USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Rocky Mountain Research Station

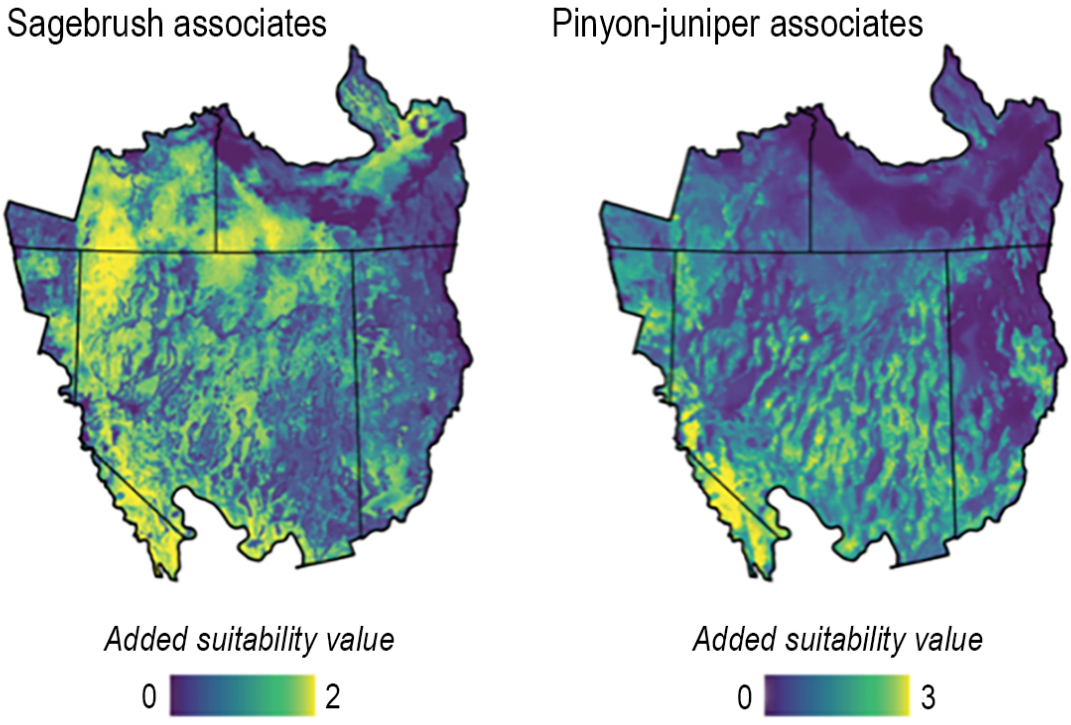
Science You Can Use *(in 5 minutes)*

JANUARY 2022

Balancing Bird Habitat and Conifer Removal in the Great Basin

Increasing the sagebrush habitat in the Great Basin Ecoregion remains a management concern for the agencies and conservation organizations within this region. Large-scale removal of the pinyon-juniper woodlands is one method for achieving this objective, particularly in the greater sage grouse (*Centrocercus urophasianus*) priority areas for conservation (PACs). However, there's concern that removal of these woodlands will result in a loss of habitat for pinyon-juniper associated bird species to the benefit of sagebrush associated bird species.

Katherine Zeller, a research biologist with the Aldo Leopold Wilderness Research Institute housed within the Rocky Mountain Research Station, was part of a team of researchers who created a series of species distribution models to determine whether this concern was warranted. "What we wanted to know is how these conifer treatments might affect a greater suite of species," she explains. "Not just the sage grouse but these other species of conservation concern."



Habitat suitability maps were generated for each of the five bird species modeled in the Great Basin. Then, areas of highly suitable habitat were added for species that are sagebrush associates, and species that are pinyon-juniper associates. These maps represent the 'richness' of highly suitable habitat for each group.

Conversations with conservation organizations and wildlife agencies identified five species of concern to create species distribution models for: gray flycatcher, juniper titmouse, pinyon jay (pinyon-juniper woodlands associated), Brewer's sparrow, and sagebrush sparrow (sagebrush associated). The observational data underpinning these models was sourced from eBird, a citizen science dataset of bird observations that Zeller credits as being "a great source for data over a large geographic area like the Great Basin." Data collected by the Great Basin Bird Observatory and the Bird Conservancy of the Rockies were used to validate the models.

Habitat Gains and Losses

The species distribution models created for each bird species show that conifer removal did indeed benefit the sagebrush associated species, but the increase wasn't as large as expected. "Across the Great Basin, the Brewer's sparrow habitat increased by about 6 percent, and for sagebrush sparrow, its habitat increased by about 17 percent," Zeller says. What the team wasn't expecting to find was an overlap of habitat of gray flycatcher and pinyon jay with the PACs, which is where Zeller expects the conifer removal would be prioritized.

"For the pinyon jay, we actually found a reduction in suitable habitat of 41 percent across the whole Great Basin," she explains. "That's a large amount for this species, since it is already experiencing declines across the Great Basin and is increasingly a species of conservation concern."

Informing Management Activities

In spite of this unexpected habitat overlap of jays and flycatchers, Zeller says that the species distribution models revealed areas where conifer treatments could occur without negatively impacting the pinyon-juniper associated species. "It's the best of both worlds," she says. "You can do this treatment and get the most benefit for those sagebrush associated species but not cause detrimental effects to those conifer associated species."

Zeller cautions that a limitation of the model is that the results are at a coarse scale and based upon the scenario of wholesale removal of the conifer. "The next step for this research would be to focus more at a fine scale and perhaps simulate different types of conifer removal scenarios on the landscape in places where they are likely to occur," she says. Another desired deliverable is updating the maps and analyses more frequently so that managers are working with the most current on-the-ground data.

Key Findings/Management Implications

- When modeling wholesale conifer removal across the Great Basin, suitable habitat increased by 6 percent to 17 percent for sagebrush associated bird species. However, pinyon-juniper associated species saw a habitat reduction of 11 percent to 41 percent.
- To increase suitable habitat for sagebrush associated species without decreasing pinyon-juniper associated species, managers could focus on removing conifer in areas where there isn't an overlap of these habitats.
- Maps from this study are available for managers seeking to identify potential areas where conifer removal would improve habitat for sagebrush species while mitigating unwanted negative impacts on pinyon-juniper species of conservation concern. Zeller can be connected at Katherine.Zeller@usda.gov for more information on maps.

FURTHER READING

Zeller, K.A.; Cushman, S.A.; Van Lanen, N.J.; Boone, J.D.; Ammon, E. 2021. Targeting conifer removal to create an even playing field for birds in the Great Basin. Biological Conservation. 257: 109130.

PROJECT LEAD

Katherine Zeller is a research biologist with the Aldo Leopold Wilderness Research Institute housed within Rocky Mountain Research Station. Her research integrates the fields of landscape ecology, wildlife biology, genetics, and conservation biology to understand wildlife population dynamics, habitat relationships, and movement. Connect with Kathy.