USDA United States Department of Agriculture

NATURAL RESOURCES CONSERVATION SERVICE

WORKING LANDS FOR WILDLIFE

SAGE GROUSE INITIATIVE

MESIC HABITAT CONSERVATION PLANNING GUIDE

April 2017

Mesic habitat refers to land with a well-balanced supply of moisture throughout the growing season, such as streamsides, wet meadows, springs and seeps, irrigated fields and high-elevation habitats.

Above photo by Claudia Strijek. Cover photo by Jeremy Maestas.

BACKGROUND AND VISION

The sage grouse life cycle is intimately linked to sagebrush uplands. Yet as nesting habitats dry out over the summer, sage grouse often seek out riparian edges, wet meadows, springs, seeps, irrigated fields and other green spots remaining on the landscape where they can still find moist forbs and plenty of insects for their growing chicks (Figure 1). These scattered mesic habitats are critical for brood survival and recruitment. In some landscapes, brood-rearing habitats can be a limiting resource negatively affecting sage grouse chick survival (Atamian et al. 2010, Blomberg et al. 2012). Mesic habitats can also play an important role in structuring sage grouse distribution and abundance such that the highest breeding bird abundance areas are often located in landscapes with the most reliable (i.e., wet year after year) and well-interspersed mesic resources (Donnelly et al. 2016).

Although mesic areas cover less than 2 percent of the landscape, roughly 75 percent are located on private lands, placing landowners and USDA's Natural Resources Conservation Service (NRCS) in a unique position to conserve these rare habitats. NRCS launched the Sage Grouse Initiative (SGI) in 2010 to strategically focus conservation efforts to maximize biological benefits to sage grouse populations. NRCS' sage grouse efforts are part of Working Lands for Wildlife (WLFW).

Conserving the West's Emerald Islands

Water is a precious resource in the arid West and the resilience of these wet areas is equally vital to livestock production, which makes mesic conservation highly compatible with SGI's shared vision of achieving wildlife conservation through sustainable ranching. In recognition of this, NRCS identified mesic habitat conservation as one of its primary conservation actions in the SGI 2.0 Investment Strategy (NRCS 2015). While many actions can be taken to conserve mesic habitats, targeting of specific practices will increase the likelihood of providing benefits where needed most. This planning guide lays out a thought process to help facilitate state and local planning of beneficial practices. This is not intended to be a cookbook, but rather to help guide NRCS and partner planning efforts to strategically tackle local mesic resource concerns.

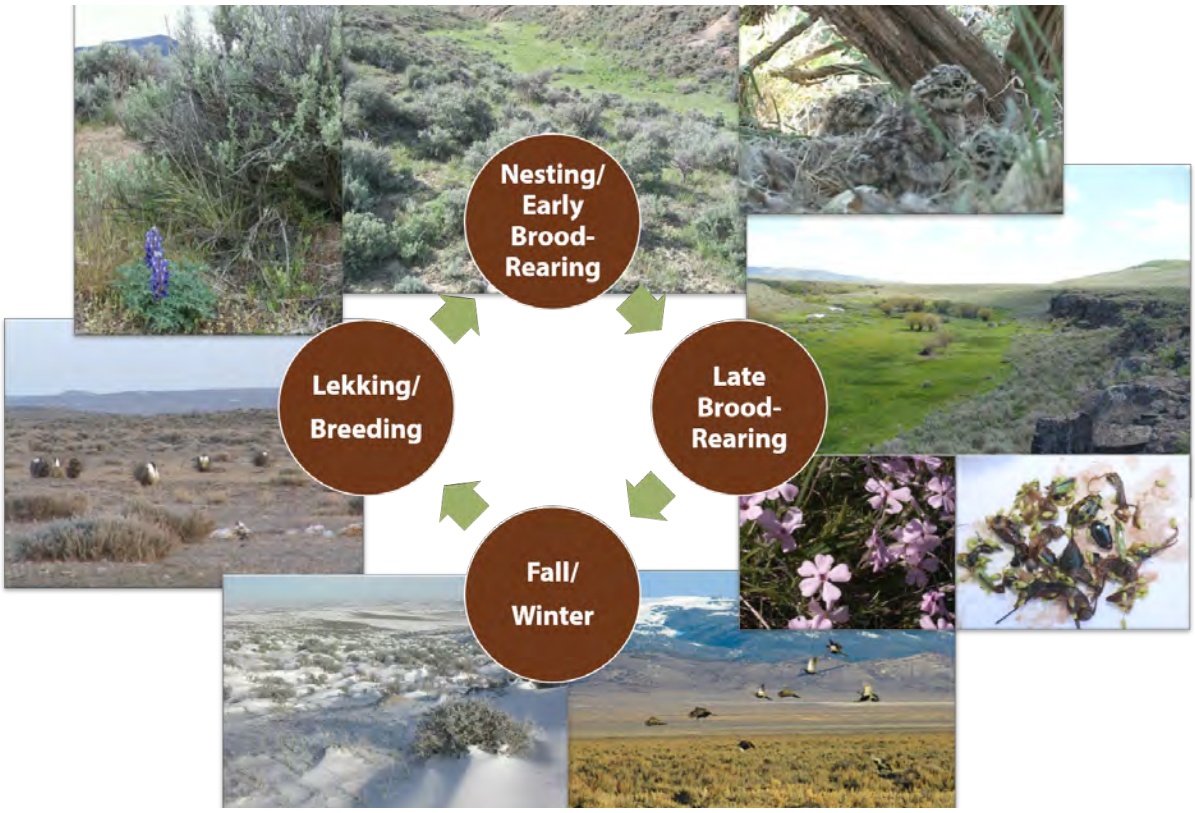


Figure 1. *Sage grouse life cycle and seasonal habitats. SGI's mesic habitat conservation seeks to bolster brood-rearing resources.*

STRATEGIC TARGETING

Healthy mesic habitats *act like sponges helping to capture, store and slowly release water. Photo by Joe Wheaton.*

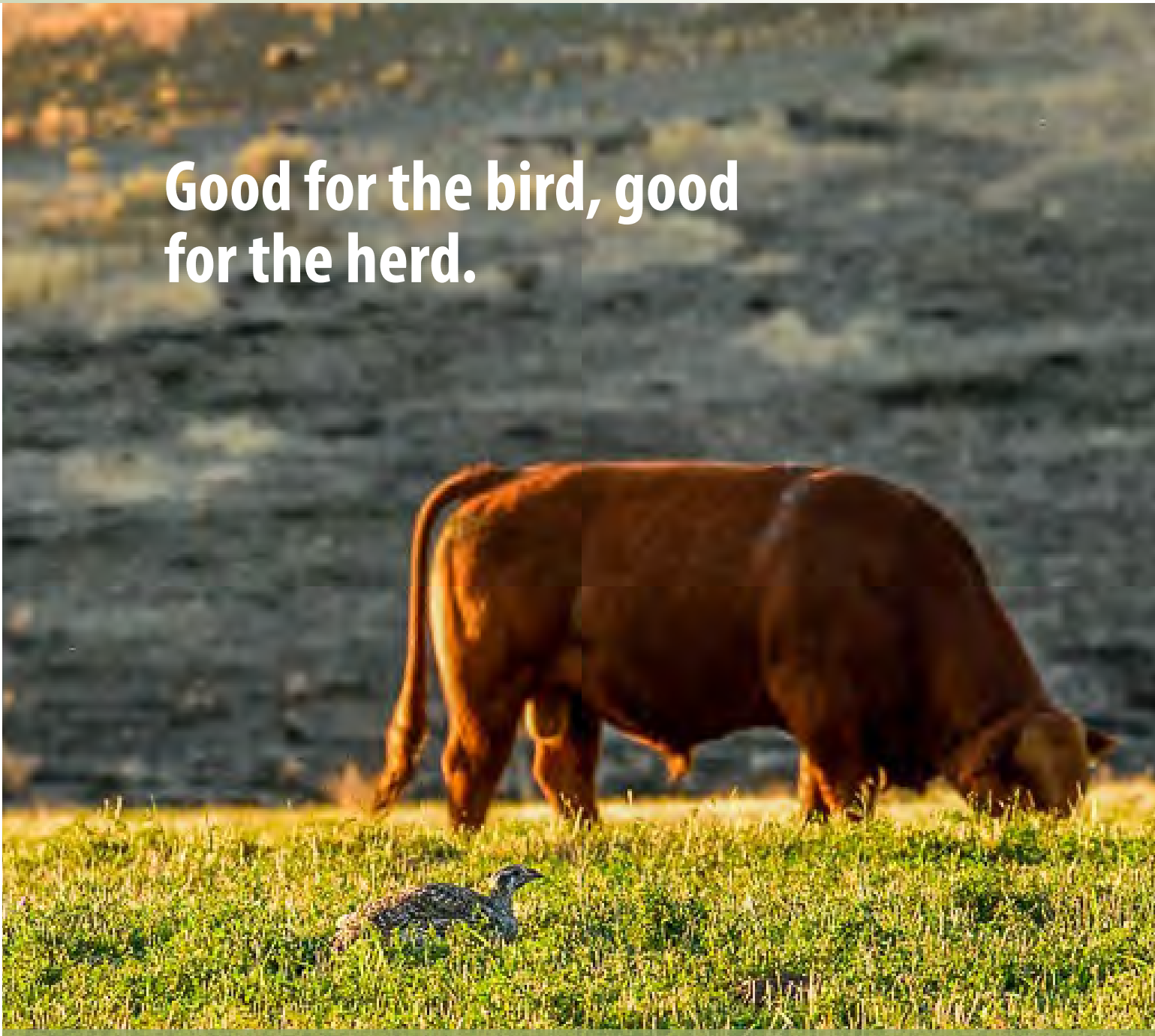
Conserving mesic habitats in an arid environment is beneficial wherever it occurs, but limited resources and the desire to make measurable progress necessitate a strategic approach. Fixing degraded systems can be time intensive and require ongoing maintenance, so it is important to assess opportunities carefully across the ranch or watershed scale and select locations where potential return-on-investment is high.

The relatively small footprint of mesic habitats makes it difficult to quantify the extent of areas in need of conservation at large scales. Also, little information exists on "how much is enough," which makes it challenging for planners to set meaningful milestones. But applying strategic thinking with available data and local knowledge can help focus efforts, develop reasonable targets, and provide the best chance at producing biological benefits.

Picking the Right Places to Work

One of the most important steps in planning is picking the right places to work. Focusing on areas relatively free of other threats provides a higher likelihood of realizing sage grouse benefits from mesic conservation. From a state- or county-wide perspective, concentrating actions in a specific watershed or other geographic area is more likely to result in cumulative benefits that can be quantified. Watersheds where a significant amount of landowner and partner conservation have already occurred may be ideal locations to focus efforts in order to leverage benefits of previous investments. Combining available information on past projects and grouse habitat use with the current condition and availability of mesic habitats in the area can help inform which landscapes to prioritize.

At the ranch scale, it is also possible to achieve considerable benefits from mesic conservation but actions must still be targeted in specific areas where biological benefits are most likely. Engaging SGI participants who have already addressed other threats may be a low-hanging fruit opportunity for initial efforts. Abundant opportunities across large ranches may make it difficult to determine where to start. By keeping the sage grouse life cycle in mind, a logical place to begin would be to evaluate the breeding landscape in the vicinity of active leks for mesic habitat issues and opportunities. For example, prioritizing restoration of incised channels in breeding habitats within a couple miles of active leks may provide the most opportunity for uplift in brood habitat use where reliable mesic resources are thought to be limiting. The idea is to provide plenty of options near nesting areas for hens and chicks to reduce distances traveled to mesic summer habitats.



Good for the bird, good for the herd.

Our Charge:

Strategically protect, restore, or enhance mesic areas (or "green spots") so sage grouse hens and chicks can more readily and reliably access forb- and insect-rich summer habitats.

DECISION SUPPORT TOOLS

A variety of tools are available to aid planning and on-the-ground inventory. Where available, remote-sensing based products can be helpful in rapidly assessing broad areas and determining where to start. For example, the SGI Mesic Resources layer (Figure 2) can be combined with sage grouse habitat layers to identify more functional mesic areas in high bird abundance areas that may be prime locations for easements.

Alternatively, the same layers could be used to identify potentially impaired mesic areas in moderate bird abundance areas that may offer restoration opportunities. Some key data layers to consider assembling include:

Spatial Layers

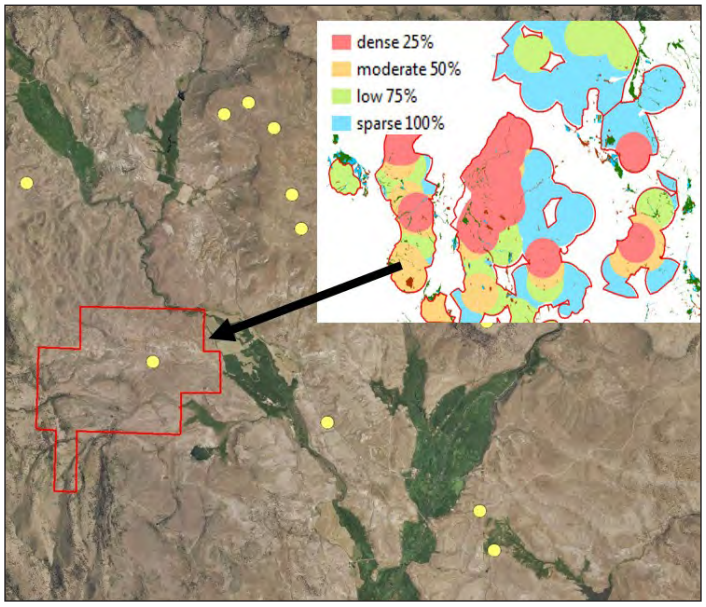
- **Sage grouse information**: lek locations (typically buffered by 2-4 miles to depict likely breeding/brood-rearing area), PACs, Breeding Bird Density maps, telemetry data and local knowledge of seasonal habitat use
- **SGI Mesic Resources layer** (available online here)
- **SGI Tree Canopy Cover layer** (available online here)
- **Soil survey information** (hydric soils, available water-holding capacity, etc.)
- **Stream/ spring/ seep maps** (U.S. Geological Survey, producer knowledge, etc.)
- **Other state/local information**

Inventory Tools

- **Proper Functioning Condition (PFC)** – Lentic and Lotic Systems
- **Stream Visual Assessment Protocol (SVAP2)**
- **Wildlife Habitat Evaluation Guides (WHEGs)** – Sage Grouse, Riparian/Meadow, etc.), SGI Threats Checklist

Assessments

After prioritizing from the office, several assessment techniques can be applied in the field to identify specific opportunities, document resource concerns, and inform alternatives. Traditional sage grouse habitat assessment protocols (WHEGs) or the SGI Threats Checklist help planners document potential brood habitat limitations from a sage-grouse standpoint. More in-depth riparian and meadow assessment techniques may also be required to determine if mesic areas are functioning according to site potential. SVAP2 is commonly used by NRCS to assess riparian and aquatic conditions in wadeable streams.



Decision support tools help targeting at multiple scales. *Combining landscape information on sage grouse abundance within PACs and mesic resources (upper right) with local ranch-scale information like lek locations (yellow dots) can help planners prioritize on-the-ground inventories and practices.*

Proper Functioning Condition (PFC) is another tool well-suited to assessing physical processes and resiliency of mesic riparian and meadow areas in sagebrush ecosystems (see the National Riparian Service Team of the Bureau of Land Management, or BLM). PFC assessment protocols are available for both lotic systems (flowing water like streams) and lentic systems (standing water like wetlands and wet meadows). PFC is also helpful in prioritizing restoration opportunities. For example, sites determined to be Functional At-Risk should be a high priority for treatment because proactive steps to halt further degradation may eliminate the need for more costly, and possibly less effective, restoration later. Using PFC may also facilitate whole watershed assessments across land ownerships because it is commonly applied by BLM partners.

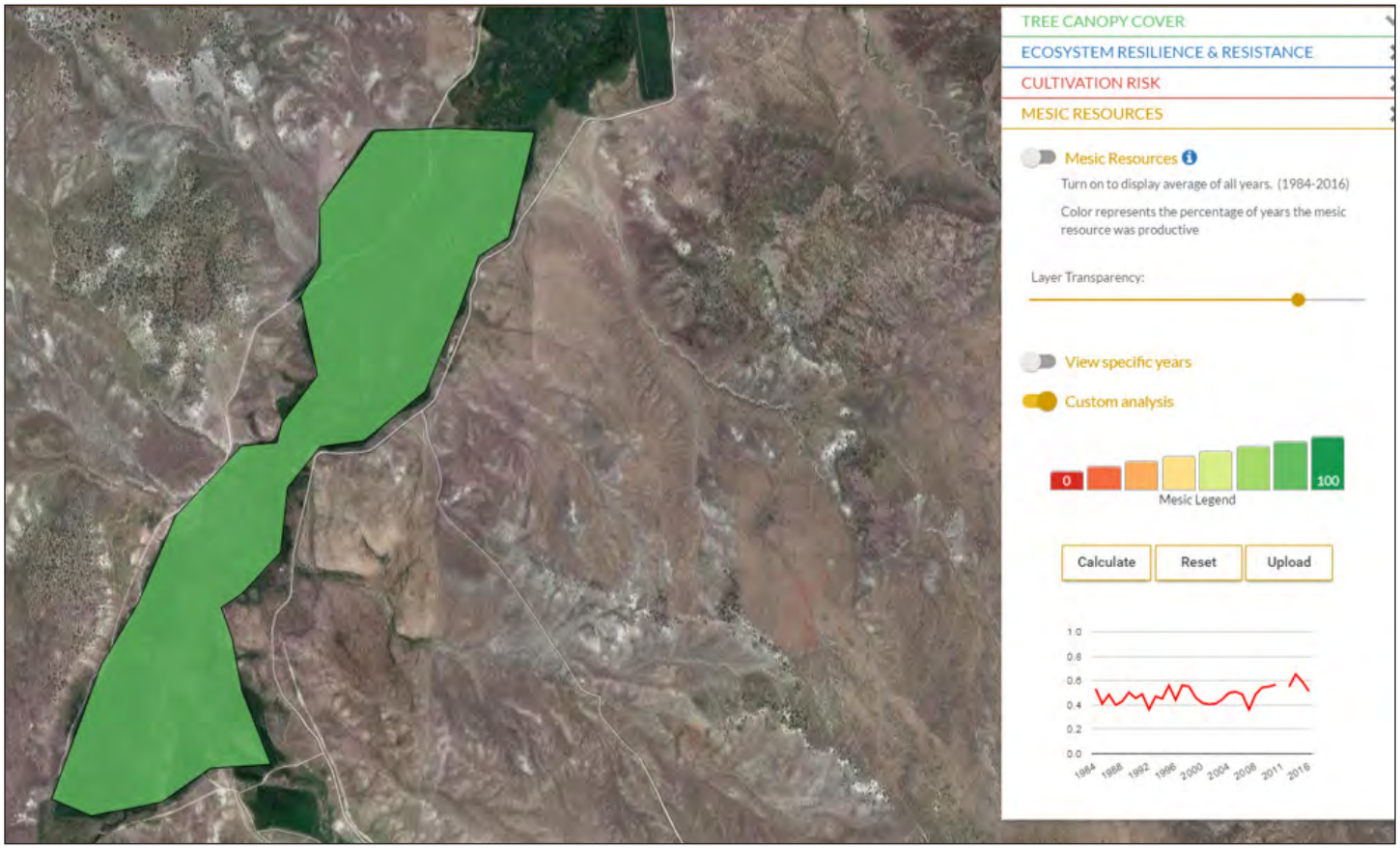
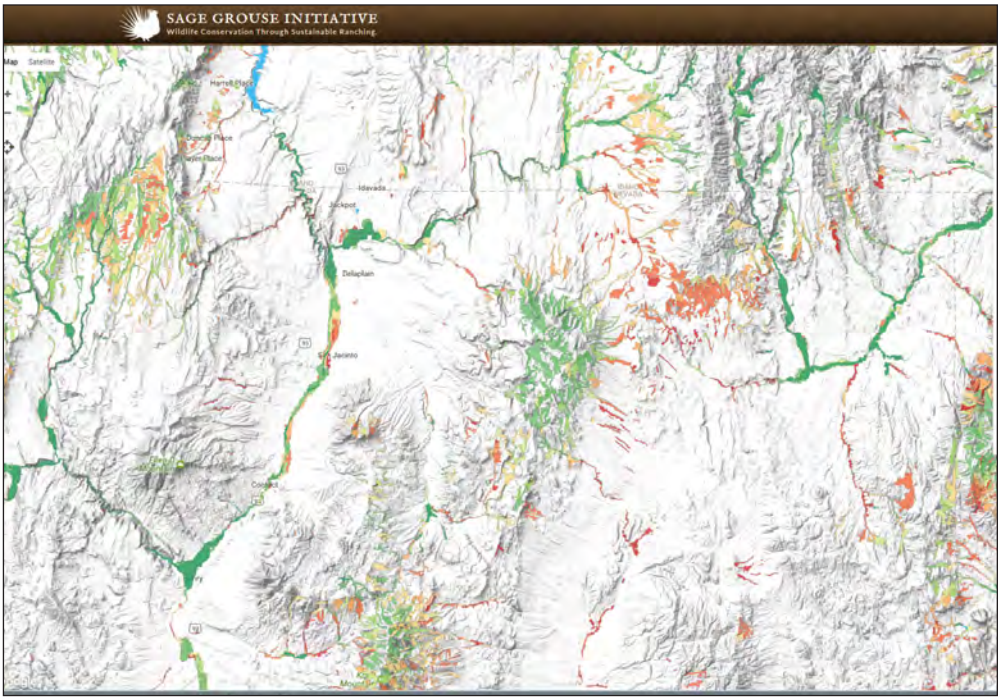


Figure 2. *The SGI Interactive Web Application is a free, open-access, online tool that helps visualize mesic resources across the entire range of sage grouse and inform local conservation efforts. The SGI Mesic Resources layer draws upon over 30 years of satellite imagery to map the location of late-summer mesic habitats and illustrate how productivity fluctuates spatially and temporally. Users can also delineate areas of interest outside of the mapped layer to generate custom analyses and visualizations for local projects. Above and to the right are two views from the tool. Visit map.sagegrouseinitiative.com to use the web application.*



Products developed by Brady Allred and Patrick Donnelly.

CONSERVATION OPTIONS

Mesic habitat conservation may require a combination of protection, restoration, and enhancement strategies.

Provided here are some specific actions planners can implement with producers and partners that would be beneficial. Actions are split into two categories: 1) those actions that are higher cost and therefore may be limited to the most essential locations, and 2) those actions that are lower cost and may be more broadly applicable within sagebrush country. The focus is primarily on areas that currently support, or historically supported, mesic habitats rather than creation of mesic resources in upland settings in order to minimize unintended negative impacts (e.g., West Nile virus, disturbance of other seasonal habitats).

Higher Cost, Limited Extent

1. Conservation Easements

- Secure conservation easements to permanently protect private lands supporting important brood habitats thereby preventing future fragmentation or conversion to less compatible, non-agricultural land uses. Work with producers and land trusts to include objectives in the easement conservation plan to maintain or restore key mesic habitats where amenable.
- Due to high cost, SGI easement investments should be highly targeted. Use local information about known concentration areas during brood-rearing season to inform decisions wherever possible. The SGI Mesic Resources layer combined with sage grouse information can be used to identify and prioritize ranches that support persistent mesic areas in high abundance centers. Prioritizing parcels with functional mesic habitats closest to leks may be beneficial for further refinement of investments.
- Examine opportunities to work with producers on existing easements to boost mesic resource availability and function through improved management or restoration.

2. Mechanical Restoration

- In highly incised or otherwise degraded riparian areas or meadows, it may be necessary to actively restore or enhance hydrologic function using intensive, mechanical restoration techniques (i.e., typically requiring heavy equipment, metal/concrete structures, or excavation).
- Examples include grade stabilization structures in meadows to halt channel incision or headcuts (e.g., sheet pilings, drop structures), and pond-and-plug meadow restoration to reconnect incised channels to historic floodplains.
- Emphasis is placed here on practices designed to restore hydrologic function and riparian recovery over time. Practices designed solely for streambank stabilization or that involve extensive revegetation are not a primary focus to address the brood habitat resource concern.
- Due to high cost, mechanical restoration should be focused primarily in critical locations where practices would be expected to produce considerable bird benefits when SGI is the funding source. Of course, addressing degraded riparian and meadow areas is beneficial for many other purposes besides sage grouse habitat so other areas may be important to treat with different funding sources.
- Ensure grazing management is compatible with supporting riparian/meadow vegetation and functions.
- Be cognizant of applicable laws, policies, and required permits and engage applicable regulatory agencies early in project design.

Lower Cost, Broader Extent

3. Grazing Management

• Implement Prescribed Grazing (along with appropriate facilitating practices) with specific grazing management objectives to maintain and improve riparian and wet meadow vegetation and hydrologic function. Implement strategies related to timing and duration of use that support riparian functions and allow adequate recovery periods (see Swanson et al. 2015, Briske et al. 2011, Wyman et al. 2006).

• Manage grazing for an upward trend in the extent of mesic vegetation within site potential.

• When practical, provide water sources far enough away from mesic areas to reduce livestock congregation during summer. However, consider potential impacts on other seasonal habitats as well.

4. Spring Protection and Enhancement

• Consider options to protect or enhance sensitive spring sources and associated mesic vegetation during conservation planning.

• When planning new spring developments, thoroughly evaluate alternative approaches to providing water (e.g., wells, riparian water gaps or pumped off-site water). If avoidance is not feasible, design water development to minimize impacts and provide a net benefit to mesic vegetation using techniques such as:

  o Install float or other control valve to minimize water withdrawal.

  o Provide watering facilities at a distance from the actual spring source to retain existing mesic vegetation.

  o Fence, or otherwise control access to, mesic areas around the spring and manage grazing to improve mesic vegetation.

  o Design trough overflow to re-hydrate existing mesic areas, meadows, and swales.

• Retrofit or redevelop existing spring developments to enhance mesic vegetation conditions

  o Consider opportunities to redevelop older spring developments that are non-functioning but have potential for restoring flow and mesic vegetation.

  o Retrofit currently functioning spring developments and livestock watering facilities, where appropriate, to incorporate measures, such as float valves, overflows, or springhead fencing to maintain or improve mesic vegetation.

5. Low-Tech Restoration

• In many degraded riparian areas, meadows, and swales that are not fully meeting site potential, it may be possible to use low-tech, bioengineering approaches (i.e., typically hand built using wood or rock) to actively restore or enhance hydrologic function.

• Examples include Beaver Dam Analogues (BDAs) and Zeedyk structures (see Pollock et al. 2015, Zeedyk and Clothier 2009). These low-cost techniques can be used to accelerate recovery of incised channels or halt headcuts by reducing water velocities, increasing sediment deposition, initiating aggradation, improving hydrologic function, enhancing floodplain connectivity, and expanding riparian and meadow vegetation.

• Emphasis is placed here on practices designed to restore hydrologic function and riparian recovery over time. Practices designed solely for streambank stabilization or that involve extensive revegetation are not a primary focus to address the brood habitat resource concern.

• Ensure grazing management is compatible with supporting riparian/meadow vegetation and functions.

• Be cognizant of applicable laws, policies, and required permits and engage applicable regulatory agencies early in project design.

6. Conifer Removal

• Remove encroaching conifers that may be limiting sage-grouse use of springs, seeps, playas, riparian, and meadow areas, or higher elevation brood habitats. Ideally, treatments would connect to large intact sagebrush habitats and remove invading trees from "ridge-to-ridge" in the drainage area above the mesic habitat to reduce raptor predation opportunities, increase soil water availability, and improve watershed hydrology. (see Maestas et al. 2015)

• Use SGI Tree Canopy Cover layer (where available) and Mesic Resources layer, combined with lek locations, to identify and prioritize potential barriers between breeding habitats and reliable mesic habitats. Use aerial imagery and ground surveys to identify and target springs/seeps invaded by conifers.

IMPLEMENTATION AND MONITORING

Training

Working in riparian and meadow systems often requires interdisciplinary expertise (e.g., biology, engineering, range management). Given the variety of strategies involved and diversity of systems, there is no one-size-fits-all training that will equip individuals with every skill needed. But discipline specialists at the area and state offices, as well as the West National Technology Support Center, can provide both direct technical assistance and help in developing specialized trainings. Planners are also encouraged to take advantage of existing training opportunities that may already be available through NRCS or partners, such as through the BLM National Riparian Service Team (see BLM).

Conservation Programs, Practices and Payment Schedules

The SGI Conference Report includes a wide variety of NRCS practices necessary to implement mesic conservation actions. Planners should continue to follow the report and associated conservation measures. The full suite of conservation programs may be appropriate to help incentivize mesic conservation including the Agricultural Conservation Easement Program (both Wetland Reserve Easements and Agricultural Land Easements), Environmental Quality Incentives Program and Conservation Stewardship Program. Many practice payment scenarios are available to help provide financial assistance to producers where needed. If additional payment scenarios are desired, opportunities exist annually to develop new regional scenarios to facilitate practice implementation and those should be brought to the attention of the appropriate state specialists. In some cases, Conservation Technical Assistance (CTA) may be all that is required to assist producers.

Tracking Progress

Tracking and reporting progress towards mesic habitat milestones is essential for quantifying and communicating accomplishments. Therefore, all SGI conservation plans including mesic habitat protection, restoration, or enhancement should schedule practice 644-Wetland Wildlife Habitat Management as a non-cost shared practice to delineate the mesic habitat area being conserved. This will allow NRCS to track acres benefited using existing software to capture progress towards SGI goals. In some cases, it may be difficult to delineate the area being benefited, such as when individual structures are installed to curb headcuts and maintain upstream habitats. It is recommended that planners use best judgment to delineate a reasonable area anticipated to directly benefit from planned practices within the near future.

Hands-on Training. *NRCS staff learning how to build beaver dam analogues at a workshop in Utah. Photo by Jeremy Maestas.*

Quantifying Outcomes

Monitoring and outcome-based evaluations will be important components of documenting effects of mesic conservation actions. At the project scale, planners should establish permanent photo points to monitor treatment results before and after implementation at a minimum. This provides a powerful visual record to illustrate change through time, course correct when necessary, and communicate outcomes. Additional vegetation monitoring may be desired depending upon the action being implemented.

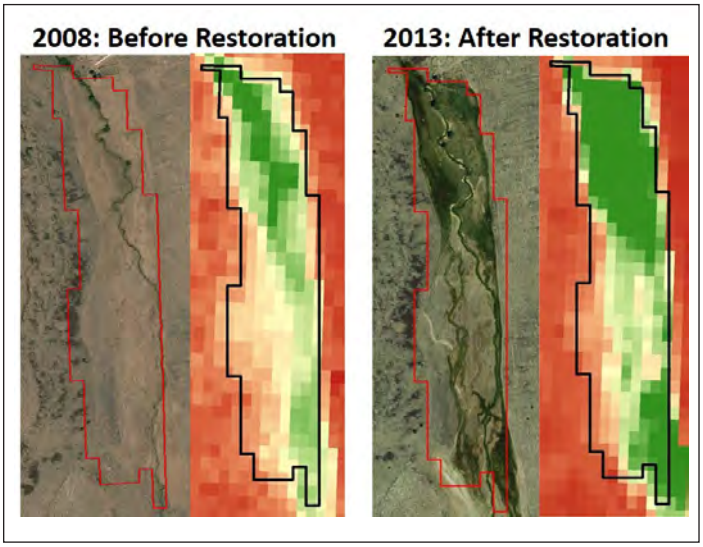


Figure 3. *Assessing changes in late-season productivity (green pixels) before and after restoration of a meadow in Nevada using remote sensing through LANDSAT. Figure by Patrick Donnelly.*

At large scales, some changes in mesic habitats can be quantified using remote sensing. SGI science collaborators are currently using the Mesic Resources layer data to quantify restoration outcomes of typical restoration actions (Figure 3). This technology also provides the ability to assess relationships between mesic resources and sage grouse population through time. Other outcome-based evaluations may also be desired to quantify various biological and hydrological responses to treatments in key watersheds with significant landowner and partner efforts.

Acknowledgements

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Photo of heatlhy mesic area by Patrick Donnelly.