

Sagebrush Ecosystem Program Strategic Action Plan

*For Implementation of the Nevada Greater
Sage-grouse Conservation Plan*

2025

**FOR INFORMATION AND QUESTIONS ABOUT THE NEVADA CONSERVATION CREDIT SYSTEM,
PLEASE CONTACT:**

Kathleen Steele
Program Manager
Nevada Sagebrush Ecosystem Program
(775) 687-2000
ksteele@sagebrusheco.nv.gov

SUGGESTED CITATION:

State of Nevada Department of Conservation and Natural Resources. Sagebrush Ecosystem Program.
2025. Nevada Strategic Action Plan.

ACKNOWLEDGMENTS:

This document is to provide guidance for the following:

Nevada Sagebrush Ecosystem Technical Team

Kathleen Steele – Program Manager
Cheyenne Acevedo – Nevada Department of Wildlife
Casey Adkins – Nevada Division of Forestry
Sarah Hale – Nevada Division of State Lands
Skyler Monaghan – Nevada Department of Agriculture

TABLE OF CONTENTS

Introduction	4
Vision.....	4
Mission Statement.....	4
Sagebrush Ecosystem and Sage-Grouse Threats	6
Goals and Objectives	9
Goal 1.....	9
Goal 2.....	10
Goal 3.....	11
Goal 4.....	12
Preferred Conservation Areas Map	13
Resources	20
Current Policies.....	20
Funding.....	20
Tools.....	23
References	27

FIGURES

Figure 1. Areas of Conservation Importance and SAP Priority Areas in Greater Sage-Grouse Habitat in Nevada.	15
Figure 2. Northwest Nevada – Areas of Conservation Importance and SAP Priority Areas.	16
Figure 3. Northeastern Nevada – Areas of Conservation Importance and SAP Priority Areas.	17
Figure 4. Central Nevada – Areas of Conservation Importance and SAP Priority Areas.	18
Figure 5. Areas of Conservation Importance, SAP Priority Areas, Wilderness, and Tribal Land Constraints. 19	

TABLES

Table 1. Total acreage of key conservation areas in Nevada, including the overall Areas of Conservation Importance, the SAP Priority Areas subset, and total land area of the state.	14
---	-----------

INTRODUCTION

The Nevada Sagebrush Ecosystem Program (SEP) is overseen by the Sagebrush Ecosystem Council (SEC) and managed by the Sagebrush Ecosystem Technical Team (SETT). The SEP aims to “preserve, restore and enhance sagebrush ecosystems on public land in this State, and on privately owned land in this State with the consent of the owner of the land” (NRS 321.592). Established by Executive Order 2012-19 from Governor Brian Sandoval in 2012 and authorized by legislation in 2013, the SEC serves as a cross-jurisdictional collaborative body representing conservation and environmental interests, energy, agriculture, ranching, mining, local government, and Native American Tribes. In coordination with state and federal natural resource agencies, the SEC oversees policy decisions, operations of the SETT, and the Nevada Conservation Credit System (CCS).

To maintain consistent and resilient mitigation practices, the SEC, and subsequently the Legislative Commission, adopted permanent mitigation regulations (NAC 232.400 – 232.480) in 2019. These regulations require compensatory mitigation for Greater Sage-grouse (*Centrocercus urophasianus*; GRSG) through the CCS, requiring mitigation for specific man-made disturbances on public lands, as outlined in the 2019 Nevada Greater Sage-grouse Conservation Plan (Sagebrush Ecosystem Program State of Nevada 2019). By leveraging scientifically quantified mitigation credits, the SEC continues to offset sagebrush ecosystem disturbances and enhance GRSG habitat in key areas.

The SETT is a multidisciplinary team composed of staff from the Nevada Department of Wildlife (NDOW), Nevada Department of Agriculture (NDA), Nevada Department of Conservation and Natural Resources (NDCNR), Nevada Division of Forestry (NDF; NDCNR), and Nevada Division of State Lands (NDSL; NDCNR). Working closely with state and federal partners, the team leads mapping, restoration, and management strategies to support sagebrush conservation. Under SEC guidance and approval, the SETT developed the State Plan in 2014, with an update in 2019. The plan provides a balanced, science-based framework for coordinated conservation and adaptive management efforts.

The SEP Strategic Action Plan (SAP) complements the 2019 State Plan by outlining SETT-specific implementation strategies for the next 5–10 years. Using the best available science and established conservation tools, the SETT, with direction from the SEC, will guide SEP efforts to address key threats. The SAP provides a framework for setting priorities, guiding best management practices, and supporting rehabilitation, restoration, and conservation initiatives. Because many sensitive wildlife species, including GRSG, use both private and public lands to complete their life cycles, successful conservation depends on coordination across jurisdictions and land ownership. In the context of the SEP, *coordination* means the intentional alignment of actions, communication, policies, and timelines among diverse stakeholders to achieve shared conservation goals, while respecting the distinct roles, authorities, and expertise of each participant. The SEP is committed to using the best available science, adaptive management, and meaningful, sustained stakeholder engagement at all levels, including local communities, landowners, industry, tribal nations, NGOs, and government agencies, to ensure transparent collaboration, build trust, address complex conservation challenges, and promote stable GRSG populations in the future.

VISION

The Sagebrush Ecosystem Technical Team envisions resilient, healthy, and intact sagebrush ecosystems that thrive alongside industry and resource management practices important to Nevada’s economy.

MISSION STATEMENT

The Sagebrush Ecosystem Technical Team’s mission is to sustain and enhance Nevada’s sagebrush ecosystems and the species that depend on them while supporting the State’s economy through responsible land stewardship and resource management.

The SAP provides tools and guidance to achieve the SEP's four long-term strategic goals:

1. **Steward and restore** Nevada's sagebrush ecosystems and Greater Sage-grouse populations by maintaining ecological health, addressing threats, and applying traditional ecological knowledge with science-based management.
2. **Refine the Nevada Conservation Credit System (CCS)** to mitigate anthropogenic impacts and ensure net conservation gain for Greater Sage-grouse habitat through the Sagebrush Ecosystem Council.
3. **Increase coordination and outreach** to address sagebrush ecosystem threats and support the Programmatic mission.
4. **Expand scientific knowledge** of sagebrush ecosystems, reduce management uncertainty, and strive for successful conservation.

To achieve these goals, the 2025 SAP outlines actionable recommendations and provides a clear framework for implementation.

The SAP is organized into the following sections:

- Threats – A list of perceived threats to GRSG and their habitat, and links to current information and resources.
- Goals and Objectives – An outline of strategic actions with measurable outcomes aimed at addressing the four strategic goals identified by the SEP.
- Preferred Conservation Areas Map – A map outlining important areas for GRSG habitat conservation and restoration.
- Resources – Information on funding opportunities, tools, project assessment resources, and current policies and regulations that affect GRSG management in Nevada. This section provides guidance for local entities and landowners in making informed management decisions to maintain intact, functional sagebrush ecosystems.
- References – A compilation of literature, reports, and sources consulted in developing this document, providing a foundation for the SAP's recommendations and ensuring transparency in the decision-making process.

The SAP will be updated as new scientific information emerges, and lessons are learned during its implementation. Annual updates on activities will allow the SETT to adjust the SAP based on project progress, the latest research, partner contributions, and public policies. The SETT will work closely with project partners to promote science-based management decisions that benefit Nevada's GRSG and sagebrush ecosystems.

SAGEBRUSH ECOSYSTEM AND SAGE-GROUSE THREATS

For a comprehensive review of threats to the sagebrush ecosystem, refer to the *Nevada Sagebrush Habitat Plan* (Nevada Department of Wildlife in draft) and the *2019 Nevada Greater Sage-Grouse Conservation Plan* (Sagebrush Ecosystem Program State of Nevada 2019). These foundational documents outline the broad, interacting pressures that degrade sagebrush ecosystems and affect Nevada's GRSG populations. This document highlights updated threats that are not captured in the above documents.

The sagebrush ecosystem is one of the most threatened landscapes in the western United States, with more than half of its historical extent degraded, fragmented, or lost entirely due to a combination of human land use and natural stressors (Knick et al. 2003, Chambers et al. 2014a, Mahood and Balch 2019). As a result, populations of GRSG, a sagebrush-obligate species and indicator of ecosystem health, have declined by an estimated 80% across their range since the 1960s (Coates et al. 2021).

The threats to sagebrush ecosystems in Nevada are complex and interconnected, often reinforcing one another in feedback loops that accelerate ecosystem loss and species decline. The following section provides a synthesis of the most pressing threats to sagebrush integrity and GRSG conservation across Nevada:

Invasive Annual Grasses

Invasive annual grasses, particularly cheatgrass (*Bromus tectorum*), are the most pervasive stressor in Nevada's sagebrush biome. These species reduce ecosystem resilience and resistance to disturbance, especially when combined with drought, improper management practices (e.g., improper livestock management, poorly timed treatments), and frequent fire (Miller et al. 2011a, Chambers et al. 2014b, Smith et al. 2023). Conversely, properly applied management tools, including targeted livestock grazing, prescribed fire, and other vegetation treatments, can reduce invasive annual grasses and improve plant community composition (Davies et al. 2024, Conway et al. 2025). Thatch (dead vegetation) creates continuous fine fuel beds that promote frequent, large wildfires, which degrade native perennial plant assemblages and communities and drive self-reinforcing fire-invasion cycles (D'Antonio and Vitousek 1992, Brooks and Pyke 2001, Chambers et al. 2024). Even without fire, annual grasses can dominate and transform sagebrush ecosystems by exhibiting a broader ecological amplitude (i.e., persisting across a wide of xeric and mesic ecological sites), displacing native vegetation in unburned areas (Smith et al. 2023) and further reducing an ecosystem's and individual plant species' ability to regain and retain their fundamental structure (both spatially and compositionally) and functionality (Miller et al. 2011b). See the [USGS ScienceBase resource on invasive grasses](#) for additional context and resources (Devendra Dahal et al. 2025).

Wildfire

Wildfires are the dominant driver of wildlife habitat loss across Nevada, fueled by the expansion of invasive annual grasses and the resulting shortened fire cycles. In many mid- to low-elevation sagebrush ecosystems of Nevada, fire return intervals have been tightened to less than 12 years. Historically, it is estimated that fire rotations in lower xeric Wyoming big sagebrush communities were 50-100 years, and in higher mesic mountain big sagebrush communities as frequent as 15 to 25 years (Baker 2006, Miller and Heyerdahl 2008, Chambers et al. 2014c). Wildfires can reduce sagebrush cover, promote alternative understory vegetation (either reducing or increasing it), and contribute to landscape fragmentation (Coates et al. 2016, Dudley et al. 2021). Fire perimeters, frequency, and severity are well documented through resources such as [Nevada Fire Info](#) and the [USGS Fire Science Portal](#) (Nevada Fire Info 2025, U.S. Geological Survey 2025).

Predation by Common Ravens

Populations of common ravens (*Corvus corax*) in the western United States have increased significantly due to human-induced changes such as urbanization, agriculture, and infrastructure development, which

provide additional food and nesting opportunities (Kristan and Boarman 2007, Bui et al. 2010, Sauer et al. 2013, Howe et al. 2014). In Nevada, common ravens have become the primary nest predators of GRSG (Lockyer et al. 2015). Since 2013, common raven populations have increased by approximately 94%, reaching an estimated 370,000 individuals (Harju et al. 2021), further intensifying top-down negative effects transferred to GRSG and other sagebrush obligate species. The rise in raven populations, driven by human activities, is linked to a decrease in GRSG nest success and has altered their population dynamics. Research indicates that raven densities exceeding 0.40 ravens per square kilometer are associated with declines in GRSG population numbers (O'Neil et al. 2018, Coates et al. 2020). The U.S. Fish and Wildlife Service has recognized this population increase of common ravens and the potential impacts to GRSG and in 2024 revised Nevada's common raven environmental assessment, and along with NDOW's take permit, to increase lethal removal from 2,500 to 12,500 common ravens.

Habitat Fragmentation and Improper Management

Anthropogenic disturbances, including infrastructure from energy development, roads, fencing, urban expansion, mining, and off-highway vehicle use, fragment GRSG habitat, reduce patch size, disrupt connectivity, and increase negative edge effects that can subsidize predators. Unsustainable land management practices compound these impacts by reducing the ecosystem's recovery capacity and lead to lasting habitat transitions (Beever and Aldridge 2011, Coates et al. 2021, Crist et al. 2023).

Wild Horses and Burros

In March 2025, the Bureau of Land Management (BLM) estimated there were 73,130 free-roaming wild horse and burros occupying BLM-administered herd management areas (Bureau of Land Management 2025a). This is more than two and a half times the designated appropriate management level (AML). As of March 1, 2025, AML for BLM-administered wild horse and burro (WHB) herds was set at 25,556 (Bureau of Land Management 2025a). Nevada hosts approximately 60–80% of the wild horses and burros in the United States (Nevada Department of Wildlife 2024a), and herd management area (HMA) populations are often well above AML and ecological carrying capacity. In Fiscal Year 2024, the BLM spent \$101 million, 66% of its \$153 million budget, to care for animals in holding facilities (Bureau of Land Management 2025b). Overpopulation leads to overgrazing, soil compaction, water resource depletion, and loss of native plant communities, especially in arid and semi-arid landscapes (Burdick et al. 2021, Beck et al. 2024, Street et al. 2025). Even areas managed at or near AML can exhibit negative effects on GRSG and sagebrush ecosystems due to the difficulties and even impossibilities of managing the timing, duration, and intensity of equid grazing. For current data, see the [BLM Wild Horse and Burro Program](#) website, [Nevada Policy 67](#), and the [NDOW Wild Horse and Burro Report](#) (Nevada Department of Wildlife 2024a, Bureau of Land Management 2025b).

Conifer

The encroachment of pinyon-juniper (P-J) woodlands into sagebrush ecosystems reduces herbaceous cover, fragments GRSG habitat, and lowers habitat suitability for GRSG and other sagebrush obligate species (Coates et al. 2017). Crawford et al. 2004 estimated a 10-fold expansion in conifer woodlands, particularly juniper and pinyon-pine, in the past 130 years, that has impacted 18.9 million hectares of sagebrush (*Artemisia* spp.) ecosystems. Stiver et al. (2006) estimated that 60,000-90,000 ha of sagebrush communities across the range are impacted annually by conifer encroachment. With cheatgrass establishment in lower elevation xeric sagebrush sites, and pinyon-juniper encroachment and infill occurring in higher elevation mesic sites the continued loss of contemporary sagebrush ecosystems could be exacerbated (Miller et al. 2011a). Further, GRSG encountering P-J communities alter movement speeds and increase daily mortality by predation and other reasons across all life history stages (Sandford et al. 2017, Prochazka et al. 2017, Small 2021). Targeted conifer removal has proven effective for GRSG habitat restoration in areas experiencing early phases of encroachment (Coates et al. 2024). This potential increase in habitat could reduce the seasonal movements of certain sagebrush obligate species, such as GRSG, by providing more continuous usable habitat; travel distances for an individual bird or population

often directly reflect the availability of suitable habitat (Dahlgren et al. 2016). Resources include the [Pinyon-Juniper Woodland Climate Response and Species Distribution Models](#) (Noel, A.R and Bradford 2024).

Extended Drought and Weather Variability

Mismatched timing of winter and spring precipitation reduces recruitment success for native and beneficial vegetation (Blomberg et al. 2012, Gibson et al. 2017). Warmer temperatures and drier conditions decrease critical forb availability for GRSG brood-rearing, while wet, cold springs increase chick mortality (Gregg and Crawford 2009, Guttery et al. 2013). Resources include the [NatureServe Climate Change Vulnerability Index for Ecosystems and Habitats](#) and [the U.S. Gridded Palmer Drought Severity Index \(PDSI\)](#) (NatureServe 2019, U.S. Department of Agriculture 2025).

GOALS AND OBJECTIVES

The four overarching goals presented in this updated Strategic Action Plan remain consistent with those outlined in the original SAP and directly support the implementation of the 2019 Nevada Greater Sage-Grouse Conservation Plan. The objectives and strategies have been revised and refined to reflect current priorities while focusing specifically on actions that fall within the Sagebrush Ecosystem Technical Team's (SETT) scope of authority and operational capacity.

This update is intended to provide a more actionable and focused framework that advances the 2019 State Plan's goals, with strategies designed to be both feasible and impactful under SETT's leadership. While SETT will take primary responsibility for coordinating and advancing these strategies, full implementation will require collaboration with partner agencies, stakeholders, landowners, and land managers. More specific roles, timelines, and partnerships will be developed through implementation plans or operational work plans that are aligned with both this SAP and the 2019 State Plan.

In some cases, detailed actions from the 2019 Nevada Greater Sage-Grouse Conservation Plan are not repeated here to avoid redundancy. However, those details remain essential and are intended to serve as a foundation for implementation efforts guided by this SAP. Where appropriate, this document will cross-reference and integrate with the State Plan during subsequent planning and prioritization phases.

GOAL 1

Steward and restore Nevada's sagebrush ecosystems and Greater Sage-grouse populations by maintaining ecological health, addressing threats, and applying traditional ecological knowledge with science-based management.

Objective 1: Identify and expand funding opportunities for conservation and enhancement efforts.

Strategy: Identify and pursue grant opportunities to finance conservation and enhancement projects.

Strategy: Assist partners and stakeholders with grant applications.

Objective 2: Reduce and limit the spread of invasive species.

Strategy: Protect undisturbed and uninvaded areas from invasive species by increasing resistance and resilience at the margins (the edge of the expansion area).

Strategy: Prioritize mapping and quantifying invaded areas to guide treatment actions.

Strategy: Facilitate strategic treatment measures in prioritized areas.

Objective 3: Address ecosystem fragmentation.

Strategy: Use integrated approaches to address threats like wildfires, invasive species, conifer encroachment, and human disturbances to minimize fragmentation.

Strategy: Promote avoid, minimize, and mitigate hierarchy during project development.

Objective 4: Ensure proper management of sagebrush and supporting ecosystems.

Strategy: Promote innovative technologies to enhance ecosystem management practices.

Strategy: Prioritize limiting disturbances in areas important to sage-grouse.

Strategy: Provide support for permit renewals with adaptive grazing practices.

Strategy: Assist land managers with riparian restoration techniques to maintain and improve ecosystem function.

Objective 5: Reduce wildfire threats to the sagebrush ecosystem.

Strategy: Prioritize protection of undisturbed and intact areas to reduce fire risk.

Strategy: Map burned areas and prioritize regions requiring post-fire management actions.

Strategy: Support pre-fire fuels management and fire suppression efforts for GRSG habitat areas.

Objective 6: Address conifer encroachment.

Strategy: Prioritize and map encroached areas to quantify and guide treatments.

Strategy: Apply measures to prevent and reduce loss of resistance and resilience to at-risk sagebrush ecosystem.

Objective 7: Manage raven populations to reduce predation pressures on GRSG.

Strategy: Support the implementation of related portions of the NDOW Predator Management Plan (Nevada Department of Wildlife 2024b).

Strategy: Support the increased take of ravens where needed to control populations.

Strategy: Reduce food subsidies and perching opportunities that support raven populations.

GOAL 2

Refine the Nevada Conservation Credit System (CCS) to mitigate anthropogenic impacts and ensure net conservation gain for Greater Sage-grouse habitat through the Sagebrush Ecosystem Council.

Objective 1: Increase enrollment and use of the Nevada CCS.

Strategy: Execute and maintain a Memorandum of Understanding (MOU) with the BLM and USFS.

Strategy: Seek additional private land CCS projects, especially in important priority areas.

Strategy: Define and implement a clear, compliant process for public land mitigation, while promoting enrollment from credit developers and public land projects. Strategy: Ensure all anthropogenic disturbances affecting GRSG habitat are enrolled and compliant with the Nevada CCS as required through regulation.

Objective 2: Update and improve the CCS based on the latest science.

Strategy: Update the CCS User's Guide, Manual, and HQT Methods document and tools with the latest available science as needed or every 5 years at a minimum.

Strategy: Create a working Literature Review Document that can be updated along with other annual updates and referenced by other program documents to ensure scientific relevance.

Strategy: Develop and execute a public lands process for CCS to enhance public land sagebrush and support ecosystems in Nevada.

Strategy: Develop and execute policies and procedures for CCS Debit Project End of Life.

Strategy: Update the SAP objectives and strategies, and the Areas of Conservation Importance Map every 5 to 10 years.

Objective 3: Enhance CCS outreach, education, and training.

Strategy: Host workshops for credit and debit proponents and other stakeholders to ensure effective program implementation and expand stakeholder engagement with the CCS.

Strategy: Provide annual formal training and certification for CCS verifiers.

Strategy: Develop an online library of training videos for CCS verifiers to enhance understanding of CCS procedures and duties.

Strategy: Keep stakeholders and federal agencies updated on state accomplishments and new findings related to the CCS.

Objective 4: Improve the conservation effectiveness of the CCS.

Strategy: Use the programmatic improvement processes to incorporate new data and scientific findings into the CCS Manual and User's Guide.

Strategy: Investigate and implement incentives for minimization to adjust disturbance decay curves when minimization actions are applied.

GOAL 3

Increase coordination and outreach to address sagebrush ecosystem threats and support the Programmatic mission.

Objective 1: Foster continuous coordination with stakeholders and partners.

Strategy: Facilitate local area working group meetings to identify causal factors for the GRSG population or habitat triggers and determine adaptive management actions.

Strategy: Coordinate with land management and conservation agencies, permittees and private landowners, and others to engage in management of land and habitats in locations identified through the adaptive management process.

Strategy: Support education on riparian management through partnerships with the Nevada Creeks and Communities Team.

Strategy: Participate in annual State Mitigation Summits and subsequent technical meetings to remain informed about mitigation strategies and policies beyond Nevada.

Objective 2: Maximize conservation and enhancement efforts through partnerships.

Strategy: Coordinate with state and federal agencies, private landowners, conservation districts, and other local partners to design and implement conservation and enhancement projects.

Strategy: Promote and support the implementation of the Wild Free-Roaming Horses and Burros Act of 1971, as amended, and related BLM/USFS land use plans.

Strategy: Coordinate with local groups to initiate large-scale conservation and enhancement efforts and/or conduct field trials evaluating the effectiveness of invasive weed control and project treatment techniques.

Strategy: Facilitate the development of locally sourced native and beneficial non-native seeds for use in projects and enhance the seed market conditions.

GOAL 4

Expand scientific knowledge of sagebrush ecosystems, reduce management uncertainty, and strive for successful conservation.

Objective 1: Foster research coordination to enhance scientific understanding.

Strategy: Coordinate with research institutions such as the USGS or the University of Nevada, Reno, to enhance the scientific understanding of GRSG populations and habitat health.

Strategy: Coordinate with research institutions to create publicly available tools that enhance conservation efforts.

Strategy: Prioritize research on GRSG population dynamics, habitat use, and landscape connectivity, particularly in under-studied or isolated populations.

Objective 2: Promote ongoing education for staff, SEC, and interested public.

Strategy: Promote participation in workshops and conferences to keep staff updated on the latest tools and scientific advancements.

Strategy: Continue having educational presentations of ongoing science to the SEC and interested parties.

PREFERRED CONSERVATION AREAS MAP

Nevada's extensive sagebrush ecosystem presents a significant challenge when prioritizing where to invest in conservation actions. To address this, the **Preferred Conservation Areas** map was developed to identify areas of conservation importance for public land projects over the next 5 to 10 years through the CCS. This map is a planning tool designed to guide the SETT in strategically targeting restoration efforts based on the best available science. It is intended to be used alongside other spatial data layers and local knowledge, such as TAWS and proactive fuels management, to support comprehensive planning and informed decision-making.

The Areas of Conservation Importance highlight regions with high ecological significance for sage-grouse and sagebrush ecosystems. These areas represent the greatest potential return on investment for sage-grouse conservation, credit generation, and long-term ecosystem integrity. However, successful implementation will always require the expertise of local biologists, land managers, and county, state, and federal partners.

This map aims to enable a coordinated, long-term approach where restoration efforts can build upon one another to create broader landscape-scale benefits over time.

The Areas of Conservation Importance were derived by integrating the following key data layers:

- **Core Sagebrush Areas (CSA):** Regions of intact sagebrush with healthy perennial herbaceous understories and minimal threats from invasive annual grasses, wildfire, and human disturbance (Doherty et al. 2022).
- **Lek Connectivity Components:** Based on the GRSG Lek Components layer (Knick and Hanser 2011), these spatial units represent interconnected clusters of leks. Connectivity within components suggests areas with higher GRSG abundance and reduced exposure to wildfire and human disturbance.
- **Priority+ and Priority Habitat Management Areas (PHMA+/PHMA):**
 - *PHMA+*: High-quality GRSG source habitat for any reproductive life stage within high-use areas, with high certainty of current occupancy.
 - *PHMA*: GRSG habitat selection areas overlapping with high-use zones, source habitat in low-use areas, and a 500 m buffer around leks to capture satellite sites. These categories guide the conservation of both occupied and restorable areas (Coates et al. 2024, Milligan et al. 2024).

These combined data identify regions where GRSG habitat enhancement and protection will yield the greatest ecological benefits for GRSG and the broader sagebrush biome.

SAP Priority Areas

The SAP Priority Areas (shown in green on the map figures) were identified in coordination with NDOW to further refine where the SETT will focus its restoration resources in the near term. These areas represent a subset of the Areas of Conservation Importance. The SAP Priority Areas were selected based on:

- Their importance to GRSG population persistence, density, and connectivity;
- Observed population responses to past efforts;
- Ongoing or recent declines in GRSG habitat quality; and
- Opportunities to support areas showing GRSG population recovery due to previous management efforts.

These areas are not “more important” than the broader Areas of Conservation Importance but are designed to help the SETT prioritize restoration actions within its scope and authority. Both area types represent high-value GRS habitat and strong credit-generating potential within the CCS. Importantly, while these maps serve as tools for strategic planning, actual management decisions will be guided by LAWGs, CDs, and Adaptive Management Response Teams (AMRT), and localized, expert knowledge. Coordination with on-the-ground biologists and land managers will ensure projects are ecologically appropriate, feasible, and aligned with the best opportunities for meaningful conservation outcomes.

These preferred conservation areas represent where the SETT will prioritize restoration actions over the next decade to maximize long-term conservation outcomes.

Table 1. Total acreage of key conservation areas in Nevada, including the overall Areas of Conservation Importance, the SAP Priority Areas subset, and total land area of the state.

AREA CATEGORY	TOTAL AREA (ACRES)
Areas of Conservation Importance	16,528,088
SAP Priority Areas	7,883,690
Land area of Nevada	70,310,656

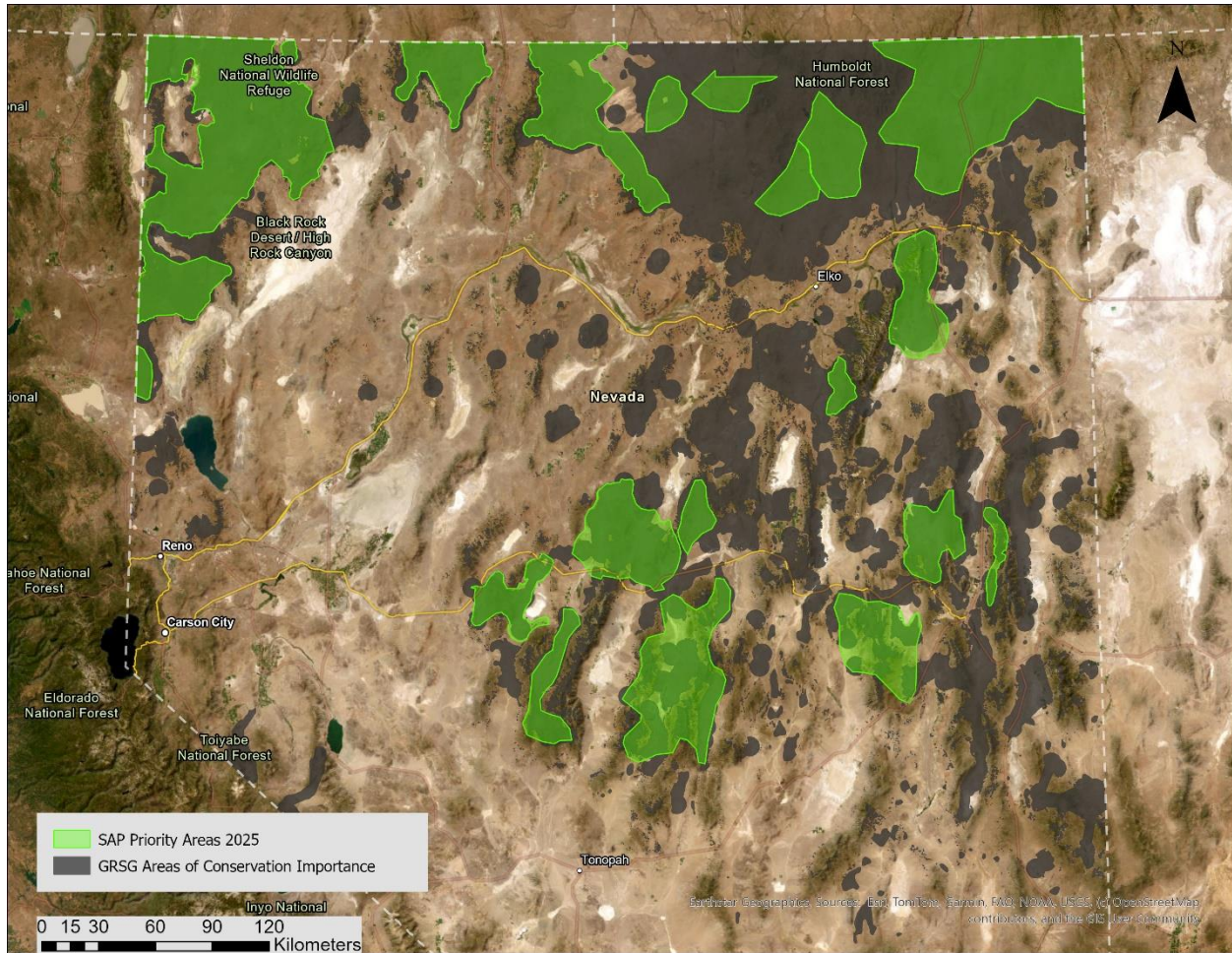


Figure 1. Areas of Conservation Importance and SAP Priority Areas in Greater Sage-Grouse Habitat in Nevada.

This statewide map illustrates two spatial planning layers used to guide restoration efforts through the Nevada Conservation Credit System. The **Areas of Conservation Importance** (gray) were developed using Core Sagebrush Areas, Lek Connectivity Components, and Priority+/Priority Habitat Management Areas (PHMA+/PHMA), and represent regions with high ecological value for sage-grouse and the broader sagebrush ecosystem. The **SAP Priority Areas** (green) indicate preferred conservation areas where the SETT will prioritize conservation and enhancement actions over the next 5 to 10 years, based on ecosystem condition, conservation response probability, and opportunities to support sage-grouse population persistence.

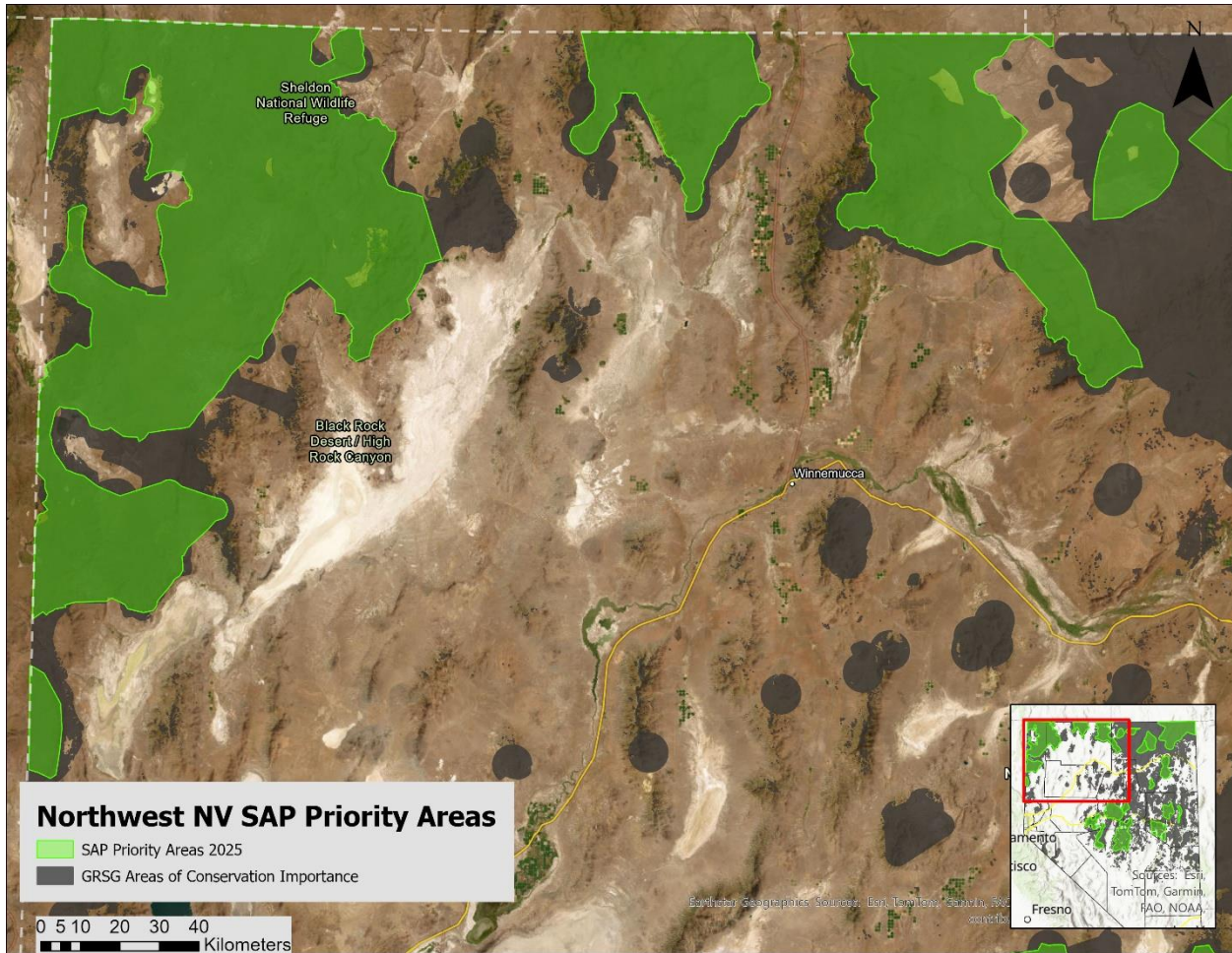


Figure 2. Northwest Nevada – Areas of Conservation Importance and SAP Priority Areas.

This regional map highlights the extensive overlap between **Areas of Conservation Importance** (gray) and **SAP Priority Areas** (green) in northwest Nevada. The region contains high-value sagebrush habitat and critical lek connectivity zones, including the Sheldon National Wildlife Refuge and surrounding landscapes. These areas are essential for sustaining long-term Greater Sage-Grouse populations and are preferred conservation areas intended for actions through the Nevada Conservation Credit System.

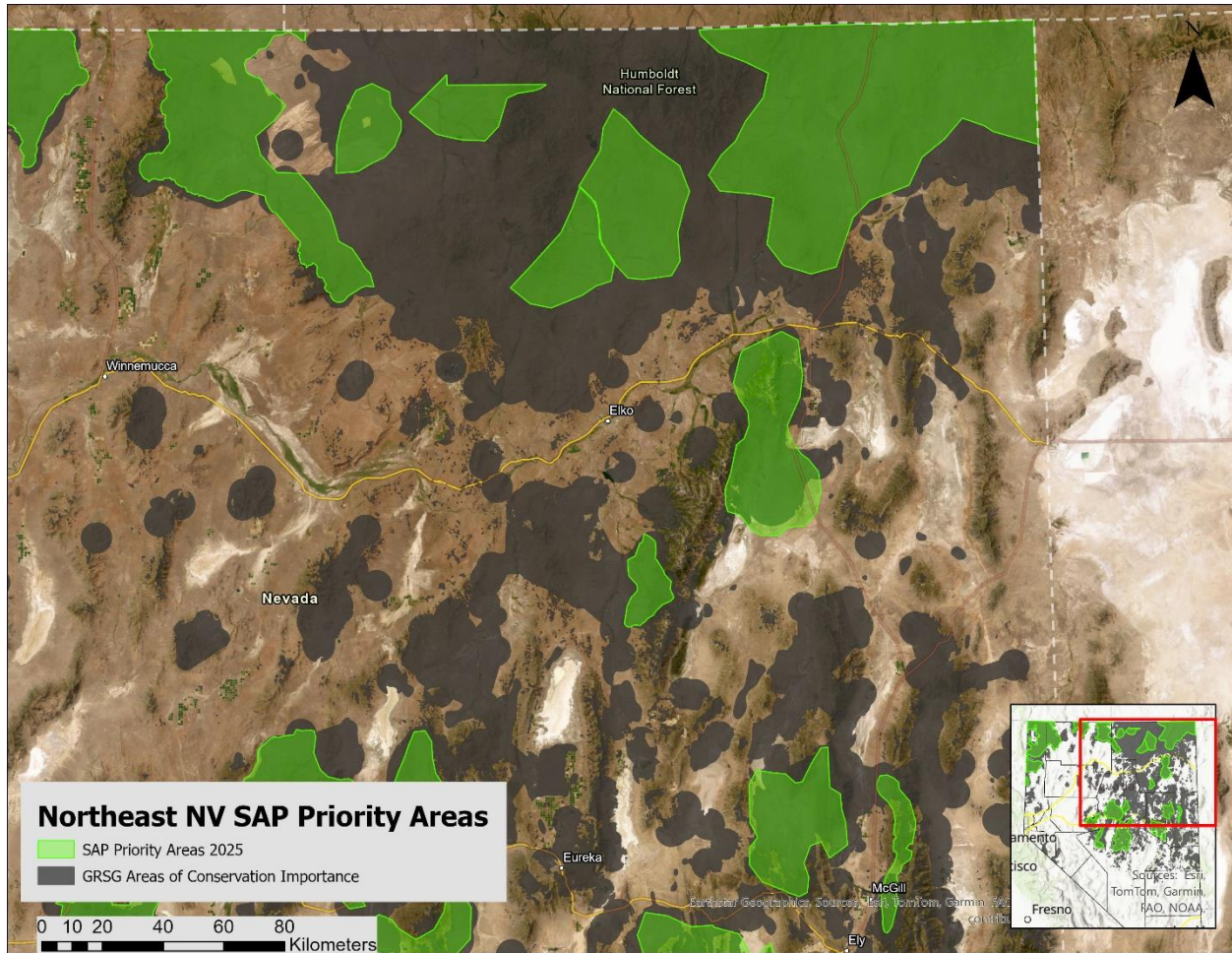


Figure 3. Northeastern Nevada – Areas of Conservation Importance and SAP Priority Areas.

This regional map shows the overlap between Areas of Conservation Importance (gray) and SAP Priority Areas (green) in northeast Nevada. The region supports some of the highest GRSG population densities in the state, due to the quality and abundance of late brood rearing habitat. This map highlights **Areas of Conservation Importance** (gray) and **SAP Priority Areas** (green), where conservation efforts will focus on post-wildfire recovery, invasive annual grass treatments, conifer removal, and reducing anthropogenic disturbance. These actions are critical to maintaining habitat integrity and ensuring long-term population viability.

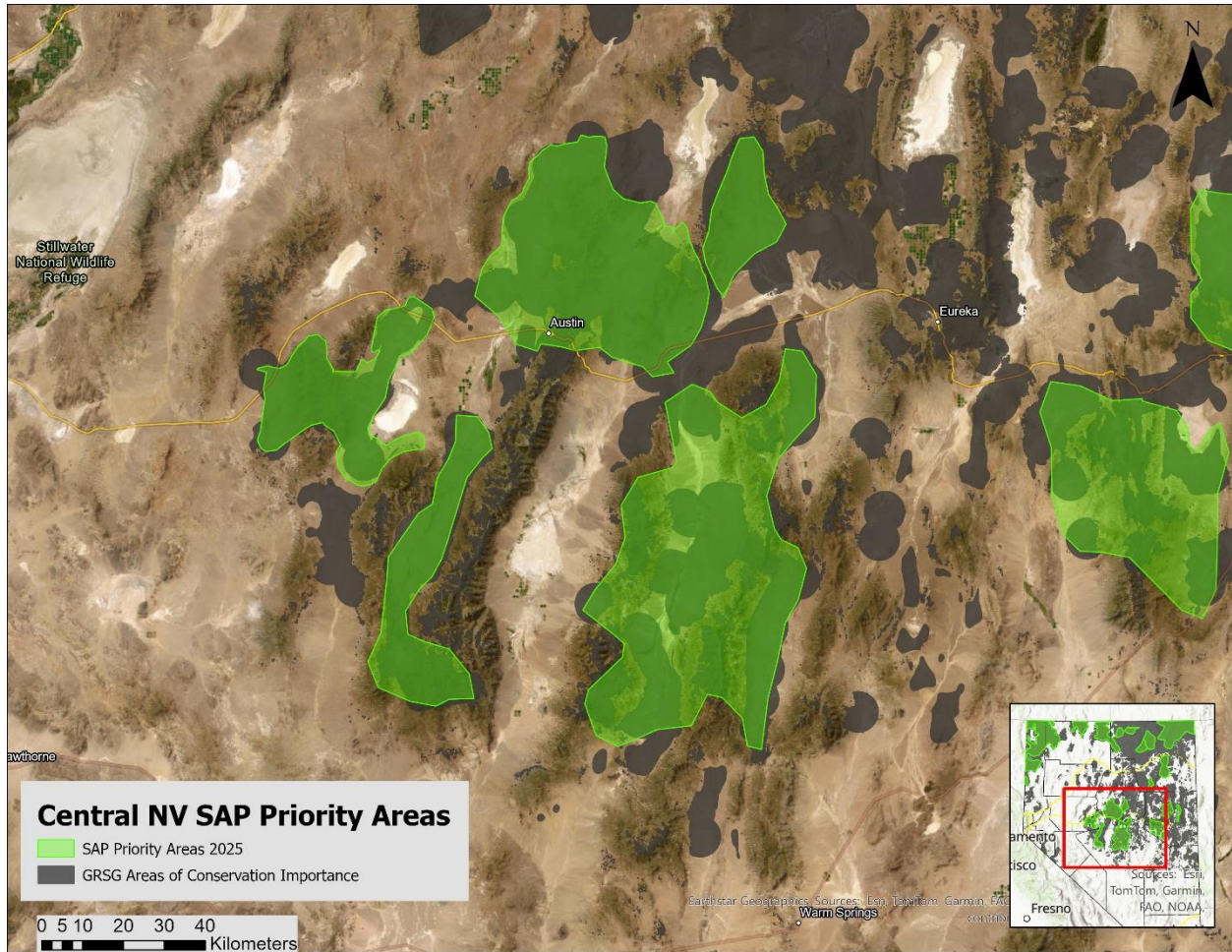


Figure 4. Central Nevada – Areas of Conservation Importance and SAP Priority Areas.

This regional map shows the overlap between Areas of Conservation Importance (gray) and SAP Priority Areas (green) in central Nevada. This region has experienced recent gains in Greater Sage-Grouse (GRSG) populations. This figure shows **Areas of Conservation Importance** (gray) and **SAP Priority Areas** (green), where actions will focus on mitigating emerging threats such as conifer expansion and development pressure. These areas represent key opportunities for proactive management to reinforce recovery trends and improve sagebrush ecosystem resilience.

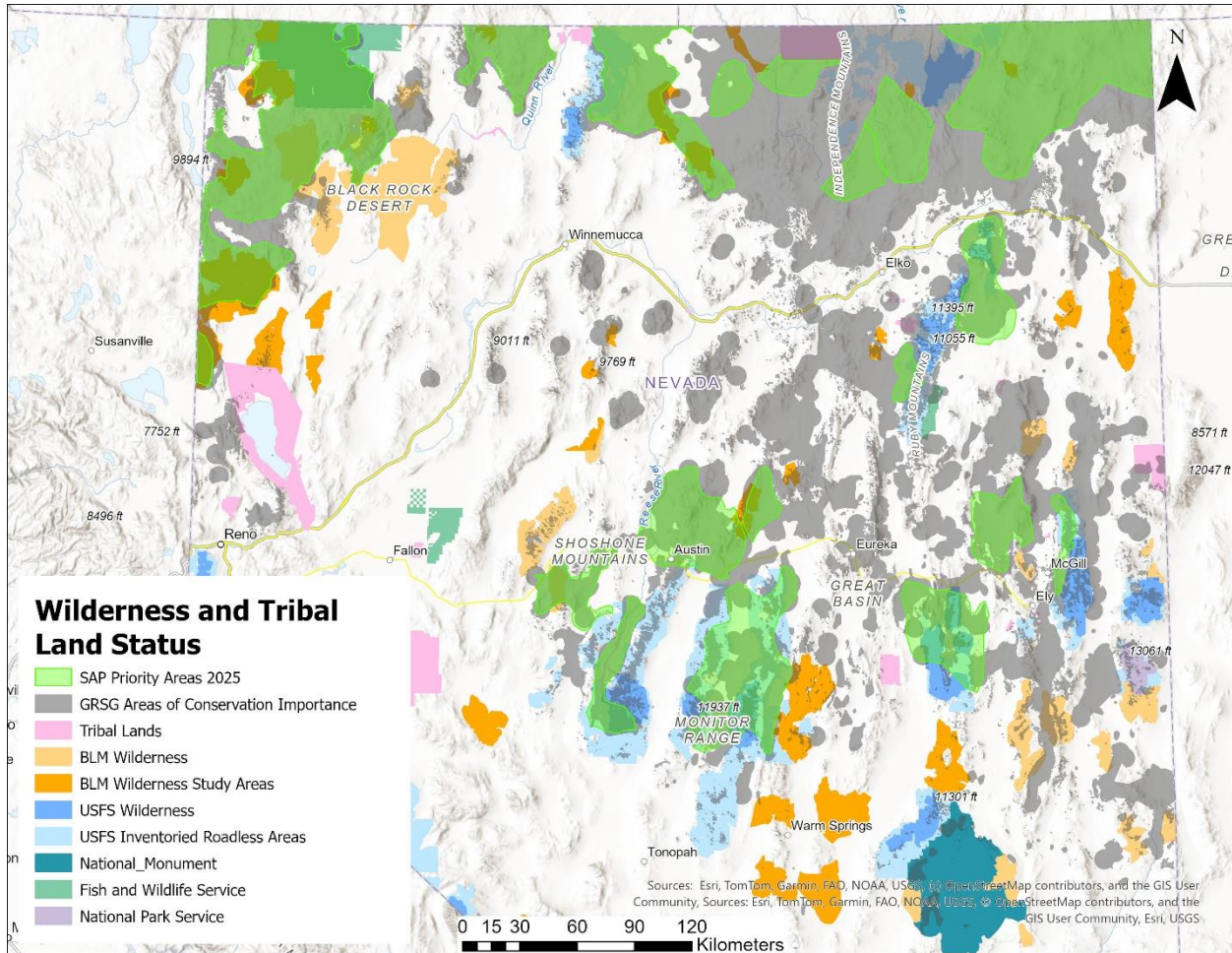


Figure 5. Areas of Conservation Importance, SAP Priority Areas, Wilderness, and Tribal Land Constraints.

This map overlays 2025 SAP Priority Areas (green) and Greater Sage-Grouse Areas of Conservation Importance (gray) with Tribal Lands, designated Wilderness, Wilderness Study Areas, US Fish and Wildlife Service, National Monuments, and National Park Service Lands, which present additional considerations for on-the-ground actions. While SAP Priority Areas identify where conservation work is most needed, implementation may be limited or require special coordination in areas managed by the US Fish and Wildlife Service, National Park Service, Tribal governments, or under wilderness protections. These considerations underscore the need for careful project planning, landowner engagement, and coordination with land management agencies to ensure effective and feasible efforts.

RESOURCES

The Resources section compiles key information to support effective sage-grouse habitat and sagebrush ecosystem conservation in Nevada. It includes details on relevant policies and regulations, funding opportunities, technical tools, and project assessment methods that influence GRSG and sagebrush management. By consolidating these resources in one place, this section serves as a practical reference for the SETT, partners, local entities, landowners, and other stakeholders. The goal is to provide guidance and information necessary to make well-informed management decisions that maintain intact, functional sagebrush ecosystems while supporting coordinated, landscape-scale conservation efforts. This list represents only a portion of the resources available and will be updated as needed, including with each SAP revision.

CURRENT POLICIES

Nevada State Plan

- [2019 Nevada Greater Conservation Plan](#)

NRS 232.161-162

- [Account to Restore the Sagebrush Ecosystem: Creation; powers and duties of Director; limitations on use of money in Account; claims.](#)
- [Sagebrush Ecosystem Council: Creation; members; terms; vacancies; compensation; powers and duties; biannual report to Governor.](#)

NRS 321.592-594

- [Division authorized to establish and carry out programs to preserve, restore, and enhance sagebrush ecosystems.](#)
- [Powers and duties of Administrator and Division regarding programs to improve sagebrush ecosystems; Division authorized to make certain grants and enter into certain contracts and agreements; regulations.](#)

NAC 232.400-480

- [Sagebrush Ecosystem Council: Mitigation of Adverse Impact to Greater Sage-grouse and Habitat](#)

Existing Management Plans (RMPs)

The BLM Resource Management Plans (RMPs) provide land use plan guidance specific to GRSG habitat conservation and management for public lands within the GRSG Habitat Management Areas (HMAs) in Nevada. The plans for each region can be found on the [BLM Nevada Planning and NEPA](#) website.

National Forest Land and Resource Management Plans (LRMPs)

The Land and Resource Management Plans (LRMPs) provide land-use plan guidance specific to GRSG habitat conservation and management for National Forest lands within the GRSG HMAs in Nevada. The Humboldt-Toiyabe National Forest plan can be found on the [USFS Plan Documents](#) website.

FUNDING

The successful implementation of a long-term, sustainable conservation strategy will rely on a combination of state and federal grant programs, as well as local funding sources to fulfill matching

requirements. Utilizing the Nevada Conservation Credit System (CCS) to mitigate anthropogenic disturbances will support restoration efforts and foster measurable environmental improvements through private sector investments. This list is not exhaustive and will be updated periodically to reflect evolving funding opportunities and program availability.

Agricultural Conservation Easement Program (ACEP)

ACEP assists landowners, land trusts, and other organizations in protecting, restoring, and enhancing wetlands or preserving working farms and ranches through conservation easements.

[Learn more about ACEP.](#)

Agricultural Land Easements (ALE)

ALE focuses on helping private and tribal landowners, land trusts, and government agencies conserve cropland and grassland on operational farms and ranches by restricting non-agricultural uses through conservation easements.

[Explore ALE opportunities](#)

Agricultural Management Assistance (AMA)

AMA supports agricultural producers by assisting with financial risk management through diversification, marketing, and implementing natural resource conservation practices.

[More on AMA](#)

Conservation Reserve Program (CRP)

Administered by the Farm Service Agency (FSA), CRP encourages farmers and landowners to convert highly erodible and environmentally sensitive land into vegetative cover, such as native grasses and riparian buffers. Participants receive rental payments and cost-share assistance to establish long-term conservation practices that enhance water quality, reduce soil erosion, and provide wildlife habitat.

[Find out more about CRP.](#)

Conservation Stewardship Program (CSP)

CSP helps landowners strengthen their agricultural operations by building on their existing conservation practices. This program supports improvements in grazing, crop resilience, and wildlife habitat development, offering customized plans and financial assistance to address resource concerns effectively.

[Details on CSP](#)

Environmental Quality Incentives Program – Nevada (EQIP)

EQIP provides technical and financial support to agricultural producers and forest landowners to address natural resource concerns, such as water and air quality, soil health, erosion control, and wildlife habitat improvement, while mitigating drought and extreme weather impacts.

[More about EQIP in Nevada](#)

Grazing Lands Conservation Initiative (GLCI)

The GLCI works to identify key issues affecting private grazing lands, offer solutions, and enhance existing conservation programs to improve land management.

[Explore GLCI](#)

Landscape Conservation Initiatives

This initiative accelerates the benefits of voluntary conservation programs to improve environmental outcomes such as cleaner water, healthier soil, and enhanced wildlife habitats.

[Learn about Landscape Conservation](#)

National Water Quality Initiative (NWQI)

NWQI aims to speed up on-farm conservation investments and direct resources to improve water quality where they can have the greatest impact.

[Read about NWQI](#)

Nevada Conservation Districts Grant Opportunities

The Nevada Department of Conservation and Natural Resources, Conservation Districts Program offers grant opportunities and hosts links to other grant opportunities for landowners and land managers wanting to Protect Sage-grouse.

[Conservation Districts Grant Opportunities](#)

Nevada Division of Forestry Grants

The Nevada Division of Forestry (NDF) provides funding opportunities for urban and rural natural resource conservation projects, as outlined in Nevada's Forest, Range, and Watershed Action Plan. The NDF collaborates with various partners and receives funding from the State of Nevada, the U.S. Forest Service, and other sources to address conservation issues and support impactful projects.

[Explore NDF Grants](#)

Pheasants Forever and Quail Forever Farm Bill Biologist Program

A partnership-driven program placing biologists across the country to help farmers, ranchers, and landowners navigate Farm Bill conservation options. Farm Bill Biologists offer technical expertise to design and implement wildlife-friendly practices on private lands, improving habitat while supporting working landscapes.

[PF and QF Farm Bill](#)

Pheasants Forever and Quail Forever Build a Wildlife Area Program

A fundraising and partnership initiative dedicated to acquiring and permanently protecting high-quality habitat for public access. Funds raised help secure critical wildlife areas, restore habitat, and expand hunting and outdoor recreation opportunities while ensuring lasting conservation benefits.

[PF and QF Wildlife Area](#)

Regional Conservation Partnership Program (RCPP)

RCPP supports collaborative conservation by bringing together public and private partners to address regional natural resource challenges. The program funds projects through two pathways: RCPP Classic, which uses NRCS contracts and easements with producers in coordination with partners, and RCPP Alternative Funding Arrangements (AFAs), which provide funding directly to partners to implement conservation work. Activities can include land management and restoration, land rentals, easements, and watershed improvements.

[Link to NRCS RCPP](#)

Sage Grouse Initiative

This initiative targets conservation efforts to improve GRSB habitat through sustainable land management practices.

[Discover more about the Sage Grouse Initiative](#)

U.S. Fish and Wildlife Service – Partners for Fish and Wildlife Program

The Partners for Fish and Wildlife Program provides technical and financial assistance to private landowners and other partners to restore, enhance, and maintain habitat for federal trust species. In Nevada, the program focuses on voluntary, incentive-based conservation projects that improve sagebrush ecosystems, wetlands, and riparian areas. Projects funded through this program can complement state-led initiatives, including the Nevada Conservation Credit System (CCS), by addressing habitat threats and increasing landscape connectivity.

Note: Partners Program-funded projects cannot be used to generate credits in the CCS for the duration of the Partners agreement, which is generally about 10 years.

[Details on the Partner's Program](#)

Wetland Reserve Easements (WRE)

Through conservation easements, WRE allows landowners to protect, restore, and enhance wetlands degraded due to previous agricultural use.

[Details on WRE](#)

Wetland Reserve Enhancement Partnership (WREP)

WREP is a voluntary program in which NRCS partners with eligible organizations to support high-priority wetland protection, restoration, and enhancement projects that benefit wildlife habitats.

[More on WREP](#)

Working Lands for Wildlife (WLFW)

Through targeted conservation efforts, WLFW focuses on enhancing agricultural and forest productivity while improving wildlife habitats in working landscapes.

[Learn about WLFW](#)

TOOLS

The tools and resources listed below are intended to support project planning, prioritization, and treatment implementation at the site scale. They help landowners, resource managers, and conservation professionals assess, manage, and restore sagebrush ecosystems critical to GRSG populations in Nevada. This updated list highlights the most relevant and effective tools currently available for sagebrush ecosystem conservation and GRSG habitat management. It does not include the analytical tools used within the CCS Habitat Quantification Tool; for a complete list of those, refer to the current *Nevada CCS HQT Methods Document*.

BLM Fire and Invasives Assessment Tool (FIAT)

FIAT is an assessment protocol to evaluate threats to GRSG habitat, such as wildfire, conifer encroachment, and invasive annual grasses. It integrates resistance and resilience concepts to guide land management decisions.

[BLM FIAT GIS Data](#)

BLM Geospatial Business Platform Hub

A centralized hub for accessing BLM geospatial data, including maps, datasets, and tools for landscape-level planning. Users can search for relevant information by keyword, geographic location, or subject category.

[BLM Geospatial GIS Data](#)

BLM Habitat Assessment Framework (HAF)

HAF provides a standardized methodology for assessing sagebrush ecosystem quality, including vegetation composition, structure, and anthropogenic impacts. This tool aids in evaluating GRSG habitat availability and suitability across different scales.

[BLM HAF](#)

Integrated Rangeland Fire Management Strategy Actionable Science Plan

This plan provides a science-based adaptive management approach to protect, conserve, and restore the sagebrush ecosystem. It addresses fire regimes, invasive species, restoration strategies, and climate impacts on sagebrush ecosystems.

[Plan Document](#)

Multi-Resolution Land Characteristic (MRLC) Consortium

The MRLC is a partnership among federal agencies to create consistent, nationwide land cover and condition data to support a broad range of resource management and environmental monitoring needs. MRLC provides access to datasets such as the National Land Cover Database (NLCD) and the Rangeland Condition Monitoring Assessment and Projection (RCMAP) time series. These resources include ecological potential, vegetation fractions, and future condition projections, which are available for download and web-based services.

[MRLC](#)

Nevada Conservation Credit System (CCS)

The CCS is a market-based conservation program that provides a framework for mitigating impacts and enhancing sagebrush ecosystems. It allows landowners and developers to generate or purchase credits to offset disturbances, ensuring net conservation benefits for GRSG. CCS serves as the primary tool for implementing compensatory mitigation in Nevada.

[Nevada Conservation Credit System](#)

Nevada Connectivity Plan

A planning document aimed at maintaining and improving habitat connectivity for GRSG and other sagebrush-dependent species.

[Nevada Connectivity Resources](#)

Nevada Sagebrush Habitat Plan

A strategic plan outlining management approaches for conserving sagebrush ecosystems and addressing threats.

Nevada Shared Stewardship

Nevada Shared Stewardship is a landscape-scale, interagency initiative launched in 2019 that brings together state and federal agencies, including the Nevada Division of Forestry, USDA Forest Service, BLM, NDOW, and others, to collaboratively prioritize and implement wildfire risk reduction, ecosystem restoration, and land management actions across the state. The program identifies 13 priority landscapes, fosters coordinated planning, and leverages shared resources to restore healthy forests and sagebrush ecosystems while safeguarding communities.

[Nevada Shared Stewardship](#)

Nevada State Wildlife Action Plan (SWAP)

The SWAP outlines a comprehensive statewide strategy to conserve Nevada's wildlife and habitats, including 367 priority species and 20 key ecotypes (referred to as 'key habitat types'). It highlights the species and ecosystems most needing protection over the next decade to ensure their persistence for future generations.

[Nevada SWAP](#)

Nevada Rangeland Monitoring Handbook (NRMH) and Rancher's Monitoring Guide

Provides short- and long-term rangeland monitoring guidelines to inform adaptive management.

[NV Rangeland Monitoring Handbook](#)

Nevada Rancher's Monitoring Guide: Offers practical monitoring techniques for landowners to track rangeland health and management outcomes.

[Nevada Rangeland Research Resources](#)

NRCS Ecological Site Descriptions (ESD) and State and Transition Models (STM)

ESDs are reports that classify and describe distinctive land units (called ecological sites) based on their soils, vegetation, and capacity to respond to management or disturbance. They provide land managers with information to evaluate land-use suitability, management responses, and long-term productivity potential. STMs illustrate possible changes in plant communities and dynamic soil properties on an ecological site, including causes of change, reversibility constraints, and management actions needed to prevent or initiate change. Crossing into alternative states often requires energy-intensive restoration to recover previous plant communities and ecosystem functions.

[ESD Catalog](#)**NRCS Field Office Technical Guide (FOTG)**

The FOTG is a primary scientific reference for conservation planning, providing technical information on soil, water, air, plant, and animal resource management.

[FOTG](#)**NRCS Web Soil Survey (WSS)**

WSS offers detailed soil data and maps to assist land managers in making informed conservation and restoration decisions.

[Web Soil Survey](#)**Proper Functioning Condition (PFC) for Lentic and Lotic Sites**

This assessment methodology provides a consistent approach to evaluating the physical functioning of riparian-wetland areas. It helps land managers determine whether these areas are functioning properly, functioning at risk, or non-functional. Properly functioning riparian areas contribute to water quality and ecosystem stability and resilience. PFC assessment is the first step in an integrated riparian management process also described in the PFC handbooks.

[PFC - Lentic Areas](#)[PFC - Lotic Areas](#)[BLM Technical References](#)**Resistance and Resilience Concepts**

A strategic multi-scale approach to managing invasive annual grasses and altered fire regimes in sagebrush ecosystems. This report outlines conservation strategies based on ecosystem resistance to invasives and resilience to disturbances.

[Resistance and Resilience Concepts Document](#)**Sagebrush Conservation Design**

A proactive approach to restoring and conserving sagebrush ecosystems across the western United States. This framework helps land managers identify priority areas for conservation and restoration efforts by integrating ecological resilience, resistance to invasive species, and GRSG habitat needs.

[Sagebrush Conservation Design](#)**SAGEMAP: GIS Database for Sage-Grouse and Shrub-steppe Management**

SAGEMAP provides spatial data to support the management of GRSG and sagebrush steppe ecosystems in the western United States.

[SAGEMAP](#)

USGS Tools

The Science-based Management of Ravens Tool (SMaRT) is an online decision-support tool designed to help land and resource managers create adaptive management plans for areas affected by high numbers of common ravens. Based on recent studies and mapping tools, SMaRT identifies where raven densities may impact sensitive wildlife, agricultural resources, or public safety (Dettenmaier et al. 2021). The tool walks users through building site-specific management strategies using a user-friendly web interface.

[SMaRT Tool](#)

Additional USGS tools coming soon...

- **Anthropogenic Disturbance Tool**
- **Conservation Planning Tool**
- **Habitat Management Map Tool**
- **Grazing Management and Planning Tool**

Working Lands for Wildlife (WLFW) – Sage Grouse Initiative (SGI):

NRCS's WLFW partnership works with private landowners to conserve wildlife habitat on working lands. The Sage Grouse Initiative under WLFW focuses on voluntary, incentive-based conservation practices that improve sagebrush habitats, support sustainable ranching, and reduce threats like invasive species and wildfire. This collaborative approach delivers locally adapted, science-based solutions that benefit both wildlife and agricultural producers.

[Working Lands for Wildlife](#)

[Sage Grouse Initiative](#)

REFERENCES

- A sagebrush conservation design to proactively restore America's sagebrush biome. (n.d.). <https://www.usgs.gov/publications/a-sagebrush-conservation-design-proactively-restore-america-sagebrush-biome>.
- Agricultural Conservation Easement Program | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/acep-agricultural-conservation-easement-program>.
- Agricultural Land Easements | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/ale-agricultural-land-easements>.
- Agricultural Management Assistance | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/ama-agricultural-management-assistance>.
- Baker, W. L. 2006. Fire and restoration of sagebrush ecosystems. *Wildlife Society Bulletin* 34:177–185.
- Beck, J. L., M. C. Milligan, K. T. Smith, P. A. Street, A. C. Pratt, C. P. Kirol, C. P. Wanner, J. D. Hennig, J. B. Dinkins, J. Derek Scasta, and others. 2024. Free-roaming horses exceeding appropriate management levels affect multiple vital rates in greater sage-grouse. *The Journal of Wildlife Management* 88:e22669.
- Beever, E. A., and C. L. Aldridge. 2011. Influences of free-roaming equids on sagebrush ecosystems, with a focus on Greater Sage-Grouse. *Studies in Avian Biology* 38:273–291.
- BLM Technical References | Bureau of Land Management. (n.d.). <https://www.blm.gov/learn/blm-library/agency-publications/technical-references>.
- 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.
- Brooks, M. L., and D. A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1–14 in K. E. M. Galley and T. P. Wilson, editors. *Proceedings of the Invasive Species Workshop: The Role of Fire in the Control and Spread of Invasive Species*. Tall Timbers Research Station.
- Bui, T.-V., J. Marzluff, and B. Bedrosian. 2010. Common raven activity in relation to land use in western Wyoming: Implications for Greater Sage-Grouse reproductive success. *The Condor* 112:65–78.
- Burdick, J., S. Swanson, S. Tsocanos, and S. Mccue. 2021. Lentic meadows and riparian functions impaired after horse and cattle grazing. *The Journal of Wildlife Management* 85:1121–1131.
- Bureau of Land Management. 2025a. Wild Horse and Burro Herd Population Estimates Report. <https://www.blm.gov/programs/wild-horse-and-burro/herd-management/herd-management-areas/nevada>.
- Bureau of Land Management. 2025b. Wild Horse and Burro Program. <https://www.blm.gov/programs/wild-horse-and-burro>.
- Chambers, J. C., B. A. Bradley, C. S. Brown, C. D'Antonio, M. J. Germino, J. B. Grace, S. P. Hardegree, R. F. Miller, and D. A. Pyke. 2014a. Resilience to Stress and Disturbance, and Resistance to *Bromus tectorum* L. Invasion in Cold Desert Shrublands of Western North America. *Ecosystems* 17:360–375.
- 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. 2014b. 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. Gen. Tech. Rep. RMRS-GTR-326. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 73 p. 326.
- 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. 2014c. 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. Gen. Tech. Rep. RMRS-GTR-326. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 73 p. 326.
- Chambers, J. C., E. K. Strand, L. M. Ellsworth, C. M. Tortorelli, A. K. Urza, M. R. Crist, R. F. Miller, M. C. Reeves, K. C. Short, and C. L. Williams. 2024. Review of fuel treatment effects on fuels, fire behavior and ecological resilience in sagebrush (*Artemisia* spp.) ecosystems in the Western US. *Fire Ecology* 20:32.
- Coates, P. S., M. C. Milligan, B. G. Prochazka, B. E. Brussee, S. T. O’Neil, C. G. Lundblad, S. C. Webster, C. L. Weise, S. R. Mathews, M. P. Chenaille, C. Aldridge, S. Espinosa, A. C. Sturgill, K. E. Doherty, J. C. Tull, K. Miller, L. A. Wiechman, S. Abele, J. Boone, H. Stone, and M. Casazza. 2024. Status of greater sage-grouse in the Bi-State Distinct Population Segment—An evaluation of population trends, habitat selection, and efficacy of conservation actions. Page 74. U.S. Geological Survey Open-File Report, US Geological Survey.
- Coates, P. S., B. G. Prochazka, M. S. O’Donnell, C. L. Aldridge, D. R. Edmunds, A. P. Monroe, M. A. Ricca, G. T. Wann, S. E. Hanser, L. A. Wiechman, and M. P. Chenaille. 2021. Range-wide greater sage-grouse hierarchical monitoring framework—Implications for defining population boundaries, trend estimation, and a targeted annual warning system. Page 243. U.S. Geological Survey Open-File Report, US Geological Survey.
- Coates, P. S., B. G. Prochazka, M. A. Ricca, K. A. Gustafson, P. Ziegler, M. L. Casazza, and D. J. Delehanty. 2020. Broad-scale occurrence of a subsidized avian predator: Reducing spatial bias in correlative models with multiscale habitat data. *Ecological Indicators* 111:106020.
- Coates, P. S., B. G. Prochazka, M. A. Ricca, K. B. Gustafson, P. T. Ziegler, and M. L. Casazza. 2017. Pinyon and juniper encroachment into sagebrush ecosystems impacts distribution and survival of greater sage-grouse. *Rangeland Ecology and Management* 70:25–38.
- Coates, P. S., M. Ricca, B. Prochazka, M. Brooks, K. Doherty, T. Kroger, E. Blomberg, C. Hagen, and M. Casazza. 2016. Wildfire, climate, and invasive grass interactions negatively impact an indicator species of the sagebrush ecosystem. *PNAS* 113:12745–12750.
- Conservation Credit System. (n.d.). <https://sagebrushco.nv.gov/CCS/ConservationCreditSystem/>.
- Conservation Districts Grant Opportunities | DCNR. (n.d.). <https://dcnr.nv.gov/divisions-boards/conservation-districts-program/conservation-districts-grant-opportunities>.
- Conservation Reserve Program (CRP) | Farm Service Agency. (n.d.). <https://www.fsa.usda.gov/resources/programs/conservation-reserve-program>.
- Conservation Stewardship Program | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/csp-conservation-stewardship-program>.
- Conway, C. J., C. A. Tisdale, K. L. Launchbaugh, B. S. Stevens, G. E. Overlie, S. D. Eigenbrode, P. D. Makela, and S. B. Roberts. 2025. The Grouse & Grazing Project: Effects of cattle grazing on demographic traits of greater sage-grouse. US Fish & Wildlife Service.

- Crawford, J. A., R. A. Olson, N. E. West, J. C. Mosley, M. A. Schroeder, T. D. Whitson, R. F. Miller, M. A. Gregg, and C. S. Boyd. 2004. Ecology and management of sage-grouse and sage-grouse habitat. *Journal of Range Management* 57:2–19.
- Crist, M. R., R. Belger, K. W. Davies, D. M. Davis, J. R. Meldrum, D. J. Shinneman, T. E. Remington, J. Welty, and K. E. Mayer. 2023. Trends, Impacts, and Cost of Catastrophic and Frequent Wildfires in the Sagebrush Biome. *Rangeland Ecology & Management* 89:3–19.
- Dahlgren, D. K., T. A. Messmer, B. A. Crabb, R. T. Larsen, T. A. Black, S. N. Frey, E. T. Thacker, R. J. Baxter, and J. D. Robinson. 2016. Seasonal movements of greater sage-grouse populations in Utah: Implications for species conservation. *Wildlife Society Bulletin* 40:288–299.
- D’Antonio, C. M., and P. M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. *Annual Review of Ecology, Evolution, and Systematics* 23:63–87.
- Davies, K. W., C. S. Boyd, J. D. Bates, L. N. Svejcar, and L. M. Porensky. 2024. Ecological benefits of strategically applied livestock grazing in sagebrush communities. *Ecosphere* 15:e4859.
- Devendra Dahal, Stephen Boyte, Logan J Megard, Kory Postma, and Neal J Pastick. 2025, June 2. Early Estimates of Exotic Annual Grass (EAG) in the Sagebrush Biome, USA, 2025. U.S. Geological Survey.
- Doherty, K., D. M. Theobald, M. C. Holdrege, L. A. Wiechman, and J. B. Bradford. 2022. Biome-wide sagebrush core habitat and growth areas estimated from a threat-based conservation design. U.S. Geological Survey.
- Dudley, I. F., P. S. Coates, B. G. Prochazka, S. T. O’Neil, S. Gardner, and D. J. Delehanty. 2021. Large-scale wildfire reduces population growth in a peripheral population of sage-grouse. *Fire Ecology* 17:15.
- Ecological site descriptions. (n.d.). <https://edit.jornada.nmsu.edu/catalogs/esd>.
- Environmental Quality Incentives Program- Nevada | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/nevada/environmental-quality-incentives>.
- FIAT | BLM GBP Hub. (n.d.). <https://gbp-blm-egis.hub.arcgis.com/pages/flat>.
- Field Office Technical Guide (FOTG) | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/resources/guides-and-instructions/field-office-technical-guides>.
- Funding Opportunities. (n.d.). <https://forestry.nv.gov/grants>.
- Gibson, D., E. J. Blomberg, M. T. Atamian, and J. S. Sedinger. 2017. Weather, habitat composition, and female behavior interact to modify offspring survival in Greater Sage-Grouse. *Ecological Applications* 27:168–181.
- GIS Data | Bureau of Land Management. (n.d.). <https://www.blm.gov/services/geospatial/GISData>.
- Grazing Lands Conservation Initiative | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/glici-grazing-lands-conservation-initiative>.
- Gregg, M. A., and J. A. Crawford. 2009. Survival of greater sage-grouse chicks and broods in Oregon. *Journal of Wildlife Management* 73:904–913.
- Guttery, M. R., D. K. Dahlgren, T. A. Messmer, J. W. Connelly, K. P. Reese, P. A. Terletzky, N. Burkepile, and D. N. Koons. 2013. Effects of landscape-scale environmental variation on greater sage-grouse chick survival. *PLoS One* 8:e65582.

- Harju, S., C. V. Olson, J. Hess, and S. L. Webb. 2021. Isotopic analysis reveals landscape patterns in the diet of a subsidized predator, the common raven. *Ecological Solutions and Evidence* 2:e12100.
- Howe, K., P. Coates, and D. Delehanty. 2014. Selection of anthropogenic features and vegetation characteristics by nesting Common Ravens in the sagebrush ecosystem. *Ornithological Applications* 116:35–49.
- Knick, S. T., D. S. Dobkin, J. T. Rotenberry, M. A. Schroeder, W. M. Vander Haegen, and I. van Riper Charles. 2003. Teetering on the Edge or too Late? Conservation and Research Issues for Avifauna of Sagebrush Habitats. *The Condor: Ornithological Applications* 105:611–634.
- Knick, S. T., and S. E. Hanser. 2011. Chapter 16: Connecting Pattern and Process in Greater Sage-Grouse Populations and Sagebrush Landscapes. Page Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats. University of California Press.
- Kristan, W. B., and W. I. Boarman. 2007. Effects of anthropogenic developments on common raven nesting biology in the West Mojave Desert. *Ecological Applications: A Publication of the Ecological Society of America* 17:1703–1713.
- Landscape Conservation Initiatives | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/landscape-conservation-initiatives>.
- Lockyer, Z. B., P. S. Coates, M. L. Casazza, S. Espinosa, and D. J. Delehanty. 2015. Nest-site selection and reproductive success of greater sage-grouse in a fire-affected habitat of northwestern Nevada. *Journal of Wildlife Management* 79:785–797.
- Mahood, A. L., and J. K. Balch. 2019. Repeated fires reduce plant diversity in low-elevation Wyoming big sagebrush ecosystems. *Fire Ecology* 15:1–15.
- Miller, R. F., J. C. Chambers, and M. Pellant. 2011a. A science framework for restoring and conserving the Great Basin sagebrush biome. U.S. Forest Service General Technical Report RMRS-GTR-256.
- Miller, R. F., and E. K. Heyerdahl. 2008. Fine-scale variation of historical fire regimes in sagebrush-steppe and juniper woodland: an example from California, USA. *International Journal of Wildland Fire* 17:245–254.
- Miller, R. F., S. T. Knick, D. A. Pyke, C. W. Meinke, S. E. Hanser, M. J. Wisdom, and A. L. Hild. 2011b. Characteristics of sagebrush habitats and limitations to long-term conservation. Greater sage-grouse: ecology and conservation of a landscape species and its habitats. *Studies in Avian Biology* 38:145–184.
- Milligan, M. C., P. S. Coates, S. T. O’Neil, B. E. Brussee, M. P. Chenaille, D. Friend, K. Steele, J. R. Small, T. S. Bowden, A. D. Kasic, and K. Miller. 2024. Greater sage-grouse habitat of Nevada and northeastern California—Integrating space use, habitat selection, and survival indices to guide areas for habitat management. Page Open-File Report. U.S. Geological Survey.
- Multi-Resolution Land Characteristics (MRLC) Consortium | Multi-Resolution Land Characteristics (MRLC) Consortium. (n.d.). <https://www.mrlc.gov/>.
- National Water Quality Initiative | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/national-water-quality-initiative>.
- NatureServe. 2019. Climate Change Vulnerability Index for Ecosystems and Habitats. <https://www.natureserve.org/climate-change-vulnerability-index-ecosystems-and-habitats>.
- Nevada Department of Wildlife. 2023. 2022 Nevada Wildlife Action Plan. <https://www.ndow.org/blog/nevada-wildlife-action-plan/>.

- Nevada Department of Wildlife. 2024a. Policy 67 Feral Horses and Burros. Report to the Nevada Board of Wildlife Commissioners.
- Nevada Department of Wildlife. 2024b. Predator Management Plan: Fiscal Year 2025. Nevada Department of Wildlife.
- Nevada Department of Wildlife. in draft. Nevada Sagebrush Habitat Plan Draft. Nevada Department of Wildlife.
- Nevada Fire Info. 2025. Wildfire Information for Nevada. <https://nevadafireinfo.org/>.
- Nevada Rangeland Monitoring Handbook (3rd) - Introduction | Extension | University of Nevada, Reno. 2018. <https://extension.unr.edu/publication.aspx?PubID=1986>.
- Nevada Shared Stewardship. (n.d.). <https://forestry.nv.gov/natural-resource-management/shared-stewardship>.
- Noel, A.R, and J. B. Bradford. 2024. Pinyon-Juniper Woodland Climate Response and Species Distribution Models. <https://www.sciencebase.gov/catalog/item/65b3f3fad34e36a390458ab5>.
- O’Neil, S. T., P. S. Coates, B. E. Brussee, P. J. Jackson, K. B. Howe, A. M. Moser, L. J. Foster, and D. J. Delehanty. 2018. Broad-scale occurrence of a subsidized avian predator: Reducing impacts of ravens on sage-grouse and other sensitive prey. *Journal of Applied Ecology* 55:2641–2652.
- Partners for Fish and Wildlife | What We Do | U.S. Fish & Wildlife Service. (n.d.). [.https://www.fws.gov/program/partners-fish-and-wildlife/what-we-do](https://www.fws.gov/program/partners-fish-and-wildlife/what-we-do).
- Pheasants Forever Build A Wildlife Area Program. (n.d.). <https://www.pheasantsforever.org/Habitat/Build-A-Wildlife-Area.aspx>.
- Pheasants Forever Farm Bill Priorities. (n.d.). [.https://www.pheasantsforever.org/Conservation/Conservation-Policy/Farm-Bill-Priorities.aspx](https://www.pheasantsforever.org/Conservation/Conservation-Policy/Farm-Bill-Priorities.aspx).
- Prochazka, B. G., P. S. Coates, M. A. Ricca, M. L. Casazza, K. B. Gustafson, and J. M. Hull. 2017. Encounters with Pinyon-Juniper Influence Riskier Movements in Greater Sage-Grouse Across the Great Basin. *Rangeland Ecology & Management* 70:39–49.
- Proper Functioning Condition Assessment for Lentic Areas | Bureau of Land Management. (n.d.). [.https://www.blm.gov/noc/blm-library/technical-reference/proper-functioning-condition-assessment-lentic-areas](https://www.blm.gov/noc/blm-library/technical-reference/proper-functioning-condition-assessment-lentic-areas).
- Regional Conservation Partnership Program | Natural Resources Conservation Service. (n.d.). [.https://www.nrcs.usda.gov/programs-initiatives/rcpp-regional-conservation-partnership-program](https://www.nrcs.usda.gov/programs-initiatives/rcpp-regional-conservation-partnership-program).
- Research Resources. 2022. <https://nevadarangelands.org/research-resources/>.
- Resources | Nevada Wildlife Connectivity Hub. 2024. <https://wildlifeconnectivity-window.hub.arcgis.com/pages/resources>.
- Sage Grouse | Working Lands For Wildlife. 2025. <https://www.wlfw.org/wildlife/sage-grouse/>.
- Sage Grouse Initiative | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/sage-grouse-initiative>.
- Sagebrush Ecosystem Program State of Nevada. 2019. 2019 Nevada Greater Sage-grouse Conservation Plan.
- Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool | Bureau of Land Management. 2022, November 16. <https://www.blm.gov/noc/blm-library/technical-reference/sage-grouse-habitat-assessment-framework-multiscale-assessment>.

- SAGEMAP | U.S. Geological Survey. 2001. <https://www.usgs.gov/centers/forest-and-rangeland-ecosystem-science-center/science/sagemap/>.
- Sandford, C. P., M. T. Kohl, T. A. Messmer, D. K. Dahlgren, A. Cook, and B. R. Wing. 2017. Greater sage-grouse resource selection drives reproductive fitness under a conifer removal strategy. *Rangeland Ecology & Management* 70:59–67.
- Sauer, J. R., W. A. Link, J. E. Fallon, K. L. Pardieck, and D. J. Ziolkowski Jr. 2013. The North American breeding bird survey 1966–2011: summary analysis and species accounts. *North American Fauna*:1–32.
- Science-based Management of Ravens Tool (SMaRT) | U.S. Geological Survey. 2022, June 6. <https://www.usgs.gov/software/science-based-management-ravens-tool-smart>.
- Small, J. R. 2021. Greater Sage-Grouse and Community Responses to Strategies to Mitigate Environmental Resistance in an Anthropogenic Altered Sagebrush Landscape. PhD Thesis, Utah State University.
- Smith, J. T., B. W. Allred, C. S. Boyd, K. W. Davies, A. R. Kleinhesselink, S. L. Morford, and D. E. Naugle. 2023. Fire needs annual grasses more than annual grasses need fire. *Biological Conservation* 286:110299.
- Street, P. A., L. Jaster, T. E. Dilts, T. L. Behnke, and J. S. Sedinger. 2025. Grazing by non-native ungulates negatively impacts vegetation important to a native species of concern. *Ecosphere* 16:e4974.
- The Integrated Rangeland Fire Management Strategy Actionable Science Plan: U.S. Department of the Interior, Washington D.C. | US Forest Service Research and Development. 2016. <https://research.fs.usda.gov/treesearch/53265>.
- U.S. Department of Agriculture. 2025. U.S. Gridded Palmer Drought Severity Index (PDSI). <https://www.ncei.noaa.gov/access/monitoring/palmer-drought-severity-index/>.
- U.S. Geological Survey. 2025. USGS Fire Science Portal. <https://www.usgs.gov/programs/fire-science>.
- 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 | US Forest Service Research and Development. 2014. <https://research.fs.usda.gov/treesearch/46329>.
- Web Soil Survey - Home. 2019, July 31. <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
- Wetland Reserve Easements | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/wre-wetland-reserve-easements>.
- Wetland Reserve Enhancement Partnership | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/wrep-wetland-reserve-enhancement-partnership>.
- Working Lands for Wildlife. 2025. <https://www.wlfw.org/>.
- Working Lands for Wildlife | Natural Resources Conservation Service. (n.d.). <https://www.nrcs.usda.gov/programs-initiatives/working-lands-for-wildlife>.



For information and questions about the Nevada Conservation Credit System, please contact:

Sagebrush Ecosystem Technical Team (SETT)

(775) 687-2000