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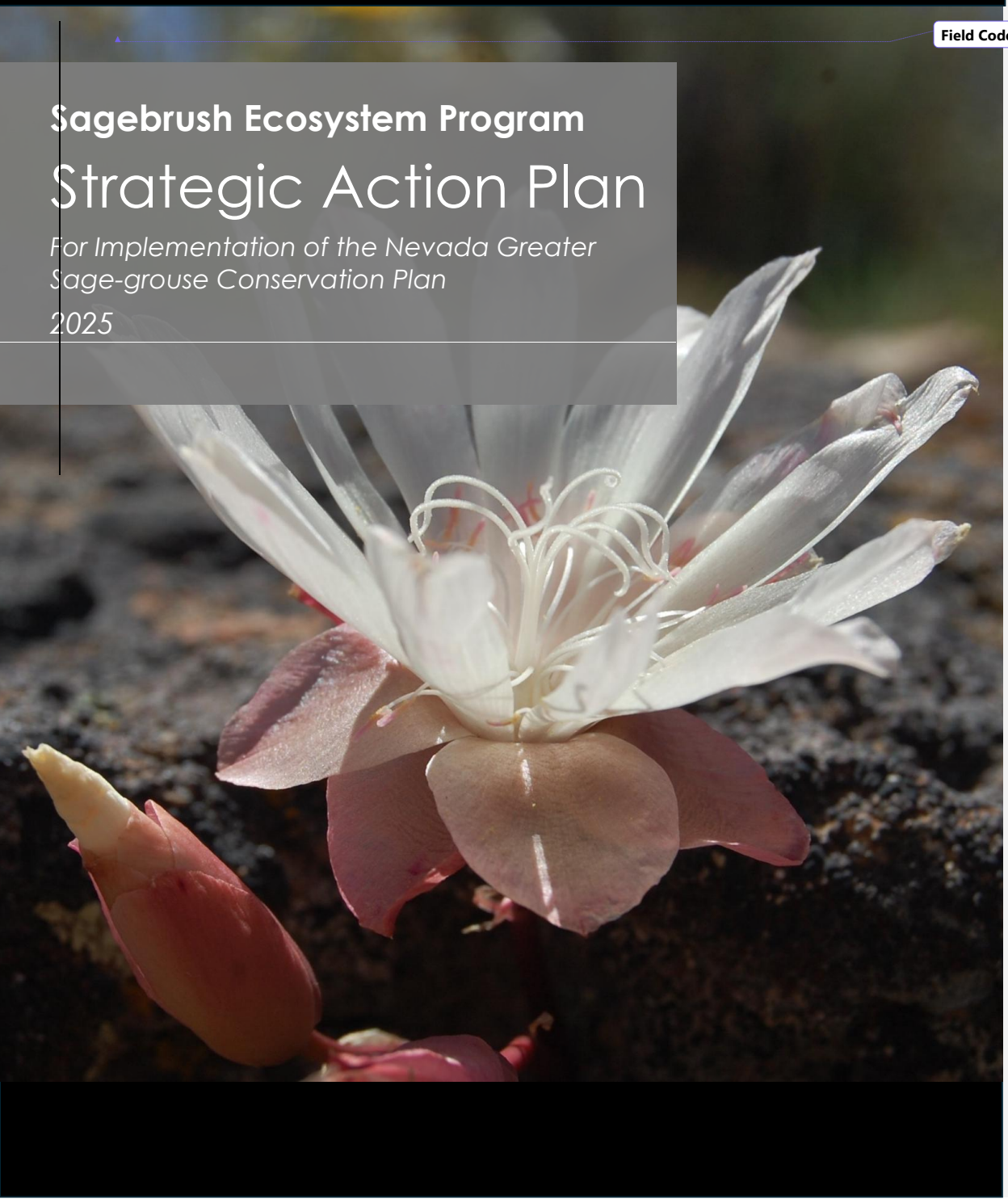

Sagebrush Ecosystem Program

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:

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Acknowledgments:

This document is to provide guidance for the following:

Nevada Sagebrush Ecosystem Technical Team

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Sarah Hale – Nevada Division of State Lands
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INTRODUCTION

The Nevada Sagebrush Ecosystem Program (SEP) ~~was established~~overseen by the Sagebrush Ecosystem Council (SEC) and is managed by the Sagebrush Ecosystem Technical Team (SETT) 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).~~address conservation challenges in Nevada's sagebrush ecosystems~~. Created 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 and 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 ensure 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 mandate 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) compliments~~builds on~~ 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 ~~mitigate~~ address key threats ~~identified in NDOW's GRSG Planning Areas~~the SAP located in SAP Priority Areas. 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 lifecycles, successful conservation depends on ~~collaboration~~ coordination across jurisdictions and land ownership. 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.~~The SEP is committed to using the best available science, adaptive management, and stakeholder engagement, more emphasis here regarding stakeholder engagement, to address complex conservation challenges and promote stable GRSG populations in the future.~~

Vision

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

Commented [JT1]: SEC did not establish the SEP. The Legislature did resulting in NRS 321.592 and .594 and NRS 232.162.

Commented [CA2]: Jake suggest changing the name of the doc

Complete a new draft and send to the SEC for review.

Commented [JT3R2]: If this is only the SETT 5 year SAP, then make that clear. If this is to implement the State Plan, then I still like the 2016 SAP and wish we would simply update it rather than a complete rewrite.

Commented [CA4]: Bevan: the SAP shouldn't be for the SETT….
Jake: pg7-8 of the state plan outlines the SAP.

Commented [JT5]: If it builds on the State Plan, it should be consistent in all regards including the exact threats and processes in the State Plan, just with more granularity and specificity.

Commented [JT6]: A lot of this seems unnecessary in here since the history is in the State Plan.

MISSION STATEMENT

The Sagebrush Ecosystem Technical Team's ~~Program'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. **Restore sagebrush ecosystems** by addressing threats to Nevada's landscapes and Greater Sage-grouse populations.
2. **Enhance the Nevada Conservation Credit System** to mitigate impacts and ensure a net conservation gain for Greater Sage-grouse habitat and enhance population resiliency.
3. **Strengthen ~~collaboration~~ coordination and outreach** to address ecosystem threats and engage stakeholders in conservation efforts.
4. **Advance scientific knowledge** of sagebrush ecosystems to reduce management uncertainty and improve conservation outcomes.

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 ~~comprehensive~~ list of perceived threats to GRSG and their habitat, and links to current information and resources.
- Goals and Objectives – An~~A~~ ~~detailed~~ outline of strategic actions with measurable outcomes aimed at addressing the four strategic goals identified by the SEP.
- Areas of Conservation Importance Map – A ~~detailed~~ 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.

Commented [CA7]: Maintain and improve sagebrush ecosystems

Commented [CA8R7]: Jake Tibbetts

Commented [JT9]: A preferred term to use since collaboration has a negative connotation in some circles. I made change throughout.

Commented [SA10R9]: Interesting. Coordination works pretty well but how about cooperation? It seems more appropriate in some locations

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 prep)~~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 will highlight 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 interacting, 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 problematic stressor in Nevada's sagebrush biome. These species reduce ecosystem resilience and resistance to disturbance, especially when combined with drought, ~~improper grazing management can be~~ management stressful to beneficial ~~perennial grasses~~vegetation,~~overgrazing~~, and frequent fire (Miller et al. 2011a, Chambers et al. 2014b)~~.~~. Conversely, when done properly, livestock grazing can reduce invasive annual grasses and improve plant community composition (Davies et al. 2024, Conway et al. 2025). Thatch, or dead vegetation, creates continuous fine fuel beds that promote frequent, ~~high-intensity~~ 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., existing in over a larger gradient 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 its 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 subsequent tightened fire cycles~~invasive annual grasses~~. In many mid to low elevation sagebrush ecosystems of Nevada, fire return intervals have been tightened to < 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 frequently as 15 to 25 years (Baker 2006, Miller and Heyerdahl 2008, Chambers et al. 2014c). Wildfires can reduce sagebrush cover, reduce (or increase) native understory vegetation, and contribute to landscape fragmentation (Coates et al. 2016, Dudley et al. 2021). Fire perimeters, frequency, and severity are well-documented through resources like Nevada Fire Info and the USGS Fire Science Portal (Nevada Fire Info 2025, U.S. Geological Survey 2025).

Predation by Common Ravens

The 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

Commented [CA11]: Jake wants the exact same threats in the 2019 state plan, and if the threats need to be updated then we should do so there.

Commented [JT12R11]: Yes. But I still made suggested edits throughout.

Commented [JT13]: All of this detail here seems out of place in a SAP. A list of the threats without all the extraneous explanation should be sufficient.

Commented [CA14]: Suggests to remove since the plan is not approved

Commented [CA15R14]: Willie disagrees

Commented [CA16R14]: Changed from "in prep" to "in draft" to reduce confusion.

Commented [CA17]: Steve wants how grazing can be a tool for control

Commented [CA18R17]: Added a sentence stating how grazing can reduce invasive annual grasses.

Commented [JT19]: To not single out just grazing. Also see results of 10 year grazing study out of U of I.

Commented [CA20R19]: Conway et al 2025 included

Commented [SA21R19]: I get it but believe a bit of transparency and plain language is warranted. Not sure what 'management stressful to beneficial vegetation' means. And this sentence is followed by 'proper grazing' sentence. I would suggest sticking with proper and improper (or other similar terms) because this is what the science has shown. See Smith et al. 2023 - I'll send the pub.

development, which provide more 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). The rise in raven populations, driven by human activities, is linked to a decrease in GRSG nest success and has altered their population dynamics, as the availability of natural prey no longer restricts ravens. 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). Since 2013, common ravens have experienced a 94% exponential population increase to the current estimate of 370,000 ~~Raven populations have doubled over the past two decades~~ (Harju et al. 2021), further intensifying ~~these~~ top-down negative effects transferred to GRSG and other sagebrush obligate species. 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 NDOW's take permit to increase lethal removal of common ravens from 2,500 to 12,500.

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, such as poorly managed grazing, inadequate fire response, and poor siting of development, compound these impacts by reducing the ecosystem's recovery capacity and leading to lasting habitat transitions (Beever and Aldridge 2011; Coates et al. 2021; Crist et al. 2023).

~~**Improper Management**~~

~~Unsustainable land management practices, including overgrazing, poor development siting, impacts from off-road vehicles, and inadequate fire response, compound the effects of natural stressors. These practices can reduce recovery capacity and lead to lasting ecosystem transitions (Coates et al. 2021, Crist et al. 2023).~~

~~**Habitat Fragmentation & Human Alterations**~~

~~Infrastructure associated with energy development, roads, fencing, and urban expansion fragments GRSG habitat, reduces patch size, increases edge effects, disrupts connectivity, and provides subsidies for predators. Anthropogenic disturbances, including mining, livestock grazing, and off-highway vehicle use, contribute to localized degradation and functional GRSG habitat loss (Beever and Aldridge 2011, Coates et al. 2021).~~

Excess Wild Horses and Burros

In March of 2025, the Bureau of Land Management (BLM) estimated that there were 73,130 free-roaming wild horse and burros occupying BLM-administered herd management areas (HMAs; Bureau of Land Management 2025a). This number demonstrates over two and a half times the designated appropriate management level (AML). As of March 1, 2025, AML for BLM-administered 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 ~~their~~ HMA populations are often well above AML and the 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 within 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 2025)~~(Nevada Department of Wildlife 2024a, Bureau of Land Management 2025b).

Commented [CA22]: Member Swanson "I note that on page 7 re ravens 94% increase 2013-2020? Does not capture the full essence of the issue. I believe I have heard they have increased substantially more than that since say the 1960s." "The writing about the raven in Fred Ryser's 1979 book Birds of the Great Basin A Natural History provides some food for thought. Present but rare in the shrublands prior to the Powerlines used for nesting."

Commented [JT23]: These seem to be very similar.

Commented [JT24]: I don't like using this term here. Some areas, even within AML and not excess, horses congregate on riparian areas, etc.

Commented [CA25]: Member Swanson: "Excess WHB – I'm not sure why you are referring to 2018 horse numbers. The 2025 numbers are attached. 2. Since 2004 a budget rider for retiring old unadoptable excess horses has exploded the budget. Care of 68,000 off-range horses takes close to 80% of the WHB management budget. Care for each horse costs the taxpayer $24,000 for the life of a horse (retirement). "

Commented [CA26R25]: Updated using the 2025 BLM Horse and Burro Report

Conifer Encroachment

The encroachment of pinyon-juniper (P-J) woodlands into sagebrush ecosystems reduces herbaceous cover, fragments GRSG habitat, and lowers 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 because of conifer encroachment. With cheatgrass establishment on lower xeric sagebrush sites and pinyon – juniper encroachment and infill occur on mesic higher elevation sites, continued loss of contemporary sagebrush habitat could be exacerbated if mitigation techniques in the form of habitat treatments are not employed (Miller et al. 2011a). Furthermore, c~~C~~ncounters with P-J communities alter movement speeds and increase daily mortality by predation and other reasons for GRSG 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 for certain sagebrush obligate species, such as GRSG, due to providing more continuous useable habitat; 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).

~~Climate Change~~Extended Drought and Weather Variability

~~Climate change compounds ecosystem threats through rising temperatures, altered precipitation patterns, and increased drought frequency.~~ Mismatched timing of winter and spring precipitation ~~decouples native plant communities' succession stages and~~ ~~further~~ reduces recruitment success ~~of~~ beneficial vegetation ~~of native vegetation~~ (Blomberg et al. 2012, Gibson et al. 2017). Warmer temperatures and dryer 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).

Commented [SA27]: Would suggest expansion instead, throughout.

Commented [JT28]: PJ encroachment isn't just about habitat degradation. GRSG avoid these areas in general because of the evolutionary responses to avoid vertical structures where predators perch. This should be better clarified.

Commented [JT29]: Not sure what this means?

Commented [LE30]: Unclear what is meant by "beneficial vegetation" instead of native vegetation.

Commented [JT31]: I recommend removing if the SAP is to address things within SETT control. Also, to avoid the hot-potato of climate change.

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.

~~coordination land owners, (Sagebrush Ecosystem Program State of Nevada 2019)~~

GOAL 1

Address threats to Nevada sagebrush ecosystems and Greater Sage-grouse populations through land stewardship and resource management.

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

Strategy: Identify and pursue grant opportunities to finance ~~restoration~~ 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.

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~~Limit~~ disturbances in sensitive areas.

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

Commented [LE32]: How are these defined? Unclear what these would be.

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 ~~restoration~~management actions.

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

Objective 6: Address conifer encroachment.

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

Strategy: Apply measures to prevent and reduce loss of resistance and resilience to at-risk sagebrush habitats~~further encroachment~~.

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

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

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

Strategy: Support the implementation of the NDOW Predator Management Plan to reduce anthropogenic threats to GRSG nests (Nevada Department of Wildlife 2024b).

Commented [JT33]: Shouldn't limit to just priority habitat

Commented [LE34]: I would put this as the first strategy and then the other two to follow. That better matches the hierarchical approach for NDOW and the State Plan.

GOAL 2

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

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

Strategy: Execute and maintain a Memorandum of Understanding (MOU) with the BLM and USFS to enroll public land credits in the Nevada CCS.

Strategy: Define and implement a process that satisfies all requirements for mitigation on public lands.

Strategy: Encourage potential credit developers and public land ~~restoration~~ projects to enroll in the Nevada CCS through outreach.

Strategy: Ensure all anthropogenic disturbances affecting GRSG habitat are enrolled and compliant with the Nevada CCS as required through regulation.

Commented [JT35]: I would like to see a strategy for outreach to enroll more private land projects.

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 ~~restoration~~ process for CCS to enhance public land sagebrush and supporting ecosystems in Nevada.

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

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.

Commented [JT36]: I would like to look at the effectiveness of proximity factors.

GOAL 3

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

Commented [CA37]: Sherm thinks this covers Jakes concerns and that this area should be expanded.

Objective 1: Foster continuous ~~collaboration~~coordination with stakeholders and partners.

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

Strategy: Engage with land management and conservation agencies, permittees and private landowners, and others to engage in ~~collaborative~~coordinated 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 ~~restoration~~ conservation and enhancement efforts through partnerships.

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

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: ~~Collaborate~~ Coordinate with local groups to initiate large-scale ~~restoration~~ 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 ~~restoration~~ 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 ~~collaboration~~coordination to enhance scientific understanding.

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

Strategy: ~~Collaborate~~ 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.

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

AREAS OF CONSERVATION IMPORTANCE MAP

Nevada's extensive ~~vast~~ sagebrush ecosystem presents a significant challenge when prioritizing where to invest in ~~restoration~~conservation actions.~~.~~ To address this, the Areas of Conservation Importance map was developed to identify ~~focal~~ ~~regions~~ preferred conservation areas for public land ~~restoration~~ projects over the next 5 to 10 years through the CCS. This map is a planning tool to guide the SETT in strategically targeting restoration efforts based on the best available science. This map is a planning tool 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 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. ~~While the map highlights broad areas of ecological significance,~~ However, successful implementation ~~and restoration~~ will always involve the expertise of local biologists, land managers, ~~all restoration projects will ultimately depend on localized expertise and site-specific knowledge from~~ county, state, and federal partners~~.~~ This map aims to enable a coordinated, long-term ~~restoration~~ approach where efforts can be built 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 (Milligan et al. 2024).
  - *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).

~~By combining these spatial layers, the map~~These combined data identify~~ies~~ regions where GRSG habitat ~~restoration~~ 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 ~~collaboration~~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 that offer the greatest potential return on investment for sage-grouse conservation, credit generation, and long-term habitat integrity. The~~se~~ SAP ~~areas~~ Priority Areas were selected based on:

- Their importance to GRSG population persistence, density, and connectivity;
- Observed population responses to past ~~restoration~~ efforts;
- Ongoing or recent declines in GRSG habitat quality; and

Commented [CA38]: Changed focal regions to priority areas. Pointed out by Member Boise.

Commented [CA39R38]: Member Tibbitts pointed out that we used the term 'preferred' in SEP program documents when we revised them, so we should use the same term in the SAP.

Commented [SA40]: Duplicate

Commented [JT41]: I suggest using the TAWS as a layer to identify these areas.

- Opportunities to support areas showing GRSG population recovery due to previous ~~restoration and~~ 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 GRSG habitat and strong credit-generating potential within the CCS. Importantly, while these maps serve as tools for strategic planning, actual ~~restoration~~ management decisions will be guided by LAWGs, CDs, and Adaptive Management Response Teams (AMRT) and localized, expert knowledge. ~~Collaboration~~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.

Commented [JT42]: Disappointing that LAWGs, AMRTs, and CDs weren't used to identify these areas. Seems like areas where triggers have been tripped and the AMRTs are in place should be priorities.

Commented [CA43]: Increase consistency of this language here and in the other docs

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

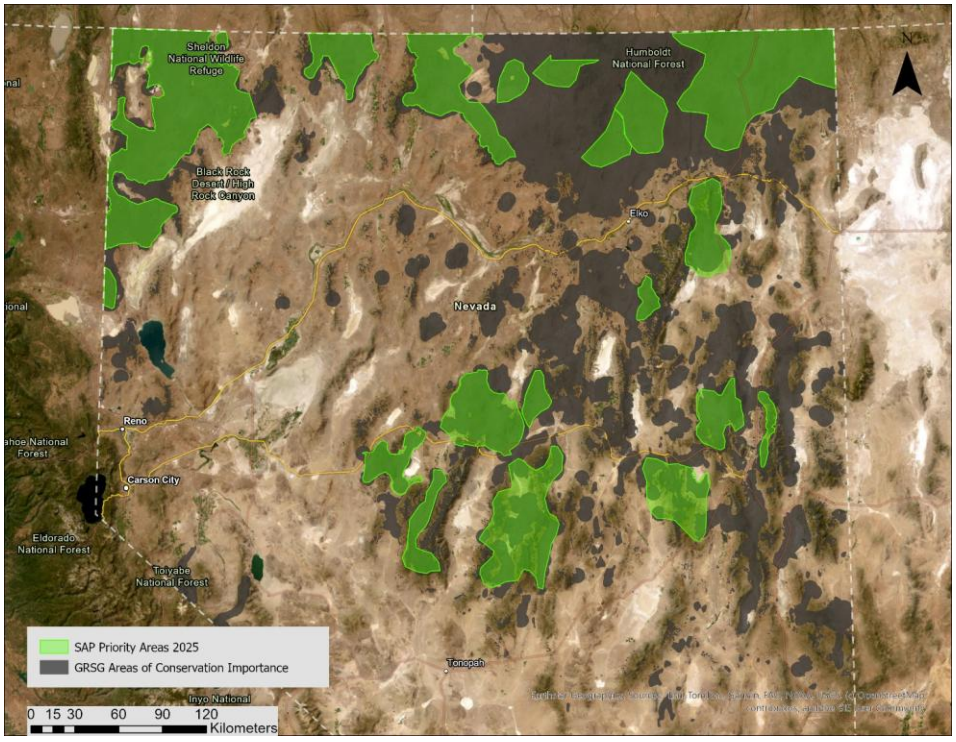

Figure 1. Areas of Conservation Importance in Greater Sage-Grouse Habitat in~~Across~~ Nevada.

Commented [SA44]: Should it be - Areas of conservation importance and SAP priority areas….

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) reflect focal zones are preferred

Commented [SA45]: I think you are looking for 'and' here? Or maybe go with 'reflecting'?

conservation areas where the SETT will prioritize ~~restoration~~ conservation and enhancement actions over the next 5 to 10 years, based on ecosystem condition, ~~restoration~~conservation -response probability, and opportunities to support sage-grouse population persistence.~~integrates four key data layers—Core Sagebrush Areas, Lek Connectivity Components, and Priority+/Priority Habitat Management Areas (PHMA+/PHMA). Together, they define Areas of Conservation Importance (gray), which inform where restoration would be most beneficial. SAP Priority Areas (green) highlight the locations where the SETT will prioritize restoration and enhancement efforts over the next 5–10 years.~~

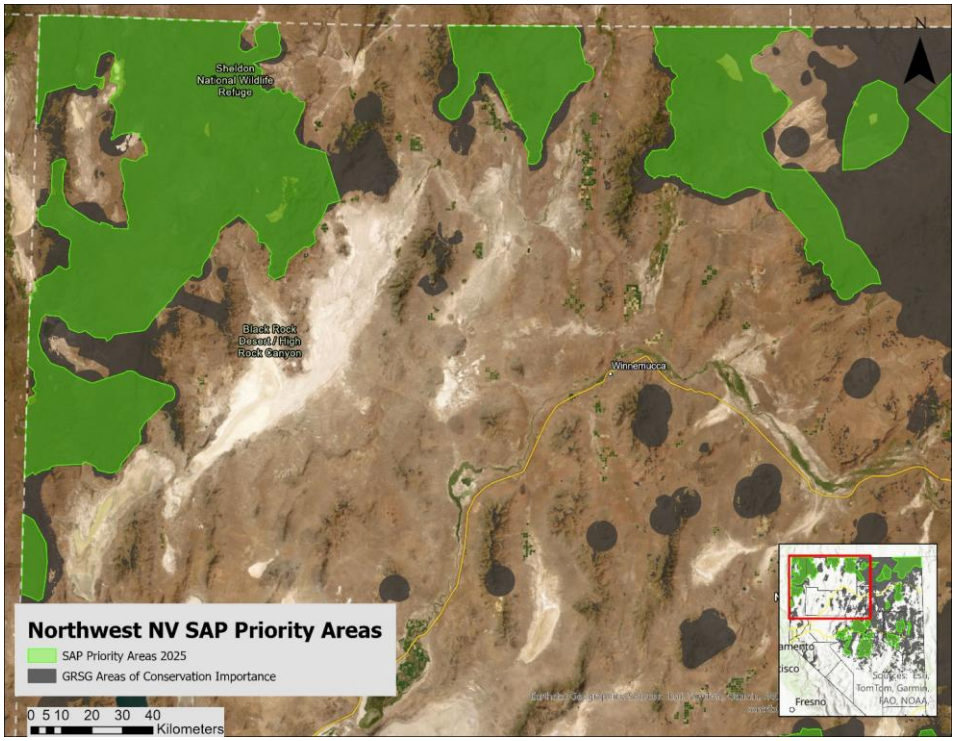

Figure 2. Northwest Nevada – ~~Core Greater Sage-Grouse Habitat and Connectivity Focus.~~Areas of Conservation Importance and SAP Priority Areas.

This regional map highlights the extensive overlap between **Areas of Conservation Importance** (gray) and **SAP Priority Areas** (green) in northwest Nevada. The region encompasses high-value sagebrush habitat and critical lek connectivity zones, including the Sheldon National Wildlife Refuge and surrounding area. These areas are essential for sustaining long-term Greater Sage-Grouse populations and are a focal pointpreferred conservation area for ~~restoration~~actions through the Nevada Conservation Credit System.~~Most Areas of Conservation Importance in northwest Nevada overlap with SAP Priority Areas. This region supports high-value core GRSG habitat and lek connectivity, critical for sustaining long-term GRSG populations.~~

Commented [CA46]: Changed from focal zones.

Commented [SA47]: Sentence structure is off a bit

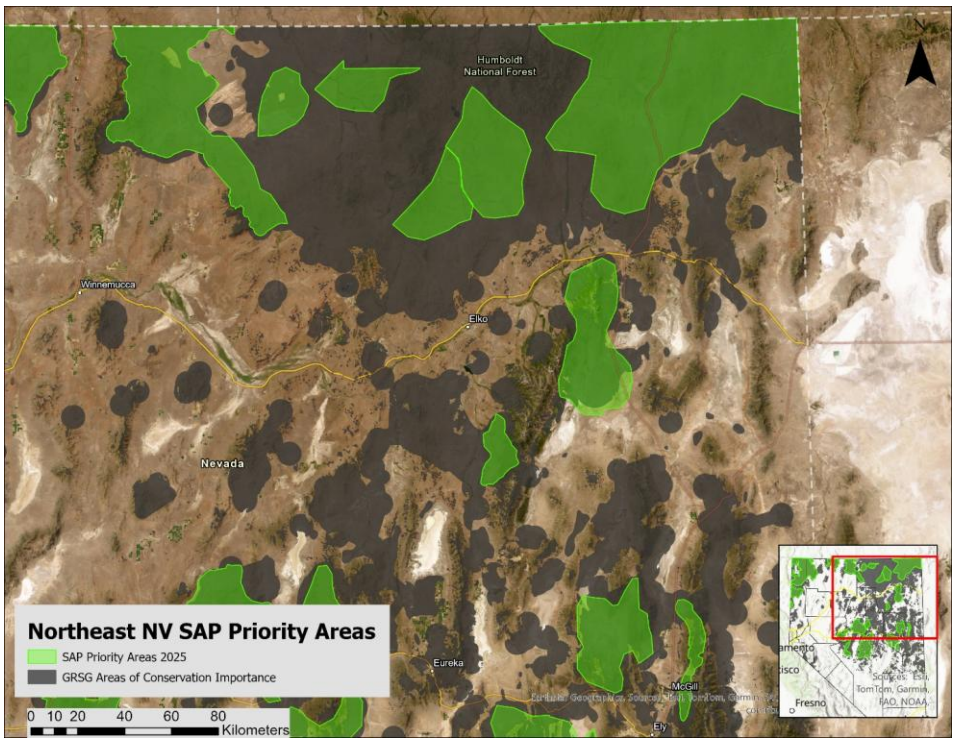

Figure 3. Northeastern Nevada – ~~High-Density Populations and Threat Reduction.~~SAP Priority Areas in Core Greater Sage-Grouse Habitat.

Northeast Nevada supports some of the highest Greater Sage-Grouse (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 ~~restoration~~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.~~Northeastern Nevada supports the majority of the state's GRSG population. SAP Priority Areas in this region emphasize post-wildfire rehabilitation, conifer removal, and mitigation of human disturbance to support continued population stability.~~

Commented [SA48]: I would use the same header as figure 2. - '**Areas of Conservation Importance and SAP Priority Areas'.**

Commented [SA49]: If this is first use, I would assume you could introduce it earlier in doc.

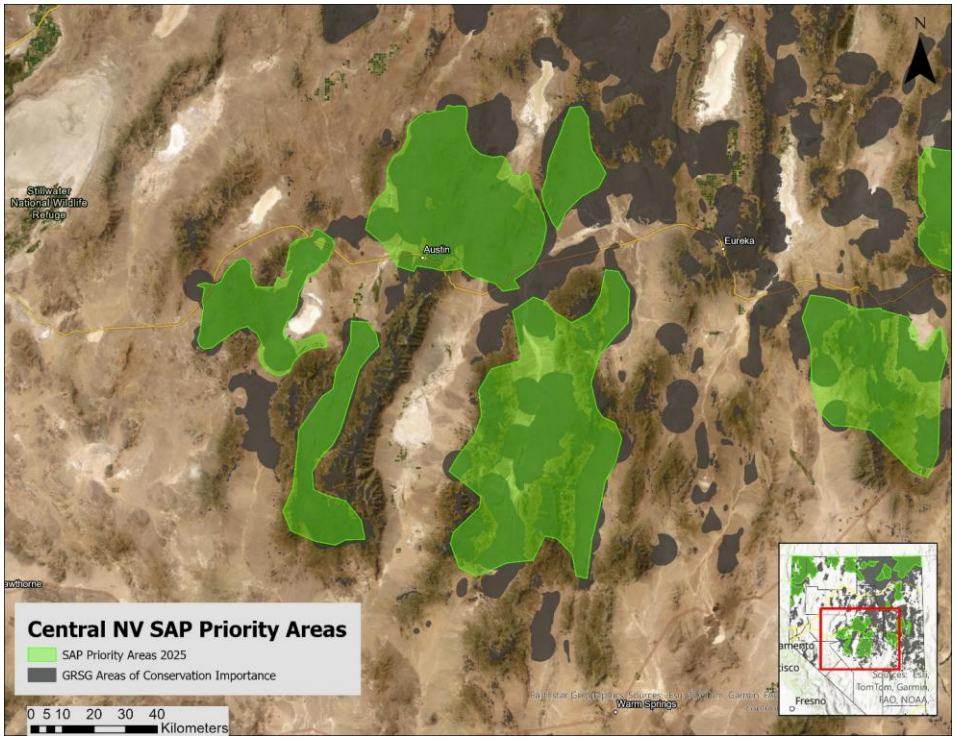

Figure 4. Central Nevada – ~~Population Recovery and Emerging Threats.~~SAP Priority Areas Supporting Population Recovery.

Central Nevada has experienced recent gains in Greater Sage-Grouse (GRSG) populations. This figure shows **Areas of Conservation Importance** (gray) and **SAP Priority Areas** (green), where ~~restoration~~ 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.~~GRSG populations in central Nevada have been increasing in recent years. SAP Priority Areas in this region aim to protect and enhance GRSG habitat amid growing development and conifer encroachment. Strategic SETT-led restoration efforts will be crucial for sustaining this momentum.~~

Commented [SA50]: Same - Use Figure 2 heading

Commented [SA51]: See comment above under Figure 2

Commented [SA52]: Each of these figure write-ups are kind of repetitive. May consider consolidating. However, if you are tailoring the likely restoration needs for each region then keep separate.

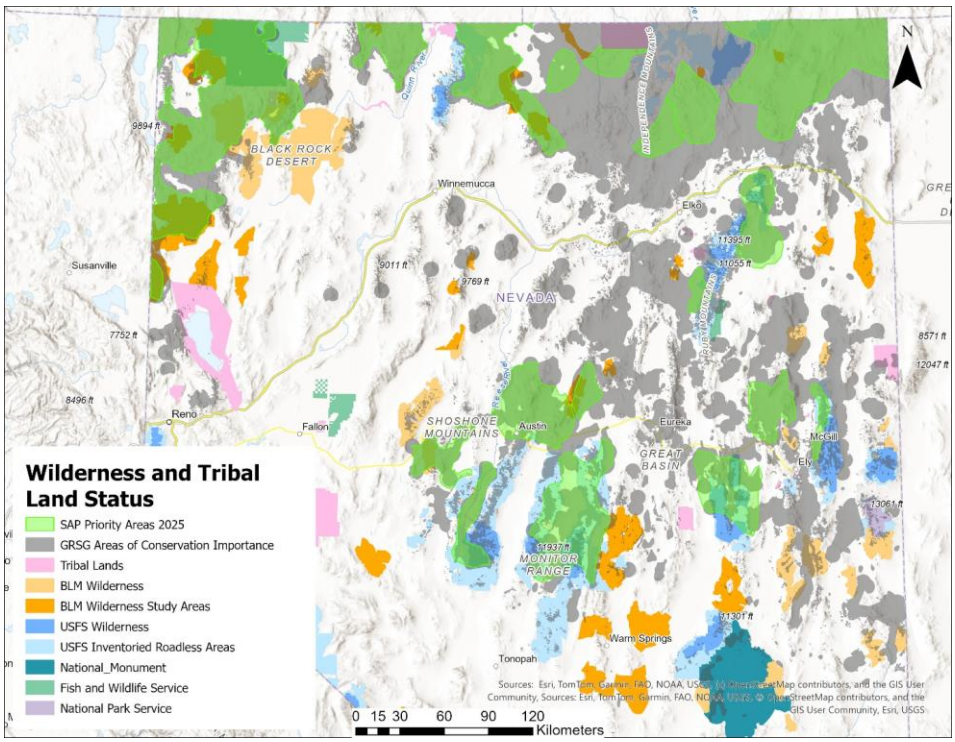

Figure 5. Areas of Conservation Importance, SAP Priority Areas, Wilderness, and Tribal Land Constraints.

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 ~~constraints~~considerations for on-the-ground ~~restoration~~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 ~~collaboration~~coordination with land management agencies to ensure effective and feasible ~~restoration~~ efforts.~~Restoration work may not be as easy to do in Wilderness, Wilderness Study areas, and Tribal Land is not Public Land.~~

RESOURCES

Commented [LE53]: An intro paragraph on how these resources should be used would be helpful.

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.

NAC232.400-480

- 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

Commented [JT54]: Add RCPP and private partner programs like Pheasant's Forever, etc.

Commented [CA55R54]: RCPP added

Commented [CA56R54]: Added Pheasant's Forever and Quail Forever

Commented [SA57R54]: If you are simply identifying additional resources outside the CCS, you could put the Services "Partners Program" here as well. A Partners funded project, however, cannot then be used for the credit side of the CCS for the length of the agreement, which is generally about 10 years.

The successful implementation of a long-term, sustainable conservation strategy will rely on a combination of state and federal grant programs alongside local funding sources to fulfill matching requirements. Utilizing the Nevada Conservation Credit System (CCS) to mitigate anthropogenic disturbances will support restoration efforts, fostering 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 ~~land owner's~~landowner's 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.

Learn more

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.

Learn more

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 GRSG habitat through sustainable land management practices.
Discover more about the Sage Grouse Initiative

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 below are designed to support project planning, prioritization, and treatment implementation at the site scale. These tools assist landowners, resource managers, and conservation professionals in assessing, managing, and restoring sagebrush ecosystems critical to GRSG populations in Nevada. This updated list ensures stakeholders access the most relevant and effective tools for sagebrush ecosystem conservation and GRSG habitat management in Nevada. This is not a list of tools that are used

Commented [JT58]: Please add and emphasize a strong bias to use of Ecological Site Descriptions and their associated State and Transition Models/Disturbance Response Groups. BLM Policy Handbook H-1734 requires BLM (and USFS and NRCS) to use "a standardized system to define and describe rangeland ecological sites" and "[i]mplementation of this policy…will facilitate the stratification of rangeland landscapes according to their ability to respond similarly to ecological stressors" and to use ESDs to "provide land managers the information needed for evaluating suitability of the land for various land-use activities, the capability to respond to various management activities or disturbance processes, and the ability to sustain productivity over the long term." Failure to put use of ESDs and their associated STMs front-and-center sets up GRSG management for subjectiveness while breeding unnecessary conflict and implementing undue and unnecessary land use restrictions. The following references also support the use and application of these tools:

- BOLTZ, S., AND G. PEACOCK. 2002. Ecological sites: understanding the landscape. Rangelands 24:18-21.
- BRISKE, D.D., B.T. BESTELMEYER, T.K. STRINGHAM, AND P.L. SHAVER. 2008. Recommendations for development of resilience based state-and-transition models. Rangeland Ecology & Management 61:359-367.
- SOIL SURVEY DIVISION STAFF. 1993. Soil survey manual. Soil Conservation Service US Department of Agriculture Handbook 18.
- STRINGHAM, T.K., P. NOVAK-ECHENIQUE, P. BLACKBURN, C. COOMBS, D. SNYDER, AND A. WARTGOW. 2015. Final report for USDA ecological site description state-and-transition models, Major Land Resource Area 28A and 28B Nevada. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-01. p. 1524. Available at: http://www.cabnr.unr. edu/resources/MLRA.aspx.
- STRINGHAM, T.K., P. NOVAK-ECHENIQUE, P. BLACKBURN, D. SNYDER, AND A. WARTGOW. 2015. Final report for USDA ecological site description state-and-transition models by disturbance response groups, Major Land Resource Area 25 Nevada. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-02:572. Available at: http://www.cabnr.unr.edu/resources/MLRA.aspx.
- STRINGHAM, T.K., P. NOVAK-ECHENIQUE, D. SNYDER, S. PETERSON AND K. SNYDER. 2016. Disturbance Response Grouping of Ecological Sites Increases Utility of Ecological Sites and State-and-Transition Models for Landscape Planning in the Great Basin. Rangelands 38(6):371-378.

by the CCS's Habitat Quantification Tool (for an exhaustive list of these, see Nevada CCS HQT Methods Document v2.0).

Bureau of Land Management (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~~ 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

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 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.

Commented [JT59]: The HAF has been institutionalized as THE tool for determining objectives and weighing management. The recent U of I study is more recent science showing the HAF, related to grazing and post-grazing grass height, is not valid. Reliance on the HAF is misguided and not the best available science. While the HAF may be useful in helping define **desired** habitat suitability, it does nothing to account for actual, attainable ecological potential and the ability of any ecological site to react to inputs to "transition" to a more desirable state. ESDs and associated STMs are the already developed tool that does what the HAF doesn't – frame ecological site status based on real, ecological potential and ecological realities.

Nevada Connectivity Resources

Nevada Sagebrush Habitat Plan

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

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

Proper Functioning Conditions 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.

Commented [CA60]: Changed from "these PFC handbooks" to "the PFC handbooks. Pointed out by Member Swanson.

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

Sage Grouse Initiative

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

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

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.
https://www.wlfw.org/wildlife/sage-grouse/
https://www.sagegrouseinitiative.com/

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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.

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.

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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.

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Bureau of Land Management. 2025b. Wild Horse and Burro Program. https://www.blm.gov/programs/wild-horse-and-burro.

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Commented [JT61]: Please add the recent study out of U of I related to grazing effects on GRSG. I also request all the references from Working Lands for Wildlife (https://www.wlfw.org/science/published-research/) and specifically Sage Grouse Initiative (https://www.wlfw.org/science/published-research/?wildlife=sage-grouse) that aren't already included to be included. Also, there are very many other sources related to GRSG and sagebrush ecosystem management that should be included but are not. Dr. Swanson did a good job years ago of highlighting which were omitted in BLM's RMPA that should be included.

Commented [CA62R61]: I've added the Working Lands For Wildlife and Sage Grouse Initiative as a link under the Tools section.

Commented [CA63]: Member Swanson : "I see no red citations. "

Commented [CA64R63]: This was due to using Zotero to keep track of the Literature Cited Section, this make it easier to format and update, but unfortunately the changes to citations are not highlighted in track changes.

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.

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