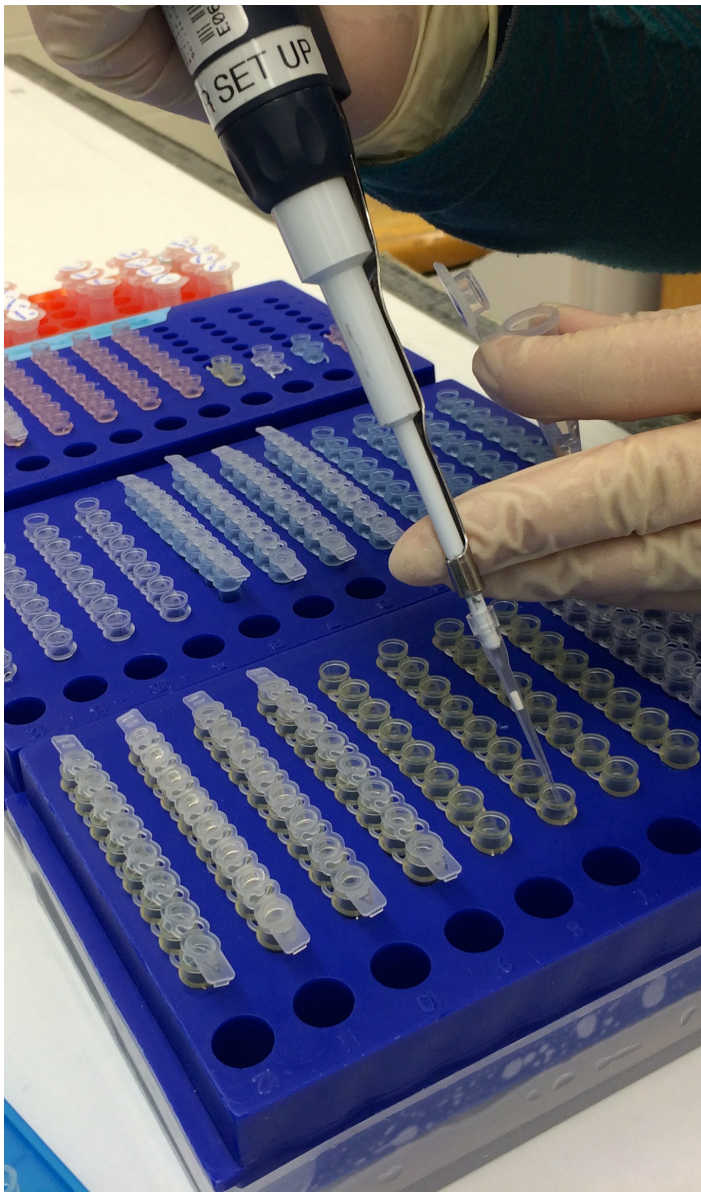
grasses and conifer encroachment, and fragmented by roads and other barriers. Every year, groups of the birds congregate at mating areas called “leks” — areas that are used every year unless they’re disrupted. Because of the location-specific nature of their mating process, greater sage-grouse are particularly vulnerable to habitat disruption.

Understanding the Role of Genetic Connectivity

While there hasn’t been much good news lately for these distinctive denizens of the West, recently published work from scientists at the Rocky Mountain Research Station (RMRS) may help protect the birds’ habitat and their ability to reproduce. The research article, entitled “The genetic network of greater sage-grouse: range-wide identification of keystone hubs of connectivity,” describes how genetic analysis of DNA from greater sage-grouse feather quills can identify and help to map areas of importance in maintaining genetic connectivity. This research can help land

managers understand how specific lek locations serve larger geographic areas and to understand the role of genetic connectivity in the birds' mating process.

In other words, this research can help land managers evaluate proposed development or management actions in light of their impact on leks that are important for genetic connectivity — and how restoration or an easement could protect connectivity or reconnect the birds with their leks. Todd Cross, one of the research article's authors and a post-doctoral research biologist with RMRS, gives this example: "Say you have a high-priority lek for genetic connectivity,



Scientists with Rocky Mountain Research Station have developed ways to identify genetic connectivity among greater sage-grouse populations (Photo: US Forest Service).

FURTHER READING

Cross, Todd B.; Schwartz, Michael K.; Naugle, David E.; Fedy, Brad C.; Row, Jeffrey R.; Oyler-McCance, Sara J. 2018. The genetic network of greater sage-grouse: Range-wide identification of keystone hubs of connectivity. *Ecology and Evolution*. 2018: 1-19. <https://www.fs.usda.gov/treesearch/pubs/56110>

Cross, T.B., Naugle, D.E., Carlson, J.C., and M.K. Schwartz. 2017. Genetic recapture identifies long-distance breeding dispersal in Greater Sage-Grouse (*Centrocercus urophasianus*). *The Condor*, 119:155-166. www.fs.usda.gov/treesearch/pubs/53960

Row, J.R., K.E. Doherty, T.B. Cross, M.K. Schwartz, S. Oyler-McCance, D.E. Naugle, S.T. Knick, and B.C. Fedy. In Press. Quantifying functional connectivity: the role of breeding habitat, abundance, and landscape features on range-wide gene flow in sage-grouse. *Evolutionary Applications*. <https://onlinelibrary.wiley.com/doi/abs/10.1111/eva.12627>

and over the years conifers have encroached due to fire suppression. To help preserve that genetic hub, you might consider cutting back the conifers."

Optimism for the Future

When asked if he's concerned about the future of the greater sage-grouse, Cross responds, "I think that with this study and others that prioritize landscapes using genetics, we increasingly have the tools to do something to prioritize conservation actions. It's now a question of how we'll use our resources."

Cross points out that the research can be applied to many of the 350-plus species that call the sagebrush home. He says, "The greater sage-grouse is a great poster-child for western landscapes but there are other animals like mule deer and elk, antelope and pygmy rabbits — all of which can benefit from this research. Through our work, we're getting a picture of how genetic connectivity is shaped by the landscape of the West."

Rocky Mountain Research Station researchers work at the forefront of science to improve the health and use of our Nation's forests and grasslands. More information about Forest Service research in the Rocky Mountain Region can be found here: <https://www.fs.fed.us/rmrs/>



Subscribe online to future Science You Can Use editions at <https://www.fs.fed.us/rmrs/science-you-can-use-bulletin>

