Science to Solutions

Sagebrush Songbirds Under the Sage Grouse Umbrella

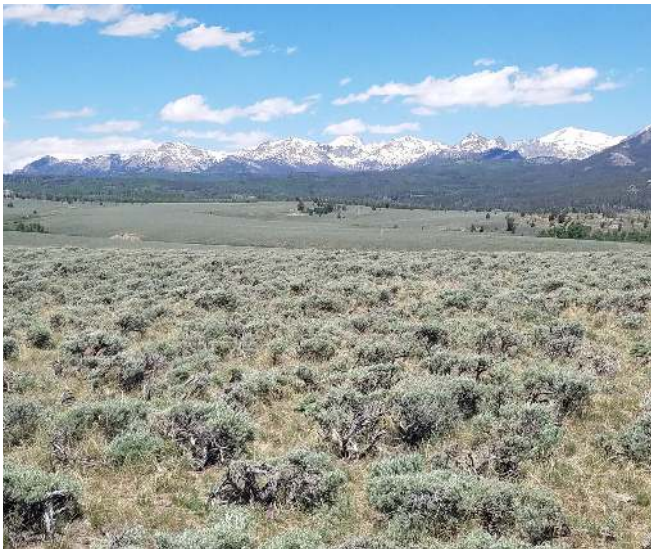
In Brief: Researchers examined whether benefits from sage grouse conservation extend to three species of sagebrush songbirds: Brewer's sparrow, sagebrush sparrow and sage thrasher. New maps reveal that strongholds for sagebrush songbirds and sage grouse coincide: songbirds are 13-19% more abundant near large leks, which support half of all known sage grouse populations. Policies and actions that benefit grouse also overlap high abundance areas for sagebrush songbirds, suggesting that benefits can extend to these less well-known species. In the Great Basin, 85% of conifer removal projects to restore sagebrush habitat, known to benefit Brewer's sparrow, coincide with high abundance centers for this species. Wyoming's land protection strategy for sage grouse also helps reduce habitat fragmentation for half of the state's largest populations of sagebrush sparrow and sage thrasher. These analyses extend our understanding of the sage grouse umbrella for songbirds, and provide tools to help target and integrate community-level benefits of conservation.

Nature's Complexity

The natural world is wonderfully messy. Add in a healthy dose of human intervention, and nature's intricacies are revealed through complex answers to outwardly simple questions. Such is the case for sage grouse when labeled an umbrella species for the 170 other species of birds and mammals inhabiting the sagebrush sea.

As a flagship species and ambassador for the sagebrush ecosystem, the sage grouse has stimulated unprecedented collaboration and resource investment for continued conservation of sagebrush communities in working landscapes. But sage grouse as an umbrella species is an entirely different question.

In Wyoming, protective energy policy and voluntary easements put in place for sage grouse also doubled land conservation for mule deer migration (Sage Grouse Initiative 2015a). Likewise, in Oregon, removal of encroaching juniper to restore sage grouse habitat increased by 50-80% the abundance of two sagebrush-loving songbirds (Sage Grouse Initiative 2015b). While benefits were demonstrated in these specific cases, scientists continue to unravel nature's complexity to understand how broadly the sage grouse umbrella extends to other sage-dependent species.



Intact sagebrush habitat for sage grouse and songbirds.

A Wide-Angle View Across the Range

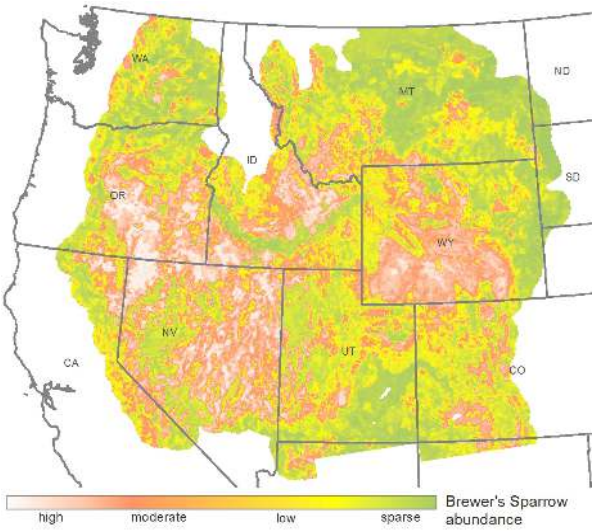
A few species are entirely dependent upon sagebrush, including Brewer's sparrow (*Spizella breweri*), sagebrush sparrow (*Artemisiospiza nevadensis*), and sage thrasher (*Oreoscoptes montanus*). With the widespread loss and degradation of sagebrush habitats, this trio of songbirds has suffered population declines (Sauer et al. 2014), and are identified as Birds of Conservation Concern by the U.S. Fish and Wildlife Service.

In a project funded by the U.S. Fish and Wildlife Service, Intermountain West Joint Venture, and Sage Grouse Initiative, scientists Patrick Donnelly (Intermountain West Joint Venture) and Jason Tack (University of Montana Avian Science Center) set out to evaluate whether investments in sage grouse conservation have also benefited these songbirds. They asked two primary questions to evaluate the reach of the sage grouse umbrella. First, are these songbirds more abundant where sage grouse are abundant, and second, if so, to what extent does each songbird benefit from conservation practices implemented on behalf of sage grouse?

New Maps of Songbird Abundance Revealed

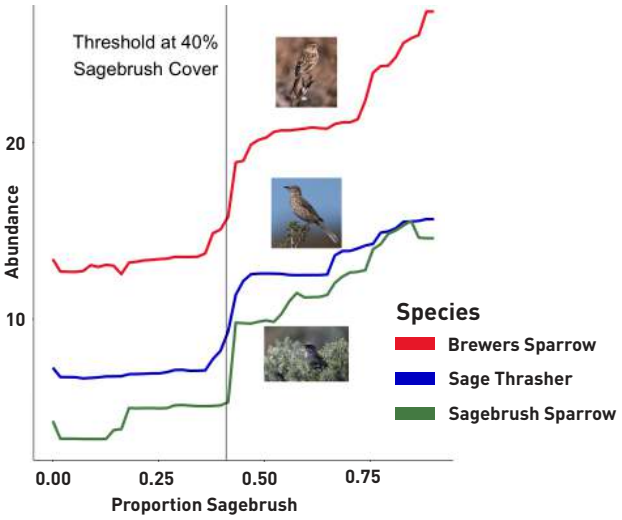
The researchers first constructed abundance maps for each sagebrush songbird species across the West using long-term songbird count data from the North American Breeding Bird Survey (BBS; Pardiek et al. 2015) joined with LANDFIRE vegetation data for sagebrush cover. Climate and landform variables were also incorporated based on the natural history of each species. The resulting maps depict relative abundance of each species based on averaged total counts for the 10-year period spanning 2004–2014. However, these new maps are unique in that they reflect not only bird count data, but also incorporate measures of climate and habitat conditions to better predict bird species' abundance (for example, see figure at top right, Brewer's sparrow abundance).

While it came as no surprise that the amount of landscape covered by sagebrush habitat predicted songbird numbers, the threshold needed to support abundant populations was surprisingly clear. Abundance of each songbird doubles when sagebrush covers 40% or more of the landscape. Yet such sagebrush-rich habitat is at a premium: fewer than 25% of sampled sites exceeded the 40% threshold.



New maps reveal the patterns of abundance of sagebrush songbirds, based on Breeding Bird Survey count data combined with sagebrush cover, landform, and climate variables. Shown here is the range-wide relative abundance of Brewer's sparrow. Map courtesy Patrick Donnelly, IWJV.

> *"New maps gave us the first habitat-based picture of rangewide abundance for sagebrush songbirds. We knew that each bird loved sagebrush but I was surprised to see the subtle differences in species' habitats, which were covered by the different SGI tools."* ~Jason Tack, Avian Science Center, University of Montana



Abundance of each of three songbirds doubles where sagebrush covers more than 40% of the landscape. Chart courtesy Jason Tack, University of Montana.

Patterns Across the Landscape

With new maps in hand, the scientists then compared patterns of songbird abundance with the distribution of sage grouse leks throughout the West. They found that songbird numbers were higher where sage grouse leks are most common. For 90% of active leks, the surrounding landscape exceeded 40% sagebrush cover, and songbirds were also more abundant in these landscapes. Near large leks, which support 50% of known grouse populations, abundance was 15% higher for Brewer's sparrow, 13% for sagebrush sparrow, and 19% for sage thrasher.

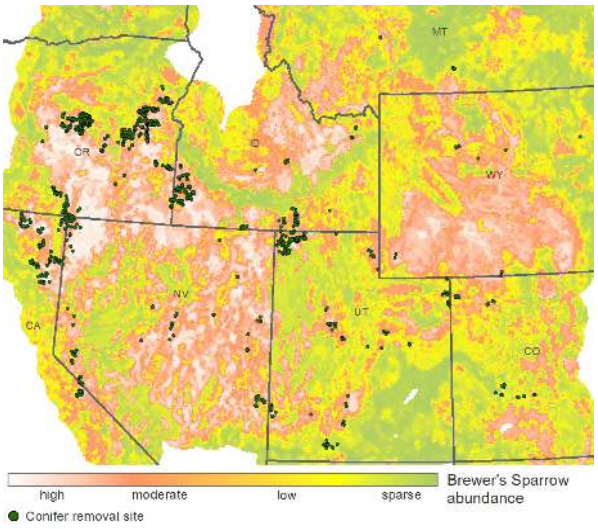
> *"Our new science confirms the long-held notion that sage grouse distributions and sagebrush songbird abundance go hand-in-hand across the West."* ~Patrick Donnelly, Landscape Ecologist, Intermountain West Joint Venture

Extending Sage Grouse Conservation to Songbirds

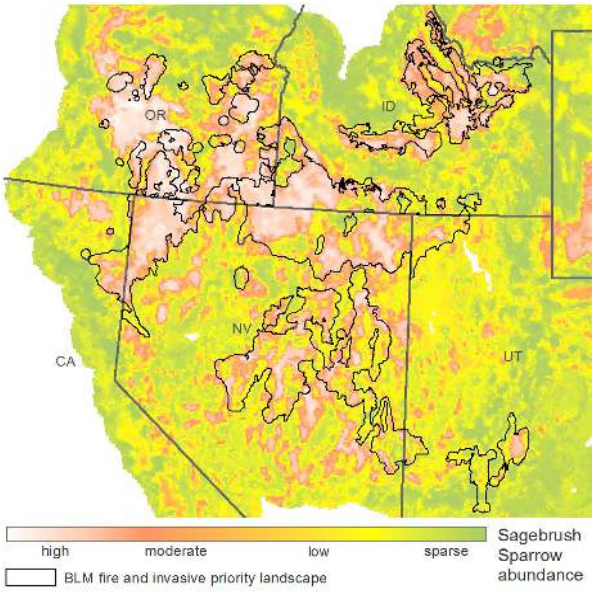
The scientists then examined how sagebrush songbirds may benefit from sage grouse conservation actions across the West. Their findings show that targeted actions for sage grouse largely overlap high abundance areas for sagebrush songbirds, and likely provide significant conservation benefits for these less well-known species.

In the Great Basin, native conifers (mostly juniper species) are encroaching into mid- to upper-elevation sagebrush habitats. Conifers reduce sagebrush habitat quality and provide perch and nest sites for avian predators that prey on sage grouse, their eggs, and chicks. Recent findings in Oregon showed Brewer's sparrow numbers increased 55% locally after targeted conifer removal (Sage Grouse Initiative 2015b). The new abundance maps revealed that conifer removal has benefits range-wide, as 85% of projects overlap with areas of high to moderate Brewer's Sparrow abundance.

In dryer, low-lying Great Basin habitats, invasion of cheatgrass and subsequent increase in wildfire threatens sagebrush communities on a massive scale. Bureau of



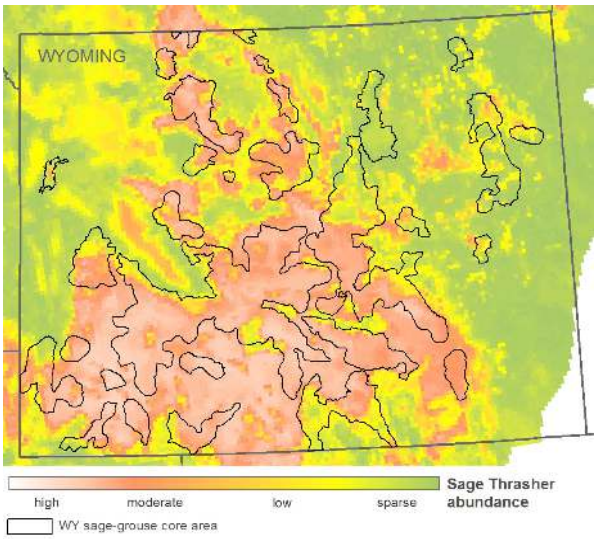
High Brewer's sparrow abundance coincided with high-elevation conifer removal projects. Map courtesy Patrick Donnelly, IWJV.



Sagebrush sparrow hotspots overlay fire and invasive priority landscapes identified by Bureau of Land Management. Map courtesy Patrick Donnelly, IWJV.

Land Management and U.S. Forest Service have identified FIAT (Fire and Invasive Assessment Team) priority areas to tackle weed invasion and manage fire. The scientists found that FIAT landscapes encompassed 51% of total estimated sagebrush sparrow abundance and 55% of sage thrasher. Clearly, the more we can accomplish under FIAT the better for the entire sagebrush community.

Wyoming's core area policy restricts and manages subdivision and energy developments to reduce fragmentation within areas of high sage grouse abundance, and offers incentives to protect and sustain sagebrush habitats. Findings here



A reduced energy footprint in Wyoming's core areas overlaps concentrations of sage thrasher. Map courtesy Patrick Donnelly, IWJV

revealed that core areas overlap with 40-50% of areas with high or moderate songbird abundance, and in particular with high abundance areas of sage thrasher.

Sagebrush songbirds have attracted less conservation attention than the more charismatic sage grouse, and the future of these species may hinge on the success of sage grouse habitat conservation. These new songbird maps and analyses extend our understanding of sagebrush wildlife communities, and provide additional tools to help expand the benefits of sage grouse conservation to other species.

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Researchers Patrick Donnelly (l) and Jason Tack (r) assessed the benefits from sage grouse conservation to songbirds across sage grouse range.

Please Cite As

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Sources

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Additional Resources

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Visit the SGI website at: **www.sagegrouseinitiative.com**

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