

Science to Solutions

Private Lands Vital to Conserving Wet Areas for Sage Grouse Summer Habitat



In Brief: In the arid West, life follows water. Habitats near water – streamsides, wet meadows and wetlands — support the greatest variety of animal and plant life, and attract wildlife during their daily and seasonal movements. In a water-scarce landscape, these lush habitats are also where people have naturally settled. A recent groundbreaking study reveals a strong link between wet sites, which are essential summer habitat for sage grouse to raise their broods, and the distribution of sage grouse breeding areas or leks. The authors found 85% of leks were clustered within 6 miles of these wet summer habitats. Moreover, although wet habitats cover less than 2% of the western landscape, more than 80% are located on private lands. This study makes it clear that successful sage grouse conservation will greatly depend on cooperative ventures with private landowners, ranchers and farmers to help sustain vital summer habitats.

Green Magnets for Grouse

The sage grouse's life history is intimately linked to sagebrush shrubsteppe uplands. Yet in late summer, as the uplands dry out, hens seek out emerald islands in the sagebrush sea: riparian edges, wet meadows, seasonal wetlands, and irrigated fields – remaining spots of green where they can still find moist forbs and plenty of insects for their growing chicks. These scattered wet habitat sites are critical for brood survival and recruitment.

Do these islands of late summer green somehow influence where sage grouse choose to breed in spring? And how does summer habitat fit into the conservation picture for sage grouse?

To answer these questions, Patrick Donnelly with the Intermountain West Joint Venture/U.S. Fish and Wildlife Service (IWJV/USFWS) and his co-authors Dave Naugle and Jeremy Maestas with the Sage Grouse Initiative (SGI), and Christian Hagen with Oregon State University (OSU), mapped sage grouse breeding sites in relation to wet habitats across a large landscape, and analyzed the land ownership of wet habitat sites.



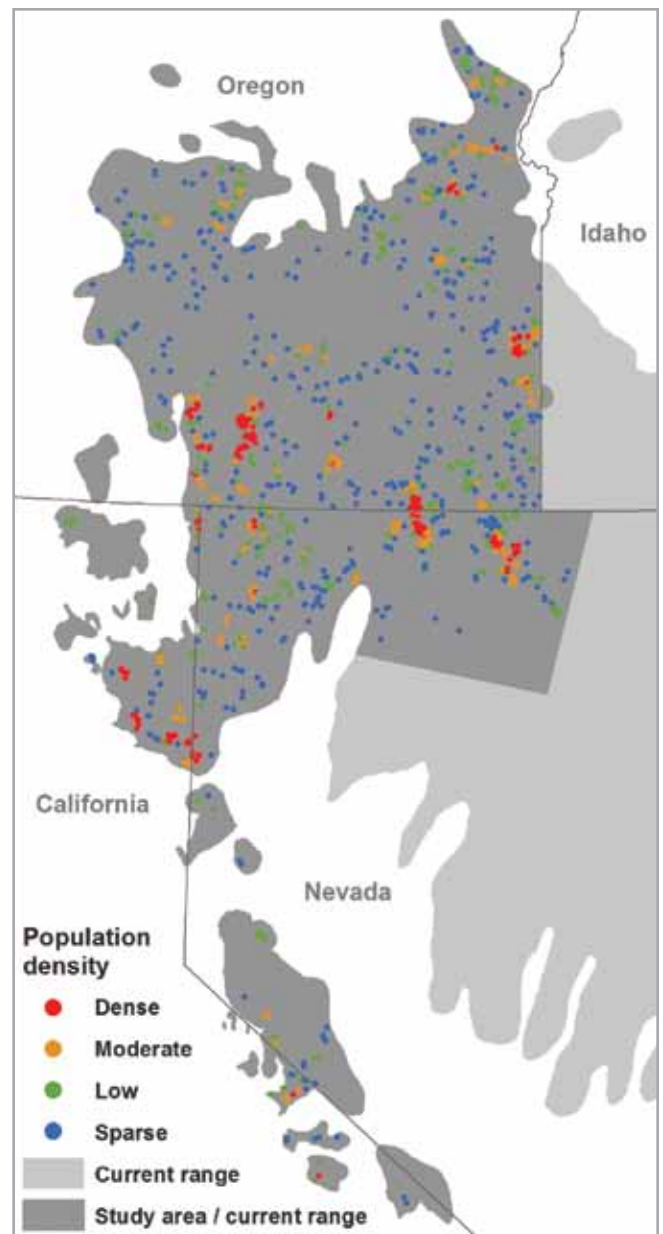
In late summer, wet meadows, riparian edges, and irrigated fields become islands of green in the sagebrush sea – vital foraging habitat for growing sage grouse broods. Photo credits: top - Dan Taylor; bottom left - Conservation Media; bottom right - Ken Miracle.

Lek Counts and Landsat

The authors studied patterns in the distribution of sage grouse breeding sites (leks) and summer habitats over a 28-year period (1984-2011) by taking advantage of two existing long-term datasets: annual lek survey data collected by the states and Landsat satellite imagery. The study area covered more than 32 million acres of current sage grouse range, encompassing populations in California, Oregon and northwestern Nevada. The scientists examined location and count data for 1,277 active lek sites in relation to habitat cover interpreted from Landsat satellite imagery. Using lek survey data they could categorize breeding areas by sparse, moderate or dense populations.

Landsat images used to map wet habitats were acquired for each year in late summer (August and September) during a time when sage grouse rely heavily on these resources for food. This allowed the authors to account for annual variations in climate and determine how changes altered summer habitat distribution during wet and dry periods. Summer habitats were classified as natural or agricultural areas. Natural sites included riparian areas, seasonal and temporary wetlands, as well as reservoirs, lakes, and playas with moist vegetation. Agricultural sites included wet meadows and alfalfa fields. Although wet meadows form naturally in basins, more than 92% of wet meadows in the study area were irrigated.

Once mapping was complete, the team could examine the spatial relationship between summer habitat locations, the likelihood of a habitat site being wet from year to year, and the distribution and abundance of sage grouse based on lek surveys. In addition, the researchers overlaid land ownership maps with wet habitat locations to establish whether late summer sage grouse habitat is more likely to be on public or private land.



The study area encompassed sage grouse range in Oregon, California and northwest Nevada. Colored dots represent leks. Grouse leks and populations cluster in the landscape: red and yellow indicate higher breeding densities; blue and green are more sparse. Map courtesy of Patrick Donnelly, IWJV/USFWS.



In late summer, sage grouse seek out productive wet habitats in both natural and agricultural areas. In this study, natural sites included riparian habitats, seasonal and temporal wetlands, and the edges of reservoirs, lakes, and playas with moist vegetation. Agricultural sites included alfalfa fields and wet meadows, which were most often associated with irrigation.

Summer Habitats Connect Sage Grouse with Private Lands

Several patterns quickly became clear. Not only were leks clumped in the landscape, but the distribution of those clusters were strongly linked to the location of wet habitats: 85% of leks were within 6.2 miles of wet sites. The breeding areas with the highest densities of birds were even closer – within only 1.8 miles of wet habitats. In other words, the scarcity of wet habitats in sagebrush ecosystems drive the location of grouse breeding sites on uplands: hens choose to mate and nest within a reasonable walk of where they can find late summer foraging for their broods.

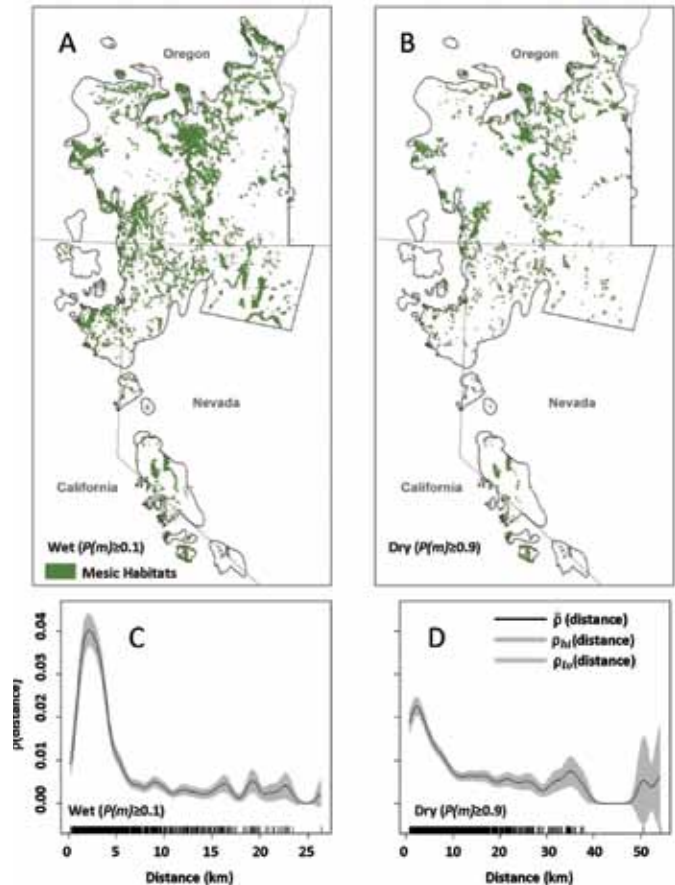
While sagebrush uplands are characteristically more stable environments, the study found the extent of wet summer habitats varied greatly from year to year with shifting climate patterns. In dry years, grouse broods must walk farther to find adequate summer foraging sites – the distance can double, increasing nutritional stress and making hens and chicks more vulnerable to predation.

Grouse breeding sites with larger populations were also linked to the best natural summer habitats, and in wet years these sites may drive population recruitment: more chicks survive. On the other hand, sparsely populated breeding areas were farther from summer habitats and often associated with irrigated agriculture. During drought, grouse find fewer options for late summer foraging and may rely more on irrigated fields and wet meadows, when natural sites dry out.

European settlers to the Great Basin well understood the best sites for farms and pastures, and settled stream bottoms and basins that collect snowmelt and remain productive late into summer. Donnelly and his team overlaid current land ownership with 1887 maps of topographic basins and with Landsat imagery of current wet habitat condition. The

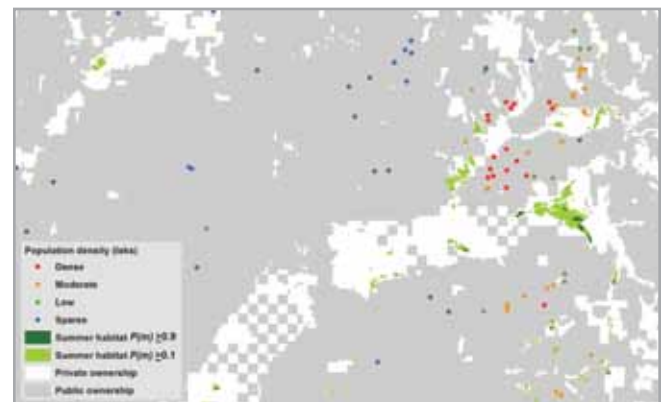
“I don’t think it was so much a surprise that grouse rely on these wet areas and that wet habitats are limited; it was how much of this was private, and how much wet summer habitat controlled the distribution of grouse across the landscape.”

~Patrick Donnelly, IWJV/USFWS



In wet years, the extent of wet (mesic) habitats can nearly double (maps at top). Hence leks are much closer to summer habitat (bottom graphs) – an easier trek from nesting areas for hens with broods. Chart courtesy of Patrick Donnelly, IWJV/USFWS.

natural basins that support both temporary and persistent wet habitats were magnets for settlers, and virtually all are in private ownership today. The authors found that while wet habitats make up only 1 to 2% of the land area, 81% are in private hands.



Mapping leks, wet summer habitats and land ownership revealed a startling pattern: although >80% of upland breeding habitat is on public lands, >80% of critical summer brood habitat is located on private lands. Chart courtesy of Patrick Donnelly, IWJV/USFWS.

An Essential Piece of the Conservation Puzzle

Conventionally, sage grouse conservation has focused on management of sagebrush uplands, yet this study reveals that wet summer habitats and private land partnerships are vital for sustaining sage grouse. “How do you conserve grouse that split their time between private and public lands?” asks Donnelly. “With 81% of sparse summer habitat in private ownership, sage grouse success is inextricably linked to ranching and farming in the West.”

Conservation must consider the connection between seasonal habitats on public and private lands and involve cooperative efforts with private landowners. By understanding the importance of privately-owned summer habitats to sage grouse, conservation practitioners can use existing volunteer and incentive-based programs to target conservation easements, and focus investment in cooperative programs to reduce threats to, restore, and enhance these habitats.

How Can I Access this Data?

IWJV and SGI have created a map-based “Decision Support Tool” for land managers to help identify summer grouse habitat and coordinate conservation. The tool can be used to target summer habitat areas for conservation, and to evaluate the outcomes of conservation efforts. The tool is available on the SGI website as an ArcGIS data package and must be downloaded to an ArcGIS platform. If you are a private landowner interested in using this decision tool, or have no ArcGIS capability, contact your NRCS field office for assistance.

The tool can help practitioners:

- Target protection, enhancement and restoration of summer habitats in priority landscapes.
- Maintain or expand available summer habitat to sustain grouse distribution and abundance.
- Coordinate conservation efforts across public and private lands.

Currently, the decision tool only covers sage grouse range in Oregon, California and northwest Nevada. Work is underway to expand the study and provide a tool for the entire sage grouse range across 145 million acres within the next two years.

To view the science webinar, “Rangewide Mapping of Scarce Wetland Resources”, presented by Patrick Donnelly, visit <http://www.sagegrouseinitiative.com/private-lands-harbor-scarce-wetlands-ideal-sage-grouse-view-science-webinar/>



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Patrick Donnelly with the IWJV/USFWS in Missoula, Montana, lead this ground-breaking study that revealed a tight link between sage grouse upland breeding sites and nearby wet summer habitats. Photo courtesy of Patrick Donnelly.

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Additional Resources

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

To find your local NRCS Service Center, visit the NRCS website at <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local/>.

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