Science to Solutions

Grazing Management In Perspective: A Compatible Tool For Sage Grouse Conservation

In Brief: Research evaluating effects of livestock grazing on greater sage-grouse nest survival suggests that a variety of locally-appropriate range management strategies support grouse populations. A new Montana study comparing effects of specialized grazing systems on ranches enrolled in the NRCS-led Sage Grouse Initiative (SGI) to ranches not enrolled in SGI grazing programs found no difference in nest survival: in both cases, long-term nest success (40-49%) was consistent with the rangewide survival rates of a stable sage grouse population. Researchers also reported heights of live and senesced grasses that were within a half-inch of each other on SGI-enrolled ranches versus non-enrolled ranches. The take-home message is that, done sustainably, grazing is a highly compatible land use for maintaining sage grouse populations, and is wholly preferred over habitat-destroying alternatives like cropland cultivation or subdivision development. Farm Bill-funded assistance through SGI to enhance grazing practices may contribute to protecting habitat by keeping ranching operations profitable and sustainable.

Framing The Question

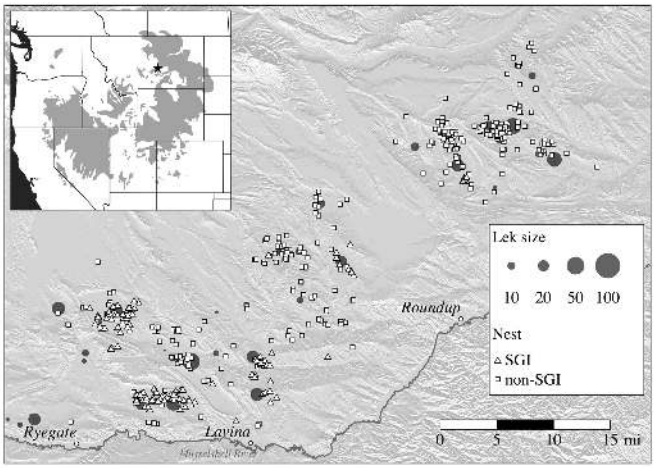
Declines in sage grouse populations are largely a result of habitat loss and degradation in sagebrush-steppe ecosystems across the West. Improper livestock grazing has been proposed as a contributing factor to habitat degradation since overgrazing can reduce concealing cover provided by vegetation around the birds' nests. Consequently, identifying ways to manage livestock that maintain high-quality habitat for sage grouse is a priority across the range.

Rotational grazing systems, which are assumed to benefit sage grouse by increasing hiding cover, typically involve moving livestock among several pastures throughout the grazing season, and changing these rotations from year to year. In some grazing systems, one or more pastures are "rested" (i.e. not grazed) for a year or more on a rotating basis. New research from a team led by Joe Smith from the University of Montana, along with scientists from Montana Fish Wildlife & Parks, Bureau of Land Management, U.S. Fish and Wildlife Service, and USDA's Conservation Effects Assessment Project, is beginning to answer the question of whether rotational grazing systems and resting pastures benefit sage grouse.

Studying Grazing Practices

The study took place in two sage grouse strongholds in central Montana near the town of Roundup. Primary goals of this study were two-fold: (1) evaluate whether SGI grazing systems resulted in increased nest survival relative to non-enrolled ranches (hereafter referred to as SGI and non-SGI ranches), and (2) evaluate differences in vegetation height and cover between treatments. A nearby National Wildlife Refuge property with pastures that had not been grazed for 4 to 12 years provided a useful control for comparing the two different grazing treatments to long-term idling of vegetation.

Rotational grazing plans implemented on SGI ranches adhered to the NRCS Montana 528 Prescribed Grazing conservation practice standards[1], and were further customized to maximize hiding cover within nesting pastures. SGI enrollees could optionally elect to rest twenty percent of the identified nesting habitat (defined as flat to rolling pastures with ≥5% sagebrush cover) on their ranches from grazing on an annually rotating basis. The rest period was designed to provide pastures without livestock use for two full nesting seasons, and generally lasted ≥15 months in duration. Researchers evaluated sage grouse nests on 10 SGI ranches that had implemented this type of rotational grazing, and then compared the results with nests on 30 non-SGI ranches.

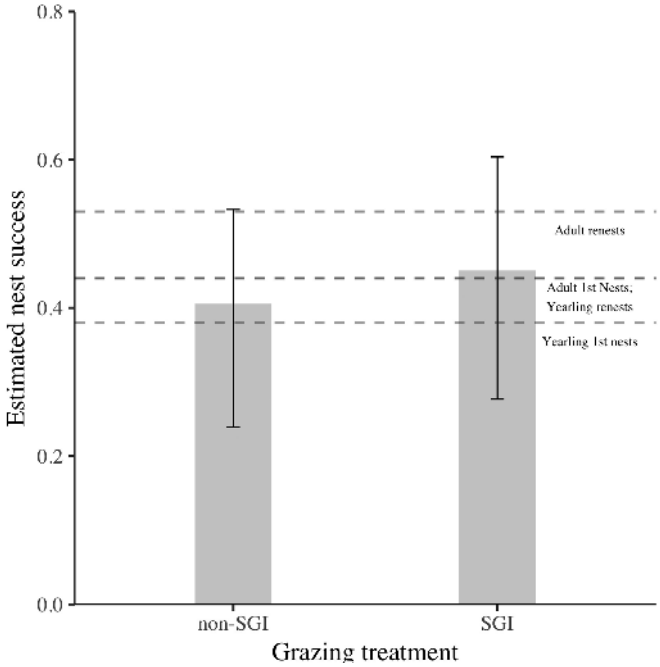


Study area in central Montana. Leks are indicated by dark grey circles, with size of circles proportional to the highest male count recorded from 2011–2016. Nests monitored from 2011–2016 are indicated by triangles (SGI ranches with rotational grazing systems) and squares (non-SGI ranches). Inset map shows location of study area (star) within the contemporary range of sage grouse (grey shading).

1. Visit efotg.sc.egov.usda.gov for more information on NRCS state practice standards

Watching The Nests

The team radio-tracked 340 female sage grouse between 2011 and 2016 on 495 nests on SGI and non-SGI ranches. When hens selected nest sites, the sites were marked and then monitored from a distance every 2-3 days until the hen left the nest. After predicted hatch dates, the team checked nests to see if they were successful with at least one hatched egg, or if the nest failed due to predation or abandonment. Median clutch size was eight eggs, and seven eggs for second or third nesting attempts. Nest survival was similar between SGI and non-SGI ranches. Average annual nest success was 40–49 percent, which falls within rangewide rates necessary to maintain a stable population.

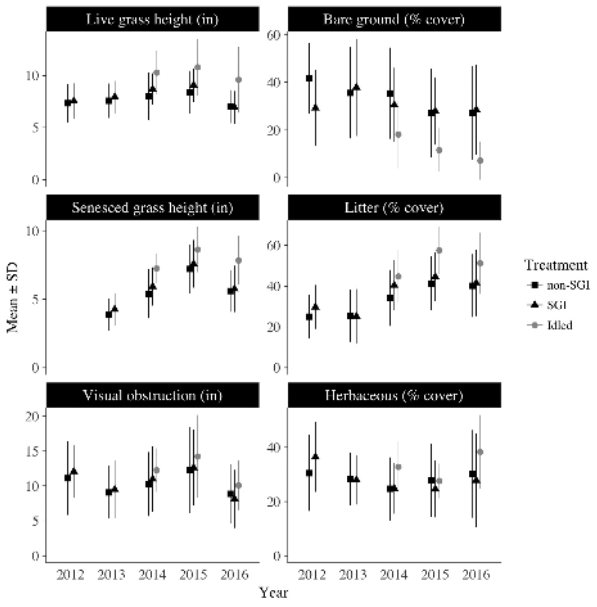


Sage grouse nest success on SGI and non-SGI ranches in central Montana, 2011–2016. Error bars depict upper and lower 95% credible intervals. Nest survival was similar between treatments, and overall nest success was consistent with rangewide rates of a stable sage grouse population, as depicted by dashed horizontal lines.

Measuring Rangeland Vegetation

Livestock grazing is thought to primarily affect sage grouse indirectly by influencing the structure or composition of vegetation the birds rely upon for food and cover. From 2013 to 2016, researchers sampled 556 test plots on SGI ranches, including 226 in rested pastures, and 451 vegetation plots on non-SGI ranches and compared the vegetative structure. To ensure consistency, test plots were standardized to ensure that variability from topography, soils, and proximity to water were considered, and that all samples were representative of nesting habitat.

Researchers found that heights of live and senesced grasses were within a half-inch of each other on SGI versus non-SGI ranches. Bare ground, herbaceous vegetative cover, and visual obstruction (a measure of vegetation density) were similar between the systems. Litter (a measure of detached dead vegetation) was five percent higher on SGI ranches. They also found that year-to-year variation largely swamped the effects of grazing systems and rest on vegetation measures. Idled lands on a nearby National Wildlife Refuge had greater vegetative cover and litter, less bare ground, and taller vegetation.



Vegetation response at plots on SGI ranches, non-SGI ranches, and idled National Wildlife Refuge pastures in Montana.

> *Done right, grazing is a land use that is highly compatible with healthy sage grouse populations.*

Putting Grazing In Perspective

The biggest takeaway message from Smith's research is to not sweat the small stuff: done right, grazing is a land use that is highly compatible with healthy sage grouse populations. Alternately, converting sagebrush grazing lands to more intensive land uses such as cultivation, housing, or energy development typically spells the demise of sage grouse.

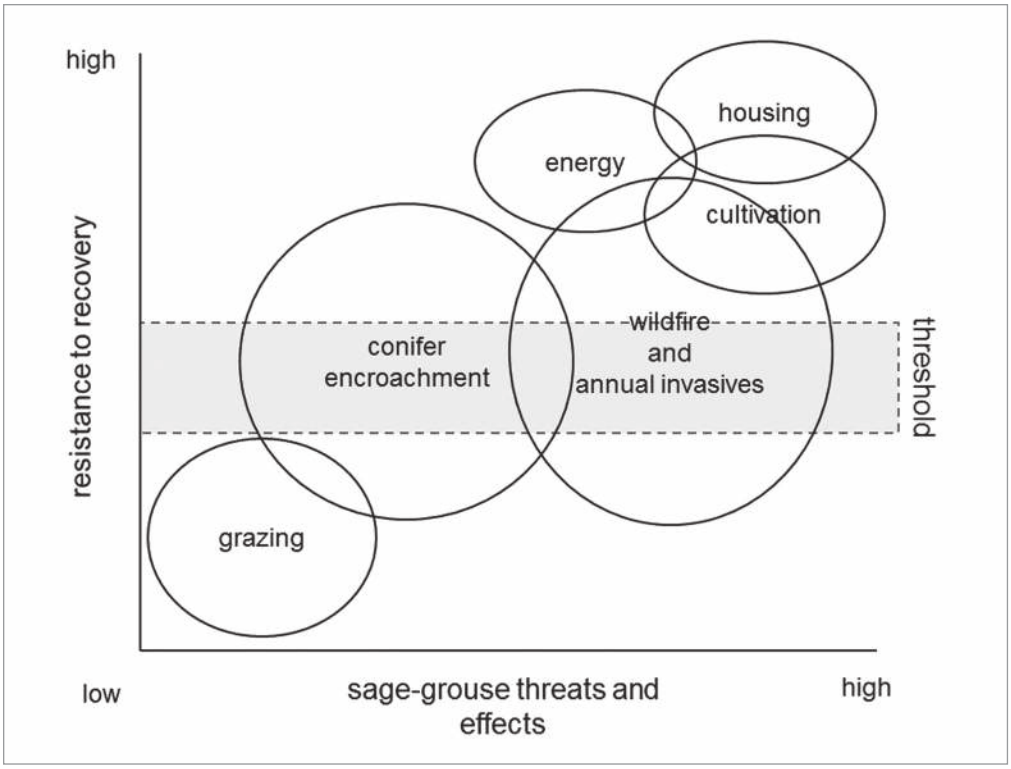
Most importantly, properly managed grazing—regardless of the specific management system—keeps mixed land ownerships stitched together across the West. Technical and financial assistance provided by SGI through the NRCS to enhance grazing practices may help conserve sage grouse habitat by keeping ranching operations profitable and sustainable.

Shown above is variation in shrub and herbaceous cover between nests in the Great Basin (left) and Great Plains (right). Note the increased shrub cover provided for nesting birds in the Great Basin.

Sustainable Grazing Important For Range Health

Smith's team cautions not to interpret their findings as diminishing the importance of good grazing management. Rather, grazing in sage grouse habitat should continue to focus on fundamental rangeland management principles. Although the effects of SGI grazing systems were negligible in Montana, studies should be replicated in other geographies across the range to account for ecological context.

By promoting robust, diverse, native perennial plant communities, managers can ensure that rangelands remain resistant and resilient so that severe threats such as drought, exotic annual grass invasion, and fire have less chance of making an impact on the birds.



Sage grouse face a number of threats across their range, varying in the severity of their impact on populations (x-axis) and their reversibility (y-axis). Impacts from livestock grazing are generally localized, minor, and reversible relative to those of cultivation, energy development, housing, or invasion by conifer or exotic annuals. Figure adapted from Fuhlendorf, et. al., 2017.

Learn More

SGI's Interactive Web App helps managers and landowners plan sagebrush conservation projects by visualizing and mapping resources: **map.sagegrouseinitiative.com**

The Sage Grouse Initiative is a partnership-based, science-driven effort that uses voluntary incentives to proactively conserve America's western rangelands, wildlife, and rural way of life. This initiative is part of Working Lands For Wildlife, which is led by USDA's Natural Resources Conservation Service: **sagegrouseinitiative.com**

Source

Smith, J. T., J. D. Tack, L. I. Berkeley, M. Szczypinski, and D. E. Naugle. 2017. "Effects of rotational grazing management on nesting greater sage-grouse" *(In press).* Journal of Wildlife Management.

Additional Resources

Gibson, D., Blomberg, E. J. and Sedinger, J. S. (2016), Evaluating vegetation effects on animal demographics: the role of plant phenology and sampling bias. Ecology and Evolution 6:3621–3631. doi:10.1002/ece3.2148

Smith, J. T., Evans, J. S., Martin, B. H., Baruch-Mordo, S., Kiesecker, J. M., and Naugle, D. E. (2016), Reducing cultivation risk for at-risk species: Predicting outcomes of conservation easements for sage-grouse. Biological Conservation 201:10-19.

Please Cite As

Sage Grouse Initiative. 2017. Grazing Management In Perspective: A Compatible Tool For Sage Grouse Conservation. Science to Solutions Series Number 14. Sage Grouse Initiative. 4pp.

Writer: Jodi Stemler, Jodi Stemler Consulting LLC, www.stemlerconsulting.com
Designer: Maja Smith, MajaDesign, Inc. www.majadesignvt.com
Photos: Joe Smith

Contacts

• Joe Smith *(right)*, SGI Research Scientist, University of Montana, Missoula, MT: joe.smith@umontana.edu

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