



United States Department of Agriculture



Sage Grouse Initiative 2.0

Investment Strategy, FY 2015-2018



Natural Resources
Conservation
Service

August 2015

LETTER FROM THE CHIEF

NRCS' Commitment to Sage Grouse

Since 2010, the Sage Grouse Initiative (SGI) has served as the model for voluntary, incentive-based conservation at its best. Through conservation science and partnerships at the federal, state and local levels, we're making a huge impact for conservation and agriculture at a time when it's needed most. In this report, we lay out our renewed commitment to this partnership through 2018 and demonstrate the effectiveness these investments can have in bringing back sage grouse populations, while helping to improve ranching operations at the same time.

USDA's Natural Resources Conservation Service (NRCS) launched SGI in 2010 to target efforts that sustain the working rangelands that support sage grouse and 350 obligate species for the long-term. Using Farm Bill conservation programs, we're addressing non-regulatory threats facing the grouse, mainly fragmentation of their habitat, which is the primary reason for the sage grouse's candidate designation under the Endangered Species Act. Through SGI, we're applying the right conservation practices in the right places to maximize our return on investment.



SGI is making a difference because private landowners voluntarily work with us to produce results on the ground. The decisions Western ranchers and other private landowners make every day about what to do on their land will continue to have a critical impact on sage grouse.

The results speak for themselves. Today, 1,129 ranches across 11 Western states are conserving 4.4 million acres of land — an area of working lands twice the size of Yellowstone National Park. We have reduced habitat fragmentation by establishing more than 451,000 acres of conservation easements. These easements maintain large and intact working ranches, and often times they connect with other habitats on public lands.

Privately-owned grazing lands underpin 40 percent of sage grouse range and constitute some of the most productive habitats available. Through implementation of 2.4 million acres of grazing systems since 2010, SGI is helping ensure those lands are managed sustainably to provide productive sage grouse habitats long term while supporting the local economy on working lands.

We've also greatly enhanced 405,241 acres of otherwise suitable habitat by removing invading conifer trees. Focusing removal on early successional sites in priority habitats ensures maximum benefits for sage grouse conservation.

In addition to benefits to wildlife, we're also preventing a loss of 60 percent of the available forage for livestock. Half of our SGI conifer effort has been invested in Oregon where we have now reduced more than 68 percent of the conifer threat on priority private lands.

We've come a long way since 2010, and we have no intention of slowing down. This report describes the significant investments NRCS plans to make through the life of the 2014 Farm Bill. These aren't random acts of conservation – we are looking to invest in the comprehensive plans put forth by the Western states and the public land management agencies. Our planned investments will complement the great work occurring throughout the West and provide our partners with a roadmap to fill unmet needs by rallying around a cohesive strategy. It is intended to be a living document, informed by the best available science and the priorities of our partners to make meaningful, targeted investments that will have a real impact for the species and bolster the productivity of working lands.

We're calling this effort SGI 2.0, and NRCS is committing approximately \$211 million to this partnership through 2018. NRCS has already invested \$296.5 million in SGI, and our partners have brought another \$128 million to the table. With the anticipated partner match on these new investments, we expect that by the end of 2018, around \$760 million will have been invested through SGI, conserving up to 8 million acres of sage grouse habitat.

SGI would not exist without the hard work and commitment from our partners — states, conservation districts, wildlife and agricultural groups, land trusts and other federal partners. And our most important partner — the ranchers who are doing their part to improve outcomes for sage grouse.

SGI is living proof that wildlife and agriculture can coexist and thrive together. You've heard it before — what's good for the bird is good for the herd. The steps we're taking to improve habitats and outcomes for sage grouse and other wildlife are good for cattle, good for ranching operations, and good for America's rural economy.

A handwritten signature in black ink, appearing to read 'J. Weller', with a large, stylized initial 'J'.

Jason Weller
Chief, USDA Natural Resources Conservation Service

Table of Contents

- Executive Summary6
- Conservation Actions.....7
 - Fire and Invasive Annual Grasses7
 - Invasive Conifers9
 - Exurban Development.....11
 - Cultivation of Grazing Lands13
 - Mesic Area Loss and Degradation15
 - Fence Collisions17
- Appendix A: References19

Executive Summary

The greater sage-grouse, an iconic ground-dwelling bird of the West, has experienced significant population declines during the past 50 years from habitat loss. The U.S. Fish and Wildlife Service (FWS) designated sage grouse in 2010 as a candidate for listing under the Endangered Species Act (ESA).

In September 2015, the FWS will determine whether to list the greater sage-grouse under the ESA or find that ongoing efforts to restore and protect sagebrush habitat are sufficient to ensure their long-term survival. Loss and fragmentation of sage grouse habitat is the primary threat and has a number of contributors, including human development and encroachment of conifer trees and invasive plants.

NRCS is working with ranchers to address these threats on private lands through restoring and protecting key sage grouse habitat while ensuring grazing lands remain sustainable and profitable. NRCS launched the Sage Grouse Initiative (SGI) in 2010 to focus efforts that reduce threats facing sage grouse and the working lands that provide their habitat.

NRCS uses a variety of Farm Bill conservation programs to restore and protect habitat, including habitat improvements through the Environmental Quality Incentives Program (EQIP) and long-term conservation easements through the Agricultural Conservation Easement Program (ACEP). Since 2010, NRCS has invested more than \$296.5 million to implement SGI. Conservation partners and landowners have contributed an additional \$128 million, bringing the total SGI investment to \$424.5 million.

Sage Grouse Initiative 2.0

NRCS plans to commit approximately \$211 million to SGI over the life of the 2014 Farm Bill, providing partners with certainty that conservation will continue well into the future. SGI 2.0 will invest around \$93 million in habitat restoration through EQIP and \$100 million in

conservation easements through ACEP. NRCS will invest the remaining \$18 million to support SGI staff and partners who work with ranchers and other partners to implement conservation actions on the ground and quantify resulting outcomes.

This four-year commitment combined with funds leveraged by partners will bring the total SGI investment to approximately \$760 million. Already underway in 2015, additional resources are enabling SGI to nearly double past achievements, putting SGI on the path to conserve about 8 million acres by 2018.

NRCS also plans to add the Conservation Stewardship Program (CSP) as another tool for conservation, beginning with a pilot in 2015 of up to 275,000 acres. CSP, like EQIP, provides technical and financial assistance to ranchers who restore habitat. Through the new Regional Conservation Partnership Program, NRCS partners have opportunities to propose projects that benefit sage grouse habitat.

Agency leaders and partners worked together at the state level to describe priorities for reducing threats to sage grouse habitat, identifying locations for projects and cost estimates. SGI 2.0 combines plans from 11 states into one cohesive, rangewide plan that will guide the agency's conservation efforts. SGI 2.0 aligns with plans of local, state and federal partners, including plans by governors, the Bureau of Land Management and U.S. Forest Service. The four-year strategy enables NRCS to better position staff for implementation and provides time for partners to leverage additional funding for identified priorities.



CONSERVATION ACTION

Threat: Fire and Invasive Annual Grasses

Purpose and Need: Wildfire poses a primary threat to habitat because of direct loss. Invasive grasses harm habitat by replacing critical habitat components and also provide fuel for unwanted fire.

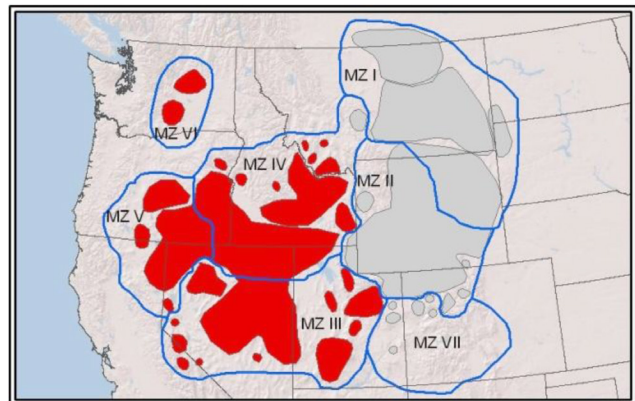
Priority Areas: Wildfire threat is in western portion of range. States include California, Idaho, Nevada, Oregon, Utah and Washington. Threat of invasive grasses extends east into Rocky Mountain states as an emerging issue in all management zones. Sage Grouse Management Zones III, IV, V and VI.

Conservation Objective: Reduce threats to annual grasses by grazing sustainably to promote deep rooted perennials, re-vegetating disturbed areas and combatting noxious weeds. Avoid further loss of sagebrush grazing lands to wildfire by reducing annual grass threat and by assisting in strategic fire break installation.

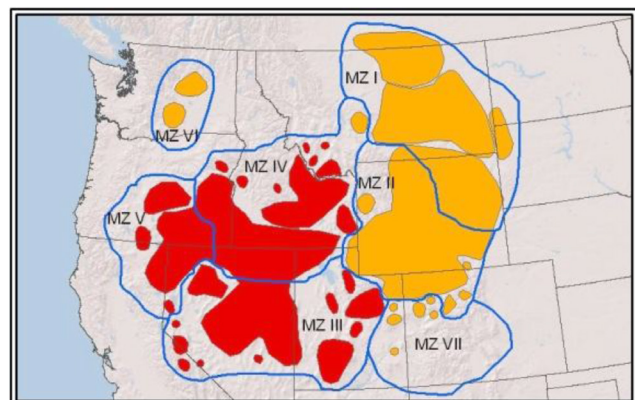
Funding Source: Environmental Quality Incentives Program (EQIP)

SGI Targeting:

Sage grouse habitats evolved with wildfire but the proliferation of invasive, non-native annual grasses has forever changed NRCS' approach to land management. Recent science shows that suppression is 98 percent effective, but the 2 percent of invasive grass that regrows continually increases in size and severity, impacting millions of acres annually (Trial by Fire; Murphy et al. 2013). Groundbreaking application of Resistance and Resilience (R&R) concepts to the sagebrush ecosystem combines the habitat needs of sage grouse with soils and climate data (Chambers et al. 2014). SGI uses resources from other agencies, like BLM, to better target sustainable grazing, weed management and re-vegetation efforts. BLM maps detail the agency's game plan for implementing the right actions in the right places before, during and after fires. BLM's prescriptions transcend property boundaries, enabling SGI to partner on implementation.



Priority areas for addressing wildfire.



Priority areas for addressing invasive grasses.

SGI Outcomes:

Since 2010, SGI has enhanced rangeland health to reduce threat of invasive grasses on 1.7 million acres. Prescribed grazing, implemented on 1.6 million acres, is the primary way that ranchers manage for deep-rooted perennial grasses whose prevalence is inversely related to that of invasive annual species. Descriptions of ecological sites and comprehensive rangeland inventories, coupled with prescribed grazing, provide the biological basis for sustainable grazing plans. Additional practices control invasive grasses and re-vegetate sites where invasives are removed.



Photo courtesy of U.S Geological Survey.

SGI 2.0 Refinement:

SGI 2.0 will scale up threat reduction of invasive and annual grasses in seven states, assisting BLM on comingled private lands. This investment is 50 percent greater than in previous years. Forty percent more land will be seeded with native grasses, and 50 percent more prescribed grazing will be implemented. Meanwhile, managing weeds will grow 40-fold. SGI 2.0 marks the first time that an estimated 216 miles of carefully placed fuel breaks will be a part of the effort, which will improve rangeland health and resilience on about 2.2 million acres in priority areas.



Photo courtesy of Jaepil Cho.

| Restoration and Enhancement | | | | |
|-----------------------------|------------------|---------------|-----------------------|------------------|
| State | Grazing Acres | Seeding Acres | Weed Management Acres | Fuel Breaks Feet |
| CA | 7,000 | 0 | 600 | 0 |
| CO | 180,000 | 14,000 | 6,000 | 550,000 |
| ID | 285,000 | 4,500 | 10,000 | 0 |
| NV | 150,000 | 0 | 200 | 15,000 |
| OR | 300,000 | 21,000 | 42,500 | 550,000 |
| UT | 40,000 | 0 | 300 | 25,000 |
| WY | 900,000 | 100 | 145,000 | 0 |
| Gunnison (CO) | 60,000 | 5,000 | 6,600 | 0 |
| TOTAL | 1,922,000 | 44,600 | 211,200 | 1,140,000 |



CONSERVATION ACTION Threat: Invasive Conifers

Purpose and Need: Altered fire regimes have allowed conifers to expand into sagebrush ecosystems reducing available habitat. Sage grouse avoid areas where pinyon and juniper trees have expanded, causing the habitat to decline.

Priority Areas: Primarily Great Basin but localized in the other management zones and states. Primary states include California, Colorado, Idaho, Nevada, Oregon and Utah. Sage Grouse Management Zones III, IV, V and VII.

Conservation Objective: Accelerate removal of conifer trees and increase efforts in key regions across the West.

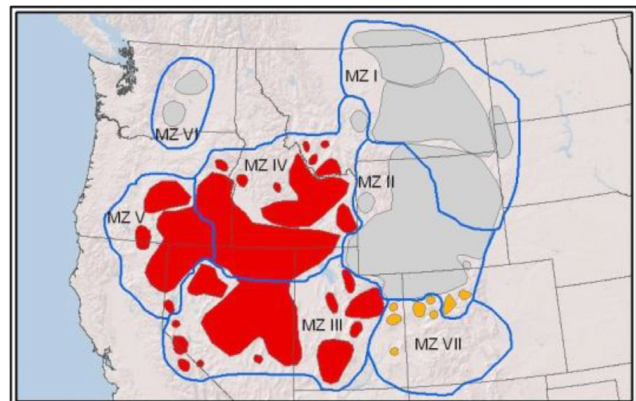
Funding Source: Environmental Quality Incentives Program (EQIP)

SGI Targeting:

Scattered young trees may look harmless to a casual observer, but science shows that birds abandon otherwise suitable habitat with as little as 4 percent tree cover (Baruch-Mordo et al. 2013). SGI conifer removal maintains extant populations by removing early encroaching trees. Junipers and pinyon pines have expanded their range six-fold in western states since the 1800s. About 80 percent of sagebrush sites occupied by conifers are in early phases of invasion. SGI strategically removes a small percentage of this early encroachment in the right places to greatly benefit populations. Cuts inside of priority areas and near their edges also function to increase the amount of available habitat.

SGI Outcomes:

SGI cuts have reclaimed 405,241 acres of otherwise suitable habitat. Nearly half of reclaimed acres are in Oregon, where conifer removal during SGI has increased by 14 times over. Threat alleviation on private lands in Oregon is 68 percent complete inside of priority areas. Recent research by U.S. Geological Survey confirms that mechanical treatments



Priority areas for invasive conifers.



NRCS photo.

benefiting sage grouse also increase sagebrush songbirds that reoccupy cut sites the spring following treatment. When conifers are removed, it also decreases the fuel available to potential wildfire.

SGI 2.0 Refinement:

Removing conifers at the landscape scale remains a core practice in SGI 2.0 with a projected 86 percent of new cuts targeted to priority areas in the Great Basin states of Oregon, California, Nevada, Idaho and Utah. New in 2015 are cuts within the Rocky Mountain states of Montana, Wyoming, Colorado and the Dakotas, where invasive conifer is a local threat. New conifer mapping to enhance targeting will be complete by September 2015 across 102.5 million acres of occupied habitat. SGI 2.0 will be partnering with state and federal entities to co-locate conifer cuts on public and private lands and track progress jointly to reduce threats.

Anticipated Milestones by 2018:

- Cuts in Oregon remove 95 percent of early succession conifer on private lands in focal areas, 90 percent of private lands in priority areas statewide, and 75 percent on private lands in occupied habitat statewide.
- On private lands in California, threat conifer will be completely removed within Klamath Basin population priority areas.
- Restore 25,773 acres in Utah representing 58 percent of non-federally encroached priority areas.

| Restoration and Enhancement Conifer Removal | |
|--|----------------|
| State | Acres |
| CA | 20,000 |
| CO | 7,000 |
| ID | 10,800 |
| MT | 2,000 |
| ND & SD | 200 |
| NV | 14,000 |
| OR | 140,000 |
| UT | 26,000 |
| WY | 19,000 |
| Bi-State (CA) | 1,000 |
| Bi-State (NV) | 3,000 |
| Gunnison (CO) | 3,000 |
| Total | 246,000 |



NRCS photo.



CONSERVATION ACTION Threat: Exurban Development

Purpose and Need: Dispersed homes on small acreages result in direct habitat loss and fragmentation. Associated infrastructure and disturbance further exacerbate impacts to populations.

Priority Areas: Rangelwide but localized. Portions of each of the 11 sage grouse states except Washington. Sage Grouse Management Zones I-V, VII and Bi-State.

Conservation Objective: Limit urban and exurban development in sage grouse habitats by acquiring conservation easements that maintain intact native sagebrush plant communities.

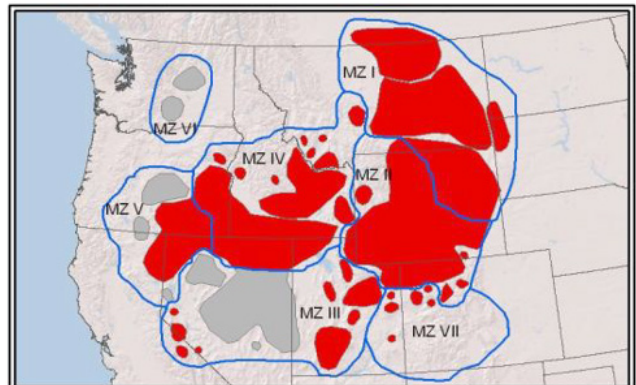
Funding Source: Agricultural Conservation Easement Program (ACEP)

SGI Targeting:

Conservation easements are an effective yet expensive mechanism for removing exurban development threat by keeping large working ranches intact. The localized nature of this threat means that comparatively few private lands are at elevated risk of development. SGI uses science-based targeting tools to strategically locate easements inside of priority areas where development potential is highest (Copeland et al. 2013, 2014). SGI clusters easements within at-risk watersheds.

SGI Outcomes:

Conservation easement acreage has increased 18-fold during SGI of which 83 percent, or 375,345 acres, were targeted to combat subdivision. Conservation easements are more than four times larger inside occupied habitats than outside them. About 94 percent provide permanent protection. Outcome-based science shows Wyoming core area policy and easements reduce losses by two-thirds that would have occurred in priority areas. In southwestern Wyoming, protective measures put in place for sage grouse also conserve 75 percent of habitat for migratory mule deer. Easement acquisitions in northwestern Colorado stitched



Priority areas for addressing exurban development.



Photo courtesy of Sage Grouse Initiative.

together forever a quarter million-acre landscape containing the largest population of sage grouse and elk in the state. In central Idaho, SGI works with the Pioneer Alliance to conserve the connectivity of 2.4 million acres of public land by conserving 65,400 acres of privately owned ranchlands.

SGI 2.0 Refinement:

SGI remains committed to systematically complete ongoing easement campaigns to prevent exurban development inside priority areas in Idaho, Colorado and Wyoming. New campaigns and their locations are being launched in Oregon and Utah.

Anticipated Milestones by 2018:

- Idaho’s easement campaign in the Pioneer Mountains will be completed by 2018 with procurement of the final 40,000 acres identified.
- In Wyoming, an additional 105,000 acres by 2018 will meet 87 percent of SGI’s goal of \$250 million, with this campaign complete by 2020.

| Restoration and Enhancement Protection | |
|--|-----------------|
| State | Easements Acres |
| CO | 25,000 |
| ID | 40,000 |
| OR | 65,000 |
| UT | 35,000 |
| WY | 105,000 |
| Gunnison (CO) | 10,000 |
| Total | 320,000 |



Photo courtesy of Jeremy R. Roberts



CONSERVATION ACTION

Threat: Cultivation of Grazing Lands

Purpose and Need: Cultivation reduces native sagebrush grazing lands, fragments remaining habitat and favors predators that feed on sage grouse populations.

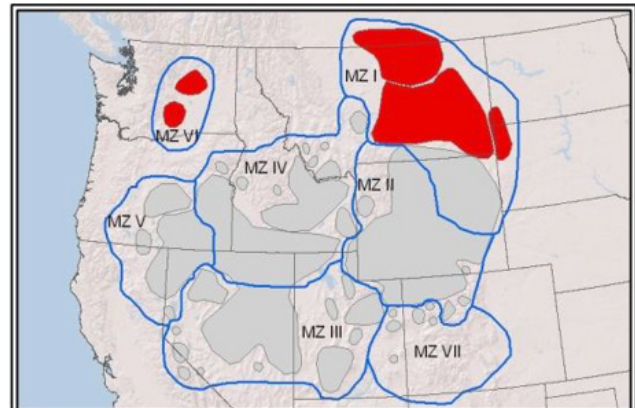
Priority Areas: Select portions of the range. States include Montana, North Dakota, South Dakota and Washington. Sage Grouse Management Zones I and VI.

Conservation Objective: Avoid further loss of sagebrush grazing lands to cultivation by acquiring conservation easements that maintain native sagebrush grazing lands. Prioritize restoration of intervening croplands and graze livestock sustainably across these landscapes.

Funding Sources: Environmental Quality Incentives Program (EQIP) and Agricultural Conservation Easement Program (ACEP)

SGI Targeting:

Management Zone I is cattle country where the region's cold climate and marginal soils have helped this landscape avoid conversion to crop land. But current pressure is high to cultivate sagebrush grazing lands and tap into high commodity prices. This area is 70 percent privately owned with 8 percent of the region currently in crops. New SGI science assessing the scale at which cultivation impacts sage grouse found that one landowner converting a single square mile into new cropland negatively impacts birds in a landscape 12 times that size (Smith et al. 2015). They found that 96 percent of active leks today are surrounded by less than 15 percent of cropland. Maps resulting from this science are helping partners identify at-risk landscapes where conservation easements would reduce cultivation risk most efficiently. Management Zone VI in eastern Washington faces a similar cultivation threat except that much of the conversion has already occurred. Targeting there focuses more on restoration rather than proactively preventing cultivation.



Priority areas for addressing cultivation of grazing lands.



NRCS photo.

SGI Outcomes:

SGI science found conservation compliance provisions in the 2014 Farm Bill and a \$146 million investment in easements can reduce the bird losses by 87 percent that would have occurred without these conservation measures in place (Smith et al. 2015). Conservation compliance provisions in the 2014 Farm Bill discourage producers from converting native rangeland to cropland by reducing federal crop insurance, but the largest benefits are realized through easements. Easement acreage increased 18-fold during SGI of which 15 percent, or 65,881 acres, reduced cultivation risk. Located within the species' northernmost priority areas, SGI's largest easement helps maintain in perpetuity the longest-known sage grouse migration, a 150-mile journey between Saskatchewan and the Missouri River in northeast Montana (Tack et al. 2012, Smith et al. 2013).

In Management Zone VI, the decline of sage grouse has reversed following maturation of 1.5 million acres of Conservation Reserve Program (CRP) lands, planted through USDA's Farm Service Agency, to restore cropland to perennial grasses and sagebrush (Schroeder and Vander Haegan 2011). Today, SGI is helping maintain these habitats by turning expiring CRP lands into working lands where sustainable grazing is the predominant land use.

SGI 2.0 Refinement:

SGI is maintaining large and intact grazing lands by coupling restoration and enhancement with conservation easements. In addition to easements, SGI is implementing sustainable grazing systems, restoring old crop fields to native rangelands and removing predator subsidies. SGI is projected to acquire another

61,500 acres of easements as part of SGI 2.0. States and partners are using SGI's spatial planning tool to target easements to landscapes under highest threat of cultivation. Under a whole systems approach, SGI is also augmenting easement acquisitions with approximately 10,000 acres of restoration by reseeded old fields back to native bunchgrasses. In these intact grazing lands, Montana is piloting removal of rock piles, outbuildings, power poles, dumps and other human subsidies to reduce avian and mammalian predation on sage grouse (Dinkins et al. 2014).

Anticipated Milestone by 2018:

- Montana, North Dakota and South Dakota will complete a third of the \$146 million easement goal by 2018, a campaign that when complete in a decade, will reduce bird losses to cultivation by 87 percent.



Photo courtesy of Sage Grouse Initiative.

| Restoration and Enhancement Protection | | | | |
|--|-----------------|----------------|---------------|------------------------|
| State | Easements Acres | Grazing Acres | Seeding Acres | Predator Subsidies ft2 |
| MT | 40,000 | 650,000 | 8,400 | 260,000 |
| ND & SD | 20,000 | 150,000 | 1,600 | 0 |
| WA | 1,500 | 50,000 | 0 | 0 |
| Total | 61,500 | 850,000 | 10,000 | 260,000 |



CONSERVATION ACTION

Threat: Mesic Area Loss and Degradation

Purpose and Need: Loss and degradation of mesic habitats exacerbate declines in many populations because grouse rely on these areas for abundant forbs and insects to feed chicks in late summer. Impacts include direct drainage, down-cutting of channels, conversion to exurban uses and conifer expansion.

Priority Areas: Rangelwide, locally in all Management Zones.

Conservation Objective: Avoid further loss of riparian edges, wet meadows, seasonal wetlands and irrigated fields by acquiring conservation easements that maintain mesic habitats. Restore and enhance degraded mesic areas to help increase populations.

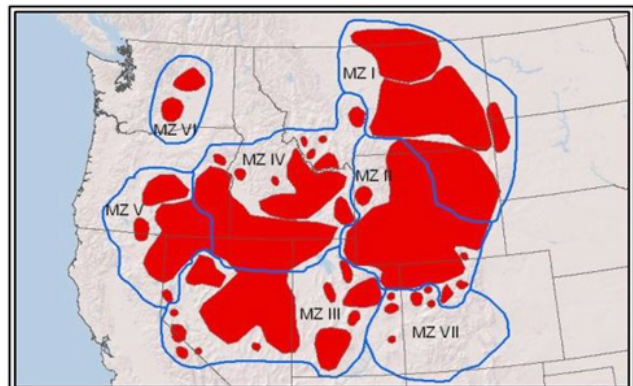
Funding Source: Environmental Quality Incentives Program (EQIP) and Agricultural Conservation Easement Program (ACEP)

SGI Targeting:

As upland nesting habitat typically dries in late summer, sage grouse follow the “green line” in search of productive wet habitats that provide food and cover for maturing young. New SGI science shows that 85 percent of leks are within six miles of mesic resources. The largest leks are within two miles of wet habitats. This is the first time science has shown that scarcity of wet habitats drive the location of grouse breeding sites on uplands as hens choose to mate and nest within a reasonable walk of where they can find late summer foraging for their broods. Wet habitats comprise less than 2 percent of the landscape, of which 80 percent are not federally owned, making private lands central to sage grouse conservation. Maps linking bird density to their mesic resources are helping partners in California, Nevada and Oregon identify the most important wetlands to focus restoration, enhancement and protection efforts (SGI 2014).

SGI Outcomes:

Mesic habitats and associated brood survival is a limiting factor in Western sage steppe landscapes (Atimian et al. 2010, Blomberg et al.



Priority areas for addressing mesic area loss and degradation.



Photo courtesy of Sage Grouse Initiative.

2012). SGI's first large-scale attempt to conserve mesic areas for sage grouse resulted in 12,000 acres of conservation easements in the Bi-State region along the Nevada-California border. This action helped keep the FWS from listing the Bi-State population under the ESA by proactively maintaining these important mesic habitats. Across the 11-state range of greater sage-grouse, 179 acres were restored or enhanced to increase quality and amount of habitat.

SGI 2.0 Refinement:

SGI 2.0 is committed to completing easement acquisitions in the Bi-State region, and to expanding its easement portfolio to protect other important mesic habitats in northern Nevada and Utah. This move represents a 150 percent increase from previous years and maintains an estimated 13,000 acres of requisite habitats on working ranches in the Great Basin. Rather than simply acquire easements, SGI also provides uplift to populations by coupling protective measures with restoration and enhancement. SGI 2.0 is expanding greatly to include mesic restoration and enhancement in 10 states totaling about 1,675 acres, which is eight times as many acres from previous years. When complete in 2015, states and partners will use rangewide SGI maps of mesic resources to further target these actions to maximize benefits (SGI 2014).

Anticipated Milestones by 2018:

- Complete acquisition of all remaining priority conservation easements identified in the Bi-State Action Plan.

| Restoration and Enhancement Protection | | |
|--|----------------|------------------------------|
| State | Easement Acres | Mesic Area Enhancement Acres |
| CA | 0 | 20 |
| CO | 0 | 130 |
| ID | 0 | 15 |
| MT | 0 | 60 |
| NV | 3,400 | 60 |
| ND & SD | 0 | 10 |
| UT | 400 | 690 |
| WY | 0 | 50 |
| Bi-State (CA) | 6,200 | 120 |
| Bi-State (NV) | 3,000 | 20 |
| OR | 0 | 500 |
| Total | 13,000 | 1,675 |



Photo courtesy of Conservation Media.



CONSERVATION ACTION Threat: Fence Collisions

Purpose and Need: Private working lands are the glue that maintain sage grouse habitats across the West. Despite habitat benefits from ranching to sage grouse, poorly placed fences may threaten birds with increased collision risk.

Priority Areas: Rangelwide, locally in all Management Zones.

Conservation Objective: Reduce sage grouse fence collisions.

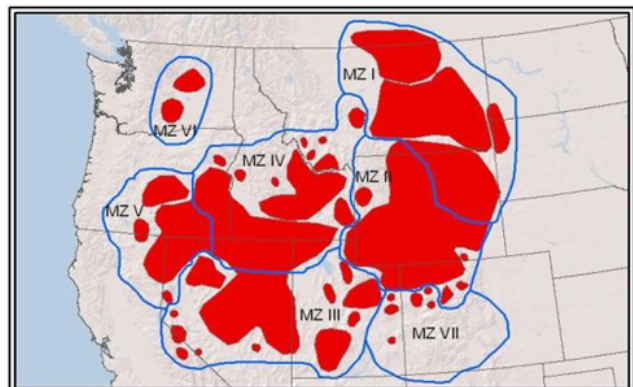
Funding Source: Environmental Quality Incentives Program (EQIP)

SGI Targeting:

SGI science has catalyzed fence-marking by first quantifying its benefit and then targeting its application (Stevens et al. 2013). About 93 percent of collisions occur within one mile of breeding grounds in flat to rolling terrain. The simple practice of fence-marking reduces grouse collisions by 83 percent (Stevens et al. 2013). With this information in hand, SGI developed a mapping tool to help land managers identify areas where grouse are most at risk of colliding with fences. Mapping reveals that only 6 to 14 percent of sage grouse range poses a high risk for collisions. This tool helps managers avoid building new fences in high-risk areas and focuses limited resources to marking those fences most likely to reduce collisions.

SGI Outcomes:

Through direct contracts with landowners and our partnership efforts, SGI has reduced threat of collision by marking 590 miles of high-risk fence. About 79 percent of marked fences are located inside priority areas to reduce risk to the greatest number of birds. Published estimates report a 600 percent decline in collisions along marked versus unmarked fences (Stevens et al. 2010, 2011a, b). Using these rates, SGI's fence-marking efforts are preventing 2,600 fence



Priority areas for addressing fence collisions.



Photo courtesy of Jeremy R. Roberts, Conservation Media.

collisions annually, which is more than twice the number of males counted annually on leks in Washington, North Dakota, South Dakota and Canada combined.

SIG 2.0 Refinement:

SIG 2.0 builds on its past success and anticipates marking another 227 miles of high-risk fence in eight states, bringing this effort to nearly 817 miles.

Anticipated Milestones by 2018:

- Utah and Colorado will have marked or removed all high-risk fences on private lands inside priority areas by 2018.

| Restoration and Enhancement | |
|-----------------------------|-------------------|
| State | Fence Marking Ft. |
| CO | 60,000 |
| ID | 60,000 |
| MT | 550,000 |
| OR | 110,000 |
| UT | 130,000 |
| WA | 110,000 |
| WY | 100,000 |
| Gunnison (CO) | 80,000 |
| Total | 1,200,000 |



Photo courtesy of Jeremy R. Roberts, Conservation Media.

References

- Atamian, M.T., J.S. Sedinger, J.S. Heaton, and E.J. Blomberg. 2010. Landscape-level assessment of brood rearing habitat for greater sage-grouse in Nevada. *Journal of Wildlife Management* 74:1533-1543.
- Baruch-Mordo, S., J.S. Evans, J.P. Severson, D.E. Naugle, J.D. Maestas, J.M. Kiesaecker, M.J. Falkowski, C.A. Hagan, and K.P. Reese. 2013. Saving sage-grouse from the trees: A proactive solution to reducing a key threat to a candidate species. *Biological Conservation* 167:233-241.
- Blomberg, E.J., J.S. Sedinger, M.T. Atamian, and D.V. Nonne. 2012. Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations. *Ecosphere* 3:55.
- Chambers, J.C., D.A. Pyke, J.D. Maestas, M. Pellant, C.S. Boyd, S.B. Campbell, S. Espinosa, D.W. Havlina, K.E. Mayer, and A. Wuenschel. 2014. Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: A strategic multi-scale approach. General Technical Report RMRS-GTR-326. Fort Collins, Colorado. U.S. Forest Service, Rocky Mountain Research Station.
- Copeland, H., A. Pocewicz, D.E. Naugle, T. Griffiths, D. Keinath, J. Evans and J. Platt. 2013. Measuring the Effectiveness of Conservation: A novel framework to quantify the benefits of sage-grouse conservation policy and easements in Wyoming. *PLoS ONE* 8:e67261.
- Copeland, H.E., H. Sawyer, K.L. Monteith, D.E. Naugle, A. Pocewicz, N. Graf, and M.J. Kauffman. 2014. Conserving mule deer through the umbrella of sage-grouse. *Ecosphere* 5:art117.
- Dinkins, J.B., M.R. Conover, C.P. Kirol, J.L. Beck and S.N. Frey. 2014. Greater sage-grouse (*Centrocercus urophasianus*) hen survival: effects of raptors, anthropogenic and landscape features and hen behavior. *Canadian Journal of Zoology* 92:319-330.
- Murphy, T., D.E. Naugle, R. Eardley, J.D. Maestas, T. Griffiths, M. Pellant, and S.J. Stiver. 2013. Trial by fire: Improving our ability to reduce wildfire impacts to sage-grouse and sagebrush ecosystems through accelerated partner collaboration. *Rangelands* 35:2-10.
- Sage Grouse Initiative. 2014. Emerald islands in a sagebrush sea: Summer habitat links sage grouse success to private lands. Science to Solutions Series Number 4. <http://www.sagegrouseinitiative.com/wp-content/uploads/2013/07/Science-to-Solutions-Private-Lands-Vital-to-Conserving-Wet-Areas-for-Sage-Grouse-Summer-Habitat.pdf>
- Schroeder, M.A., and W.M. Vander Haegen. 2011. Response of greater sage-grouse to the Conservation Reserve Program in Washington State. Pages 517-529 In S.T. Knick and J.W. Connelly (editors). *Greater sage-grouse: Ecology and conservation of a landscape species and its habitats*. Studies in Avian Biology Series (volume 38), University of California Press, Berkeley, California.
- Smith, J.T., J.S. Evans, S. Baruch-Mordo, J.M. Kiesaecker, and D. E. Naugle. 2015. Reducing cropland conversion risk to sage-grouse through strategic conservation of working rangelands: Submitted.
- Stevens, B.S., D.E. Naugle, B. Dennis, J.W. Connelly, T. Griffiths, and K.P. Reese. 2013. Mapping sage grouse collision risk: Spatially explicit models for targeting conservation implementation. *Wildlife Society Bulletin* 37:409-415.
- Stevens, B.S. 2011a. Impacts of fences on greater sage grouse in Idaho: Collision, mitigation, and spatial ecology. Unpublished M.S. Thesis. University of Idaho, Moscow, Idaho.
- Stevens, B.S., K.P. Reese, and J.W. Connelly. 2011b. Survival and detectability bias of avian fence collision surveys in sagebrush steppe. *Journal of Wildlife Management* 75:437-449.
- Tack, J.D., D.E. Naugle, J.C. Carlson, and P.J. Fargay. 2012. Greater sage-grouse *Centrocercus urophasianus* migration links the USA and Canada: A biological basis for international prairie conservation. *Oryx* 46:64-68.



USDA is an equal opportunity employer and provider.
nrcs.usda.gov/initiatives