

Science to Solutions

# Sagebrush Songbirds Benefit from Sage Grouse Habitat Restoration



*Singing Brewer's sparrow and green-tailed towhee in Lake County, Oregon. Both species increased in sagebrush habitats after removal of encroaching junipers. Credit Jacob Spendelow, tringa.org.*

**In Brief:** Sage grouse breeding habitat is lost to invading juniper when trees exceed 4% canopy cover. Focused tree removal on early- and mid-successional sites prevents conversion of sagebrush-steppe to conifer woodlands and should benefit sage grouse populations. New science shows that conifer removal for sage grouse also benefits sagebrush-dependent songbirds. In the Warner Mountains of southern Oregon, Brewer's sparrow abundance increased by +55% and green-tailed towhee jumped +81% following cuts. Annual increases each year post tree removal suggest that songbird use may increase even more with time. Abundances of species less dependent on shrublands including mountain bluebird and rock wren were unaffected by treatments. Gray flycatcher, a species whose increasing prevalence in portions of their range may be related to increases in juniper trees, decreased -78%. This science demonstrates the utility of songbirds as early indicators of restoration effectiveness and illustrates how restorative cuts for sage grouse that retain shrub cover can result in immediate benefits for other sagebrush species.

## Coping with Conifer Encroachment

Over the past 150 years, junipers and pinyon pines have expanded into sagebrush country, often due to fire suppression, historic overgrazing and favorable climatic conditions. Conifer encroachment today is largely an infill issue, as most sites vulnerable to invasion became occupied by trees late in the 1800s and 1900s. Where traditional sagebrush habitat had a few large, old growth conifer trees scattered across the landscape or restricted in clumps, more trees are now moving into the sage-steppe and in some cases completely outcompeting

shrubs, grasses and forbs. Roughly 80% of sagebrush sites invaded by conifers are still in the early phases of woodland succession (Phases I and II), where native shrubs and bunchgrasses are common providing a window of opportunity for conservationists to reclaim otherwise suitable habitat. Conifer encroachment has benefited a number of woodland associated bird species, but scientists have long suspected that this happens at the detriment of shrub and grassland dependent bird species – many of which are of greater conservation concern.

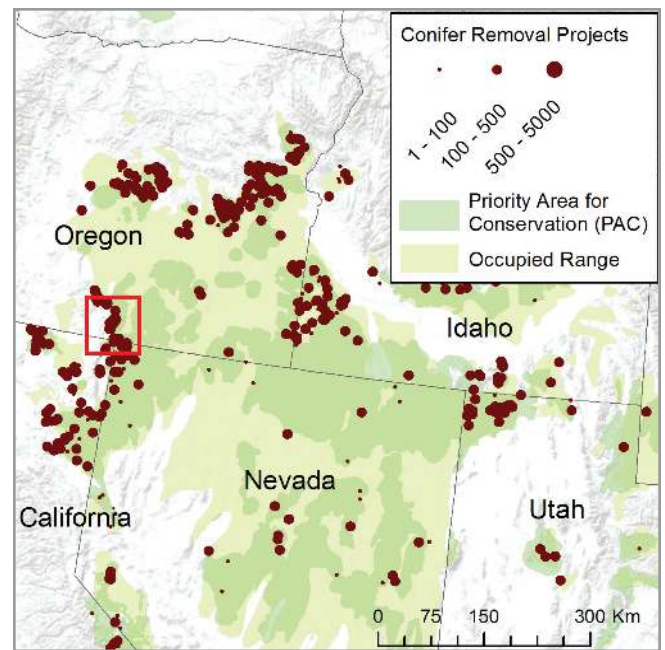
## Conifer Removal a Key Strategy in Sage Grouse Recovery

**A** core practice in sage-steppe restoration for sage grouse has been the removal of encroaching conifer. Through the Sage Grouse Initiative (SGI) alone, over 400,000 acres of otherwise suitable habitat are being reclaimed by ranchers through targeted tree removal in and around priority areas where encroaching trees are a widespread threat. Cross boundary collaboration with public land management agencies is increasingly occurring with the goal of whole watershed restoration.

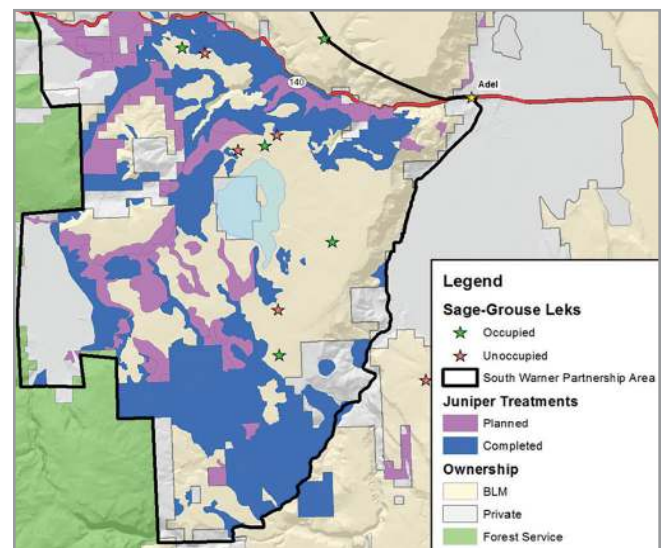
One of those landscapes is the Warner Mountains of southeast Oregon where the Bureau of Land Management, Natural Resources Conservation Service, Oregon Department of Fish and Wildlife, private landowners/ permittees and other partners have led the way on conifer removal. Through careful planning across the 70,000-acre South Warner project area, partners identified approximately 40,000 acres that had some level of juniper encroachment but selected for treatment about 30,000 acres with the greatest potential to reclaim sagebrush habitat.



These photos of a portion of the South Warner project area show Phase II juniper encroachment in 2008 and the same view in 2015 after juniper removal. Credit Todd Forbes, Bureau of Land Management.



Location and size (acres) of SGI-sponsored conifer removal projects in the Great Basin Region. The red box denotes SGI cuts within the Warner Mountain landscape.



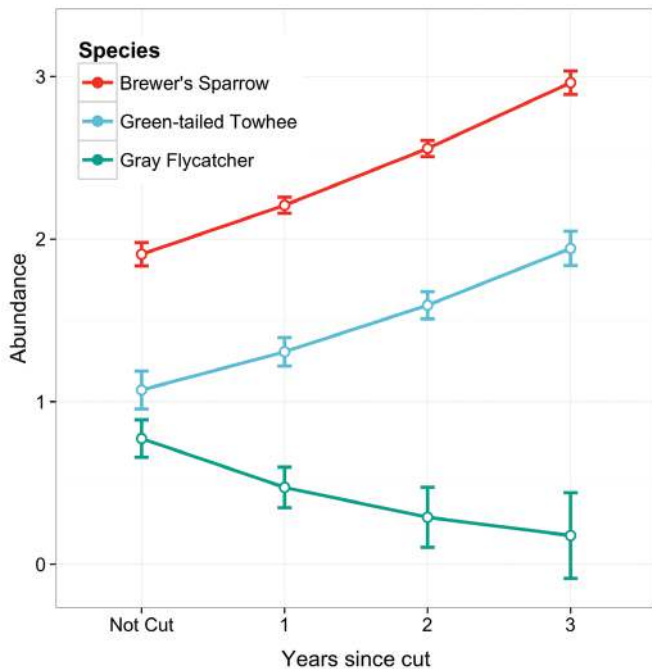
South Warner project area where partners are working across comingled public-private lands to remove conifers. Treatment areas planned and completed as of spring 2015 are identified in relation to sage grouse leks.

A shared goal among partners for restoration included maximizing shrub retention during treatments to benefit sage grouse, mule deer, and a host of other shrub-dependent species. Good planning coupled with targeted removal efforts at large scales make it the ideal location to assess biological outcomes of juniper removal. Long term research by SGI partners evaluating sage grouse response to conifer removal has been underway for several years but songbird responses have been recently quantified.

## Studying Songbirds in the Warner Mountains

In a project funded by the Bureau of Land Management, U.S. Fish and Wildlife Service and the Intermountain West Joint Venture, Dr. Aaron Holmes, director of Northwest Wildlife Science and a research associate with Point Blue Conservation Science, assessed the biological outcome of conifer cuts to songbirds in the South Warner project area near Adel, Oregon. In 2013 and 2014, observers surveyed all birds seen or heard at 404 sites within the treatment area that had been at either Phase II (377 sites) or III (27 sites) of juniper encroachment. Each site was surveyed in one year and at the time was either not yet cut, or had been cut from one to three nesting seasons prior to sampling. At each sampling point, scientists also quantified current shrub canopy cover and compared both pre-and post-treatment tree density.

Holmes found that abundance for two shrub-obligate species of conservation concern in the sagebrush steppe increased



*Songbird response to juniper removal one to three years post-treatment. Count data was recorded within a 12-acre area (125-meter radius point counts) and modeled as a function of years since juniper removal.*

following cuts – the Brewer's sparrow by +55% and green-tailed towhee by +81%. Abundance of these species continued to increase annually after conifer removal suggesting that benefits may not yet be fully realized as birds continue to recolonize cuts through time. Vesper sparrow, a more grassland-dependent species, also showed a +38% increase following cuts. Abundances of other species such as rock wren and mountain bluebird that use both wooded and shrub habitats were unaffected by conifer removal. One species, gray flycatcher, decreased by -78% inside cuts – an outcome expected for a species that prefers mixed sagebrush-woodland communities and whose population increases in recent decades track juniper invasion through time.



*Green-tailed Towhee.*  
Credit: Tom Grey.

### **Songbirds as Indicators of Habitat Restoration**

Throughout the West, more than 350 species depend on the sagebrush ecosystem to various degrees. Many of these species, including sage grouse, have experienced declines as sagebrush habitat quality has deteriorated. Compared to sage grouse, songbirds are relatively easy to monitor during the nesting season when the males sing frequently. Their territories are also generally much smaller than those of sage grouse – often falling completely within the boundaries of juniper removal projects. As a result, evaluating the response of songbirds to habitat restoration in sage-steppe habitat can provide an early barometer of restoration effectiveness long before sage grouse biological responses are observed.

In 2008, the U.S. Fish and Wildlife Service identified Brewer's sparrow and green-tailed towhees as species of conservation concern in the Great Basin bird conservation region due to declining populations. The abundant gray flycatcher holds no special conservation status.



## How Removal is Done Affects Response

**N**ot all juniper removal is created equal. Using prescribed fire as a tool to remove conifers in the sage steppe is often desired among land managers to efficiently treat large acreages and restore ecosystem processes. However, sagebrush is intolerant of fire and only capable of recovering through seed dispersal over time. Historically this natural recovery process worked well for sagebrush species with plenty of other habitat available on the landscape. Today, large-scale habitat loss and degradation have backed managers into a “habitat-deficit corner” where any additional removal of sagebrush undermines species conservation objectives. As a surrogate for fire, SGI partners are using hand felling and mechanical removal of trees as the preferred method for meeting near-term species needs while ensuring sagebrush and other shrubs remain intact after treatment.

In the Warner Mountains and in other juniper removal areas, a highly effective method typically used is hand cutting with chainsaws. Felled trees are further broken down onsite or piled and burned during winter months to reduce predator perching opportunities, lower fuel loads and enhance nutrient cycling. This method maintains existing shrub communities and allows selective removal of invasive young trees and retention of “old growth” juniper. While more expensive and more labor intensive, hand felling of junipers is key in maintaining the shrub-component of the habitat.

## Under the Sage Grouse Umbrella

**C**onifer removal has emerged as a primary conservation practice for maintaining extant sage grouse populations through rapid restoration of degraded sage steppe. This new science provides additional evidence that conservation benefits extend to sagebrush-reliant songbirds co-occurring in the same landscapes. In a companion study on mule deer, scientists in Wyoming found that conservation measures implemented to benefit sage grouse also doubled the protection of mule deer migratory corridors and winter range. These studies add to the growing body of evidence that sagebrush ecosystem restoration and protection conducted under the sage grouse umbrella also benefit other non-target species of concern.

## Contacts:

Dr. Aaron Holmes, Point  
Blue Conservation Science:  
aholmes@pointblue.org

David Naugle, SGI Science  
Advisor, University of Montana,  
Missoula, MT: david.naugle@  
umontana.edu



*Dr. Aaron Holmes*

Jeremy Maestas, NRCS West  
National Technology Support Center, Portland, OR:  
jeremy.maestas@por.usda.gov

## Please cite as:

Sage Grouse Initiative. 2015. Sagebrush songbirds benefit from sage grouse habitat restoration. Science to Solutions Series Number 9. Sage Grouse Initiative. 4pp.

## Source:

Holmes, A., J. Maestas, and D. Naugle. 2015. In preparation. Removal of Western Juniper in Sagebrush-Steppe: Songbirds as Early Indicators of Restoration Success for Sage-Grouse.

## Additional Resources:

- NRCS. February 2015. Outcomes in Conservation: Sage Grouse Initiative. [http://www.sagegrouseinitiative.com/wp-content/uploads/2015/02/NRCS\\_SGI\\_Report.pdf](http://www.sagegrouseinitiative.com/wp-content/uploads/2015/02/NRCS_SGI_Report.pdf)
- Sage Grouse Initiative. April, 2014. Conifer Removal Restores Sage Grouse Habitat. Science to Solutions Series Number 2. Sage Grouse Initiative. 4pp. <http://www.sagegrouseinitiative.com/conifer-removal-restores-sage-grouse-habitat/>
- Maestas, J. D., B. A. Roundy, and J. D. Bates. 2015. Conifer Removal in the Sage Steppe: the why, when, where, and how. Great Basin Fact Sheet. Number 4. <http://www.sagegrouseinitiative.com/conifer-removal-in-the-sagebrush-steppe/>
- Sage Grouse Initiative. March 2015. Sage Grouse Conservation Benefits Migratory Mule Deer. Science to Solutions Series Number 6. Sage Grouse Initiative. 4pp. <http://www.sagegrouseinitiative.com/sage-grouse-conservation-benefits-migratory-mule-deer/>

To learn more about sage grouse conservation and the Sage Grouse Initiative, visit the SGI website at [www.sagegrouseinitiative.com](http://www.sagegrouseinitiative.com)

Writer: Jodi Stemler, Jodi Stemler Consulting LLC, [www.stemlerconsulting.com](http://www.stemlerconsulting.com)  
Designer: Maja Smith, MajaDesign, Inc. [majadesignwt@comcast.net](mailto:majadesignwt@comcast.net)

September 2015