SGI Mesic Habitat Conservation Planning Guide

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 (Fig. 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% of the landscape, roughly 75% are located on private lands placing landowners and NRCS in a unique position to conserve these rare habitats. 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, thoughtful targeting of specific practices will increase the likelihood of providing benefits where needed most. Here we lay 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 the resource concern.

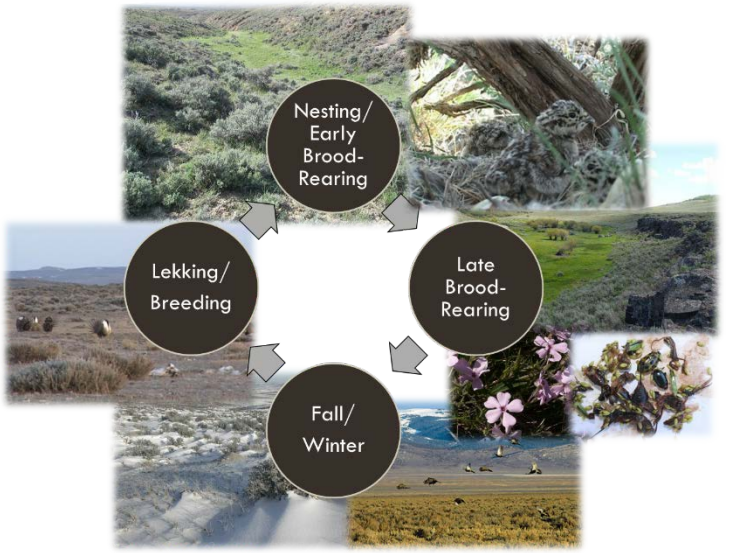

Figure 1. Sage-grouse life cycle and seasonal habitats. SGI's mesic habitat conservation seeks to bolster brood-rearing resources.

STRATEGIC TARGETING

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' that would allow planners to set meaningful milestones. However, applying some strategic thinking with available data and local knowledge can help focus efforts, develop reasonable targets, and provide the best chance at producing biological benefits.

> ***What is the Resource Concern?***
> *Degradation and loss of mesic areas for sage-grouse brood-rearing habitat.*
>
> ***Our Charge:*** *Strategically protect, restore, or enhance mesic areas ('green spots') so sage-grouse hens and chicks can more readily and reliably access forb- and insect-rich summer habitats.*

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 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 has 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. However, 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 or gullies 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.

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 Resource layer 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 marginal 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 3-4 mi to depict likely breeding/brood-rearing area), PACs, Breeding Bird Density maps, telemetry data and local knowledge of seasonal habitat use
- SGI Mesic Resource layer (OR, CA, parts of NV-available, rest of range-summer/fall 2016)
- SGI Tree Canopy Cover layer (available at: http://map.sagegrouseinitiative.com/)
- Soil survey information (hydric soils, available water-holding capacity, etc.)
- Spring/seep maps (USGS, producer knowledge, etc.)
- Other state/local information

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.

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 BLM National Riparian Service Team). 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.

Inventory Tools

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

CONSERVATION ACTIONS

Mesic habitat conservation can be broadly split into two categories: 1) Protection, and 2) Restoration and Enhancement. Provided here are some specific strategies planners can implement with producers and partners that would be beneficial. 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).

Protection Strategies

Secure conservation easements

- 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. Where available, the SGI Mesic Resource layer combined with sage-grouse information can be used to identify and prioritize ranches that support reliable mesic areas in high abundance centers. If this layer is not available, prioritize ranches with functional mesic habitats within high breeding bird density areas that are closest to leks. Use local information about known concentration areas during late brood-rearing season to inform decisions wherever possible.
- Examine opportunities to work with producers on existing easements to boost mesic resource availability and function through improved management or restoration.

Minimize water development impacts to springs

- When considering new spring developments, thoroughly evaluate alternative approaches to provide 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:
    - Install float or other control valve to minimize water withdrawal.
    - Provide watering facilities at a distance from the actual spring source to retain existing mesic vegetation.
    - Fence, or otherwise control access to, mesic areas around the spring and manage grazing to improve mesic vegetation.

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

Restoration and Enhancement Strategies

Improve livestock grazing to promote riparian and wet meadow functions

- Implement 528-Prescribed Grazing (along with appropriate facilitating practices and 645) 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.

Actively restore or enhance hydrologic function in degraded riparian areas, meadows, swales, etc.

- Implement restoration and enhancement activities in strategic locations where mesic resources are not meeting site potential. Different techniques are available contingent upon site-specific conditions and complexity of the problem. 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.
- Some techniques with utility for achieving mesic habitat goals include:
    - Higher Cost Alternatives (i.e., typically requiring heavy equipment, metal, or concrete and higher job class engineering design)
        - Grade stabilization structures in meadows to halt channel incision or headcuts (e.g., sheet pilings, drop structures)
        - Pond-and-plug meadow restoration to reconnect incised channels to historic floodplains
    - Lower Cost Alternatives (i.e., typically hand built using wood or rock, lower job class design requirements, lower gradient systems)
        - Bioengineering techniques constructed in incised channels and gullies to reduce water velocities, increase sediment deposition, initiate aggradation, improve riparian hydrologic function, restore or enhance floodplain connectivity, and expand riparian and meadow vegetation. Example techniques include beaver dam analogues (e.g., post line-wicker weave), Zeedyk structures (e.g., one rock dams), etc. (see Pollock et al. 2015, Zeedyk and Clothier 2009)
- Given the investment of time and resources, restoration and enhancement alternatives should be very targeted. If funded through SGI, higher cost alternatives should be focused primarily in critical locations where restoration would be expected to produce considerable bird benefits. Of course, addressing degraded riparian and meadow areas is beneficial for many other purposes besides sage-grouse habitat so other areas may important to treat with different funding sources.
- Ensure grazing management is compatible with riparian/meadow functions prior to implementing any restoration and enhancement techniques.
- Be cognizant of applicable laws, policies, and required permits.

Improve connectivity to, and availability of, mesic resources through 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 and improve watershed hydrology. Removing conifers can increase soil water availability in the spring, especially in Phase 2 and 3 stands, which enhances mesic vegetation growth. (see Maestas et al. 2015)

- Use SGI Tree Canopy Cover layer and Mesic Resource layer (where available), 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.

Retrofit or redevelop existing spring developments to enhance mesic habitat conditions

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

CONSERVATION PROGRAMS, PRACTICES, AND PAYMENT SCHEDULES

A variety of practices already covered in the SGI Conference Report are available to implement most strategies. Several additional practices relevant to mesic habitat conservation are also currently pending inclusion in the Conference Report that will further expand the toolbox. The full suite of conservation programs may be appropriate to help incentivize mesic conservation including, ACEP-ALE, ACEP-WRE, EQIP, and CSP. 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 2.0 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 (e.g., 5 years).

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, coarse correct when necessary, and communicate outcomes. Additional vegetation monitoring may be desired depending upon the action being implemented.

At large scales, some changes in mesic habitats can be quantified using remote sensing. We intend to apply SGI Mesic Resource layer currently being developed rangewide as a monitoring tool to quantify restoration benefits. An example is illustrated here using drainages in Nevada with ongoing restoration through grazing management improvements and beaver recovery illustrates proof-of-concept (Fig. 2).

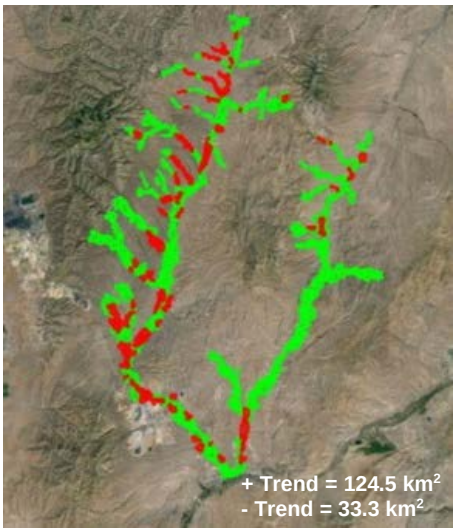

Figure 2. Susie and Bettie Creek drainages, NV, where improved grazing management practices were adopted. Green polygons represent areas that have had a positive vegetative productivity trend from 1984-2011 during late-brood rearing season (Aug-Sept); red polygons represent a negative trend.

This technology provides the foundation to quantify cumulative effects of mesic habitat conservation efforts and eventually evaluate population-level benefits for sage-grouse through time. Other outcome-based evaluations may also be desired to quantify sage-grouse response to treatments in key watersheds with signficant landowner and partner efforts.

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. However, 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).

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.

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.

Briske, D.D., editor. 2011. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. NRCS-CEAP. Washington, D.C.

Bureau of Land Management [BLM]. National Riparian Service Team resources (PFC assessment technical references, training opportunities, etc.). http://www.blm.gov/or/programs/nrst/index.php

Donnelly, J. P., D. E. Naugle, C. A. Hagen, and J. D. Maestas. 2016. Public lands and private waters: scarce mesic resources structure land tenure and sage-grouse distributions. Ecosphere 7(1):e01208. 10.1002/ecs2.1208. Download brief summary here.

Maestas, J.D., B.A. Roundy, and J.D. Bates. 2015. Conifer Removal in the Sagebrush Steppe: The why, when, where, and how. Great Basin Fact Sheet Series, no. 4. http://www.sagegrouseinitiative.com/category/science-to-solutions/great-basin-factsheet490series/

Natural Resources Conservation Service [NRCS]. 2015. Sage Grouse Initiative 2.0 Investment Strategy, FY 2015-2018. United States Department of Agriculture, Natural Resources Conservation Service. http://www.sagegrouseinitiative.com/wp-content/uploads/2015/08/SGI2.0_Final_Report.pdf

Pollock, M.M., G. Lewallen, K. Woodruff, C.E. Jordan and J.M. Castro (Editors). 2015. The Beaver Restoration Guidebook: Working with Beaver to Restore Streams, Wetlands, and Floodplains. Version 1.02. United States Fish and Wildlife Service, Portland, Oregon. 189 pp. Online at: http://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Beaver.asp

Swanson, S. S. Wyman, and C. Evans. 2015. Practical Grazing Management to Maintain or Restore Riparian Functions and Values on Rangelands. Journal of Rangeland Applications 2:1-28. Download here.

Wyman, S., D. Bailey, M. Borman, S. Cote, J. Eisner, W. Elmore, B. Leinard, S. Leonard, F. Reed, S. Swanson, L. Van Riper, T. Westfall, R. Wiley, and A. Winward. 2006. Riparian area management: Grazing management processes and strategies for riparian-wetland areas. Technical Reference 1737-20. BLM/ST/ST-06/002+1737. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center, Denver, CO. 105 pp.

Zeedyk, B., and V. Clothier. 2009. Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels. Chelsea Green Publishing.