



# 2024 Bi-State Sage-Grouse Action Plan

*Strategy to Conserve the Bi-State Distinct Population Segment  
of the Greater Sage-Grouse*



## EXECUTIVE SUMMARY

The Bi-State sage-grouse distinct population segment (DPS) of the greater sage-grouse (*Centrocercus urophasianus*) has been the center of collaborative conservation efforts for over two decades<sup>1</sup>. The Bi-State partnership involves a multi-jurisdictional group of diverse stakeholders whose work has been guided by a series of Bi-State sage-grouse action plans — released first in 2004, again in 2012, and now, in 2024. The primary goals of the Bi-State action plans are to: 1) maintain and improve sagebrush and associated habitats in the Bi-State area for the greater sage-grouse and other species, and 2) ensure no net loss of greater sage-grouse breeding populations in the Bi-State area.

The prior iteration of the Action Plan, which was released in 2012, provided a roadmap to conserve the sage-grouse and its habitat using a science-based, adaptive management approach. Since then, the actions set forth in that Plan have been continuously implemented in a coordinated effort. Bi-State sage-grouse conservation under the 2012 Action Plan was hugely successful in terms of dollars allocated, completion of actions set forth in the Plan, and the positive impact of those actions on the success of sage-grouse populations in the Bi-State area. Furthermore, USGS analyses suggest that the Bi-State DPS, as a whole, has not exhibited evidence of decrease or increase in population abundance over the last 10-15 years, and population growth has been observed in 2022 and 2023<sup>2</sup>. The majority of actions in the 2012 Plan have now been implemented. Moving forward, the 2024 Bi-State Action Plan will guide the conservation of sage-grouse and their habitat in the Bi-State area.

The development of the 2024 Action Plan relied on information provided by the public, expert opinion from local biologists and technical experts, and the best available science. As with the 2012 Plan, actions in the 2024 Plan are devised to 1) promote a coordinated interagency approach 2) improve regulatory mechanisms, 3) manage habitat and subpopulations based on specific threats, 4) address research and monitoring needs to ensure that management of the Bi-State DPS is science-based and adaptive, and 5) advance communication among Bi-State partners and the public.

Effective and efficient coordination within and among the Bi-State Action Plan signatories is key to successful implementation of the Action Plan. To this end, the 2024 Action Plan focuses on leveraging available staff and funding across jurisdictional boundaries to facilitate the implementation of actions designed to avoid or minimize the loss of sage-grouse habitat in the Bi-State area. Actions in the Action Plan also aim to improve inter-organizational policies to ensure the effectiveness and consistency of discretionary agency actions that may impact the Bi-State DPS and its habitat.

The Bi-State area is ecologically and topographically diverse and the extent to which threats are impacting sage-grouse across the Bi-State vary locally. Therefore, the 2024 Action Plan addresses risks and threats at local scales within the Bi-State area and the actions consider the health of multiple ecosystems and species.

Threats to sage-grouse and their habitat in the Bi-State area addressed in this Action Plan include:

- Wildfire
- Small-scale infrastructure
- Large-scale infrastructure
- Urbanization
- Motorized recreation
- Non-motorized recreation
- Wild horse overpopulation & range expansion
- Predation
- Small populations
- Invasive plant species
- Conifer expansion
- Climate change
- Lack of mesic habitat availability
- Permitted livestock grazing
- Disease & parasites

The implementation of actions set forth in the 2024 Plan will be prioritized based on the extent to which they: 1) protect the core of the Bi-State DPS and its habitat, 2) enhance subpopulations and habitats with the greatest potential for growth and connectivity, and 3) restore smaller, isolated subpopulations and habitats that may see significant improvement if historic habitats are restored.

Actions included in the 2024 Action Plan also address research and monitoring needed to: 1) improve our understanding of risks that lack sufficient data to quantify population level impacts to sage-grouse, 2) quantify the effectiveness of implemented conservation actions, and 3) increase our understanding of sage-grouse biology, demographics and movement.

Finally, the 2024 Action Plan aims to continue strengthening communication and collaboration among Bi-State partners and interested parties through engagement with the Local Area Working Group, Technical Advisory Committee, Bi-State Tribal Natural Resources Committee, and the Executive Oversight Committee.



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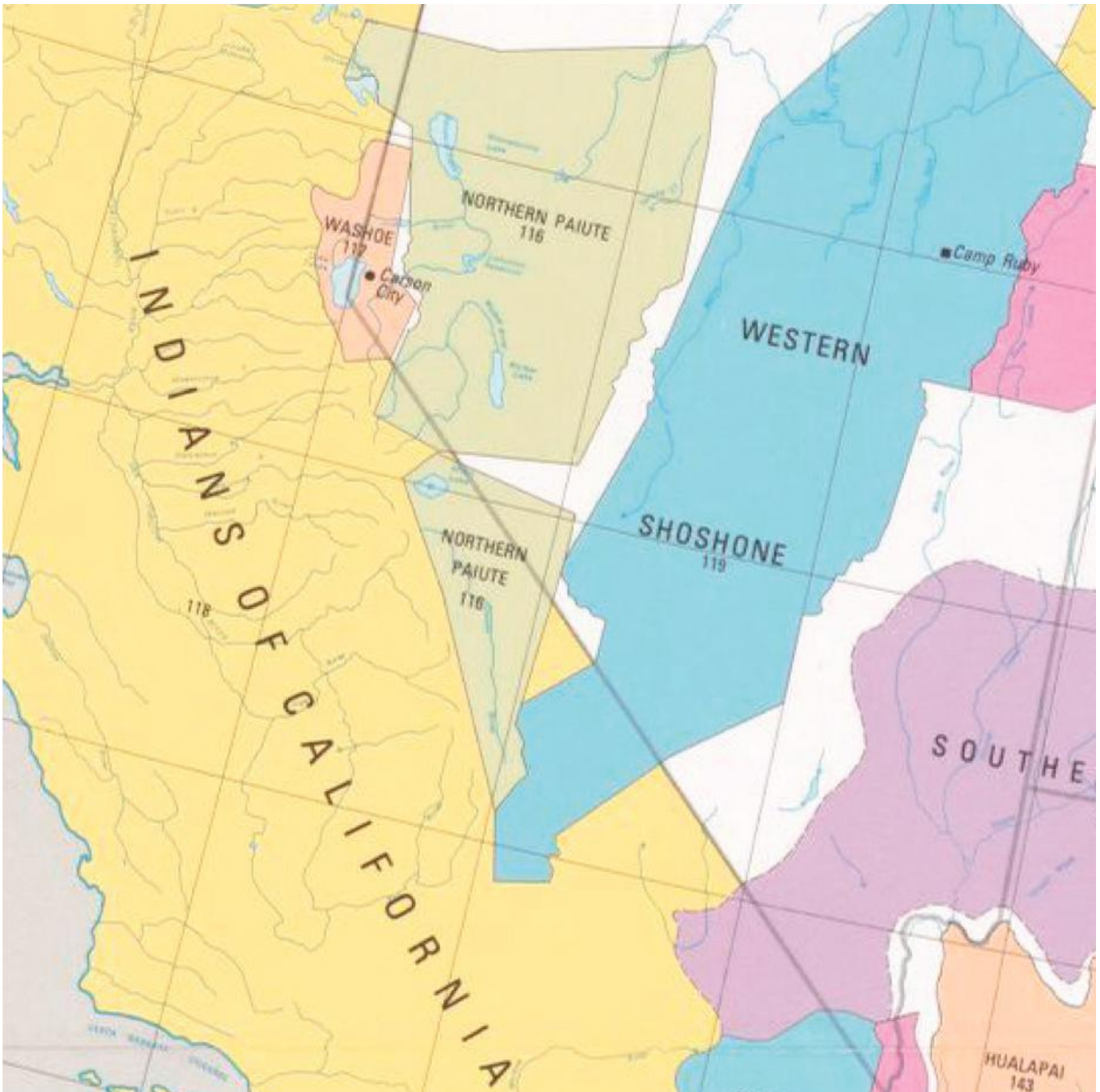
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## LIST OF ACRONYMS

<b>AML</b>	Appropriate Management Level
<b>AMP</b>	Adaptive Management Plan
<b>ARS</b>	Agricultural Research Service
<b>BLM</b>	Bureau of Land Management
<b>BSAP</b>	Bi-State Action Plan
<b>BSSG</b>	Bi-State Sage-Grouse
<b>BTNRC</b>	Bi-State Tribal Natural Resources Committee
<b>CDFW</b>	California Department of Fish and Wildlife
<b>CPT</b>	Conservation Planning Tool
<b>DOD</b>	Department of Defense
<b>DPS</b>	Distinct Population Segment
<b>EOC</b>	Executive Oversight Committee
<b>EPA</b>	Environmental Protection Agency
<b>HMA</b>	Horse Management Area
<b>HPAI</b>	Highly Pathogenic Avian Influenza
<b>HTNF</b>	Humboldt-Toiyabe National Forest
<b>INF</b>	Inyo National Forest
<b>IPM</b>	Integrated Population Model
<b>LADWP</b>	Los Angeles Department of Water and Power
<b>LAWG</b>	Local Area Working Group
<b>NC</b>	Neighborhood Cluster
<b>NDF</b>	Nevada Division of Forestry
<b>NDOT</b>	Nevada Department of Transportation
<b>NDOW</b>	Nevada Department of Wildlife
<b>NGO</b>	Non-Governmental Organization
<b>NRCS</b>	Natural Resources Conservation Service
<b>OHV</b>	Off Highway Vehicle
<b>PMU</b>	Population Management Unit
<b>RMP</b>	Resource Management Plan
<b>TAC</b>	Technical Advisory Committee
<b>TAWS</b>	Targeted Annual Warning System
<b>USFS</b>	United States Forest Service
<b>USFWS</b>	United States Fish and Wildlife Service
<b>USGS</b>	United States Geological Survey
<b>WAFWA</b>	Western Association of Fish and Wildlife Agencies
<b>WH&amp;BT</b>	Wild Horse and Burro Territory
<b>WNV</b>	West Nile Virus



**Figure 1:** Ancestral lands of the Bi-State area (map source: Indian Claims Commission)

## **ANCESTRAL LANDS ACKNOWLEDGEMENT**

The Bi-State area is located in the heart of the Northern Paiute (Numu) territory and includes the Washoe (Wa She Shu) to the west, and the Western Shoshone to the south and east. These Indigenous caretakers have stewarded this land since time immemorial. We acknowledge and pay our respect to these Ancestors long past and continue to embrace the stewards of this land now and for future generations.

# I. INTRODUCTION

## OBJECTIVE

The objective of the Bi-State Action Plan is to create a comprehensive conservation strategy with actionable management recommendations. It provides a framework to conserve the Bi-State distinct population segment (DPS) by addressing administrative needs, regulatory mechanisms, habitat improvement, and monitoring and research. The 2024 Bi-State Action Plan builds on the actions outlined in the 2012 Bi-State Action Plan<sup>3</sup> to: 1) maintain and improve sagebrush and associated habitats in the Bi-State area for the greater sage-grouse and other species, and 2) ensure no net loss of greater sage-grouse breeding populations in the Bi-State area.

## NEED

The Bi-State DPS of the greater sage-grouse is genetically distinct and has likely been geographically isolated from nearby greater sage-grouse populations for thousands of years<sup>4,5,6</sup>. It also differs from other greater sage-grouse populations in its use of the environment and the extent to which ecological factors influence its vital rates<sup>7,8,9</sup>. Furthermore, the Bi-State area is heterogeneous with respect to its ecology, topography, and anthropogenic influences. Sage-grouse subpopulations within the Bi-State area vary in how they interact with and are distributed across the environment<sup>10</sup> as do the type and magnitude of threats to which they are subjected. These differences warrant a conservation management plan that addresses the specific needs of the Bi-State area and the sage-grouse subpopulations within to ensure that actions are appropriate and effective.

## U.S. FISH AND WILDLIFE SERVICE LISTING DECISION CURRENT STATUS

On May 16, 2022, the U.S. District Court for the Northern District of California overturned the U.S. Fish and Wildlife Service’s (USFWS) 2020 withdrawal of a proposed Endangered Species Act listing for the Bi-State DPS. As a result, the 2013 proposed threatened status was reinstated, 1.8 million acres is again considered proposed critical habitat, and the USFWS is expected to issue a new final listing decision in the summer of 2024<sup>11</sup>. A full history of the USFWS listing can be found in *Appendix A*.

## BI-STATE COLLABORATIVE STRUCTURE

The effort to conserve the Bi-State DPS of the greater sage-grouse and its habitat involves a collaborative, multi-jurisdictional group of diverse stakeholders. Partners include the USFWS, U.S. Geological Survey (USGS), U.S. Bureau of Land Management (BLM), U.S. Forest Service (USFS), U.S. Natural Resources Conservation Service (NRCS), Nevada Department of Wildlife (NDOW), California Department of Fish and Wildlife (CDFW), Los Angeles Department of Water and Power (LADWP), state and local governments from California and Nevada, NGOs, Native American Tribes, agricultural producers, land owners, citizens, and all other parties that are interested in or involved in the conservation of the Bi-State DPS. The key components of this multi-tiered conservation partnership include; 1) the Bi-State Local Area Working Group (LAWG), which serves as a foundation of stakeholders engaged in the conservation and management of the Bi-State DPS; 2) the Bi-State Tribal Natural Resources Committee (BTNRC), which facilitates communication among Tribes and land and wildlife management agencies in the Bi-State area; 3) the Technical Advisory Committee (TAC), which provides technical expertise to guide the



science-based, adaptive strategy for conserving the Bi-State DPS; and 4) the Executive Oversight Committee (EOC) which ensures a coordinated interagency approach and the commitment of partners to carrying out conservation actions. Through this partnership the Bi-State DPS has been the focus of sustained collaborative efforts through the implementation of the Bi-State Action Plans<sup>3</sup>.

Detailed information on the structure, roles and responsibilities for each group are as follows:

**A. Bi-State Local Area Working Group**

The Bi-State LAWG includes all parties engaged in the conservation and management of the Bi-State DPS. Participants include, but are not limited to, federal, state, and local government agencies, Native American Tribes, non-profit organizations, ranchers, private landowners, and the public.

- 1. The Bi-State LAWG provides a forum for any interested party to learn about and participate in the conservation and management of the Bi-State DPS.
- 2. LAWG members implement the conservation actions laid out in the Action Plan to benefit the Bi-State DPS, its habitat, and surrounding ecosystems and species.

**B. Bi-State Tribal Natural Resources Committee**

The BTNRC is a Tribally convened and led group composed of official representatives from Tribes in the Bi-State area, individual Tribal members, and representatives of Bi-State land and wildlife management agency units who are ex-officio members.

- 1. The mission of the BTNRC is to promote, protect, and preserve good management of lands in the Bi-State area through advocacy and education using a holistic approach.
- 2. The purpose of the BTNRC is to educate and facilitate communication between Tribes and land and wildlife management agencies.
- 3. BTNRC meetings are not government-to-government consultation and do not replace the need and responsibility of agencies to engage in required and meaningful consultation.

**C. Technical Advisory Committee**

The core of the TAC includes biologists and resource staff from the following signatory agencies: NDOW, CDFW, USFWS, BLM, USFS, NRCS, Mono County and the USGS. Additional technical specialists from other state, Tribal, and local organizations are also invited to participate at the discretion of the core committee members. Invited participants currently include the Eastern Sierra Land Trust, Walker Basin Conservancy, a representative from the Bi-State Tribal Natural Resources Committee that is also part of the Washoe Tribe of California and Nevada’s Environmental Protection Department, a California State Parks representative and the Los Angeles Department of Water and Power. TAC responsibilities include:

- 1. Providing technical expertise and data on the Bi-State DPS and its habitat.
- 2. Identifying and implementing actions necessary for the long-term conservation of the Bi-State DPS and its habitat.

3. Reviewing, updating, and implementing the actions set forth in the Bi-State Action Plan.
4. Providing technical and scientific leadership that encourages and supports collaborative conservation and continued involvement of the LAWG.

**D. Executive Oversight Committee**

The EOC includes agency leadership from NDOW, CDFW, USFWS, BLM, USFS, NRCS, USGS, LADWP, and Mono County, California. The EOC is co-chaired by one state wildlife agency representative and one federal land management agency representative. EOC responsibilities include:

1. Leveraging collective resources.
2. Assembling the best technical talent to direct and prioritize ongoing and future conservation actions.
3. Ensuring consistent regulatory oversight.
4. Achieving long-term conservation of the Bi-State DPS and its habitat.
5. Ensuring a coordinated conservation effort across jurisdictional boundaries.

**SUMMARY OF ACCOMPLISHMENTS 2012 – 2023**

The most recent iteration of the Action Plan was released in 2012 and provided a clear strategy to collaboratively maintain healthy sage-grouse populations and habitat in the Bi-State area. This framework, in combination with the motivation and commitment of Bi-State partners, has resulted in significant quantifiable accomplishments. Since 2012, partners have allocated over \$55 million toward sage-grouse conservation efforts. Through these efforts they have completed approximately 90% of the conservation actions laid out in the 2012 Action Plan. This work has cumulatively improved over 180,000 acres of Bi-State DPS habitat and has benefitted many other species that use these and adjacent habitats. Consistent monitoring of sage-grouse populations across multiple life stages has also provided Bi-State partners with a comprehensive understanding of sage-grouse biology, population dynamics, and conservation need. Since 2012, over 1000 birds have been tracked across all population management units<sup>12,13</sup>.

The USGS has recently completed an analysis of the effectiveness of completed conservation actions on sage-grouse population performance within the Bi-State DPS<sup>2</sup>. Data on sage-grouse habitat quality have been collected and analyzed from over 800 sites to measure the effectiveness of actions including, but not limited to, post-fire restoration, conifer treatment, road closings, fence marking and modification, raven control, and restoration of mesic resources. Recent analysis of these data suggest that apparent abundance of sage-grouse located near areas where conservation efforts have been carried out exhibit stronger growth than areas not located near conservation efforts, resulting in cumulative increases in abundance of 37% since 2012<sup>2</sup>. These results provide clear evidence of effective conservation actions that have been implemented in the 2012 Action Plan. Additionally, these increases have appeared to “lift” the Bi-State population, as a whole, to a neutral trend with evidence of a slight decreasing trend<sup>2</sup> (lacking evidence of substantial decrease or increase), while nearly all other populations range-wide continue to decline substantially, especially in the Great Basin<sup>2,14</sup>. A much more detailed

discussion of work accomplished between 2012 and 2023 can be found in the [Bi-State Sage-Grouse 10-YR Accomplishment Report 2012 – 2021](#)<sup>12</sup> and the [Bi-State Sage-Grouse Accomplishment Report 2022-2023](#)<sup>13</sup>.

The 2012 Bi-State Action Plan also identified the need for science-based tools to inform adaptive management of the Bi-State DPS, guide the implementation of the plan, and quantify conservation efficacy. To this end, the USGS, in partnership with state and federal agencies, and other Bi-State partners, developed a suite of scientific products required to implement the data-driven research, monitoring, and management objectives of the plan. Tools and models that have been developed over the last ten years include: 1) The Conservation Planning Tool (CPT), which provides a quantitative basis for making conservation decisions by ranking areas within each PMU<sup>15,16</sup>. Currently the CPT can be used to identify priority areas for conifer treatment and has the potential to be expanded to evaluate additional conservation actions in the future; 2) The Targeted Annual Warning System (TAWS), which provides a means to determine when critical population thresholds have been reached and management interventions are required to maintain population stability<sup>17</sup>; 3) Integrated Population Models (IPMs), which evaluate population dynamics across nested spatial and temporal scales to estimate population parameters<sup>2,18,19</sup> and; 4) Updated mapping products that integrate patterns of habitat selection with demographic information to identify patterns of space use and demographic performance across seasons and life-stages<sup>2,20</sup>. More detailed descriptions of these science products can be found in *Appendix B*.

**POPULATION MANAGEMENT UNITS AND SUBPOPULATIONS**

The Bi-State DPS occurs over an area approximately 170-miles long and up to 60 miles wide. It includes portions of five counties in western Nevada: Douglas, Lyon, Carson City, Mineral, and Esmeralda; and three counties in eastern California: Alpine, Mono, and Inyo. In 2001, the Nevada Governor’s Sage-Grouse Conservation Team delineated six population management units (PMUs) within the Bi-State area which have since been used to manage and monitor populations<sup>3</sup>.

PMUs are broad areas within which populations, local breeding complexes, leks, and known seasonal habitats are, or historically were, known to occur. While these units serve as management tools for tracking conservation actions and monitoring sage-grouse population performance and distribution, they do not represent sage-grouse range/habitat, nor do they hold legal significance. Therefore, PMU boundaries alone have no influence on local laws, policies or plans for jurisdictions occurring within any given PMU. The Bi-State DPS includes six PMUs (from north to south): Pine Nut, Desert Creek–Fales, Bodie Hills, Mount Grant, South Mono, and White Mountains (Table 1, Fig. 2).

**Table 1.** Total area and land managers for each Bi-State population management unit (PMU).

<b>PMU</b>	<b>Area (acres)</b>	<b>Land Management</b>
Pine Nut	574,373	BLM, USFS, Tribal, private, and state or county
Desert Creek-Fales	567,992	USFS, private, BLM, state, county, and Dept. of Defense
Mount Grant	699,079	USFS, BLM, Department of Defense, private, and Tribal
Bodie Hills	349,630	BLM, USFS, private, state, county, and Tribal
South Mono	579,483	BLM, USFS, private, county, and Tribal
White Mountains	1,753,875	BLM, USFS, and private

More recently, the USGS and partners modeled subpopulations within the Bi-State area, some of which stretch across multiple PMUs (Fig. 3), as part of a range-wide hierarchical modeling approach<sup>21,22,23</sup>. Both subpopulations and PMUs are referenced throughout this Action Plan. Here we provide generalized descriptions of the major geographic and vegetative\* characteristics that define each PMU and the subpopulations that occur within, or in some cases, across them (Fig. 3).

Pine Nut PMU (includes subpopulations A-008, A-009, A-010 and part of A-004)

The Pine Nut PMU includes what are currently modeled to be four subpopulations, the Northern, Central and Southern Pine Nut subpopulations (A-009, A-010, and A-008 respectively), and a portion of the Wellington Hills subpopulation (A-004) (Table 2, Fig. 3). It occupies the northernmost end of the Bi-State, encompassing the Pine Nut Mountains and Buckskin Range in Nevada, and Slinkard Valley in California (Fig. 2). In the Pine Nut PMU, sagebrush ecosystems are generally dominated by a mix of Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and low sagebrush (*Artemisa arbuscula* spp. *arbuscula*). Sagebrush ecosystems here primarily occur at lower elevations and are more arid relative to many other parts of the Bi-State area. More mesic brood rearing habitat is found at the top of the Pine Nut range and large bands of pinyon-juniper woodland occur at mid-elevations. Land to the east and west of the Pine Nut Range (Smith Valley and Carson Valley respectively) have been developed for agriculture.

Desert Creek-Fales PMU (includes subpopulations A-002 and parts of A-003 and A-004)

The Desert Creek-Fales PMU contains what are currently modeled to be three subpopulations. These include the Fales subpopulation (A-002), portions of the Wellington Hills subpopulation (A-004), and portions of the Bodie Complex subpopulation (A-003) (Table 2, Fig. 3). This PMU encompasses the Wellington Hills, Sweetwater Flat, and the Pine Grove Hills in Nevada and the Sweetwater Mountains, Wheeler Flats, and Bircham Flats in California. The East Fork of the Walker River beginning from the Bridgeport Reservoir forms the southern boundary of the PMU (Fig. 2). The portion of the PMU that occupies Nevada is known as Desert Creek and the portion that occupies California is known as Fales.

The sagebrush steppe found in the Fales portion of the PMU is dominated by a mix of mountain sagebrush (*Artemisia tridentata* spp. *vaseyana*) and low sagebrush with narrow bands of mountain mahogany (*Cercocarpus ledifolius*). Big sagebrush also occurs in areas with higher moisture levels. Jeffrey pine (*Pinus jeffreyi*), lodgepole pine (*Pinus contorta*), juniper (*Juniperous* spp.) and pinyon pine (*Pinus monophyla*) are primarily found at higher elevations. Sage-grouse habitat in Fales is relatively mesic due to its proximity to the Sierra Crest.

Most of the sagebrush ecosystems in the Desert Creek portion of the PMU are open sagebrush flats that occur at mid-elevation and include a mix of Wyoming sagebrush and low sagebrush.

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\* Sagebrush ecosystems in the Bi-State area are generally characterized by big sagebrush (*Artemisia tridentata* subspecies), low sagebrush (*Artemisia arbuscula*), and black sagebrush (*Artemisia nova*). Hybridization readily occurs among sagebrush species and subspecies and their distribution is dictated by a unique combination of environmental factors including elevation, soil type, and precipitation. Bitterbrush (*Purshia tridentata*), rabbitbrush (*Ericameria species*), and perennial grasses and forbs are also ecologically important plant taxa that characterize these ecosystems. The descriptions presented here are broad generalizations of the complex plant communities that compose sagebrush ecosystems in the Bi-State.

Sagebrush habitat here is often surrounded by extensive pinyon-juniper woodland which transitions to desert scrub on the eastern edge of the PMU due to a west-to-east aridity gradient.

Mount Grant PMU (Includes part of subpopulation A-003)

The Mount Grant PMU occurs entirely in Nevada and is more arid than many other PMUs in the Bi-State area. It includes the eastern side of the Bodie Complex subpopulation (A-003) (Table 2, Fig. 3). The Mount Grant PMU encompasses the eastern edge of the Bodie Hills, Aurora Crater, Rough Creek, the Excelsior Mountains, and the length of the Wassuk Range including Mount Grant and Powell Mountain in the south and Black Mountain in the north (Fig. 2). Sagebrush ecosystems in the Mount Grant PMU can be found in large open valley bottoms that are dominated by big sagebrush (*Artemisia tridentata* spp. *tridentata*), and mountain tops with sagebrush steppe dominated by Wyoming and mountain sagebrush. Patches of low and black sagebrush can also be found on ridges. The sagebrush steppe in the eastern part of the PMU is characterized by lower foliar cover of sagebrush than most other areas in the Bi-State.

Bodie Hills PMU (Includes the core of subpopulation A-003):

The Bodie Hills PMU includes the core of the modeled subpopulation with the largest abundance of sage-grouse, the Bodie Complex subpopulation (A-003) (Table 2, Fig. 3). This PMU occurs in California and is less arid than other PMUs in the Bi-State due to its elevation and proximity to the Sierra Nevada. It encompasses the Bodie Hills, Bridgeport Valley, the Green Creek area in the eastern Sierra, and the northern side of the Mono Basin (Fig. 2). Most of the sagebrush shrubland in this PMU is found at relatively high-elevations and is dominated by mountain sagebrush mixed with patches of low sagebrush. While bands of pinyon pine are present at mid-elevations, they are not continuous and connectivity among sagebrush habitat in this PMU is generally considered to be good. At lower elevations, on the deep sand of the Mono Basin flats, big sagebrush occurs in stands along with narrow bands of very old juniper woodland and open juniper-shrub savanna. Land in Bridgeport Valley has been converted to irrigated pastureland. The sagebrush steppe in this PMU and the South Mono PMU are characterized by higher foliar cover of sagebrush than most other areas in the Bi-State.

South Mono PMU (Includes subpopulations A-007, A-011, A-005, and A-006)

The South Mono PMU includes three main modeled subpopulations; Parker (A-006), Sagehen (A-005), and Long Valley (A-007) as well as a smaller modeled subpopulation called West Long Valley (A-011) that is separated due to natural and anthropogenic barriers but also maintains some connection with the main Long Valley population, at least in the winter (Table 2, Fig. 3). This PMU includes the landscapes on the south side of the Mono Basin including Parker Meadows on the Sierra slopes, Sagehen Summit and the Granite Mountains, Adobe Valley, the Glass Mountains, Banner Ridge, Long Valley, and parts of Casa Diablo and the Tablelands from the Chidago Canyon area to Blind Springs Hill (Fig. 2). While most of the areas within this PMU occur at mid-elevations, it is relatively mesic due its proximity to a low point in the Sierra Crest.

Sagebrush steppe at Parker Meadows is primarily composed of mountain sagebrush with Jeffrey pine and pinyon pine occurring in surrounding areas of higher elevation. Meadow habitat at Parker Meadows was irrigated until 2001.

The dominant sagebrush species at Sagehen is mountain sagebrush with stands of big sagebrush and mountain mahogany. Pinyon pine can be found on the rocky ridges and alkali habitats to the

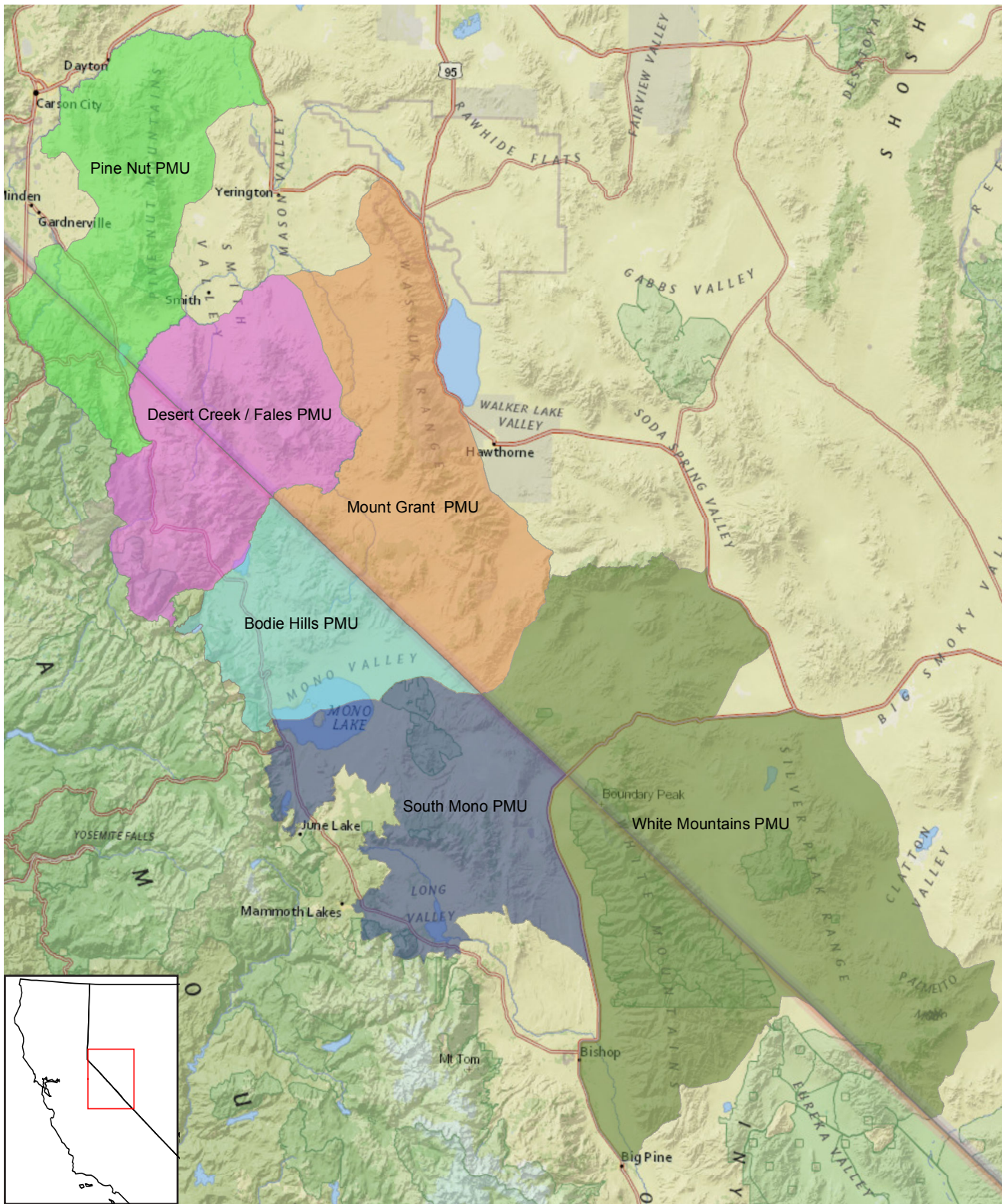
east in Adobe Valley. The southern edge of the Sagehen subpopulation is separated from Long Valley by the Jeffrey pine and lodgepole forests of the Glass Mountains.

Sagebrush habitat in Long Valley is composed of dense shrubland dominated by a combination of mountain sagebrush and low sagebrush. Hybridization among these two species is common, resulting in many individuals that are morphological intermediates. Big sagebrush is also common, especially at the bottom of the alluvial fans on the east side. The sagebrush steppe in the Long Valley portion of this PMU is characterized by higher foliar cover of sagebrush than most other areas in the Bi-State. Long Valley also contains large wet meadows surrounding Crowley Lake that are maintained by supplemental irrigation. Pinyon woodlands can be found on the eastern and southern sides of the flanks of the Glass Mountains and Casa Diablo Flat.

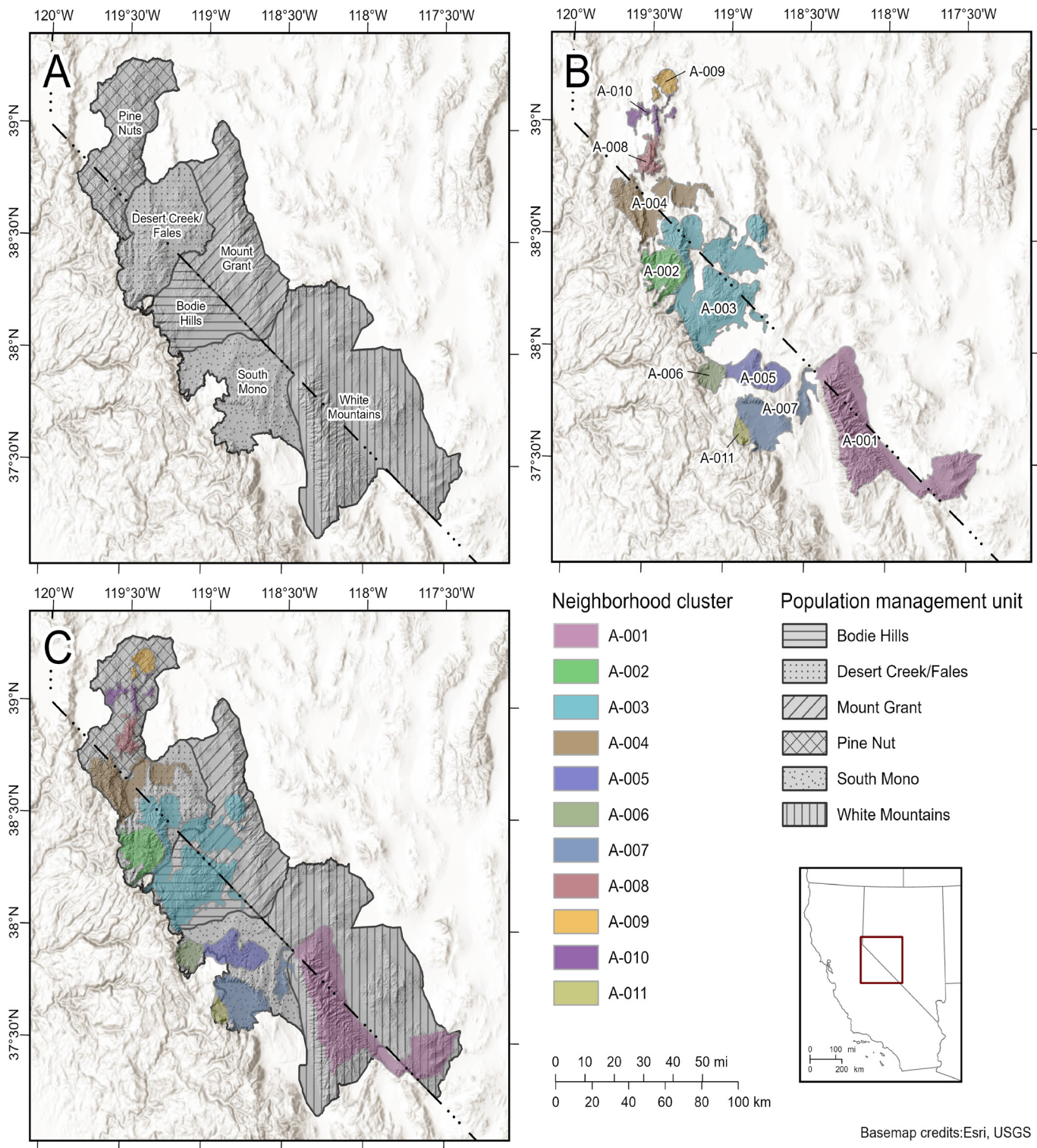
White Mountains PMU (includes subpopulation A-001)

The White Mountains PMU contains one modeled subpopulation (A-001) (Table 2, Fig. 3). It is the southeasternmost PMU in the Bi-State area and is bisected by the border between California and Nevada (Fig. 2). The majority of occupied sage-grouse habitat in this PMU occurs in the White Mountain Range at high-elevations (~ 9,000 – 12,000 ft.). These sagebrush ecosystems are characterized by open expanses dominated by low sagebrush, rothrock sagebrush (*Artemisia rothrockii*), and mountain sagebrush with inclusions of meadows, mountain mahogany and Great Basin subalpine forests of limber pine (*Pinus flexilis*) and bristlecone pine (*Pinus longaeva*). High-elevation sage-grouse habitat is separated from lower elevation Wyoming sagebrush found to the east by a large band of pinyon woodland. Areas within the PMU that are not currently occupied by sage-grouse (but may have been in the past) include the Pizona area and Excelsior range to the north, and the Silver Peak Range and the Palmetto Mountains to the east of Fish Lake Valley. The Pizona and Silver Peak sections of the PMU are primarily characterized by pinyon woodlands with small openings of sagebrush. Irrigated agriculture can be found at the bottom of the Fish Lake and Hammil Valleys on the east and west side of the White Mountains and do not contain sage-grouse habitat.





**Figure 2.** Bi-State population management units.



**Figure 3.** Population management units and subpopulations in the Bi-State area. **(A)** Bi-State PMUs. **(B)** Bi-State subpopulations delineations<sup>2</sup>. **(C)** Bi-State subpopulations overlaid on Bi-State PMUs.



**Table 2.** USGS subpopulation IDs, names, and corresponding PMUs.

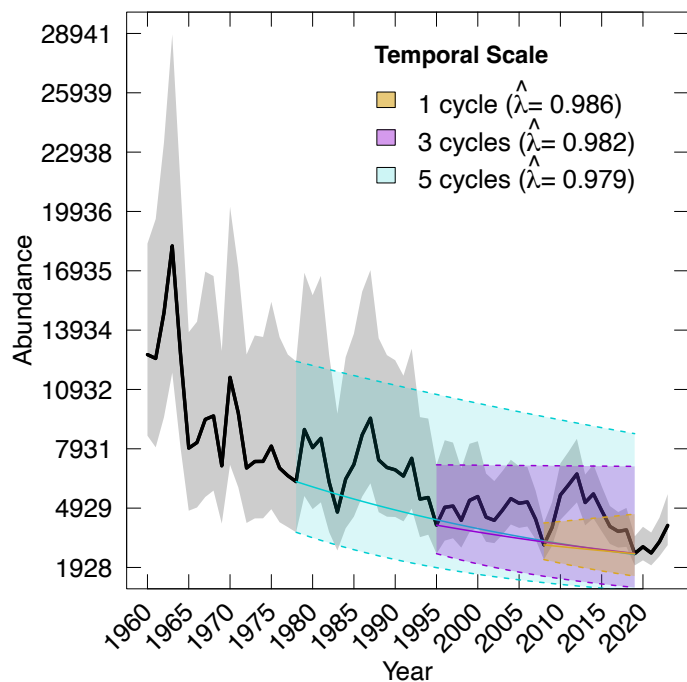
Subpopulation ID	Subpopulation Name	PMU(s)
A-009	Northern Pine Nut	Pine Nut (NV)
A-010	Central Pine Nut	Pine Nut (NV)
A-008	Southern Pine Nut	Pine Nut (NV)
A-004	Wellington Hills	Pine Nut (CA) Desert Creek-Fales (Desert Creek, NV)
A-003	Bodie Complex	Desert Creek-Fales Mount Grant Bodie Hills
A-002	Fales	Desert Creek-Fales (Fales, CA)
A-006	Parker Meadow	South Mono
A-005	Sagehen	South Mono
A-007	Long Valley	South Mono
A-011	West Long Valley	South Mono
A-001	White Mountains	White Mountains

## II. SAGE-GROUSE POPULATION DEMOGRAPHICS

### BI-STATEWIDE POPULATION TRENDS

USGS, in cooperation with the USFWS, BLM, and 11 western state wildlife agencies, have developed range-wide sage-grouse monitoring tools, based on standardized lek count and data management protocols<sup>21,22,23</sup>. These include models of estimated population abundance and rates of change<sup>21</sup>, which included the Bi-State DPS and each of its subpopulations. Within the Bi-State DPS, a separate analysis was conducted using Integrated Population Models, which incorporate lek count and demographic data into a unified framework<sup>19,24</sup> to estimate trend and abundance more precisely<sup>2</sup>.

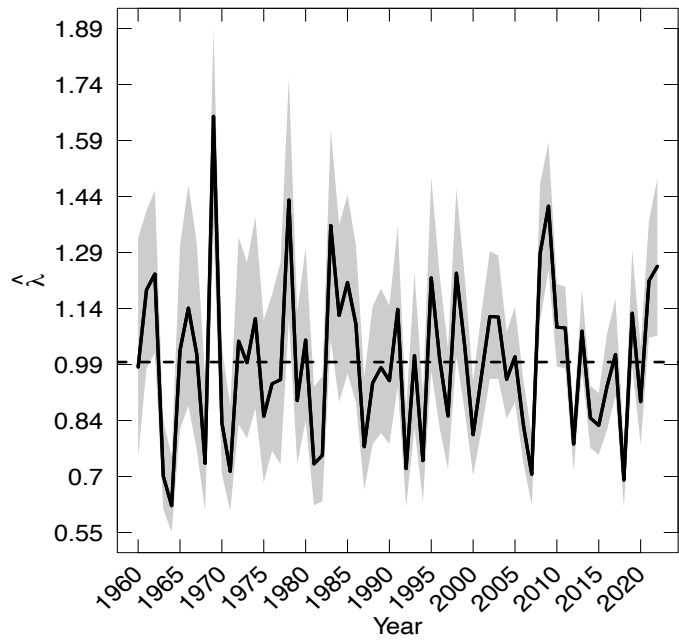
While overall sage-grouse abundance across the Bi-State DPS has declined substantially (by approximately 66 percent) over the last half century<sup>2</sup>. USGS modeling suggests that population declines are decelerating. The decline has slowed considerably, and the DPS has approached



**Figure 4.** Population trends for the full Bi-State DPS from 1960 – 2023. Population cycles are calculated from nadir to nadir. Population trends over long-term (5 population cycles), medium-term (3 population cycles) and short-term (1 population cycle) temporal scales are compared<sup>25</sup>.

a trend of neutrality with some evidence of slight decrease over the last 10-15 years<sup>2</sup> (Fig. 4).

In the most recent years (2022 – 2023) the Bi-State DPS has exhibited population growth<sup>2,25</sup> (Fig. 5), which might be viewed as encouraging. However, population abundance within the Bi-State DPS shows considerable year-to-year variation driven by climatic conditions imposed on top of longer-term population cycles, which has been reported for nearly all populations range-wide<sup>21,24</sup>. Therefore, inferences based on individual years may be misleading and associated with annual variation in climatic conditions (e.g., precipitation). Long-term trends must be assessed across population low points (nadirs), and additional years of data will be necessary to confirm whether recent population growth reflects a long-term increase following the most-recent nadir, in 2019<sup>2</sup>. Even if absolute population sizes continue to increase, USGS analysis suggests that the distributional range of the Bi-State DPS is decreasing with the population contracting into the core<sup>2,26</sup> which may be a cause for concern.



**Figure 5.** Annual rates of population change for the Bi-State DPS from 1960 to 2023<sup>25</sup>.

## SUBPOPULATION PERFORMANCE

Although DPS-wide trends suggest improvement in recent decades compared to longer trends (see *Bi-Statewide Population Trends*), substantial variation in population trends remains among subpopulations (Figs. 6 and 7). Here we present the results of recent term (2008-2019) nadir-to-nadir trends for each subpopulation<sup>2</sup> along with descriptions of how population trends have changed from 2020 – 2022 (Figs. 6 and 7). However, it should be noted that the annual trends reported below should be interpreted cautiously due to the cyclic nature of sage-grouse populations<sup>2, 24, 27</sup>. For more-detailed information on subpopulation performance and trends across multiple population cycles and temporal scales, see *Appendix C*.

### Northern, Central, and Southern Pine Nut and Wellington Hills subpopulations (A-009, A-010, A-008 and A-004)

- Within the Pine Nut PMU, subpopulation A-004 (Wellington Hills) exhibited a positive trend across the most recent population cycle (2008-2019) while subpopulation A-009 (Northern Pine Nut) continued to exhibit a slightly negative trend. Both A-004 and A-009 showed negative annual rates of change in 2021 and 2022 (Figs. 6D, 6H, 7D, and 7H). Recent trend estimates are not available for subpopulations A-008 and A-010 (Southern and Central Pine Nut).

Fales subpopulation (A-002)

- Sage-grouse in subpopulation A-002 (Fales) within the Desert Creek-Fales PMU exhibited a negative trend over the most recent population cycle and positive annual rates of change in both 2021 and 2022 (Figs. 6B and 7B).

Bodie Complex subpopulation (A-003)

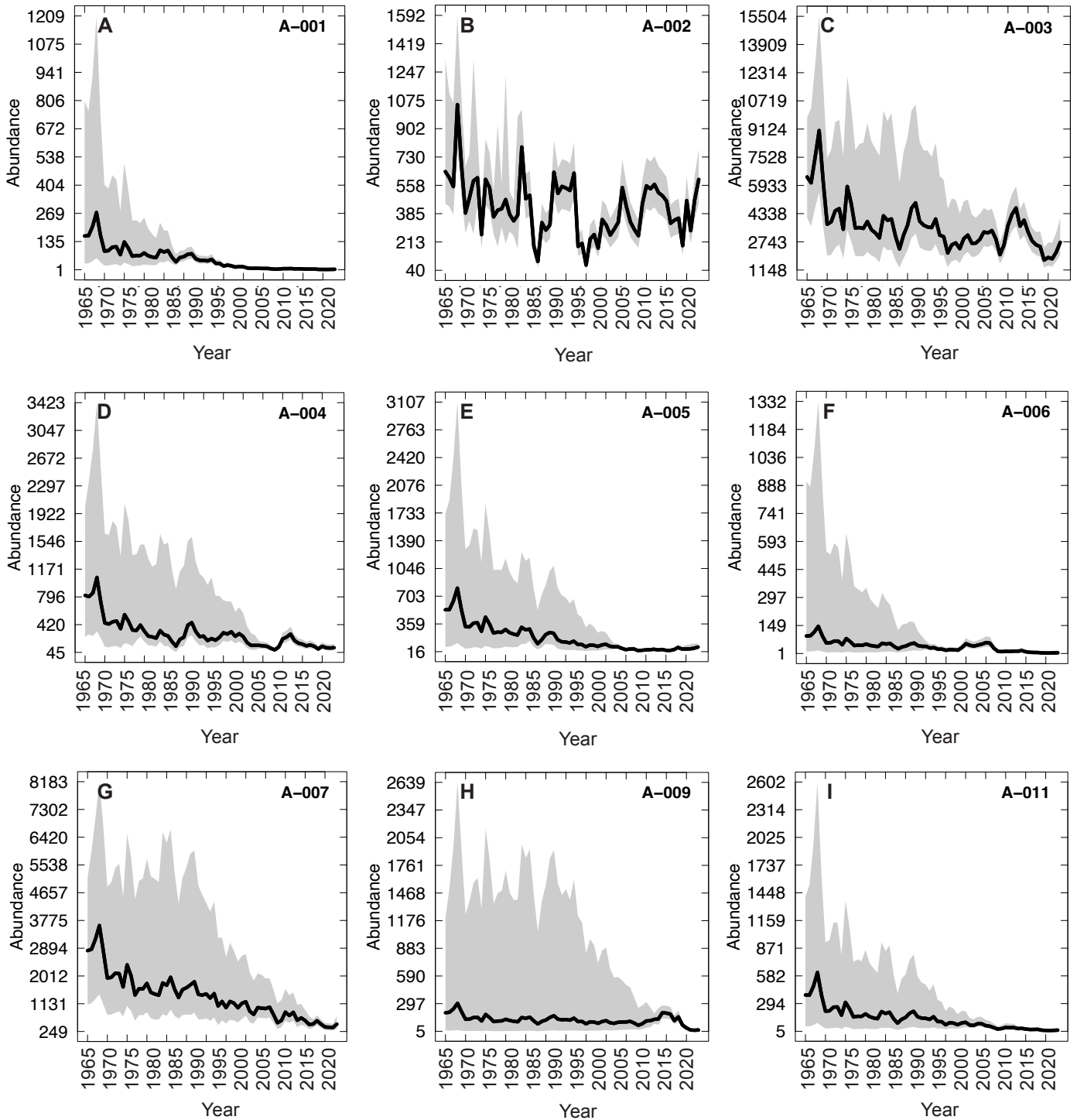
- Sage-grouse in the Bodie Hills and Mount Grant PMUs (subpopulation A-003) exhibited negative trends across the most recent cycle and annual rates of change have been mixed (both positive and negative) in the intervening years (Figs. 6C and 7C).

Long Valley, Parker Meadows and Sagehen subpopulations (A-007, A-006, and A-005)

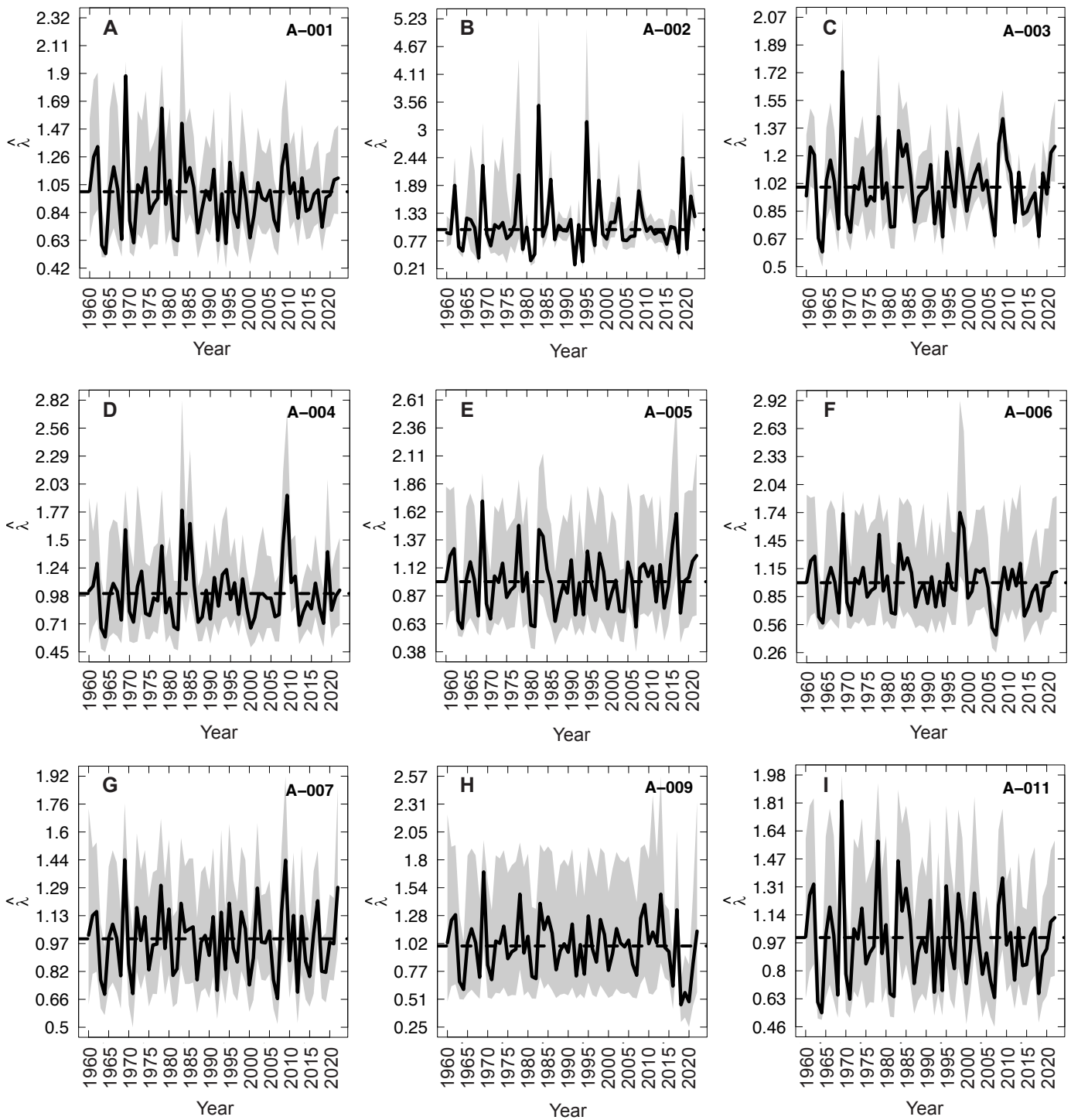
- Within the South Mono PMU, subpopulation A-007 (Long Valley) exhibited a slightly negative population trend across the most recent population cycle and positive annual rates of change in both 2020 and 2021 (Figs. 6G and 7G).
- Subpopulation A-006 (Parker Meadow) exhibited a continued negative trend across the most recent population cycle and negative annual rates of change in both 2020 and 2021, despite being supplemented by individuals translocated from the Bodie Hills (Figs. 6F and 7F).
- Subpopulation A-005 (Sagehen) exhibited a positive population trend across the most recent population cycle, owing to several years of growth from 2010 – 2013, but annual rates of change were negative in 2020 and 2021(Figs. 6E and 7E), and this subpopulation may be nearly extirpated<sup>2</sup>.

White Mountains subpopulation (A-001)

- Sage-grouse in subpopulation A-001 (White Mountain) exhibited a slightly negative population trend across the most recent cycle, which was the highest recorded for the White Mountain PMU. However, annual population rates of change have recently been negative including in 2020 and 2021 (Figs. 6A and 7A). Due to steep terrain and a harsh climate population growth rate projections presented here rely almost entirely on data from a small number of accessible leks in this PMU. However, anecdotal field observations suggest that population sizes may be greater than indicated by the current model. Additional monitoring in the White Mountains is necessary to increase the confidence surrounding these estimates.



**Figure 6.** Annual estimates of population abundance for Bi-State subpopulations<sup>25</sup>. **(A)** A-001 **(B)** A-002 **(C)** A-003 **(D)** A-004 **(E)** A-005 **(F)** A-006 **(G)** A-007 **(H)** A-009 **(I)** A-011



**Figure 7.** Annual estimates of population rates of change for Bi-State subpopulations<sup>25</sup>. (A) A-001 (B) A-002 (C) A-003 (D) A-004 (E) A-005 (F) A-006 (G) A-007 (H) A-009 (I) A-011

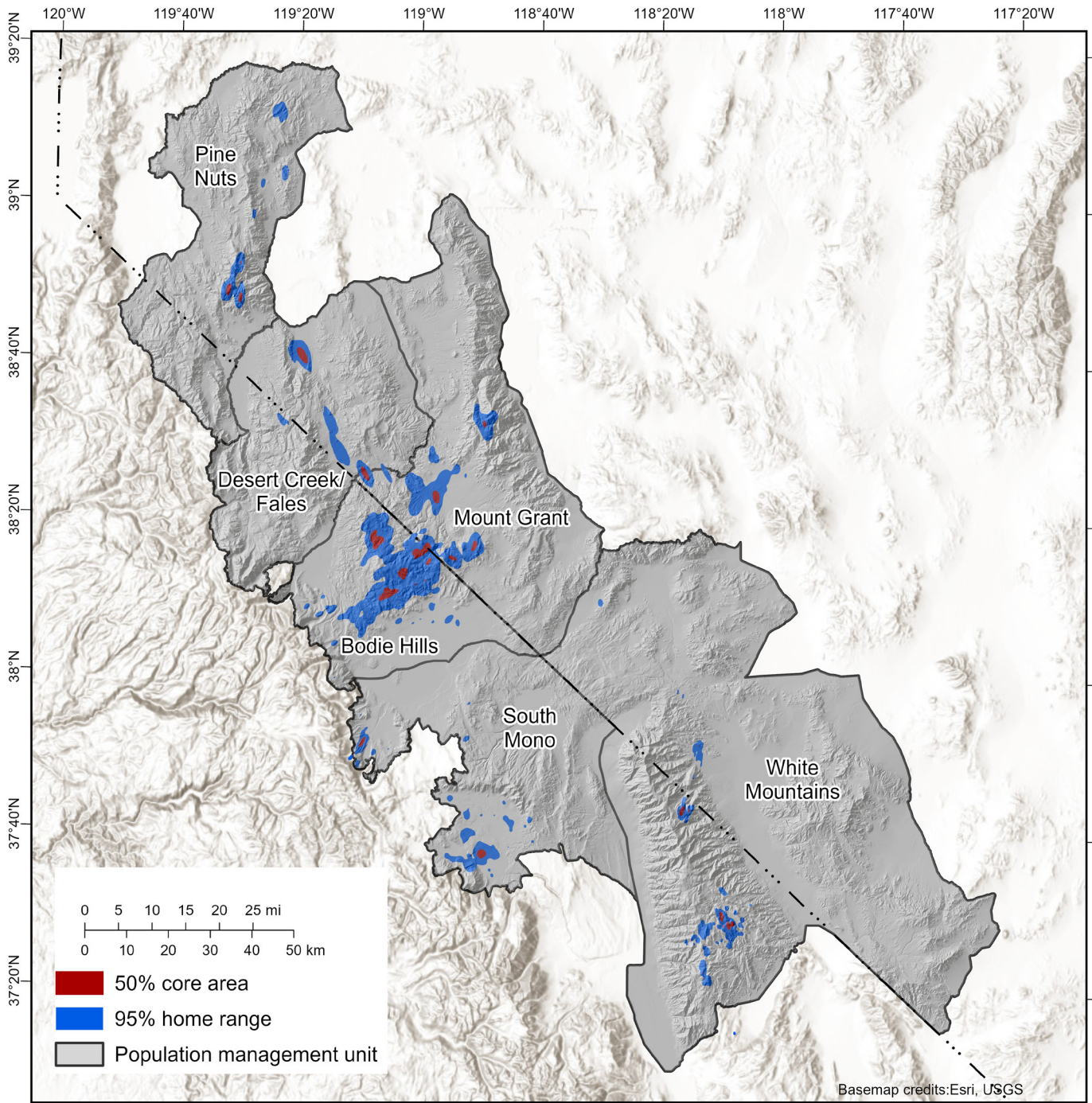
## SPACE USE AND DISTRIBUTION

Overall, the predicted spatial distribution of sage-grouse in the Bi-State DPS has contracted by approximately 156 km<sup>2</sup> since 1995<sup>2</sup>. During that period, the distribution of the Bi-State DPS has shifted among subpopulations with three subpopulations showing expansion in their area occupied and six subpopulations showing contraction. Among subpopulations, the largest contractions were in the South Mono PMU (Long Valley, Sagehen, and Parker Meadows subpopulations) and in the Northern Pine Nut subpopulation. Expanding distributions in the Bodie Hills, Mount Grant, Desert Creek-Fales and the California portion of the Pine Nut PMUs were insufficient to fully offset the losses in the others. Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges for each subpopulation calculated from data collected from 2011 – 2023 from marked birds are displayed in Fig. 8. The number of sage-grouse tracked across all years for each subpopulation are displayed in Table 3.

**Table 3.** Number of sage-grouse tracked in the Bi-State from 2011 to 2023.

Subpopulation	2011 - 2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Bodie Hills	41	14	92	77	47	26	33	35	32	397
Desert Creek	18	31	20	10	-	-	-	-	-	79
Long Valley	32	13	33	26	11	10	29	15	19	188
Mount Grant	48	32	27	18	-	-	29	26	26	206
Pine Nut Mountains	131	-	-	-	-	-	-	-	-	131
Sagehen	16	-	-	-	-	-	-	-	-	16
Parker Meadows	5	-	28	22	21	-	5	-	-	81
White Mountains	2	4	23	50	27	29	22	24	30	217
<b>Total</b>	<b>293</b>	<b>94</b>	<b>223</b>	<b>203</b>	<b>106</b>	<b>65</b>	<b>118</b>	<b>100</b>	<b>107</b>	<b>1,315</b>





**Figure 8.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within each PMU calculated from data collected from 2011 – 2023<sup>25</sup>.

### III. RISKS AND THREAT ASSESSMENT

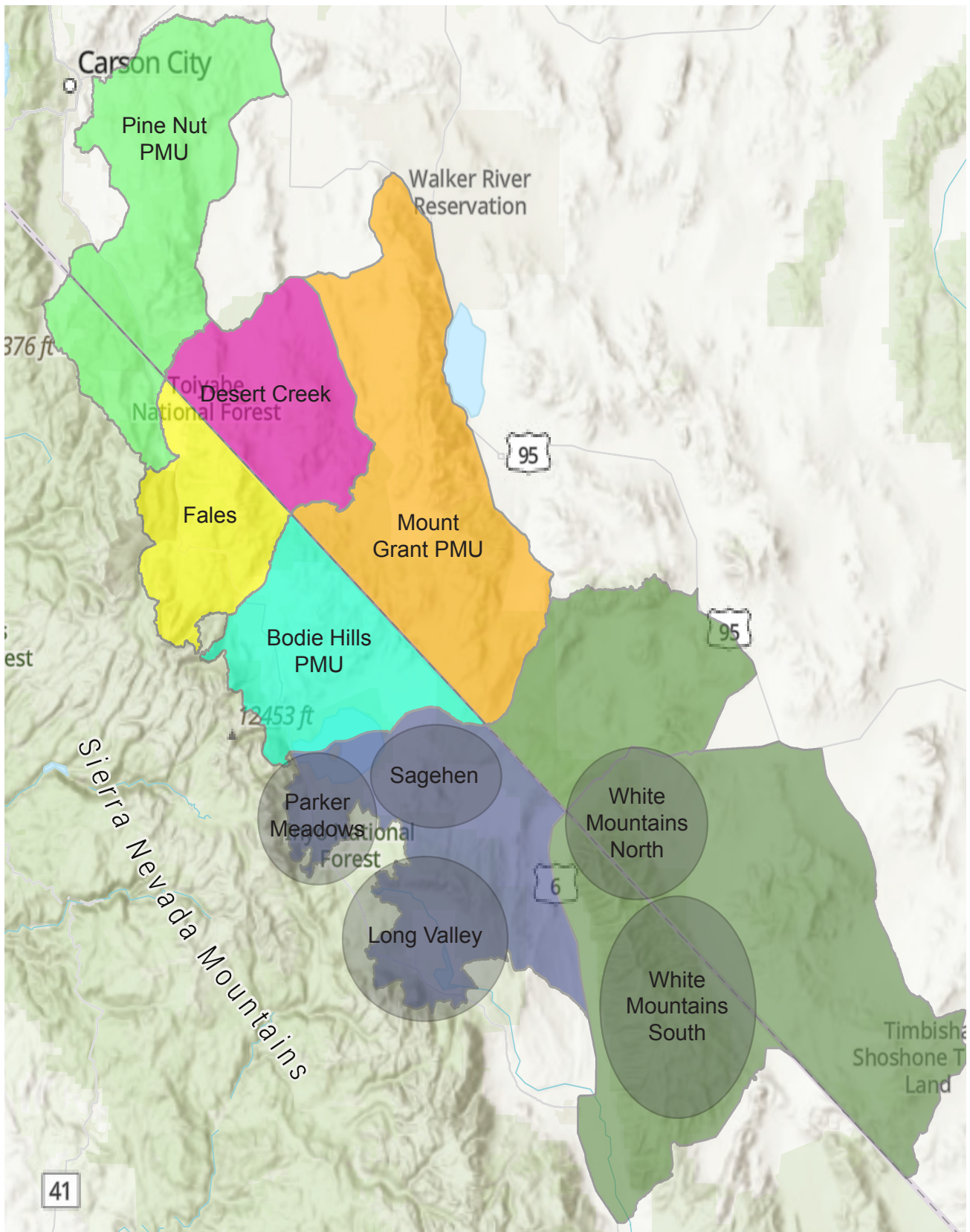
The process used to assess current risks to the Bi-State DPS and its habitats integrated stakeholder input, the best available data, and technical expertise from local wildlife and land management experts. Stakeholder input on observed and perceived risks, relative threat levels, and other conservation and management concerns were gathered over the summer of 2023 (see *Stakeholder Input*). The USGS also conducted quantitative threat assessments for subpopulations and for the entire Bi-State area. The analysis, which is still being refined for publication, considers threat types for which mapping products are available including conifer cover, annual grass cover, cropland cover, cumulative burned area, raven abundance, and land development. Finally, the TAC updated risk categories and relative threat level classifications based on the USGS threat assessment results, stakeholder input, and local technical habitat and wildlife management knowledge. Risk categories were developed for the entire Bi-State area and relative threat level classifications were developed for each PMU and in some cases for subpopulations or geographic areas within each PMU. (Fig. 9, Table 4).

**Table 4.** Bi-State areas for which risks and threat levels were assessed and their associated subpopulations and PMU.

Area	Subpopulation ID	PMU
Pine Nut PMU	A-008, A-009, A-010, portion of A-004	Pine Nut PMU
Desert Creek	Portion of A-004	Desert Creek-Fales (NV)
Fales	A-003, A-002, portion of A-004	Desert Creek-Fales (CA)
Mount Grant PMU	portion of A-003	Mount Grant
Bodie Hills PMU	portion of A-003	Bodie Hills
Long Valley	A-007, A-011	South Mono
Parker Meadow	A-006	South Mono
Sagehen	A-005	South Mono
White Mountains North	A-001	White Mountains
White Mountains South	A-001	White Mountains







**Figure 9.** Bi-State areas for which risks and relative threat levels were established.

## STAKEHOLDER INPUT

Stakeholder input on observed and perceived risks to the Bi-State DPS and its habitats was gathered over the summer and fall of 2023 via a series of meetings devoted exclusively to the update of the Action Plan. Presentations and information gathering was also conducted at partner meetings, through personal communications, targeted interviews, and online surveys. Input and feedback was submitted via the following venues:

- Pine Nuts & Desert Creek-Fales PMUs Meeting
- Mount Grant & Bodie Hills PMUs Meeting
- South Mono PMU Meeting
- White Mountains PMU Meeting
- Full Bi-State Local Area Working Group Meeting
- Bi-State Tribal Natural Resources Committee Meeting
- Three Bi-State TAC Meetings
- Three Bi-State EOC Meetings
- Bi-State Inter-Tribal Meeting (Con vened by the BTNRC and hosted by the Washoe Tribe)
- EPA Regional Tribal Operations Committee, Nevada Workgroup Meeting
- Mono County Collaborative Planning Team Meeting
- Walker Basin Workgroup Meeting
- 27 personal interviews
- Seven online submissions

## IV. RISKS AND THREAT LEVELS

Relative threat levels for each risk varied greatly across the Bi-State area (Table 5). Wildfire was the only risk that was consistently identified as a high threat to sage-grouse across all areas in the Bi-State. Permitted livestock grazing and disease and parasites were the only risks that were consistently identified as a low threat. Climate change, which was identified as a moderate to high threat across the Bi-State, is expected to alter trends as related to precipitation, atmospheric carbon, and temperature. While climate change is impacting and will continue to impact the entire Bi-State, areas with robust mesic resources are expected to be more resilient to climate change and therefore received a moderate threat level. Impacts associated with climate change may interact with, and in some cases amplify, the threat levels for other risks particularly as they pertain to wildfire, invasive species, loss of sagebrush habitat and water availability<sup>28</sup>. Therefore, actions that address issues associated with climate change can be found under *Wildfire*, *Conifer Expansion*, *Mesic Habitat Availability*, and *Invasive Plants Species*.

**Table 5.** Relative threat level for risks identified and assessed for all areas within the Bi-State. For areas within the Bi-State: PN = Pine Nut PMU; DC = Desert Creek area within the Desert Creek-Fales PMU; F= Fales area within the Desert Creek-Fales PMU; MG = Mount Grant PMU; BH = Bodie Hills PMU; LV = Long Valley within the South Mono PMU; PM = Parker Meadows within the South Mono PMU; SH= Sagehen within the South Mono PMU; WMN= the northern portion of the White Mountain PMU; and WMS = the southern portion of the White Mountains PMU. For relative threat levels: L= Low; M= Moderate; H= High, E= Extreme and U=Unknown.

Risk	Relative Threat Level									
	PN	DC	F	MG	BH	LV	PM	SH	WMN	WMS
Wildfire	E	H	H	H	H	H	H	H	M	M
Small-Scale Infrastructure	M	M	L	L	L	M	M	L	L	L
Large-Scale Infrastructure	H	M	L	M	M	M	M	L	L	M
Urbanization	H	H	M	L	L	M	L	L	M	L
Motorized Recreation*	H	M	M	M	M	H	M	L	M	M
Non-Motorized Recreation*	L	L	M	L	L	H	M	L	L	L
Wild Horse Overpopulation and Range Expansion	M	L	L	M	M	M	M	H	H	L
Predation	H	H	M	M	M	H	M	L	L	L
Small Populations	H	M	H	L	L	L	H	H	H	U
Invasive Plant Species	H	M	H	M	M	M	M	M	L	L
Conifer Expansion	M	H	M	M	M	L	L	L	M	M
Climate Change	H	M	M	H	M	M	M	M	H	H
Mesic Habitat Availability	H	M	L	H	M	M	M	M	M	M
Permitted Livestock Grazing	L	L	L	L	L	L	L	L	L	L
Disease and Parasites	L	L	L	L	L	L	L	L	L	L

\* The relative threat levels for recreation are perceived and require additional data to discern the true extent to which they may be negatively impacting Bi-State sage-grouse populations.

## BI-STATE AREA-WIDE RISKS

### Wildfire

Wildfire continues to be one of the greatest risks to sage-grouse and their habitats in the Bi-State area. Habitat risks associated with large, uncontrolled fire include direct loss of important habitats, habitat fragmentation, and the potential for long-term degradation and/or loss of sagebrush habitats<sup>3</sup>. The increased risk of wildfires in sagebrush ecosystems is largely driven by the accumulation of flammable fuel loads. Fuel load increases in the Bi-State area can largely be attributed to the expansion of conifer woodlands, invasion of flammable, non-native weeds, and the suppression of smaller, less severe fires in surrounding woodland habitats that historically reduced fuel build up at regular intervals<sup>29, 30, 31, 32, 33</sup>. In addition to growing larger, fuel loads are also becoming more flammable. Climate projections for the Great Basin predict a shift toward hotter and dryer summer conditions and drought events are expected to become more common<sup>34, 35, 36</sup>. Under these conditions both living and dead vegetation becomes drier and more flammable, increasing the risk of ignitions. Invasion of cheatgrass and other invasive plants is of particular concern in the Bi-State area because they alter post-fire successional dynamics, increasing the likelihood for more frequent type conversion fires in the future<sup>37</sup>. Invasion of intact sagebrush habitats by non-native plant species across the Great Basin, including the Bi-State area, is already altering the fire regime<sup>32, 38</sup>. With cheatgrass and other invasive plant species expanding into the understory of sagebrush ecosystems, the probability of ignition and fire growth increases, resulting in more and larger scale fires. In the decade from 2010 to 2020, 73,791 acres of sage-grouse habitat burned in the Bi-State area, a 70% increase in sage-grouse habitat burned from 2000 to 2010 and a 560% increase from the area burned from 1990 to 2000. These current trends are in line with climate and wildfire projections which predict that increases in the frequency and size of wildfire in the Bi-State will continue in the next decade. Acres of sage-grouse habitat burned within each PMU can be found in Table 6.

**Table 6.** Acres of sage-grouse habitat burned by decade for each PMU.

PMU	Acres of Sage-Grouse Habitat Burned		
	1990 to 2000	2000 to 2010	2010 to 2020
Pine Nuts	9,236	26,047	36,252
Desert Creek-Fales (Desert Creek)	0	1,562	261
Desert Creek-Fales (Fales)	984	11,453	8,178
Mount Grant	44	0	9738
Bodie Hills	69	853	5798
South Mono	600	2984	13564
White Mountains	150	390	0
TOTAL	11,083	43,289	73,791

### Infrastructure

Infrastructure is broken down into three separate subcategories: small-scale infrastructure, large-scale infrastructure, and urbanization. It is important to note that while infrastructure has been categorized as either small or large, size is a continuous variable and is likely to be positively correlated with the magnitude of disturbance to sage-grouse and their habitat. Thus, the size of individual structures and their associated disturbance should be accounted for when considering

the relative threat of different infrastructure projects within these two categories.

Small-scale infrastructure includes structures such as non-highway roads, utility poles, distribution lines (<33kV), fences, signs and mineral exploration. Installation of small-scale infrastructure in sagebrush ecosystems results in a direct loss of sage-grouse habitat and fragments existing habitat. Distribution lines, utility poles, fences, and signs provide perches and nesting sites for avian predators<sup>31, 39, 40, 41, 42, 43</sup> and sage-grouse may instinctively avoid tall objects regardless of raptor activity<sup>44</sup>. Unmarked fences are also a collision hazard for sage-grouse, particularly when they occur near or adjacent to leks<sup>45</sup>. Roads lead to sage-grouse mortality due to vehicle strikes and fragment large and connected sagebrush expanses. They can also facilitate the invasion of non-native plant species, increase human use, and facilitate human incursion into previously unvisited areas. Roads can also lead to increases in local predator populations that may use them as corridors or be attracted to and subsidized by roadkill<sup>40, 46, 47, 48, 49</sup>. Electrical utility lines can increase wildfire risk and required maintenance means that disturbance is likely to occur repeatedly over time.

Large-scale infrastructure includes structures with large footprints. Much of this infrastructure is associated with industrial scale resource extraction such as solar and wind farms, geothermal facilities and full scale mining operations. It also includes transmission lines (>33kV), state and federal highways, and landfills. Installation of large-scale infrastructure in sagebrush ecosystems results in a direct loss of sage-grouse habitat and fragments existing habitat. Light and noise associated with industrial operations can lead to disturbance, behavioral avoidance and reductions in habitat use<sup>50</sup>. Increased human use and development of supporting small-scale infrastructure such as roads and powerlines also typically accompany large-scale infrastructure projects. This results in additional negative impacts including habitat degradation, introduction of invasive plant species, disturbance of sage-grouse and increased predation pressure (see previous paragraph). Large-scale infrastructure such as transmission lines typically require continual maintenance over time and eventual replacement. As a result, large-scale projects can negatively impact sage-grouse and their habitats repeatedly over long periods of time.

As with large- and small-scale infrastructure, urbanization can result in permanent direct loss of habitat and habitat fragmentation. Urbanization is also associated with the installation of small-scale infrastructure, increased human activity, and the introduction and spread of invasive plant species and predators (e.g. pets and ravens), all of which can have direct and indirect negative impacts on sage-grouse and their habitats<sup>51</sup>.

### Wild Horse Overpopulation and Range Expansion

There are several wild horse management areas and territories within the Bi-State area (Table 7). Wild horse overpopulation and expansion outside of designated territories and herd management areas pose a threat to sage-grouse in the Bi-State area. Numerous wild horse populations in the Bi-State are above their established Appropriate Management Levels (AML) and have expanded their range outside of their designated Wild Horse and Burro Territories (WH&BT) and Herd Management Areas (HMA). High densities of wild horses contribute to the degradation of sagebrush ecosystems, brood-rearing and summer habitat, and mesic resources such as springs and streams<sup>52</sup>. Additional detrimental impacts include soil compaction, spread of invasives, and direct disturbance of lekking activity<sup>53</sup>.

**Table 7.** Herd Management Areas and Wild Horse and Burro Territories within the Bi-State area.

HMA / WH&BT	PMU	Managing Agency
Pine Nut Mountains HMA	Pine Nut	Carson BLM
Wassuk HMA	Mount Grant	Carson BLM
Montgomery Pass WH&BT	South Mono and White Mountains	INF
Powell Mountain WH&BT	Mount Grant	HTNF
White Mountain WH&BT	White Mountains	INF
Marietta Burro Range	White Mountains	Carson BLM
Fish Lake Valley HMA	White Mountains	Tonopah BLM
Piper Mountain HMA	White Mountains	Ridgecrest BLM

Predation

Predation poses a risk to sage-grouse in locations where anthropogenic subsidies have led to greater predator abundances than could naturally be sustained on the landscape. In this situation, predator-prey relationships can become unbalanced leading to greater predation pressure than would be present in the absence of subsidies<sup>54</sup>. While there are many generalist predators of sage-grouse, in the Bi-State this dynamic has been observed primarily with respect to the common raven (*Corvus corax*). Ravens are known predators of both sage-grouse nests and fledglings; and human-subsidized increases in raven populations above a density of 0.4 ravens per km<sup>2</sup> have been demonstrated to reduce sage-grouse nest success in the Bi-State<sup>55</sup>. Increases in raven populations in response to human subsidies have been linked to higher road densities, agricultural areas, and rest stops<sup>40</sup>. The presence of large- and small-scale infrastructure also increases raven predation by providing ravens with perches and nesting structures<sup>40,56</sup> (see *Infrastructure* for further discussion). Increases in predator pressure is likely to be especially detrimental when sage-grouse populations are already small<sup>57</sup>. In addition to ravens, Bi-State LAWG members have voiced concern about other predators that may be impacting sage-grouse populations. However, while generalist predators such as coyotes, bobcats, raptors, bears, and others are sage-grouse predators, there are currently no data suggesting that the predator-prey relationships for these species have become unbalanced with respect to sage-grouse in the Bi-State area.

Small Populations

The threat of negative impacts to sage-grouse due to small population sizes is greatest in the northern and southern most portions of the Bi-State area. Small populations are inherently at higher risk of extirpation due to predation, disease, natural environmental stressors, stochastic events, and natural population fluctuations. Small populations are also more likely to suffer from negative effects associated with low genetic diversity and inbreeding depression<sup>58</sup>.

Conifer Expansion

The threat level for conifer expansion varies across the Bi-State area. Expansion of conifers, which include single-leaf pinyon pine, juniper, Jeffrey pine and other conifer species, into sagebrush and mesic habitats threaten sage-grouse in a variety of ways. Conifer expansion reduces available nesting habitat, decreases habitat connectivity, provides perches for predators, increases behavioral avoidance, reduces the availability and quality of mesic habitats, and increases fuel

loads<sup>29, 30, 31, 33</sup>. The expansion of conifers into adjacent non-woodland habitats is a complex threat that requires a thoughtful management approach to avoid inadvertent harm to other resources and values in the Bi-State area. Pinyon woodlands, pinyon-juniper woodlands, and open juniper ridges and savannahs are native plant communities that provide important habitat for many animal species including the pinyon jay (*Gymnorhinus cyanocephalus*), which is also currently under consideration for listing by the USFWS<sup>59</sup>. Pinyon pine and juniper are also culturally important resources for Native American Tribes who have utilized pine nuts as a food source and juniper products for tools and medicinal purposes for thousands of years. Collectively, Bi-State Tribes have voiced deep concern over the removal of pinyon and juniper as the primary tool to improve sage-grouse habitat.

### Mesic Habitat Availability

Loss and/or degradation of water resources and wet meadows is a risk to sage-grouse in the Bi-State area. Mesic habitats are an especially important component of pre-laying, brood rearing, and summer habitat for sage-grouse because both hens and chicks rely on forbs and insects to meet their increased nutritional requirements. Several threats listed in this Action Plan are directly linked to the loss or degradation of water resources. For example, drought, reduced snowpack, and higher temperatures due to climate change are expected to negatively impact mesic resources in the Bi-State area. Overuse by horses and livestock can degrade existing water sources, conifer expansion into mesic areas reduces stream flow and depletes soil water availability, and water diversion by humans can cause channeling in meadow ecosystems.

### Invasive Plant Species

Invasive plants pose a moderate risk to sage-grouse throughout much of the Bi-State area. Invasion by non-native plants have direct negative impacts on sagebrush ecosystems. These include reducing native plant biodiversity and altering ecosystem function, productivity, nutrient cycling, and hydrology<sup>60</sup>. Cheatgrass is of particular concern because it modifies the fire regime in sagebrush and other upland plant communities leading to more frequent and larger fires<sup>37</sup>. The association between wildfire and cheatgrass invasion has been particularly well documented in the Wyoming sagebrush ecosystems found across much of the Great Basin and the Colorado Plateau<sup>61, 62, 63</sup>. However, data suggest that this connection is more nuanced in some parts of the Bi-State area where poor soils limit the ability of cheatgrass to successfully invade, and, at higher elevations, cold temperatures and higher moisture availability favor the success of perennial grasses. Vulnerable sites post-fire tend to be constrained to south-facing slopes, roadsides, and other areas with disturbed soils (M. Slatton per communication, unpublished data). As a result, threat levels associated with the risk of invasive plant species in some parts of the Bi-State area may not directly match the threat level associated with wildfire — particularly in areas that have already exhibited post-fire resilience. Additional invasive plants of concern in the Bi-State area include, medusahead rye (*Taeniatherum caput-medusae*), Russian thistle (*Salsola tragus*) and pepperweed (*Lepidium* spp.). Except for cheatgrass, most invasives are not consistently abundant across the entire Bi-State area. However, this threat could easily increase in the future.

### Recreation

Limited data and anecdotal evidence suggest that recreational use in the Bi-State area has increased over the last decade and may pose a growing risk to sage-grouse. However, the extent to which it has increased, where it has increased, and the degree to which it may be negatively impacting sage-grouse populations has not been empirically evaluated. Therefore, the relative threat levels for recreation presented in this Action Plan represent the threat levels that are

perceived by local biologists and technical experts. Research aimed at better understanding if, when, and where recreation activities negatively impact sage-grouse represents a priority area for investigation. Recreation is broken down into two subcategories - motorized and non-motorized. Motorized recreation, which includes off highway vehicles (OHVs), over snow vehicles, and car traffic, is thought to indirectly impact grouse through disturbance (noise or otherwise) and may lead to behavioral avoidance and reduced habitat use, particularly during lekking season<sup>64</sup>. Motorized recreation can also lead to direct mortality when vehicle strikes occur<sup>45</sup>. Non-motorized recreation, which includes activities such as backcountry skiing and snowboarding, hunting and fishing, hiking, mountain biking, lek viewing and camping may destroy habitat and/or disturb grouse leading to behavioral avoidance and reduced habitat use<sup>65</sup>. Walking with dogs off-leash can also pose a threat to sage-grouse if they flush or kill the birds and human activity has been associated with increased corvid predation on nests<sup>55</sup>.

### Permitted Livestock Grazing

Permitted livestock grazing is classified as a low-level threat across the entire Bi-State area. While light-to-moderate levels of well-managed grazing are unlikely to pose a measurable risk to sage-grouse or their habitats, overgrazing or poorly managed grazing may negatively impact grouse habitat quality. Negative impacts occur if livestock grazing reduces the height and availability of shrubs and grasses which provide cover for protection from predators, particularly during the nesting season. Concentrated livestock use can also lead to reduced soil stability, accelerated erosion, and degradation of stream channels<sup>42, 66</sup>. Poorly designed and placed small-scale infrastructure associated with grazing may also negatively impact sage-grouse and their habitats. For example, poorly designed and located fences are well-documented as strike hazards for sage-grouse and may serve as predator perches<sup>45</sup>. These threats are discussed in more detail under *Predation and Small-Scale Infrastructure*.

### Disease & Parasites

Disease and parasites are currently considered a low risk within the Bi-State area but should continue to be monitored. While USGS research technicians have noted field observations of high parasite loads in deceased birds, the extent to which parasites may be impacting success at the population level is unclear. Impacts from West Nile Virus (WNV) and Highly Pathogenic Avian Influenza (HPAI) also remain low at this time but could become a greater threat if climatic variation leads to changes in vector distribution. Currently, studies on greater sage-grouse from outside of the Bi-State area suggest that local outbreaks of WNV alone are unlikely to have significant population level impacts<sup>67</sup>. However, a more widespread outbreak could pose a greater threat. West Nile Virus has not been detected in Bi-State sage-grouse in the last decade. In 2022, HPAI was detected in one greater sage-grouse individual found northeast of the Bi-State region in Pershing County, NV. While no positive cases in sage-grouse have been detected since, monitoring should continue, particularly in high precipitation years when abundant surface water may increase the probability that sage-grouse will encounter waterfowl carrying the virus.

### Hunting

Hunting of the Bi-State sage-grouse is currently prohibited in both California and Nevada and therefore does not pose a threat.



**Pine Nut PMU Risks And Relative Threat Levels**  
 Subpopulations A-008, A-009, A-010 and a portion of A-004

Risks and actions for the Pine Nut PMU were developed considering all subpopulations/portions of subpopulations in the Pine Nut PMU together (Table 8, Fig. 9).

**Table 8.** Risks and relative threat levels: Pine Nut PMU

<b>Risk</b>	<b>Relative Threat Level</b>
Wildfire	Extreme
Small-Scale Infrastructure	Moderate
Large-Scale Infrastructure	High
Urbanization	High
Motorized Recreation	High
Non-Motorized Recreation	Low
Wild Horse Overpopulation and Range Expansion	Moderate
Predation	High
Small Populations	High
Invasive Plant Species	High
Conifer Expansion	Moderate
Climate Change	High
Mesic Habitat Availability	High
Permitted Livestock Grazing	Low
Disease and Parasites	Low

The Bi-State sage-grouse subpopulations in the Pine Nut PMU have declined precipitously over the last decade and their small population sizes make them extremely susceptible to extirpation due to indirect and direct impacts associated with both anthropogenic threats and natural stochastic events.

Wildfire is considered an extreme risk in the Pine Nut PMU. From 2010 to 2020 approximately 50% of all sagebrush habitat that burned in the Bi-State burned in this PMU (Table 6). Wildfire and other large-scale disturbances facilitate invasion by cheatgrass and this successional dynamic has taken place across large portions of the Pine Nut PMU. Cheatgrass establishment, coupled with dry conditions and the high likelihood of lightning ignitions, has significantly increased the risk of large fires in sagebrush ecosystems across the Pine Nut PMU.

Expansion of conifers into sagebrush ecosystems continues to pose a risk to sage-grouse in the Pine Nut PMU. However, given the large amount of conifer treatments that have taken place over the last decade (~ 22,000 acres), along with widespread pinyon and juniper mortality due to climate change, fire, and pests and disease, conifer expansion is currently considered a moderate

threat. Pinyon pine is also an important cultural resource for Bi-State Tribes and participants in the Bi-State Inter-Tribal Meeting felt strongly that large-scale loss of pinyon-juniper woodlands in the Pine Nut PMU over the last decade has acutely and adversely impacted local Tribes.

The risk posed to the Bi-State sage-grouse from large-scale infrastructure is high in the Pine Nut PMU. The risk from small-scale infrastructure that often accompanies the development of large-scale infrastructure is moderate. The potential for large-scale renewable energy development in the Pine Nut Mountains is high. The proposed Greenlink West Transmission Line includes 525 kV, 345 kV, 230 kV, and 120 kV electric transmission facilities that would stretch between Las Vegas and Yerington, NV, traversing a total of approximately 350 miles and cutting through sage-grouse habitat in the Pine Nut PMU. An application to reauthorize a wind energy testing project area right-of-way within the Pine Nut PMU by Carson BLM is currently prohibited but should continue to be tracked in the event that there is pressure to amend the Resource Management Plan (RMP). If this project were to proceed, the proposed project area would cover approximately 4,000 acres and would likely interrupt movement corridors between brood rearing habitat in the south Pine Nuts and the Mill Canyon Lek in the north Pine Nuts. In addition to direct loss of sage-grouse habitat and reduced habitat connectivity through the installation of large-scale structures, both projects would require the development of associated small-scale infrastructure which would likely contribute to additional habitat loss/modification, vehicle traffic, human disturbance, potential for vehicle strikes, introduction/expansion of invasive species, and an increase in avian predators.

Suburban and exurban development is ongoing and thus poses a high risk to sage-grouse in the Pine Nut PMU. In addition to direct habitat loss and reduced habitat connectivity, urbanization will likely contribute to several other risks. New small-scale infrastructure such as roads, and powerlines are likely to accompany urban development. Growing human populations are also associated with the introduction/expansion of invasive species, increases in avian predators due to food subsidies, increased potential for wildfire due to human starts, and increased recreation on the land. Recreational OHV use is perceived to be a growing risk in the Pine Nut PMU and motorized recreation has been ranked as a high threat.

Increases in raven predation are directly linked to human development and likely pose the greatest risk of direct mortality to sage-grouse. While raven surveys have not been conducted in the Pine Nut PMU recently, spatial modeling<sup>68</sup> predicts a raven density of 0.51 ravens/km<sup>2</sup> for this PMU. Raven surveys are necessary to validate this prediction however, factors that drive direct mortality are likely to pose a significant risk for the long-term conservation of sage-grouse in this PMU due to small population sizes.

Overpopulation and expansion of the Pine Nut wild horse herd outside of its HMA currently poses a moderate risk. While recent horse gathers conducted in 2019 have brought the herd down to AML, wet meadows used as brood rearing habitat by grouse experienced significant degradation from horses and need remediation. Degradation of mesic resources by horses in the Pine Nut PMU is further exacerbated by drought caused by climate change and conifer expansion into mesic areas.

## Desert Creek-Fales PMU Risks and Relative Threat Levels

Portions of subpopulations A-004 and A-003

The Desert Creek-Fales PMU threats and relative threat levels were assessed for the Desert Creek portion of the PMU (Nevada) and Fales portion of the PMU (California) individually (Table 9, Fig. 9). The Desert Creek portion of the PMU boundary includes portions of subpopulations A-004 and A-003. The Fales portion of the PMU includes subpopulation A-002 and a portion of A-003.

**Table 9.** Risks and relative threat levels for Desert Creek and Fales in the Desert Creek-Fales PMU.

Risk	Relative Threat Level	
	Desert Creek	Fales
Wildfire	High	High
Small-Scale Infrastructure	Moderate	Low
Large-Scale Infrastructure	Moderate	Low
Urbanization	High	Moderate
Motorized Recreation	Moderate	Moderate
Non-Motorized Recreation	Low	Moderate
Wild Horse Overpopulation and Range Expansion	Low	Low
Predation	High	Moderate
Small Populations	Moderate	High
Invasive Plant Species	Moderate	High
Conifer Expansion	High	Moderate
Climate Change	Moderate	Moderate
Mesic Habitat Availability	Moderate	Low
Permitted Livestock Grazing	Low	Low
Disease and Parasites	Low	Low

The risk to sage-grouse due to small population sizes is high in Fales and moderate in Desert Creek. However, within the northern portion of Desert Creek, the Wellington Hills subpopulation (A-004) is impacted by habitat loss driven by a combination of factors including urbanization, conversion of land to agriculture, road and transmission line construction, invasion from non-native plant species and conifer expansion. As a result, this subpopulation is likely isolated from birds in other portions of the range, increasing its risk for extirpation.

Wildfire currently poses a high risk in both Desert Creek and Fales. Land previously burned in the Jackass Fire, which occurred on the border between Desert Creek and Fales, is at high risk for recurrent fires due to subsequent cheatgrass invasion. In Desert Creek, wildfire risk is greatest at the lower elevation valley bottoms and benches, some of which are near sage-grouse habitat. Hazardous fuel conditions also occur on Humboldt-Toiyabe Forest lands west of Sweetwater Ranch. An ignition in this area or a wind-driven fire from the west or

southwest could jeopardize existing sagebrush habitat near the Sweetwater Flat and Desert Creek breeding habitat. State Road 338 and some exurban development also increase human-caused ignition risk in the Desert Creek portion of the PMU. In the Fales portion of the PMU, fire risk to sage-grouse is highest in the lower to mid-elevation areas where high fuel loads are found in the dense sagebrush-bitterbrush stands that make up the majority of quality nesting habitat. A large-scale fire event in these areas would have a significant adverse impact on the Fales breeding population.

The risk to sage-grouse from invasive plant species is moderate and high for the Desert Creek and Fales subpopulations, respectively. Cheatgrass stands near Desert Creek lek #2 could potentially progress toward full habitat conversion if a fire were to occur. In Fales, invasion by cheatgrass and Russian thistle present a major challenge.

Conifer expansion is a high risk in Desert Creek and a moderate risk in Fales. In the Desert Creek portion of the PMU, conifer expansion is occurring in both upper and lower elevation areas where it adversely impacts nesting and winter habitats, decreases the extent and quality of springs and riparian areas, and reduces brood rearing/summer habitat quantity and quality. Reduction in brood rearing habitat may have led sage-grouse to rely almost completely on private irrigated meadows within the Desert Creek portion of the PMU. Current priorities for conifer treatment include the low-elevation areas between Sweetwater Ranch and Desert Creek Ranch. In the Fales portion of the PMU, conifer expansion has reduced habitat connectivity near the Wheeler Lek and poses a significant risk in the Huntoon Valley and Mount Jackson areas.

Currently both large- and small-scale infrastructure pose a low threat to sage-grouse in the Fales portion of the PMU, which remains relatively undeveloped. The planned Sonora Junction Wildlife Crossing Project is in the planning stages but would require the construction of wildlife fencing which could reduce connectivity between sage-grouse habitat on the western slopes of the Sweetwater Range and the eastern slopes of the Sierra Nevada Range. Fencing associated with this project could also increase the risk of mortality due to fence strikes and provide predator perches and thus should be designed in partnership with Bi-State collaborators to minimize risk to sage-grouse. In Desert Creek, the threat associated with all infrastructure is moderate. Currently, large-scale infrastructure projects on the east side of the Pine Grove Hills do not impact sage-grouse habitat. However, if expansion were to occur, indirect impacts due to noise or traffic could increase.

Urbanization is a high risk in the Desert Creek portion of the PMU and a moderate risk in the Fales portion. Urbanization in these areas is also likely to be accompanied by the development of additional small-scale infrastructure and associated increases in human use. In Desert Creek, proximity to Smith Valley, Gardnerville and Minden means that land is subject to subdivision and ranchette development pressures. Development is currently occurring south of the Wellington Hills and extending up Desert Creek Road. Dispersed developments are also springing up in the Sweetwater Flat area. Urbanization for the Fales portion of the PMU is only ranked as moderate thanks in large part to work by CDFW in collaboration with other Bi-State partners to secure easements covering a significant amount of quality sage-grouse habitat. Still, there is the potential for additional loss of habitat if development is initiated to the west of the Wellington Hills or near the Burcham and Wheeler leks.

The threat posed by motorized recreational activities is moderate in both Desert Creek and Fales. Non-motorized recreation poses a low threat to sage-grouse in Desert Creek and a

moderate threat in Fales. As with many areas in the Bi-State, a wide range of stakeholders have expressed concern regarding perceived increases in recreational use across the PMU. Most of the known breeding and brood rearing habitat in the Desert Creek area is located along the State Road 338 corridor. State Road 338 is a paved road that is easily accessible for all recreationists and is frequently traveled on at speeds of 60 mph or greater. Furthermore, several leks near Sweetwater Flat occur along it and sage-grouse have been observed crossing the road putting them at risk for vehicular strikes. Desert Creek Lek #2 receives numerous visitations during breeding season which can disturb the birds. Foot and car traffic associated with lek viewing can also degrade sagebrush and associated plant communities. In the Fales area, partners have perceived an increase in OHV usage and believe that dispersed camping is on the rise. However, more data is needed to confirm the extent to which recreational use across the PMU is increasing and to discern where and how it may be impacting sage-grouse.

The threat from loss or degradation of mesic resources is moderate in Desert Creek and low in Fales. While Desert Creek is drier than Fales, high quality brood rearing habitat and mesic resources are found on the Desert Creek, Sweetwater, and Sceirini Ranchs which are protected by conservation easements. As a result, the threat level is lower than what it might otherwise be.

Predation likely poses the greatest risk of direct mortality to sage-grouse in the Desert Creek-Fales PMU where ravens are known to patrol State Road 338 and golden eagles are relatively abundant. Predation was ranked as high for Desert Creek and moderate for Fales.

## Mount Grant PMU Risks and Relative Threat Levels

Portion of subpopulation A-003

Risks and relative threat levels were established for the Mount Grant PMU which includes a portion of subpopulation A-003 (Table 10, Fig. 9).

**Table 10.** Risks and relative threat levels for the Mount Grant PMU.

Risk	Relative Threat Level
Wildfire	High
Small-Scale Infrastructure	Low
Large-Scale Infrastructure	Moderate
Urbanization	Low
Motorized Recreation	Moderate
Non-Motorized Recreation	Low
Wild Horse Overpopulation and Range Expansion	Moderate
Predation	Moderate
Small Populations	Low
Invasive Plant Species	Moderate
Conifer Expansion	Moderate
Climate Change	High
Mesic Habitat Availability	High
Permitted Livestock Grazing	Low
Disease and Parasites	Low

Birds in the Mount Grant PMU regularly move back and forth between Bodie Hills and Mount Grant and also maintain some level of connectivity with subpopulations occupying the Desert Creek-Fales and Pine Nut PMUs.

Wildfire is considered a high risk in the Mount Grant PMU, especially at lower elevations. If fires were to occur, they would likely reduce or eliminate connectivity between the Mount Grant and Bodie Hills PMUs. Furthermore, the low-elevation and high aridity of the Mount Grant PMU is likely to make successful post-fire restoration more challenging. In the areas surrounding China Camp and Nine Mile Flat, cheatgrass abundance currently remains relatively low compared to other areas in the Bi-State however, if this were to change fire risk could further increase. Habitat quality on and around Nine Mile Ranch and the Rosaschi Ranch is reduced due to the presence of established agricultural weeds including tall whitetop (*Lepidium latifolium*) and hoary cress (*Lepidium draba*). Nine Mile Flat also has established populations of Russian knapweed (*Raphonticum repens*).

Conifer expansion is considered a moderate risk in the Mount Grant PMU. Conifer removal projects have taken place at lower elevation sagebrush habitats and transitional zones between the Bodie Hills and the East Walker River as well as some upper elevation habitats (Aurora lek and

Baldwin Canyon). Maintenance of past removal projects are needed to maintain connectivity and habitat quality.

The risk associated with small-scale infrastructure in the Mount Grant PMU is low. However, if ongoing mining exploration projects were to shift to full scale development, the threat level for both large- and small-scale infrastructure would quickly increase. Small-scale infrastructure projects include the proposed Polaris Exploration Project, a mining proposal that includes the temporary construction of up to 25 miles of new road and/or reconstruction of previously reclaimed roads and the construction of 250 drill sites. If it proceeds, this project will likely open roads to and around Brawley Peak potentially increasing traffic through the Aurora Lek area. Infrastructure associated with mineral exploration near Lapon Canyon and Bald Peak also have the potential to impact surrounding sage-grouse habitat.

Risk to the Bi-State sage-grouse associated with existing large-scale infrastructure is moderate. Large-scale mineral exploration is currently active in the western portion of the PMU and in the Aurora area. While infrastructure associated with the Aurora Mine does not occupy sage-grouse habitat, it is nearby, and associated activities may lead to the development of additional transmission lines and increased vehicle traffic in portions of the PMU that are important to sage-grouse.

The risk associated with recreation in the PMU is moderate (motorized recreation) to low (non-motorized recreation). As with almost every other PMU, human recreational use in the area is perceived to be increasing. However, more data is needed to evaluate the extent to which such activities impact sage-grouse. The establishment of the Walker River Recreation Area, a Nevada State Park, has the potential to increase recreational use near known sage-grouse habitat and leks. Currently, OHV use is not allowed within the park. Urbanization is currently considered to be low threat in the Mount Grant PMU however, Lucky Boy Pass has the potential to be developed. Impacts to sage-grouse should be evaluated if development were to occur in the future.

Limited availability of water resources poses a high threat due to the aridity of the Mount Grant PMU and sparsity of high-quality mesic habitat. The lower elevations of the Mount Grant PMU currently provide limited-quality nesting and brood rearing habitat. Habitat quality and productivity are better in the upper elevations of the PMU, especially near Mount Grant and Lapon Meadows, but it is still limited. At Rosaschi Ranch, irrigation has occasionally occurred in the low floodplain when water has been available. The upper fields are rarely irrigated. Mesic resources at Nine Mile Ranch are currently maintained with supplemental irrigation. Nine Mile Ranch also represents an isolated area of concern where livestock may be contributing to degradation of wet-meadow habitat and other mesic resources.

## Bodie Hills PMU Risks and Relative Threat Levels

### Subpopulation A-003

The Bodie Hills PMU threats and relative threat levels were assessed using the PMU boundary which includes the portion of subpopulation A-003 (Table 11, Fig. 9).

**Table 11.** Risks and relative threat levels for the Bodie Hills PMU.

Risk	Relative Threat Level
Wildfire	High
Small-Scale Infrastructure	Low
Large-Scale Infrastructure	Moderate
Urbanization	Low
Motorized Recreation	Moderate
Non-Motorized Recreation	Low
Wild Horse Overpopulation and Range Expansion	Moderate
Predation	Moderate
Small Populations	Low
Invasive Plant Species	Moderate
Conifer Expansion	Moderate
Climate Change	Moderate
Mesic Habitat Availability	Moderate
Permitted Livestock Grazing	Low
Disease and Parasites	Low

Wildfire is a high risk in the Bodie Hills PMU. While wildfire in this PMU has been relatively limited in recent years the potential for a large uncontrolled wildfire to adversely affect important sage-grouse seasonal use areas is real. The Bodie Hills PMU contains some of the highest quality sage-grouse habitat in the Bi-State and is occupied by the subpopulation with the highest abundance of birds. Consequently, the occurrence of wildfire in this PMU would likely lead to the direct loss of important habitat and habitat fragmentation and could have major ramifications for the long-term persistence of the entire Bi-State DPS. While fires in this PMU may be driven by natural ignition (e.g. lightning) fire risk associated with human ignition is also an increasing possibility if human use increases.

The presence of cheatgrass in some portions of the Bodie Hills PMU also threatens to alter fire cycles leading to larger and more frequent fires which pave the way for further invasion by cheatgrass. To date, no landscape-scale fires, or type conversion of sagebrush dominated habitats to non-native annual grasslands have occurred in the Bodie Hills PMU. However, some limited risk of type conversion does exist, especially in the lower elevation big sagebrush habitats adjacent to Bridgeport Valley and Mono Basin. This risk is greatest on drier, south and west facing slopes and sites with loamy soils.



Numerous conifer removal projects have been successfully completed over the last decade and thus conifer expansion is currently ranked as a moderate risk in the Bodie Hills PMU. Reduced connectivity within the PMU and among other PMUs due to the expansion of juniper, pinyon and Jeffrey pine is still a concern in Cottonwood Canyon and the area north of Mormon Meadows.

Recreation in the Bodie Hills PMU is perceived to be increasing, particularly with respect to dispersed camping and OHV use. However, data collection on human use in sage-grouse habitat will be necessary to empirically evaluate the extent to which current recreational activities may or may not be impacting sage-grouse in this PMU. Most of the core breeding and brood rearing habitat in the Bodie Hills area is located along State Road 270. Currently, this road remains closed through the winter and spring. However, if road access were to be modified to provide winter and spring access to recreationists, the threat of motorized and non-motorized human disturbance in and around these leks would increase.

Urbanization is a low risk in the Bodie Hills PMU. Habitat loss and fragmentation attributable to land use change and development has been limited and over the last decade there has been enormous success in securing conservation easements on private lands with quality sage-grouse habitat.

Small-scale infrastructure also poses a low risk to sage-grouse in the Bodie Hills PMU. There are no major, multi-line, high voltage utility corridors in the Bodie Hills PMU nor is there likely to be much new road development here. However, existing roads associated with the installation and maintenance of utility lines do pose some risk of habitat degradation and fragmentation as well as providing predator perches. Fences are relatively common in, and adjacent to, a variety of sage-grouse habitats on both public and private lands. However, the majority have been marked to increase their visibility to grouse and/or are being converted to let-down fences which allows them to be laid down during lekking season.

Development of large-scale infrastructure is currently considered to be a moderate risk but may rise if mining exploration in the Bodie Hills leads to large-scale mineral extraction. Currently, there are active claims in Nevada (near the California/Nevada border) that are adjacent to the Dry Lakes Plateau and Rough Creek drainage in California, and near Bald Peak in Nevada. Highway 395 cuts through important sagebrush habitat and any expansion of the highway within the PMU boundaries would likely pose a threat to sage-grouse and their habitat.

Limited mesic habitat availability is currently considered a moderate risk for this PMU. The Bodie Hills PMU represents one of the more mesic PMUs with resilient water resources and associated habitats. However, a variety of factors may negatively impact mesic resources and therefore water resources should be monitored closely.

Wild horses currently pose a moderate threat to sage grouse and their habitat in the Bodie Hills PMU. The Montgomery Pass Wild Horse Territory and the Powell Mountain Wild Horse Territory both border this PMU. Recent observations in the form of horse feces point data suggest that wild horse incursions have been occurring in the south-east corner of the Bodie Hills near 7-Troughs, Brawley Peaks, and Upper Mexican Spring. These horses are most likely originating from the Powell Mountain herd although it is possible the Montgomery Pass herd could be contributing as well. Sage-grouse habitat in the vicinity of Mono Lake is also at risk for habitat degradation caused by wild horses. A FS/BLM census flight that occurred in February 2024 recorded wild horses occupying areas surrounding Mono Lake, and in total estimated 624 were outside of their

territory. Wild horses have been known to regularly move between Adobe Valley and Mono Lake; however, the number of horses residing at Mono Lake and the duration of time they spend there has been increasing. These horses most likely originate from the Montgomery Pass horse herd however, the Powell Mountain herd may be contributing horses as well.

Predation likely poses the greatest risk of direct mortality to sage-grouse in the Bodie Hills PMU due to the proximity of grouse habitat to the US 395 corridor. Raven predation is a concern near Green Creek in the western portion of the PMU and should be monitored. A new privately owned refuse transfer station was recently established along California State Highway 167 in the southeast portion of the PMU. The use permit governing this operation requires all municipal and putrescent solid waste to be stored entirely indoors and thus it should not be, or become, a raven attractant. However, monitoring will be useful to ensure that the system in place is effective.

### **South Mono Risks and Relative Threat Levels** Subpopulations A-005, A-006, A-011 and A-007.

The South Mono PMU threats and relative threat levels were assessed for the Long-Valley area which includes subpopulations A-011 and A-007, Parker Meadows (subpopulation A-006) and Sagehen (subpopulation A-005) (Table 12, Fig. 9). The Sagehen area was referred to as Granite Mountain in the 2012 Action Plan.

**Table 12.** Risks and relative threat levels for the Long Valley, Parker Meadow and Sagehen areas in the South Mono PMU.

Risk	Relative Threat Level		
	Long Valley	Parker Meadow	Sagehen
Wildfire	High	High	High
Small-Scale Infrastructure	Moderate	Moderate	Low
Large-Scale Infrastructure	Moderate	Moderate	Low
Urbanization	Moderate	Low	Low
Motorized Recreation	High	Moderate	Low
Non-Motorized Recreation	High	Moderate	Low
Wild Horse Overpopulation and Range Expansion	Moderate	Moderate	High
Predation	High	Moderate	Low
Small Populations	Low	High	High
Invasive Plant Species	Moderate	Moderate	Moderate
Conifer Expansion	Low	Low	Low
Climate Change	Moderate	Moderate	Moderate
Mesic Habitat Availability	Moderate	Moderate	Moderate
Permitted Livestock Grazing	Low	Low	Low
Disease and Parasites	Low	Low	Low

The Sagehen and Parker Meadows populations are currently small. Birds have not been observed on Sagehen leks since 2018 and egg hatching failure attributed to low genetic diversity and inbreeding were previously observed in the Parker Meadows subpopulation. Parker Meadows was irrigated as part of a LADWP domestic sheep grazing lease until 1999 when the Sierra bighorn sheep was listed as state and federally endangered. In response, the lease was terminated, and the landscape was allowed to revert back to its pre-agricultural vegetative condition. Hen and brood translocations were conducted between 2017 and 2023. These appear to have alleviated egg failures. Still, the Parker Meadows subpopulation remains small. Both this subpopulation and the Sagehen subpopulation are susceptible to extirpation from both anthropogenic threats and natural stochastic events due to their small population sizes.

The wildfire risk is considered high for all areas within the PMU. Wildfire is recognized as an especially high risk in the Long Valley portion of the PMU where the overall availability of sagebrush is limited. Uncontrolled wildfire is of particular concern for known wintering habitat along the base of the Glass Mountains, east of Crowley Lake, and the Owens River. In the Mono Basin portion of the PMU, the risk of wildfire is also high, although the relative availability of sagebrush is also substantially higher. While fires in this PMU may be driven by natural ignition (e.g. lightning), fire risk associated with human ignition is also a risk in popular recreation areas and areas where there has been development at the wildland-urban interface.

Currently, the threat posed to sage-grouse from invasive plant species is moderate for all three subpopulations. The presence of cheatgrass across many of the sagebrush habitats in the South Mono PMU adds to the risk of altered fire cycles which may further increase the abundance of cheatgrass. Post-fire recovery in sagebrush dominated habitats in the South Mono PMU over the last decade has been variable. Within the initial ten-year recovery period some fires have exhibited high cover of invasives including cheatgrass and Russian thistle. Other fires have had favorable recovery with strong expression of perennial native grasses, sagebrush, and bitterbrush. Russian thistle populations have been expanding in fire footprints at Sagehen and also within the Hot Creek Fire footprint in Long Valley.

The majority of locations that were prioritized for conifer removal in the South Mono PMU as part of the 2012 Action Plan have been successfully treated. Therefore, conifer expansion is currently ranked as a low threat to all sage-grouse subpopulations. Still, reduced connectivity within the PMU and among other PMUs due to expansion of pinyon, juniper and Jeffrey pine remains a concern in portions of Deer Springs, the south slopes of Glass Mountain and areas north of Hot Creek.

Recreation is perceived to be a high, moderate and low threat in the Long Valley, Parker Meadows and Sagehen areas, respectively. However, the threat of human recreation to sage-grouse has not been well quantified at any of these locations. Long Valley is an attractive location for a wide range of outdoor recreation activities because of its proximity to the Town of Mammoth Lakes, open public lands, existing recreation facilities, and relatively gentle topography. Recreational use occurs year-round here and anecdotal observations from wildlife biologists and USGS field crews suggest that it has been increasing over the last several years. The primary risk associated with most recreational use is disturbance and displacement of birds from important use areas, such as leks and brood habitats. Sage-grouse are particularly vulnerable to disturbance during the breeding and brood rearing seasons, as well as the winter period when birds concentrate in large flocks. Because sage-grouse in Long Valley are relatively non-migratory, spending their

entire life cycle in the valley, the impact of dispersed recreational activities on breeding and nesting habitat use is of particular concern. Nests have been documented adjacent to well-traveled roads and campsites, and pets have been observed near leks, active brood nests, and brood meadows. Fishing and hunting seasons, holidays, and hot-spring visitation also increases visitation in Long-Valley.

In the South Mono PMU, urbanization is a moderate risk for the Long Valley subpopulation and a low risk for the Sagehen and Parker Meadows subpopulations. The majority of private land in the South Mono PMU is owned and managed by LADWP. Most of these parcels are associated with perennial water and provide important sage-grouse habitat. The largest block of non-LADWP land occurs adjacent to key sage-grouse habitat west of Crowley Lake and includes the Sierra Business Park and the Mammoth Airport. The Town of Mammoth Lakes plans to build additional storage buildings/hangars around the airport and to extend the runway to the east and west in the next 3 to 12 years. There are also plans to build a security fence that will surround the airport. The Town is also currently working with LADWP on an expanded lease area for the Whitmore Recreation Area to develop a dog park and an additional sports field. The dog park has the potential to indirectly impact sage-grouse by increasing human activity. While patrons of the sports complex will initially be drawn to the area to attend events in the complex, there is the potential that they may disperse into adjacent lands. Increased human use in and around the sports complex could increase trash and raven subsidies. There are currently no plans to expand the Sierra Business Park, however, vacant lots within the established business park may be developed in the future. There are also four private parcels near lek #10 in the vicinity of Layton Springs. The probability that these plots will be developed in a manner that is exempt from the California Environmental Quality Act (CEQA) within in the next ten years is very high. The remaining private lands in the PMU are still characterized as rangeland.

The threat associated with small-scale infrastructure poses a moderate risk in Long Valley and Parker Meadow, and a low risk in Sagehen. Infrastructure of concern includes busy roads in Parker Meadows and Long Valley, fences associated with livestock grazing in Long Valley, fences associated with the planned Mammoth Wildlife Crossing Project, and existing utility lines in Sagehen.

Large-scale infrastructure in Long Valley is considered a moderate risk to sage-grouse due to interest in mineral exploration in the vicinity of Hot Creek. Long Valley was the previous site of the Benton Crossing Landfill which closed in 2023. Ravens are known predators of both sage-grouse nests and fledglings; and the Benton Crossing Landfill provided food subsidies which led to increased raven populations and subsequent decreases in sage-grouse nest success. Since the landfill's closing, raven subsidies have been eliminated from the site by burying all municipal solid waste. However, monitoring may still be warranted. As a previously subsidized over-population of ravens loses access to a major source of food, they may increasingly target other prey, including sage-grouse, before they disperse from the area.

The threat to sage-grouse in Parker Meadows from large-scale infrastructure is currently moderate. The Pumice Valley Landfill, which is now accepting refuse that previously would have gone to the Benton Crossing Landfill, accepts refuse from four Mono County transfer stations as well as the Town of Mammoth Lakes. The Pumice Valley Landfill continues to include an open landfill for construction & demolition waste however, the disposal chain for municipal and putrescent waste that is now being received was designed by Mono County with the aim of minimizing raven and gull subsidies. Municipal and putrescent waste are stored entirely indoors before being transferred out of the area. This design should minimize raven and gull activity in the area, but monitoring will be necessary to confirm this.

Limited availability of wetlands is a moderate threat in all three of the South Mono PMU areas. The availability of brood rearing/late-summer meadow habitat is likely a major limiting factor in the Sagehen portion of the South Mono PMU. Here, sagebrush habitat is extensive, but the availability of wet meadows, streams, and springs is limited. In contrast, available nesting habitat is more likely to be a limiting factor in the Long Valley portion of the PMU. In this portion of the PMU an extensive network of irrigated meadows, native meadows, streams, and springs provide abundant brood rearing/late summer habitat; while sagebrush habitat is somewhat patchy and irregularly distributed. Without LADWP's engagement in conserving sage-grouse habitat in Long Valley the threat level for this risk would likely be higher. LADWP remains committed to protecting sage-grouse habitat at Long Valley per the *Adaptive Management Plan (AMP) for Bi-State Sage-Grouse Brood-Rearing Habitat on Los Angeles Department of Water and Power Lands in Long Valley*. There are also other water resources in Long Valley that are not under the jurisdiction of LADWP which could be improved.

Wild horse overpopulation and range expansion poses a moderate risk in the Parker Meadows and Long Valley portion of the South Mono PMU and a high risk in Sagehen. The Montgomery Pass wild horse herd is currently more than 200% over AML and expanding outside of its HMA. Horses from this herd pose the largest risk to sage-grouse habitat in Sagehen. BLM and the INF are currently working collaboratively to carry out the environmental planning necessary to remove horses that are outside of their WH&BT. Incursions into the South Mono PMU from the White Mountains wild horse herd also pose a risk to sage-grouse habitat in the South Mono PMU.

**White Mountains PMU Risks and Relative Threat Levels**  
Subpopulation A-001

Very little is known about the sage-grouse populations that inhabit the White Mountain PMU. Sage-grouse are known to occur in two main areas within the PMU (White Mountains North and White Mountains South) (Fig. 9). While the extent to which birds move between these two areas is unknown, risks and threat levels were established for each area individually in order to capture geographic variation in the threats to sage-grouse in this PMU (Table 13). The Pizona area is outside of the White Mountains North and South areas and represents a location where birds were historically known to occur. This area is discussed below, however, because sage-grouse are no longer known to inhabit it, threat levels were not established.

**Table 13.** Risks and relative threat levels for the north and south areas of the White Mountains PMU.

Risk	Relative Threat Level	
	White Mountains North	White Mountains South
Wildfire	Moderate	Moderate
Small-Scale Infrastructure	Low	Low
Large-Scale Infrastructure	Low	Moderate
Urbanization	Moderate	Low
Motorized Recreation	Moderate	Moderate
Non-Motorized Recreation	Low	Low
Wild Horse Overpopulation and Range Expansion	High	Low
Predation	Low	Low
Small Populations	High	Unknown
Invasive Plant Species	Low	Low
Conifer Expansion	Moderate	Moderate
Climate Change	High	High
Mesic Habitat Availability	Moderate	Moderate
Permitted Livestock Grazing	Low	Low
Disease and Parasites	Low	Low

Sage-grouse in the White Mountains PMU utilize habitat that is often difficult for humans to access due to steep terrain, high altitudes, and a harsh climate. While the remoteness of these areas means that many anthropogenic risks are lower relative to other PMUs, it also makes population monitoring more difficult. While modeled population estimates for this PMU suggest that population sizes are very small, these estimates rely almost entirely on data from the few known leks in the northern portion of the PMU. Anecdotal field observations after the lekking season (i.e. mid-summer or later) suggest that population sizes may be greater than indicated by the current models and that there may be additional undescribed leks in the White Mountains. While it is suspected that the

true abundance of birds in the southern portion of this PMU may be underrepresented/unknown, populations in the north are likely small and thus at high risk for extirpation due to natural stochastic events. Increased monitoring is essential to better understand the true abundance and distribution of sage-grouse in the White Mountains PMU.

Wildfire risk is moderate in both the northern and southern portions of the PMU. High-elevation areas that are above the tree line are relatively resistant to large scale fires. However, fire is still a risk in the lower elevations, particularly in big sagebrush habitat where there is potential for fire to spread into areas that are occupied by sage-grouse. While lightning ignitions are not uncommon, the fire history in the White Mountains is very sparse and fires historically have not spread (Table 6). Still, with cheatgrass and climate change altering fire regimes throughout the Great Basin, this pattern may change in the future.

Conifer expansion is currently considered to pose a moderate threat to sage-grouse in the White Mountains PMU. While conifer mortality has been observed in the lowest elevations of the PMU, expansion likely restricts sage-grouse movement between high-elevation summer habitat and low-elevation winter habitat. Areas where conifer expansion poses the greatest risk in the White Mountain PMU include Chiatovich Canyon, Middle Canyon and Trail Canyon. Conifer expansion in the Pizona area, where sage-grouse once occurred, may also be adversely affecting connectivity between occupied habitat in the White Mountains North area and the South Mono PMU.

The threat posed by wild horses is high in the northern portion of the White Mountains PMU and low in the southern portion. Within the White Mountains PMU there are five wild horse management areas. Currently, the herds of biggest concern are the Montgomery Pass and White Mountain Wild Horse Territories. For both herds, wild horse numbers are currently above AML and horses are occupying areas outside of their WH&BTs. In the lower Trail Canyon and Rock Creek areas, wild horse use may be negatively impacting sage-grouse breeding and early brood rearing habitat.

Urbanization poses a moderate threat to the subpopulation in the northern portion of the White Mountains PMU. Some development has occurred in the lower elevations of Chiatovich Creek creating roads and housing pads that have fragmented potential sage-grouse habitat. Development in the lower elevations of the PMU has led to direct habitat loss and fragmentation along with the introduction of predators (e.g. pets and ravens).

Large-scale infrastructure is a moderate threat in the southern portion of the White Mountains PMU. The biggest risk related to large-scale infrastructure is Southern California Edison’s Control Silver Peak Project which proposes to remove two powerlines that don’t meet current regulatory requirements and replace them with a single 55kv line with fewer poles. Segment 3 of the proposed project would cross the White Mountains, traversing approximately 37 miles which contains known sage-grouse habitat. This segment of the project would include replacing all poles, reducing the overall number of poles and powerlines, and replacing the conductor with a new conductor and double-circuit poles. While this project would ultimately reduce the amount of infrastructure present in the White Mountains PMU, and possibly reduce predation risk, operations necessary to complete the proposed work may result in irreversible habitat destruction, direct mortality, and visual and aural disturbances that negatively impact sage-grouse. Any future renewable energy development projects on the west side of the Inyo and White Mountains could also pose a threat to sage-grouse in the White Mountains PMU.

## V. 2024 BI-STATE ACTIONS

### CONSERVATION GOALS

The overarching conservation goals of the 2004, 2012 and 2024 Bi-State Action Plans are to:

1. Maintain and improve sagebrush and associated habitats to provide for the long-term viability of greater sage-grouse populations and other sagebrush obligate species within the Bi-State area.
2. Ensure no net loss of greater sage-grouse breeding populations in the Bi-State area.

The 2024 Bi-State Action Plan also includes an additional goal to:

3. Improve landscape level health of the Bi-State area by managing land in a manner that also considers the conservation needs of ecosystems and species found adjacent to sagebrush ecosystems (e.g. pinyon-juniper woodland and meadow ecosystems and pinyon jay).

To meet these goals, the Bi-State Action Plan stipulates actionable recommendations to be carried out. Actions in the 2024 Plan are devised to 1) promote a coordinated interagency approach, 2) improve regulatory mechanisms, 3) manage habitat and subpopulations based on specific threats, 4) address research and monitoring needs to ensure that management of the Bi-State DPS is science-based and adaptive, and 5) advance communication among Bi-State partners and the public.

While the Action Plan provides a cohesive and overarching strategy for Bi-State partners to conserve the Bi-State DPS and its habitat, implementation still requires that the responsible agencies conduct action specific planning, appropriate environmental review, and implementation consistent with applicable laws, regulations, agency policies, and land use plan guidance. For more details on agency specific land use plan direction and guidance, see section *VI Existing Regulatory Mechanisms*.

### FUNDING AND IMPLEMENTATION PRIORITIES

#### Subpopulation and Habitat Management

Project funding and implementation priorities should generally be based on the following criteria, unless science or management coordination determines that additional priorities or order of priority better support the goals of the plan:

1. Maintenance of the largest subpopulations and/or the least threatened habitats (Long Valley portion of the South Mono PMU, Bodie and Mount Grant PMUs, Sweetwater and Desert Creek portions of the Desert Creek-Fales PMU, and the White Mountains portion of the White Mountains PMU).



2. Enhancement of subpopulations and/or habitats with the greatest potential for growth and connectivity with core populations and habitats (Fales portion of the Desert Creek-Fales PMU, and the Parker, Sagehen and Adobe Valley portions of the South Mono PMU).
3. Attempts to restore smaller and likely more isolated subpopulations and habitats that may realize dramatic improvements if historic habitats are restored (Pine Nut PMU and the Truman and Silver Peak portions of the White Mountains PMU).

Research and Monitoring

Research and monitoring funding and implementation priorities should generally be based on the following criteria, unless science or management coordination determines that additional priorities or order of priority better support the goals of the plan:

1. Gathering and evaluating data on risks that currently lack sufficient data to quantify population level impacts to sage-grouse
2. Assessing conservation action effectiveness
3. Research and monitoring to better understand sage-grouse biology, demographics, and movement. Research and monitoring should be prioritized as follows:
  - a. Subpopulations with no, or limited, data on bird movements, habitat use, and population status (White Mountains, Mount Grant, Desert Creek-Fales and Pine Nut PMUs).
  - b. Small and/or isolated populations or portions of larger populations with no, or limited, data on bird movements and habitat use (Parker, Sagehen and Adobe Valley in the South Mono PMU and the Bodie Hills PMU west of U.S. Highway 395).
  - c. Subpopulations where substantial habitat improvement work has occurred (portions of the Bodie, Desert Creek-Fales, Mount Grant, and Pine Nut PMUs).
  - d. Subpopulations with a current abundance of available information (Long Valley in the South Mono PMU and Bodie Hills proper in the Bodie Hills PMU).

**BI-STATEWIDE ACTIONS**

Coordinated Interagency Approach

**Objective:** Implement a coordinated interagency approach towards conservation and management of greater sage-grouse populations and habitats within the Bi-State area.

**Strategy:** Leverage available staff and funding to facilitate implementation of the 2024 Bi-State Action Plan.

**Responsible Parties:** EOC, TAC, LAWG, BTNRC

1. Continue interagency and stakeholder engagement to support the long-term conservation and management of the Bi-State DPS and its habitats through the work of the EOC, TAC, LAWG, and the BTNRC. Update the interagency Memorandum of Understanding for the Greater Sage-Grouse Conservation; Bi-State Distinct Population Segment (DPS) (2021 - 2026) as needed to provide the framework for successful implementation of the Action Plan.
2. Provide cross-jurisdictional staff support to facilitate the coordinated interagency effort to conserve the Bi-State DPS and its habitat.
3. Provide multi-jurisdictional funding and/or support to assist sage-grouse conservation and management efforts in the Bi-State area.
4. Consider developing a voluntary mitigation strategy to help offset negative impacts to sage-grouse and their habitat caused by activities that are not subject to mitigation requirements as specified by applicable resource management plans.
5. Where possible, develop agreements and funding mechanisms for Tribal participation in conservation and management on their traditional lands.
6. Annually, or more frequently as needed, engage the EOC to ensure consistent regulatory oversight and ensure a coordinated conservation effort that successfully achieves long-term conservation of the Bi-State DPS and its habitats.
7. Annually, or more frequently as needed, engage the LAWG to discuss ongoing work, planned work, and monitoring and research results.
8. Biannually, or more frequently as needed, engage the TAC to review Action Plan implementation progress, discuss monitoring and research results, and revise future conservation actions to reflect the best available data and science.
9. Annually, or more frequently as needed, engage the BTNRC to share information and gather input on Action Plan implementation progress, monitoring and research results, traditional ecological knowledge considerations, and any revisions to proposed conservation actions based on the best available data and science.

**Science Based Adaptive Management**

**Objective:** Implement scientifically and economically sound management strategies to conserve greater sage-grouse populations and habitats within the Bi-State area.

**Strategy:** Coordinate with the USGS Western Ecological Research Center and other partners to provide Science Advisor support for monitoring, research, and tool development to help support the conservation and management of greater sage-grouse populations and habitats within the Bi-State area.

**Responsible Parties:** EOC, TAC

10. Create an interagency research and monitoring steering committee from the Action Plan signatory agencies to help guide monitoring and research questions, priorities, input, and funding mechanisms.

11. As funding allows, continue to establish interagency agreements and funding mechanisms to support research needs identified by the interagency research and monitoring steering committee.
12. As funding allows, continue to establish interagency agreements and funding mechanisms for science advisory support from the USGS Western Ecological Research Center. Science advisory support includes conducting scientific research and monitoring, sharing research results, and providing science-based recommendations for the conservation and management of Bi-State sage-grouse populations and their habitats.
13. Collaborate with the BTNRC and consult with Tribal Governments in the Bi-State area to ensure that Tribal perspectives are considered during the development and implementation of greater sage-grouse conservation and management projects. When it is of interest to Bi-State Tribes, collaborate to ensure that traditional ecological knowledge is considered as well.

**Implement Regulatory Mechanisms**

**Objective:** Implement and improve inter-organizational guidelines, policies, plans, and programs to ensure the effectiveness and consistency of discretionary agency actions that may impact the Bi-State DPS and its habitats.

**Strategy:** Coordinate with affected county and local governments to develop and implement guidelines, policies, plans, and programs designed to avoid or minimize the loss of sage-grouse habitat in the Bi-State area.

**Responsible Parties:** BLM, USFS, NDOW, CDFW, FWS, Counties

14. Continue to coordinate with Mono County to develop and incorporate sage-grouse conservation guidance into applicable policies, plans, and programs.
15. Increase communication with Inyo, Alpine, Mineral, Esmeralda, Douglas, Lyon, Storey and Carson City Counties. As desired by counties, coordinate to develop and incorporate sage-grouse conservation guidance into applicable policies, plans, and programs.

**Strategy:** Implement inter-agency guidance designed to minimize or eliminate threats associated with potential land use or other authorizations that may affect greater sage-grouse populations and habitats in the Bi-State area consistent with applicable laws, regulations, agency policies, and land use plan direction and guidance.

**Responsible Parties:** BLM, USFS, NDOW, CDFW, FWS, NRCS

16. Continue coordination among state wildlife departments and federal land and resource management agencies to amend, update or develop applicable policies, plans, and programs to incorporate new or revised sage-grouse conservation guidance as needed.

**Minimize and Eliminate Risks**

**Objective:** Substantially reduce or eliminate potential risks to greater sage-grouse populations and habitats in the Bi-State area.

*Minimize and Eliminate Risks: Disease & Parasites*

**Strategy:** Monitor, and quantify where possible, the extent of disease and parasite risks to greater sage-grouse populations in the Bi-State area. Take appropriate management action where causal effects can be identified and effectively mitigated.

**Responsible Parties:** NDOW, CDFW, BLM, USFS, USGS, FWS, DOD

- 17. When Bi-State sage-grouse mortalities are detected and carcasses are recoverable, test for the presence of disease and/or parasites.

*Minimize and Eliminate Risks: Wildfire*

**Strategy:** Implement a coordinated interstate/interagency approach towards managing wildfire incidents and suppression activities. Implement treatments/actions designed to minimize the risk of future catastrophic wildfire and proactively plan for restoration resources to minimize the associated loss of sage-grouse habitat in the Bi-State area.

**Responsible Parties:** BLM, USFS, NDOW, CDFW, CalFire, FWS, NRCS, DOD, NDF

For actions related to invasive plant species post-wildfire, see section *Invasive Plant Species*.

- 18. Minimize sage-grouse habitat loss or degradation through implementation of Wildfire Best Management Practices (*Appendix E*).
- 19. Share and mobilize resources from adjacent regions to implement prescribed burns when burn windows are open.
- 20. Identify areas where prescribed fire will decrease fuel loads, regenerate fire-adapted species, and maintain a healthy mosaic of sagebrush and associated woodland and mesic habitats.
- 21. Collect seeds of sagebrush, native grasses, and forbs from local sources within each PMU to meet future restoration needs. Work with members of Nevada Native Seed Partnership, Seeds of Success, and other interested partners to clean, store, increase, and grow out restoration seed or seedlings.

*Minimize and Eliminate Risks: Infrastructure*

**Strategy:** Implement site-specific conservation measures designed to minimize or eliminate risks associated with existing infrastructure and/or proposed infrastructure and development within the Bi-State area. Secure conservation easements or agreements with willing landowners to maintain private rangelands by avoiding or minimizing the risk of future development impacts to the Bi-State DPS and its habitats.

**Responsible Parties:** BLM, USFS, Landowners, NRCS, FWS, NDOW, CDFW, NGOs

*Minimize and Eliminate Risks: Small-Scale Infrastructure*

For actions related to predation associated with small-scale infrastructure, see section *Predation*.

- 22. Except as necessary for public safety, public need, or to accommodate existing land use authorizations or valid existing rights, avoid the construction of new roads, powerlines, and other small-scale infrastructure within known occupied and potential sage-grouse habitat to the extent allowed by applicable laws, regulations, agency policies, and land use plan direction/guidance unless these features are designed to maintain or improve habitat conditions.
- 23. Maintain existing fences and flight diverters or convert existing fences to letdown fencing to deter fence strikes. Remove fences that are no longer needed.
- 24. Evaluate newly constructed fences for fence strike hazards. Modify or mark fencing to deter fence strikes as needed.
- 25. Evaluate all small-scale infrastructure including, but not limited to, signs, windmills, stock watering facilities or any structure taller than the surrounding brush in sage-grouse habitat. Remove extraneous structures where possible. Where structures are deemed necessary, modify or replace existing structures to mitigate negative impacts to sage-grouse and their habitats.
- 26. Identify and evaluate roads and trails that may negatively impact the hydrology in areas near mesic resources including springs, seeps, creeks, rivers, lakes, and ponds in sage-grouse habitat. Where necessary and practical, conduct the planning and environmental review necessary to relocate or decommission roads and trails to maintain or improve hydrology and mesic habitats.

*Minimize and Eliminate Risks: Large-Scale Infrastructure*

- 27. Develop recommended mitigation measures to conserve and protect sage-grouse and their habitats if new large-scale infrastructure projects are authorized or when existing projects are reauthorized or decommissioned.
- 28. Within sage-grouse habitat, limit development of large-scale infrastructure to the extent allowed by applicable laws, regulations, agency policies, and land use plan direction/guidance. Implement required and recommended mitigation measures to conserve and protect sage-grouse and their habitats if new development is authorized or when existing projects are reauthorized or decommissioned.
- 29. For all large-scale infrastructure projects, especially those that involve multiple jurisdictions, ensure that the lead agency directly contacts partner agencies early in the planning process. Input regarding the proposed action, alternatives, design features, mitigation measures, and potential impacts to sage-grouse should be solicited and provided. The lead agency should strongly consider conveying cooperating agency status to partner agencies as appropriate.

*Minimize and Eliminate Risks: Urbanization*

- 30. Secure conservation easements or agreements with willing landowners to maintain or improve sage-grouse habitat.
- 31. Collaborate and communicate with counties in the Bi-State area so that they have the best available information on the Bi-State DPS and its habitats.
- 32. Work with counties to identify private lands where development may pose a threat to sage-grouse. Work toward establishing conservation easements that will maintain an acceptably low-level of development or land trades to transfer ownership to a public resource management agency.

*Minimize and Eliminate Risks: Minimize and Eliminate Risks: Recreation*

**Strategy:** Monitor, and quantify where possible, the extent to which recreational activities pose a risk to greater sage-grouse populations and their habitats in the Bi-State area. Implement appropriate site-specific management actions where causal effects can be identified and effectively mitigated.

**Responsible Parties:** BLM, USFS, NDOW, CDFW, USGS

*Minimize and Eliminate Risks: Motorized Recreation*

- 33. Monitor and evaluate traffic on roads in sage-grouse habitat to identify locations where current traffic levels may pose a threat to sage-grouse. In areas where negative impacts are identified, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits, or other protective measures as deemed necessary and practical.
- 34. Minimize the authorization of new rights-of-way where feasible and, when possible, utilize existing public or private utility rights-of-way to reduce impacts on sage-grouse, their habitat, and other resources.
- 35. Monitor and evaluate authorized and unauthorized motorized activities. If activities are deemed to pose a threat to sage-grouse and/or their habitats, take the necessary steps to limit them and their impacts.
- 36. Work with partners to identify areas where motorized vehicle use will have fewer negative impacts on the environment. Work with applicable agencies to redirect motorized recreation to those areas.

*Minimize and Eliminate Risks: Non-motorized Recreation*

- 37. Monitor and evaluate authorized and unauthorized non-motorized activities (such as dispersed camping, equestrian use, hiking, mountain biking etc.). If activities are deemed to pose a threat to sage-grouse and/or their habitats, take the necessary steps to limit them and their impact.

- 38. Work with partners to identify areas where non-motorized recreation use will have fewer negative impacts on the environment and work with applicable agencies to redirect non-motorized recreation to those areas.

*Minimize and Eliminate Risks: Wild Horse Overpopulation and Range Expansion*

**Strategy:** Maintain wild horse populations at the AMLs and within designated HMAs or WH&BTs to minimize the risk of overpopulation, excessive use, and range expansion.

**Responsible Parties:** BLM, USFS

- 39. Monitor wild horse populations to determine the extent to which they are over AML and/or expanding outside of their designated HMAs or WH&BTs.
- 40. Implement captures or other population control methods to maintain wild horse populations at AML.
- 41. Implement captures of wild horses occurring within sage-grouse habitat that are outside of designated HMAs or WH&BTs.
- 42. Evaluate mesic resources, leks, nesting and early brood rearing habitats, and late brood rearing and summer habitats for impacts from wild horses. When necessary, conduct the planning and environmental review necessary to install wildlife-friendly fences or implement other appropriate measures to minimize or eliminate impacts.
- 43. Where sage-grouse habitat is being degraded due to wild horse use, determine site-specific measures to improve or restore sage-grouse habitat. Conduct the planning and environmental review necessary to implement the site-specific measures.
- 44. Update individual HMA and WH&BT management plans within the range of the Bi-State DPS to include relevant actions from the Action Plan as well as sage-grouse related management guidance and direction from applicable laws, regulations, agency policies, and land use plans.
- 45. Consider herd management techniques and range improvement actions designed to encourage wild horses to stay within their designated HMAs or WH&BTs. Conduct the planning and environmental review necessary to implement herd management techniques and range improvement actions as deemed necessary.

*Minimize and Eliminate Risks: Predation*

**Strategy:** Monitor, and quantify where possible, the extent to which predation poses a risk to greater sage-grouse populations in the Bi-State area. Take appropriate management actions where causal effects can be identified and effectively mitigated.

**Responsible Parties:** NDOW, CDFW, BLM, USFS, USGS, FWS, DOD, ARS

- 46. Continue to monitor raven and raptor population levels using the raptor/raven survey protocol implemented by the USGS to assess impacts on sage-grouse during the nesting and brood rearing seasons. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods.

- 47. Identify and evaluate new areas where raven population monitoring is needed to determine impacts on sage-grouse during the nesting and brood rearing seasons. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods.
- 48. Collaborate with the BTNRC and consult and collaborate with Tribal Governments in the Bi-State Plan area to ensure that traditional ecological knowledge is considered during the development and implementation of raven management plans and/or management projects.
- 49. Support projects that have the potential to reduce raven and other predator subsidies.

*Minimize and Eliminate Risks: Small Populations*

**Strategy:** Identify potential sage-grouse population augmentation and re-introduction sites and develop translocation guidelines to support potential augmentation and re-introduction efforts in the Bi-State area.

**Responsible Parties:** NDOW, CDFW, BLM, USFS, USGS, FWS

- 50. Develop a translocation protocol to guide decision making regarding when, where, how, and for how long translocation efforts should be conducted. This protocol will include consideration of impacts on donor and recipient populations.
- 51. Evaluate habitat suitability and carrying capacity for areas with small populations that are at risk for extirpation if populations decline. Where habitat quality is low and carrying capacity is limited, restore habitat so that it can support larger populations if translocations were to be deemed necessary.
- 52. If local populations have declined to a level deemed to put them at risk for extirpation and habitat is suitable, consider translocations from larger source populations within the Bi-State area. Decisions about when, where, how, and for how long translocation projects are planned and implemented should be guided by the Bi-State sage-grouse translocation protocol.

*Minimize and Eliminate Risks: Invasive Plant Species*

**Strategy:** Implement projects to minimize the impacts of invasive species and restore healthy native plant ecosystems on public and private lands in the Bi-State Plan area.

**Responsible Parties:** BLM, USFS, LADWP, NRCS, FWS, Landowners, Permittees, LAWG, NDOW, CDFW, CalTrans, NDOT, Counties, Inyo-Mono Agricultural Commissioner’s Office

- 53. Utilize an integrated weed management strategy to manage invasive annual grasses, noxious weeds and other invasive plants.
- 54. Inventory and evaluate mesic areas for invasive plant species. Where necessary and practical, conduct the planning and environmental review necessary to implement control.



- 55. Evaluate and monitor burn areas to determine where native plant recruitment is low and invasive plants are an existing threat. Where necessary and practical, conduct the planning and environmental review necessary to implement native plant restoration practices and invasive plant controls.
- 56. Conduct pre-fire planning to ensure that native seed mixes are available for immediate post-fire restoration to reduce invasion by non-native plants and ensure reestablishment of critical sage-grouse habitat.
- 57. Monitor for invasive plant establishment and treat small populations of invasive plants early to prevent population growth and dispersal.
- 58. Control weed populations on roadsides so that they do not provide a seed source for invasions into adjacent sagebrush and associated habitats. Collaborate with state departments of transportation and county road departments as necessary.

*Minimize and Eliminate Risks: Conifer Expansion*

**Strategy:** Map and quantify the level of pinyon-juniper expansion that has occurred in relation to known occupied, potential, and historic sage-grouse habitat in the Bi-State area. Consider the cultural needs of Tribes and pinyon-associated species during the development and implementation of site-specific treatments designed to maintain, improve, or restore seasonal ranges and habitat connectivity within and among breeding populations based on restoration potential.

**Responsible Parties:** BLM, USFS, NRCS, USGS, FWS, Landowners, NDOW, CDFW

- 59. Maintain previously implemented conifer treatments.
- 60. When identifying, planning, and implementing conifer treatment projects utilize best management practices in *Appendix F* to ensure consistency, account for Tribal perspectives, minimize impacts to old trees and the pinyon jay, and reduce the risk from fire and invasive plant species.
- 61. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat, will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing conifer removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation.
- 62. Maintain and expand partnerships with local Tribes and other parties as appropriate to monitor and manage pinyon woodlands, mesic habitats, sagebrush uplands, and the ecotones between them to increase fire resiliency, conserve cultural values, and improve habitat conditions for sage-grouse, pinyon jay, and other species.

*Minimize and Eliminate Risks: Mesic Habitat Availability*

**Strategy:** Implement projects to increase the availability and health of mesic resources on public and private lands in the Bi-State Plan area.

**Responsible Parties:** BLM, USFS, LADWP, NRCS, FWS, Landowners, Permittees, LAWG, NDOW, CDFW

For actions related to degradation of mesic resources by wild horses, see section *Wild Horse Over Population and Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.

- 63. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for habitat improvement and ecological restoration work. Design site-specific habitat improvement projects as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success.
- 64. Monitor springs, meadows, and other mesic resources for livestock impacts. Where unacceptable impacts are identified, consider site-specific measures to improve affected resource conditions.

*Minimize and Eliminate Risks: Permitted Livestock Grazing*

**Strategy:** Continue to monitor and manage permitted domestic livestock grazing to ensure that the health and productivity of sagebrush steppe and associated mesic resources that provide habitat for the Bi-State DPS are maintained and/or improved if needed. Take appropriate management actions when monitoring indicates a change is necessary.

**Responsible Parties:** BLM, USFS, LADWP, Landowners, Permittees/Lessees, NRCS

For actions related to fences associated with livestock grazing management, see section *Small-Scale Infrastructure*.

For actions related to mesic resources and livestock grazing management, see section *Mesic Habitat Availability*.

- 65. Continue to manage livestock grazing permits using best management practices to minimize impacts to sage-grouse and their habitats including, but not limited to, utilization standards, pasture rotations, and season of use considerations. Where unacceptable impacts are identified, consider site-specific measures to improve affected resource conditions.

- 66. Manage livestock to maintain healthy upland range conditions and to achieve the functioning condition for riparian and wet/dry meadow systems that provides the greatest forb abundance and diversity (usually functioning at risk or proper functioning condition) while maintaining adequate hiding cover and ensuring long-term system function.

Research and Monitoring

**Objective:** Implement a coordinated interagency research and monitoring program to support the conservation and management of greater sage-grouse populations and habitats within the Bi-State area.

**Strategy:** Implement a coordinated interstate/interagency lek inventory and monitoring strategy for the Bi-State area. Assess threats and conservation effectiveness to guide implementation of management actions.

**Responsible Parties:** EOC, TAC, NDOW, CDFW, BLM, USFS, LADWP, FWS, USGS, NRCS

- 67. Continue to collaborate with research partners to monitor population performance, threats, and conservation action effectiveness.
- 68. Develop a monitoring strategy to guide the collection of data necessary to prioritize the implementation of actions, evaluate the effectiveness of implemented actions and modify management practices based on results.
- 69. Support the monitoring of ecosystems and species found adjacent to sage-grouse habitat to ensure that sage-grouse conservation efforts do not result in unintended negative impacts.
- 70. Continue to stay up to date on the most recent scientific literature investigating the effects of climate change on greater sage-grouse and the sagebrush biome. Where and when possible, apply findings to guide adaptive management.

Maintain and Improve Stakeholder Involvement

**Objective:** Maintain active, well informed, local planning groups committed to the development and implementation of sage-grouse and sage-grouse habitat conservation actions within the Bi-State area.

**Strategy:** Continue to support the stakeholder based Bi-State Local Areas Working Group process to identify, develop and implement PMU specific conservation actions for greater sage-grouse populations and habitats in the Bi-State area. Encourage and foster stakeholder participation in the implementation of the Bi-State Action Plan.

**Responsible Parties:** LAWG, TAC, BTNRC, NDOW, CDFW, BLM, USFS, NRCS, FWS, USGS

- 71. As funding allows, continue to establish interagency agreements and funding mechanisms to ensure the Bi-State Data and Communications Coordinator position is funded and filled.

- 72. Continue to conduct PMU planning meetings on an as needed basis to address PMU specific issues and to identify, develop, and prioritize PMU specific conservation actions.
- 73. Continue to conduct Bi-State LAWG planning meetings on a semi-annual basis to review the status of greater sage-grouse populations and habitats in the Bi-State area and to identify, prioritize, and coordinate implementation of annual conservation actions.
- 74. Continue to conduct workshops to provide information about programs available to assist ranchers and other private landowners that may be interested in the implementation of sage-grouse and sage-grouse habitat conservation projects and to explore opportunities for cooperative conservation of sage-grouse and their habitats in the Bi-State area.
- 75. Continue to develop and disseminate electronic communications and updates for the Bi-State LAWG.
- 76. Continue to publish a publicly accessible Bi-State LAWG Sage-Grouse Conservation webpage to share and distribute information specific to greater sage-grouse conservation efforts in the Bi-State area.
- 77. Migrate the Bi-State Sage-Grouse Conservation website from the Mono County platform to the Eastern Sierra Interpretive Association webpage.
- 78. Work with the BTNRC and local Tribes to incorporate traditional ecological knowledge into the body of knowledge about sage-grouse, their habitats, effective habitat restoration treatments, and pinyon-juniper woodland and pinyon jay management.
- 79. Increase communication with stakeholder groups such as local counties and conservation districts to keep them informed and involved with sage-grouse related projects and issues in their areas.

**PMU SPECIFIC ACTIONS**

**Pine Nut PMU**

Wildfire

For actions related to invasive plant species post-wildfire, see section Invasive Plant Species.

- 80. Evaluate sagebrush habitats to identify locations where additional fuel breaks could help keep wildfires small and/or minimize the likelihood of frequent re-burns. When deemed appropriate, install fuel breaks in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have large impacts on sage-grouse habitat.
- 81. Identify remnant stands of sagebrush and nearby pinyon pine within or adjacent to recent fire footprints that are at high risk for reburning and could be protected from wildfire by installing new fuel breaks. When deemed appropriate, conduct the required planning and install.

82. Identify and evaluate existing fuel breaks that should be maintained to protect remnant stands of sagebrush and nearby pinyon pine that exist within or adjacent to recent fire footprints. When deemed appropriate, implement maintenance measures in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have large impacts on sage-grouse habitat.
83. Evaluate the success of burned area restoration efforts. In places where cheatgrass is successfully being controlled, plant and monitor islands of sagebrush and other native perennial species to encourage succession toward a native shrubland ecosystem.
84. Establish and maintain sagebrush islands in burn footprints with extensive herbaceous vegetation to encourage dispersal of sagebrush seed and expansion of a native shrubland ecosystem.
85. Identify and evaluate areas where dead and dying pinyon are found in or adjacent to otherwise healthy sagebrush and/or woodland systems. Where dead and dying trees are NOT harboring active beetle infestations, remove trees to decrease future wildfire risk.
86. Increase coordination and timely communication within and among agencies (e.g. coordination between fuels and wildlife departments within a single agency and coordination among various federal and state agencies) to improve planning and execution of fuel reduction projects.

Small-Scale Infrastructure

For actions related to predation associated with small-scale infrastructure, see section *Predation*.

87. Maintain existing fences and flight diverters to deter fence strikes. Remove extraneous fences that are no longer needed. Priority areas include but are not limited to:
  - Big Meadow Complex
88. Evaluate newly constructed fences for fence strike hazards. Modify or mark fencing to deter fence strikes. Priority areas include but are not limited to:
  - Hercules Spring

Urbanization

89. Secure conservation easements or agreements with willing landowners to conserve sage-grouse habitat, improve connectivity and protect important water sources in the Pine Nuts PMU.

## Motorized Recreation

90. Monitor and evaluate traffic on frequently used roads in sage-grouse habitat to identify locations where current traffic levels may pose a threat to sage-grouse. In areas where negative impacts are identified, conduct the planning and environmental review necessary to implement measures such as seasonal or permanent closures, speed limits or other measures to minimize or eliminate the risk to sage-grouse as deemed necessary. Priority areas include but are not limited to:
  - Mill Canyon
  - Bald Mountain
91. Conduct the planning and environmental review necessary to decommission non-designated OHV trails near or through leks and/or within or adjacent to nesting and brood rearing habitats. Identify and implement habitat restoration measures as a component of the decommissioning effort.

## Wild Horse Overpopulation and Range Expansion

92. Monitor the Pine Nut Wild Horse Herd to determine the extent to which the herd is over AML and/or expanding outside of their designated HMA.
93. If necessary, implement captures or other population control methods to maintain the Pine Nut Wild Horse Herd at AML and within their HMA. Conduct environmental planning as necessary.
94. Evaluate mesic resources, leks, nesting and early brood rearing habitats, and late brood rearing and summer habitats for impacts from wild horses. When necessary, conduct the planning and environmental review necessary to install wildlife-friendly fences or implement other appropriate mitigations.

## Predation

95. Continue to monitor raven population levels and impacts on sage-grouse during the nesting and brood rearing seasons. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods. Priority locations include:
  - Mill Canyon Dry Lakebed
96. Consider monitoring new raven populations to determine impacts on sage-grouse during the nesting and brood rearing seasons. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods. Priority locations include:
  - The Buckskins
  - Big Meadow Complex
  - Bald Mountain
  - Mount Siegal
  - Mill Canyon

97. Pursue appropriate permitting to implement consistent raven control actions in both the California and Nevada portions of the PMU.

### Small Populations

98. Evaluate habitat suitability and carrying capacity for areas in the PMU with small, localized subpopulations that are at risk for extirpation if population declines continue. Where habitat quality is poor and carrying capacity is limited, prioritize habitat improvement and restoration actions to increase the likelihood of successful translocations and population augmentation efforts.
99. If local populations in the PMU decline to a level deemed to put them at risk for extirpation and habitat is suitable, consider translocations from larger source populations within the Bi-State area. The planning and implementation of any translocation effort(s) would be guided by the Bi-State sage-grouse translocation protocol.

### Invasive Plant Species

100. Identify and evaluate areas with invasive plant species. Where necessary and practical, conduct the planning and environmental review necessary to implement control measures which may include a combination of soil stabilization, weed treatment, and seeding or planting native species. Priority areas include but are not limited to:
  - Big Meadow Complex
101. Evaluate burn areas where native plant recruitment is low and weeds are an existing threat. Where necessary and practical, conduct the planning and environmental review required to implement native plant restoration practices and invasive plant controls including, but not limited to, soil stabilization, weed treatment, and seeding or planting native species. Priority areas include but are not limited to:
  - Mill Canyon Lek Vicinity
102. Identify and evaluate cheat grass dominated fire footprints for restoration. Where necessary and practical, conduct the planning and environmental review necessary to implement native plant restoration practices and invasive plant controls including, but not limited to, soil stabilization, weed treatment, and seeding or planting native species.
103. Maintain/continue previous weed treatments. Priority areas include but are not limited to:
  - Big Meadow Complex and Vicinity.

### Conifer Expansion

104. Continue to implement pinyon and juniper removal in the Buckskin Valley Vegetation Treatment project area.

- 105. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat, will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing pinyon and juniper removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation.
- 106. Maintain and expand partnerships with local Tribes to monitor and manage pinyon woodlands, mesic habitats, sagebrush uplands, and the ecotones between them to increase fire resiliency, conserve cultural values, and improve habitat conditions for sage-grouse, pinyon jay, and other species. Explore funding opportunities to increase Tribal capacity for participation.
- 107. Evaluate diseased conifers for fuels reduction. Initiate projects if deemed necessary. Priority areas include but are not limited to:
  - West side of Sunrise Pass
- 108. Maintain previous conifer expansion projects. Priority areas include but are not limited to:
  - Upper Mill Canyon
  - Buckskin Valley

Mesic Habitat Availability

For actions related to degradation of mesic resources by wild horses, see section *Wild Horse Over Population and Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.

- 109. Evaluate the need for artificial water developments, such as small game guzzlers, to improve wildlife access to water in sagebrush habitats with limited water availability. If deemed necessary, conduct the planning and environmental review necessary to install watering infrastructure along with appropriate fencing to exclude livestock where needed.
- 110. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for potential habitat improvement and ecological restoration work. Design site-specific habitat improvement projects as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success. Priority areas include but are not limited to:
  - Big Meadow Complex



## Permitted Livestock Grazing

For actions related to fences associated with livestock grazing management, see section *Small-Scale Infrastructure*.

For actions related to mesic resources and livestock grazing management, see section *Mesic Habitat Availability*.

## Research and Monitoring

111. Prioritize efforts to get consistent lek count data in the PMU by initiating annual volunteer based lek counts and implementing infrared flights to identify new leks and detect bird activity at leks that are inaccessible.
112. Inventory areas in the PMU where current information on sage-grouse distribution and use is limited and/or areas that were historically occupied to identify locations grouse may be inhabiting undetected. Review the results and conduct targeted pedestrian surveys to identify areas of active use. Priority survey areas include but are not limited to:
  - Singatse
  - Mill Canyon
  - Buckskin Valley
  - Leviathan-Monitor Pass Vicinity
  - Bagley Valley
  - Slinkard Valley

## **Desert Creek-Fales PMU**

### Wildfire

For actions related to invasive plant species post-wildfire, see section *Invasive Plant Species*.

113. Identify and evaluate areas where dead and dying pinyon are found adjacent to sagebrush and healthy woodlands. When feasible, and where dead and dying trees are NOT harboring active beetle infestations, remove dead trees to decrease future wildfire risk.
114. Evaluate sagebrush habitats to identify locations where additional fuel breaks could help keep wildfires small and/or minimize the likelihood frequent re-burns. When deemed appropriate, install fuel breaks in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have large impacts on sage-grouse habitat.
115. Evaluate post-restoration fire areas for success. In places where cheatgrass is successfully being controlled, plant and monitor islands of sagebrush and other native perennial species (e.g., bunchgrasses and forbs) to encourage succession toward a native shrubland ecosystem.

## Small-Scale Infrastructure

For actions related to predation associated with small-scale infrastructure, see section *Predation*.

116. Upon its construction, monitor and evaluate the impact that the deer fence on Highway 395 has on sage-grouse connectivity. Mark the fence where deemed necessary. Priority areas include but are not limited to:
  - Stretch of fence from Fales Hot Springs to Little Walker River Rd.

## Large-Scale Infrastructure

117. Map connectivity corridors crossing Highway 395 that are utilized by sage-grouse moving between the western slopes of the Sweetwater Range and the eastern slopes of the Sierra Nevada Range between Fales Hot Springs and the Little Walker River to inform the Caltrans Sonora Junction Wildlife Crossing Project.
118. Coordinate with Caltrans to ensure that the Sonora Junction Wildlife Crossing Project is appropriately designed to facilitate connectivity between sage-grouse habitats in the western slopes of the Sweetwater Range and the eastern slopes of the Sierra Nevada Range between Fales Hot Springs and the Little Walker River.

## Urbanization

119. Secure conservation easements or agreements with willing landowners to conserve sage-grouse habitat, improve connectivity and protect important water sources in the Desert Creek-Fales PMU.

## Recreation

120. Develop measures to document use and impacts at Rosaschi Ranch. If deemed necessary, improve recreation management to reduce impacts of motorized and non-motorized human use/recreation. (Rosaschi Ranch is found on the border of the Desert Creek-Fales and Mount Grant PMUs. Therefore, this action is included under both PMUs)

## Motorized Recreation

121. Monitor and evaluate traffic on frequently used roads in sage-grouse habitat to identify locations where current traffic levels may pose a threat to sage-grouse. In areas where negative impacts are identified, conduct the planning and environmental review necessary to implement measures such as seasonal or permanent closures, speed limits or other measures to minimize or eliminate the risk to sage-grouse as deemed necessary. Priority areas include but are not limited to:
  - Burcham Flat Rd.
  - Little Walker River Rd.

Non-Motorized Recreation

- 122. Evaluate areas utilized for non-motorized recreational activities that near sage-grouse habitat. Where necessary, install signs to communicate to the public where recreation is or is not permitted. Signs should include design elements that inherently reduce perching.

Wild Horse Overpopulation and Range Expansion

- 123. Monitor the Wassuk Horse Herd to determine the extent to which the population is over AML and/or expanding outside of their designated HMA.
- 124. If necessary, implement captures or other population control methods to maintain the Wassuk Horse Herd at AML and within their HMA. Conduct planning and environmental review as necessary.
- 125. Evaluate mesic systems, leks, nesting and early brood rearing habitats, and late brood rearing habitat and summer habitats for impacts from wild horses. When necessary, conduct the planning and environmental review necessary to install barriers that deter horse use. Install wildlife-friendly fences where appropriate.

Predation

- 126. Evaluate the need for monitoring of raven populations in the Desert Creek and Fales portions of the PMU to determine impacts on sage-grouse during the nesting and brood rearing seasons. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods.
- 127. Pursue appropriate permitting to implement consistent raven control actions in both the California and Nevada portions of the Desert Creek-Fales PMU.

Small Populations

- 128. Evaluate habitat suitability and carrying capacity for areas in the PMU with small, localized subpopulations that are at risk for extirpation if population declines continue. Where habitat quality is poor and carrying capacity is limited, prioritize habitat improvement and restoration actions to increase the likelihood of successful translocations and population augmentation efforts.
- 129. If local populations in the PMU decline to a level deemed to put them at risk for extirpation and habitat is suitable, consider translocations from larger source populations within the Bi-State area. The planning and implementation of any translocation effort(s) would be guided by the Bi-State sage-grouse translocation protocol.

Invasive Plant Species

- 130. Continue treatment of medusahead on Desert Creek Ranch (Desert Creek portion of the PMU).

- 131. Identify and evaluate areas where Russian thistle and cheatgrass have established. Where necessary and practical, conduct the planning and environmental review necessary to implement control measures which may include a combination of soil stabilization, weed treatment, and seeding or planting native species. Priority areas include but are not limited to:
  - Desert Creek Lek #2 (Desert Creek portion of the PMU)
- 132. Evaluate options to reduce medusahead populations in the Coleville area in the Fales portion of the PMU. Where necessary and practical, conduct the planning and environmental review necessary to implement site-specific control measures which may include a combination of weed treatment, and seeding or planting of native species.

Conifer Expansion

- 133. Monitor and maintain existing conifer removal projects.
- 134. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing pinyon and juniper removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation. Priority areas include but are not limited to:
  - Dead Ox Canyon
  - Wheeler Lek vicinity
  - Sweetwater Canyon
  - Historic Meadow at the top of the Pine Grove Hills
  - Sario Canyon/Huntoon Valley and the adjacent slopes of the Sweetwater and Sierra Nevada Ranges
- 135. Initiate and expand partnerships with local Tribes to monitor and manage pinyon woodlands, wet meadows, sagebrush and the ecotones between them to improve their condition for the pinyon jay and sage-grouse and to increase fire resiliency. Explore funding opportunities to increase Tribal capacity for participation.

Mesic Habitat Availability

For actions related to degradation of mesic resources by wild horses, see section *Wild Horse Over Population and Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.

- 136. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for potential habitat improvement and ecological restoration work. Design site-specific habitat improvement projects as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success. Priority areas include but are not limited to:
  - Burcham Flats
  - Wheeler Flats
  - Little Walker River
  - Two Rivers Preserve
  
- 137. Identify opportunities for mesic habitat improvement on private lands. Priority areas include but are not limited to:
  - Huntoon Valley/Sario Canyon
  - Swauger Creek
  - North Bridgeport Valley
  - Desert Creek

Permitted Livestock Grazing

For actions related to fences associated with livestock grazing management, see section *Small-Scale Infrastructure*.

For additional actions related to mesic resources and livestock grazing management, see section *Mesic Habitat Availability*.

- 138. Continue to manage livestock grazing on key brood meadows to achieve the functioning condition that provides the greatest forb abundance and diversity (usually functioning at risk or proper functioning condition) while maintaining adequate hiding cover and ensuring long-term system function. Priority areas include but are not limited to:
  - Burcham Flat
  - Little Walker River
  - Sage Road
  - Wheeler Flat

## Research and Monitoring

139. Inventory areas in the PMU where current information on sage-grouse distribution and use is limited and/or areas that were historically occupied to identify locations grouse may be inhabiting undetected. Review the results and conduct targeted pedestrian surveys to identify areas of active use. Priority survey areas include but are not limited to:
- Huntoon Valley/Sario Canyon
  - Pine Grove Hills
  - North Bridgeport Valley/Bridgeport Reservoir
  - Bald Mountain
  - West slope of the Wellington Hills
  - East side of Antelope Valley in California and Nevada
  - Two Rivers Preserve
140. Measure and monitor the amount of motorized traffic in sage-grouse habitat. Priority areas include but are not limited to:
- Burcham Flat
  - Little Walker River
  - Sage Road

## **Mount Grant PMU**

### Wildfire

For actions related to invasive plant species post-wildfire, see section *Invasive Plant Species*.

141. Increase fire safety education at the Walker River State Recreation Area.
142. Develop fire protection plans for the Walker River State Recreation Area.

### Small-scale Infrastructure

For actions related to predation associated with small-scale infrastructure, see section *Predation*.

143. Maintain existing fences and flight diverters to deter fence strikes. Remove extraneous fences that are no longer needed and modify or mark fencing to deter fence strikes. Areas for consideration include but are not limited to:
- Nine Mile Ranch
  - Area around the China Camp leks
144. Evaluate irrigation pivots at Nine Mile Ranch for use as predator perches or as sage-grouse deterrents. Remove if possible. If not, develop an alternative solution.
145. When modifying or replacing fences consider use of the area by pronghorn and bighorn sheep. Where appropriate, replace or modify fences with wildlife friendly fences.

## Large-Scale Infrastructure

146. Develop and implement stipulations to minimize disturbance impacts associated with increased traffic from the Aurora-Borealis mine.
147. Limit development of large-scale infrastructure to the extent allowed by applicable laws, regulations, agency policies, and land use plan direction and guidance. Implement required and recommended mitigation measures to conserve and protect sage-grouse and their habitats if new large-scale infrastructure projects are authorized or when existing projects are reauthorized or decommissioned. Areas of concern include but are not limited to:
  - Bald Peak
  - Spring Peak
  - Brawley Peak
  - Area to the west of Aurora Peak

## Urbanization

148. Secure conservation easements or agreements with willing landowners to conserve sage-grouse habitat, improve connectivity and protect important water resources.
149. Continue to collaborate and communicate with Lyon and Mineral counties so that they have the best available information on the Bi-State sage-grouse.
150. Evaluate the direct (e.g. habitat conversion) and indirect (e.g. increased human use/traffic) impacts that development at Lucky Boy Pass will have on the Bi-State sage-grouse.

## Recreation

151. Develop measures to document use and impacts at Rosaschi Ranch. If deemed necessary, improve recreation management to reduce impacts of motorized and non-motorized human use/recreation. (Rosaschi Ranch is found on the border of the Desert Creek-Fales and Mount Grant PMUs. Therefore, this action is included under both PMUs)

## Motorized Recreation

152. Develop and implement a public communication and law enforcement plan in the Walker River State Recreation Area to reduce population level harm to sage-grouse from motorized vehicles.

## Non-Motorized Recreation

153. Update recreation plans for Nine Mile ranch to include protections for mesic areas that serve as brood rearing habitat.

## Wild Horse Overpopulation and Range Expansion

154. Monitor the Wassuk and Powell Mountain Horse Herds to determine the extent to which the populations are over AML and/or expanding outside of their designated HMA/WH&BT.
155. If necessary, implement captures or other population control methods to maintain the Wassuk and Powell Mountain Horse Herds at AML and within their HMA/WH&BT. Conduct planning and environmental review as necessary.

## Predation

156. As maintenance is needed on the Pacific DC Intertie transmission line, coordinate with LADWP to install perch deterrents.
157. Monitor ravens along the East Walker River Corridor that runs through Rosaschi Ranch and the Walker River State Recreation Area.
158. Monitor roadkill on Lucky Boy Rd. and Aurora Rd. to determine if actions should be developed to reduce food subsidies for sage-grouse predators such as ravens.

## Small Populations

159. Evaluate habitat suitability and carrying capacity for areas in the PMU with small, localized subpopulations that are at risk for extirpation if population declines continue. Where habitat quality is poor and carrying capacity is limiting, prioritize habitat improvement and restoration actions to increase the likelihood of successful translocations and population augmentation efforts.
160. If local populations in the PMU decline to a level deemed to put them at risk for extirpation and habitat is suitable, consider translocations from larger source populations within the Bi-State area. The planning and implementation of any translocation effort(s) would be guided by the Bi-State sage-grouse translocation protocol.

## Invasive Plant Species

161. Continue implementing the short-term plan and develop a long-term plan for weed control and restoration in the mesic and old field areas of the Walker River State Recreation Area.
162. Evaluate restoration of areas in the Spring Peak Fire that have Russian thistle infestations for restoration. Where necessary and practical, conduct the planning and environmental review necessary to implement control measures which may include a combination of soil stabilization, weed treatment, and seeding or planting native species.
163. Evaluate the Rosaschi Ranch for invasive plant species. If necessary, develop and implement an invasive plant control plan.
164. Continue invasive plant treatments throughout the Walker Basin, even outside of sage-grouse habitat, to prevent spread into sage-grouse habitat.



Conifer Expansion

165. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing pinyon and juniper removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation.

Mesic Habitat Availability

For actions related to degradation of mesic resources by wild horses, see section Wild Horse Over Population and *Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.

166. Work with the Hawthorne Army Depot and BLM to maintain and improve brood habitat quality at Lapon Meadows. Design and implement site-specific habitat improvement projects where feasible and install off-site water sources where appropriate.

167. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for habitat improvement and ecological restoration work. Design site-specific habitat improvement projects as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success. Priority areas include but are not limited to:

- Nine Mile Ranch
- Lower Bodie Creek
- Lower Rough Creek
- Fletcher Spring
- Rosaschi Ranch
- Meadows to the southeast of Aurora Peak
- Baldwin Canyon

168. Remove derelict fencing at Fletcher Spring and replace with pipe-rail fencing to protect mesic habitat from livestock and horses.

169. Evaluate grazing management at Nine Mile Ranch and identify areas for improving protection of meadow/brood rearing habitat.

170. Continue to implement the management plan for restoration and improvement of mesic resources at the Walker River State Recreation Area.

171. Continue to irrigate Rosaschi Ranch and develop additional habitat improvements as described in Action 167.

## Permitted Livestock Grazing

For actions related to fences associated with livestock grazing, see section *Small-Scale Infrastructure*.

For actions related to mesic resources and livestock grazing management, see section *Mesic Habitat Availability*.

## Research and Monitoring

172. Increase the level of interagency support and effort for annual lek counts in the Mount Grant section of the PMU and coordinate with the DOD to conduct lek counts on the Hawthorne Army Depot.
173. Monitor brood rearing habitat at Nine Mile Ranch to evaluate response to management actions and inform future management.
174. Inventory areas in the PMU where current information on sage-grouse distribution and use is limited and/or areas that were historically occupied to identify locations grouse may be inhabiting undetected. Review the results and conduct targeted pedestrian surveys to identify areas of active use. Priority survey areas include but are not limited to:
  - Powell Mountain
  - Cambridge Hills

## **Bodie Hills PMU**

## Wildfire

For actions related to invasive plant species post-wildfire, see section *Invasive Plant Species*.

175. Maintain fuel breaks to help keep wildfires small. Implement maintenance measures in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have large impacts on sage-grouse habitat. Priority areas include but are not limited to:
  - Mono City
  - Conway Ranch
176. Evaluate road networks in and around private inholdings to identify areas where additional fuel breaks could help contain wildfires. When deemed appropriate, install fuel breaks in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have large impacts on sage-grouse habitat. Priority areas include but are not limited to:
  - Mono Basin Flats (Goat Ranch Road)
  - Area surrounding Bodie State Park

- 177. Plan and implement small-scale shrub treatments to introduce seral diversity in the sagebrush shrublands of the Bodie Hills described in the 2009 Conservation Action Plan done collaboratively with The Nature Conservancy. Projects should be designed to both improve habitat quality and to improve the shrubland resistance and resilience to large scale wildfire.
- 178. Provide support to private landowners to burn or dispose of slash from pinyon-juniper treatments to reduce fuels. Priority areas include but are not limited to:
  - Mormon Meadows property

Small-Scale Infrastructure

For actions related to predation associated with small-scale infrastructure, see section *Predation*.

- 179. Remove extraneous fences that are no longer needed. Priority areas include but are not limited to:
  - Bishop BLM’s fence #B1042 off of Geiger Grade.
- 180. Monitor the need for existing infrastructure and remove as it becomes obsolete. Priority areas include but are not limited to:
  - Power/telephone lines in Cottonwood Canyon
- 181. When modifying or replacing fences in sage-grouse habitat consider if the area is used by pronghorn. Where appropriate replace or modify fences with pronghorn friendly fences. Priority areas include but are not limited to:
  - Potato Peak
  - Big Flat (west of Bull Spring)

Large-Scale Infrastructure

- 182. Work with Caltrans to limit the impacts of any improvement or maintenance of U.S. Highway 395 through the Bodie Hills and develop mitigation measures such as grouse-friendly wildlife crossings as necessary.
- 183. Limit mineral exploration and development (locatable, saleable, and leasable) in sage-grouse habitat to the extent allowed by applicable laws, regulations, agency policies, and land use plan direction and guidance. Develop and apply project-specific design features and on-site mitigation measures to avoid and/or minimize impacts to sage-grouse and their habitats including ground and/or surface water and associated resources if new exploration or development is authorized or when existing projects are reauthorized or decommissioned. Limit the consideration and application of off-site mitigation to cases where negative impacts cannot be mitigated on-site and/or where there is a quantifiable net benefit to the Bi-State DPS and its habitats.

Urbanization

- 184. Secure conservation easements or agreements with willing landowners to conserve sage-grouse habitat, improve connectivity and protect important water sources in the Bodie Hills PMU.

185. Continue to collaborate and communicate with Mono County to provide them with the best available information on the Bi-State sage-grouse.

Motorized Recreation

186. Monitor and evaluate traffic on frequently used roads in sage-grouse habitat to identify locations where current traffic levels may pose a threat to sage-grouse. In areas where negative impacts are identified, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits or other protective measures as deemed necessary. Priority areas include but are not limited to:

- Goat Ranch Road
- Green Creek/Dunderberg Meadows Road
- Aurora Canyon Road
- Cottonwood Canyon Road
- Bodie Road
- Bridgeport Canyon Road
- Coyote Springs Road in Bridgeport Canyon
- Summers Meadow Road
- Masonic Road
- Geiger Grade (Bodie-Masonic Road)

187. Monitor traffic on less well traveled roads in sage-grouse habitat in locations where increased traffic levels may pose a threat to sage-grouse. If vehicle use begins to approach levels linked to negative impacts, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits or other protective measures as deemed necessary. Priority areas include, but are not limited to:

- Dry Lakes Road
- 7-Trough Road
- Big Flat Road
- Biedeman Lek Road

188. Coordinate with Caltrans, CA State Parks and Mono County to ensure that recreational use and maintenance of State Road 270 and the Cottonwood Canyon Road does not pose a threat to nearby leks.

189. Provide input on how to minimize impacts for recreational proposals with the potential to impact sage-grouse and sage-grouse habitat, such as Towns to Trails or other similar proposals with the potential to increase recreational use in sage-grouse habitat.

Non-Motorized Recreation

190. Monitor and evaluate non-motorized recreation such as dispersed camping, hiking, recreational events, and off leash dogs near lek sites, nesting habitat or brood rearing habitat. If recreational use is deemed to pose a threat to sage-grouse, conduct the planning and environmental review necessary to implement appropriate mitigations. Priority areas include, but are not limited to:
- Biedeman Lek
  - Stringer Meadows
  - Lek 9
  - Racetrack Lek

Wild Horse Overpopulation and Range Expansion

191. Monitor wild horse populations to determine the extent to which populations are expanding outside of their designated HMAs or WH&BTs into the Bodie Hills PMU. Known areas of occurrence include:
- Southeastern portion of the Bodie Hills
  - Brawley Peaks
  - Upper Mexican Spring
  - 7-Troughs
  - Dry Lakes Plateau
  - Larkin Lake
  - Rough Creek Headwaters (Meadow Canyon - tributary 2)
192. Conduct environmental planning as appropriate to implement captures where incursion of horses outside of their respective territory/herd management area boundaries and within the PMU are negatively impacting sage-grouse habitat.
193. Prevent the establishment of wild horses that are expanding outside of designated herd units in neighboring PMUs (Powell Mountain Herd and Montgomery Pass Herd). Consider physical deterrents such as fences. Priority areas include but are not limited to:
- Dry Lakes Plateau
  - Brawley Peaks-Upper Mexican Spring
  - 7-Troughs
  - Highway 167-Larkin Lake
194. Evaluate mesic systems, leks, nesting and early brood rearing habitats, and late brood rearing and summer habitats for impacts from wild horses. When necessary, consider physical deterrents such as fences. Priority areas include but are not limited to:
- Dry Lakes Plateau
  - Brawley Peaks-Upper Mexican Spring
  - 7-Troughs

## Predation

195. Evaluate the need for raven monitoring in nesting and brood rearing habitat. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods. Priority locations include:
- Bodie State Park
  - Green Creek/lower Summers Meadows area
  - CA State Road Road 270 (Bodie Road) Corridor
  - U.S. Highway 395 Corridor/Conway Ranch to Point Ranch
  - Cottonwood Road Transfer Station

## Invasive Plant Species

196. Evaluate post-fire restoration areas for success. In places where Russian thistle, cheatgrass or other invasive plant infestations are occurring, design and implement weed control. This may include combinations of soil stabilization, weed treatment, and seeding or planting of native species. Priority areas include but are not limited to:
- Spring Peak burn area
  - Potato Peak burn area
  - Aurora burn area
  - Green Creek burn area
197. Continue roadside weed monitoring and treatment to prevent weed infestations from establishing in core sagebrush habitats. Priority areas include but are not limited to:
- Aurora Canyon Road
  - Bodie Road
  - Cottonwood Canyon
  - Green Creek Road/Dynamo Pond

## Conifer Expansion

198. Maintain and expand partnerships with local Tribes to monitor and manage pinyon woodlands, mesic habitats, sagebrush uplands, and the ecotones between them to increase fire resiliency, conserve cultural values, and improve habitat conditions for sage-grouse, pinyon jay, and other species. Continue work in priority areas and work with local Tribes to identify new areas where future work is needed. Priority areas include but are not limited to:
- Rancheria Gulch
  - North of Bodie Road (Cinnabar Canyon to Warm Springs/Big Alkali)
  - Masonic Mountain vicinity
199. Continue monitoring of existing and planned pinyon-juniper treatments for both sage-grouse population response and pinyon jay use of the edges and adjacent pinyon woodlands.

200. Conduct pinyon jay studies to find nesting colonies and fall foraging and caching areas to inform conifer removal projects and identify where management actions can benefit both sage-grouse and pinyon jay.
201. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing pinyon and juniper removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation.
  - North of Bodie Road (Cinnabar Canyon to Warm Springs/Big Alkali)
  - Lower Mono Basin (tree line and canyon mouths where connectivity to higher country may be impacted)
  - Lower Rough Creek and tributaries
202. Monitor previous conifer treatment areas for trees missed during the original contract or resprouting and maintain previous treatments as necessary. Priority areas include but are not limited to:
  - Aurora Canyon
  - Big Flat
  - South of Mormon Meadows
  - Bridgeport Canyon
  - Sinnamon Cut
  - Green Creek
  - Treatments that have been conducted on private lands
203. Plan and complete conifer removal treatments in BLM Wilderness Study Areas (WSAs). Prioritize work in areas near leks and nesting habitat adjacent to existing treatments outside the WSAs. When possible, consider allowing seedlings to be removed for transplantation by local Tribes as specified in *Appendix F*. Priority areas include but are not limited to:
  - Aurora Canyon south of the wagon road
  - Bridgeport Canyon (east of Coyote Springs)
  - Cottonwood Canyon (west of road)

Mesic Habitat Availability

For actions related to degradation of mesic resources by wild horses, see section *Wild Horse Over Population and Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.

204. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for potential habitat improvement and ecological restoration work. Design site-specific habitat improvement projects based as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success. Priority areas include but are not limited to:

- Upper reach of Cottonwood Creek near Biedeman Lek
- Meadows in Bridgeport Canyon
- Stringer Meadows
- Red Wash Meadow and drainage (Rough Creek tributary 4) near Big Flat Lek
- Coyote Springs drainage
- Rough Creek headwaters
- Aurora Canyon headwaters
- Mormon Meadow
- Little Mormon Meadow
- Sinnamon Cut
- Lower Cottonwood Creek
- Goat Ranch
- Dry Lakes Plateau

205. Identify and evaluate areas where brush vegetation management such as burning, thinning, and mowing can aid in promoting meadow restoration/health. Priority areas include but are not limited to:

- Little Mormon drainage
- Spring west of Dry Lakes
- Meadows in Big Flat vicinity
- Biedeman satellite leks vicinity
- Bridgeport Canyon vicinity
- Upper Rough Creek and tributaries
- Dry Lakes Plateau vicinity

206. Maintain existing meadow habitat livestock exclosures in the Bodie Hills.

207. Evaluate previous mesic habitat restoration projects throughout the Bodie Hills to develop best practices for new projects. Conduct maintenance if needed. Priority areas include but are not limited to:

- Aurora Canyon
- Red Wash
- Clark Canyon
- Little Mormon Creek
- Clearwater Creek
- Big Alkali



208. Inventory and evaluate mid and high-elevation mountain big sagebrush and silver sagebrush habitats for potential brood rearing and late summer habitat improvement sites. Design and implement site-specific habitat improvement projects and/or management strategies based on the results. Select habitat improvement techniques and/or management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success.

### Permitted Livestock Grazing

For actions related to fences associated with livestock grazing, see section *Small-Scale Infrastructure*.

For actions related to mesic resources and livestock grazing management, see section *Mesic Habitat Availability*.

### Research and Monitoring

209. Assess the impact of research and monitoring activities such as captures, nest monitoring, and relocations on the Bodie population.
210. Evaluate the need to continue monitoring and/or the need to shift monitoring to understudied areas based on the 2024 Bi-State Sage-Grouse Research and Monitoring Plan.
211. Maintain the current level of interagency support and effort required to conduct annual lek counts in the Bodie Hills PMU.
212. Inventory areas of the PMU where current information on sage-grouse distribution and use is limited and/or areas that are not currently occupied by sage-grouse for habitat suitability and potential use. Identify areas of currently suitable habitat that may support sage-grouse and areas of historical use that could support sage-grouse if habitat conditions were improved or restored. Review the results and conduct targeted pedestrian surveys to identify areas of active use. Priority survey areas include but are not limited to:
  - Northeast Mono Basin/Mono Valley
  - Northwest Mono Basin/South of Mono City
  - Eastern Slopes/Moraines of the Sierra Nevada

### Collaboration and Coordination

213. Pursue partnerships between government agencies and local Tribes to provide Tribal involvement in projects with training and employment opportunities for Tribal youth.
214. Pursue partnerships between government agencies and local NGOs to provide on-the-ground opportunities for public participation in Bi-State sage-grouse conservation projects.

## South Mono PMU

### Wildfire

For actions related to invasive plant species post-wildfire, see section *Invasive Plant Species*

215. Continue to manage and restore adjacent Jeffrey pine forests at Sagehen to allow frequent low intensity wildfire to reduce the chances that fire spreads into adjacent sagebrush habitat. Management approaches should include a combination of mechanical fuels reduction, prescribed fire, and management of wildfires for multiple benefits.
216. Coordinate among agencies to educate recreationalists about wildfire risk and enforce fire and camping restrictions on public and LADWP land. Priority areas include:
  - Sagehen
  - Parker Meadows
  - Long Valley
217. Evaluate the road network in Long Valley/Upper Owens River areas for fuel breaks to help contain wildfires. Where deemed appropriate, install fuel breaks in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have negative impacts on sage-grouse habitat.
218. Maintain existing fuel breaks and evaluate the need for new fuel breaks to reduce the likelihood of a fire spreading out of the Wildland-Urban Interface into adjacent sage-grouse habitat. Where deemed appropriate, maintain, or install fuel breaks in a manner that minimizes native species removal, encourages native plant diversity and cover, and discourages invasive plant species from establishing while still providing a means to control wildfires that would have large impacts on sage-grouse habitat. Priority areas include but are not limited to:
  - Benton
  - Old Benton
  - Benton Paiute Reservation
  - Mammoth Lakes

### Small-scale Infrastructure

For actions related to predation associated with small-scale infrastructure see section *Predation*

219. Avoid installing new small-scale infrastructure unless necessary or if it provides overall benefit to sage-grouse populations. When new infrastructure must be installed, consider installing structures with design elements that inherently reduce perching. Priority areas include but are not limited to:
  - Sagehen
  - Parker Meadows
  - Long Valley

220. Evaluate small-scale infrastructure and remove if possible. Where it cannot be removed, install bird deterrent spikes on structures near lek and brood rearing habitat to reduce predation. Priority areas include but are not limited to:
  - Sagehen
  - Parker Meadows
  - Brown’s Owens River Campground (Long Valley)
  - Upper Owens River (Long Valley)
221. Maintain existing fences and flight diverters to deter fence strikes. Remove extraneous fences that are no longer needed. Where deemed necessary, modify and mark fencing to deter fence strikes. If let-down fences are installed, implement best management practices to reduce the removal of sagebrush. Remove extraneous fences when possible. Priority areas include but are not limited to:
  - Sagehen
  - Parker Meadows
  - Laurel Ponds (Long Valley)
  - Proposed deer fence on Highway 395 (Long Valley)
222. Coordinate with lessees in Long Valley to ensure let-down fences are not raised until after lekking season.
223. Coordinate with lessees in Long Valley to complete windmill removal and solar pump replacement.
224. Coordinate partners on the development of the Mammoth Wildlife Crossing project to reduce adverse impacts of the proposed deer fence.
225. Once the deer fence associated with the Mammoth Wildlife Crossing project is constructed, monitor and evaluate the impact of any portion of fence extending between Laurel Ponds and Mammoth Creek.
226. Evaluate the potential for virtual fences in Long Valley. If deemed favorable, coordinate with local ranchers to initiate a pilot project.

Large-scale Infrastructure

227. Coordinate with LADWP to reduce negative impacts to greater sage-grouse during the spillway modification and the installation of the new gates at the Grant Lake Reservoir at Parker Meadows.
228. Map connectivity corridors crossing Highway 395 in Long Valley that are utilized by sage-grouse moving between Long Valley and West Long Valley to inform the Mammoth Wildlife Crossing Project.
229. Coordinate with Caltrans to ensure that the proposed Highway 395 wildlife crossing is appropriately designed to facilitate connectivity between sage-grouse populations in West Long Valley and Long Valley.

- 230. Limit mineral exploration and development (locatable, saleable, and leasable) in sage-grouse habitat to the extent allowed by applicable laws, regulations, agency policies, and land use plan direction and guidance. Develop and apply project-specific design features and on-site mitigation measures to avoid and/or minimize impacts to sage-grouse and their habitats including ground and/or surface water and associated resources if new exploration or development is authorized or when existing projects are reauthorized or decommissioned. Limit the consideration and application of off-site mitigation to cases where negative impacts cannot be mitigated on-site and/or where there is a quantifiable net benefit to the Bi-State DPS and its habitats.
- 231. Continue to coordinate with Mono County to monitor and mitigate potential adverse impacts on sage-grouse that may occur during the closure and restoration of the Benton Crossing Landfill in Long Valley.
- 232. Coordinate with Mono County and the Town of Mammoth Lakes on any potential airport use expansions.
- 233. Coordinate with the Town of Mammoth Lakes on any potential expansion to the sports complex and dog park in the Whitmore Recreation Area.

Urbanization

- 234. Secure conservation easements or agreements with willing landowners to conserve sage-grouse habitat, improve connectivity and protect important water sources in the South Mono PMU.
- 235. Continue to collaborate and communicate with Mono County to provide them with the best available information on Bi-State sage-grouse and make recommendations for continued protections.
- 236. Collaborate with Mono County, LADWP, and Caltrans to limit development in sage-grouse habitat in Parker Meadows or in areas that may limit population connectivity between Parker Meadows and other subpopulations. When new development is necessary, collaborate to ensure that design features and mitigation measures are implemented to reduce negative impacts on sage-grouse.
- 237. Collaborate with Mono County to limit development in sage-grouse habitat in Long Valley or in areas that may limit population connectivity between Long Valley and other subpopulations. When new development is necessary, collaborate with the County and Town to ensure that best management practices are implemented to reduce negative impacts on sage-grouse. Priority areas include but are not limited to:
  - Private parcels near Layton Spring

Recreation

- 238. When impacts are identified, conduct environmental planning as appropriate to manage all recreation including, but not limited to, vehicles, camping, dogs, lek viewing, hiking, skiing and fishing in Long Valley to reduce impacts of human use on sage-grouse and their habitat.

239. Collaborate with the Town of Mammoth Lakes, Mono County and LADWP on existing recreation uses and proposals for expansion of recreation activities to reduce, minimize, and eliminate impacts to sage-grouse.

### Motorized Recreation

240. Coordinate with LADWP and Mono County to reduce vehicle speeds along Parker Meadows Road leading to Parker Lake trailhead.
241. Monitor and evaluate traffic on frequently used roads in Long Valley that pass through or near sage-grouse habitat to identify locations where current traffic levels may pose a threat to sage-grouse. In areas where negative impacts are identified, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits or other protective measures as deemed necessary. Priority areas include:
- Crowley Lake access roads (Leks 2, 3 and 4 vicinities)
  - Shepard's Tub
  - Crab Cooker Tub
  - Rock Tub Loop
  - Benton Crossing
  - Owens River Road
  - Antelope Springs Road
  - Parker Road
242. Monitor traffic on less well traveled roads in sage-grouse habitat in Long Valley where future increases in traffic could pose a threat to sage-grouse. If vehicle use begins to approach levels linked to negative impacts, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits or other protective measures as deemed necessary. Priority areas include but are not limited to:
- Wilfred Canyon Road
243. Continue the use of seasonal road closures in Long Valley during lekking season and expand the number of roads or length road segments that are closed as needed.
244. Increase coordination among LADWP, BLM and USFS to restrict motorized access to sensitive habitat in Long Valley.
245. Monitor and evaluate over snow vehicle use near lek sites or overwintering habitat in Long Valley to determine thresholds for which population level impacts are observed. If over snow vehicle use is deemed to pose a threat to sage-grouse, conduct the planning and environmental review necessary to implement appropriate mitigation. Coordinate with appropriate land management agencies to update over snow vehicle use plans if impacts are observed.

Non-Motorized Recreation

- 246. Develop educational materials to educate public users of Parker Meadows on sage-grouse and the risks posed to the birds by off-leash pets.
- 247. Replace damaged or missing no camping signs where needed in Long Valley. Utilize deterrents such as boulder placement where necessary.
- 248. Monitor and evaluate non-motorized recreation in Long Valley such as dispersed camping near lek sites and nesting habitat or conflicts with dogs in brood rearing habitat Determine thresholds for which population-level impacts are observed. If recreational use is deemed to pose a threat to sage-grouse, conduct the planning and environmental review necessary to implement appropriate mitigations. Priority areas include but are not limited to:
  - Long Valley Hot Springs
  - Along the Owens River
  - Laurel Pond
  - Mammoth Creek
  - Whitmore Recreation Area

Wild Horse Overpopulation and Range Expansion

- 249. Monitor the Montgomery Pass wild horse herd to determine the extent to which populations are over AML and/or expanding outside of their designated WH&BT. Priority areas include but are not limited to:
  - Sagehen Summit and Meadows (Sagehen)
  - Adobe Valley (Sagehen)
  - Cowtrack Mountain (Sagehen)
  - Indian Springs (Sagehen)
  - Shoreline areas of Mono Lake (Parker Meadows via Sagehen)
  - Any movement towards the Bodie Hills PMU (Sagehen)
  - Any movement towards Long Valley (via Sagehen)
  - Waterson Divide area (Long Valley)
  - Benton Valley (Long Valley)
- 250. Conduct environmental planning as appropriate to implement captures or other population control methods to maintain the Montgomery Pass wild horse herd at AML and within the designated WH&BT.
- 251. Implement captures or other population control methods to maintain the Montgomery Pass wild horse herd at AML and within the designated WH&BT.
- 252. Conduct environmental planning as appropriate to implement captures of wild horses occurring within sage-grouse habitat that are outside of the designated WH&BT.
- 253. Implement captures of wild horses occurring within sage-grouse habitat that are outside of the designated WH&BT.

- 254. Prevent wild horses from crossing into the Parker Meadows through management of the Montgomery Pass wild horse population. If necessary, install fencing on the west side of Highway 395.
- 255. Evaluate mesic systems, leks, nesting and early brood rearing habitats, and late brood rearing and summer habitats for impacts from wild horses. When necessary, install wildlife-friendly fences. Priority monitoring areas include:
  - Indian Springs (Sagehen)
  - South Shore of Mono Lake (Parker Meadows)
  - Highway 120 corridor (Parker Meadows)
  - Long Valley

Predation

- 256. Monitor raven population levels and impacts on sage-grouse during nesting and brood rearing seasons at Sagehen and Parker Meadows. If population level impacts are identified, identify and remove raven attractants. If necessary, consider implementing raven control methods. Priority areas include:
  - Pumice Valley Landfill and Transfer Station
- 257. Evaluate raptor and raven use of the double wood transmission line in Long Valley that crosses brood meadows along the upper Owens River east of Lek 9x at Inaja Ranch. Install perch deterrents if predation is adversely affecting sage-grouse population performance.
- 258. Continue to survey raven populations in Long Valley to detect potential prey switching impacts in response to the closure of the Benton Crossing Landfill. Consider expanding monitoring to include gulls or other predators if necessary.
- 259. Continue to implement raven control methods such as egg oiling if populations are above the threshold that impact sage-grouse population performance in Long Valley. Consider additional methods as appropriate.

Small Population

- 260. Evaluate habitat suitability and carrying capacity for areas with small populations that are at risk for extirpation if populations decline. Where habitat quality is low, restore habitat to support larger populations if translocations are deemed necessary. Priority areas include but are not limited to:
  - Sagehen
- 261. If local populations decline to a level deemed to put them at risk for extirpation and habitat is suitable, consider translocations including from source populations from other parts of the Bi-State. The planning and implementation of any translocation effort(s) would be guided by the Bi-State sage-grouse translocation protocol.
  - Sagehen
- 262. Consider halting the translocation efforts to the Parker Population to determine if the resultant increases in population size are self-sustaining.

## Invasive Plant Species

263. Evaluate burn areas where native plant recruitment is low, and/or weeds such as cheatgrass Russian thistle or other invasive plant infestations are an existing threat. Where necessary and practical, implement and monitor restoration actions including, but not limited to, soil stabilization, weed control and seeding or planting of native species. Priority areas include but are not limited to:
- Indian Fire burn area
  - Beach Fire burn area
  - Walker Fire burn area
  - Hot Creek burn area
264. Continue monitoring and treating perennial pepper weed in and around mesic areas in Long Valley to prevent weed infestations from establishing in core sagebrush habitats.

## Conifer Expansion

265. Maintain existing Jeffrey pine removal project areas at Sagehen as needed.
266. Maintain existing Jeffrey pine removal projects in Parker Meadows as needed. Evaluate the need for additional Jeffrey pine removal projects to restore mesic resources. When possible, carry out removal of early seral stands without disturbing old Jeffrey pine stands.
267. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing pinyon and juniper removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation.
- Waterson Divide
  - Corridor between Wild Rose Summit and Black Lake
268. Evaluate removal of scattered Jeffrey pine in the West Long Valley area while considering habitat sink dynamics.
269. Continue to monitor and control conifer expansion near Long Valley leks.

## Mesic Habitat Availability

For actions related to degradation of mesic resources by wild horses, see section *Wild Horse Over Population and Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.



- 270. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for potential habitat improvement and ecological restoration work. Design site-specific habitat improvement projects as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success. Priority areas include but are not limited to:
  - Parker Meadows
  - Hot Creek Meadow (Long Valley)
  - Springs near O’Harrel Creek (Long Valley)
  - Inaja/Lek 9 Complex vicinity (Long Valley)
- 271. Continue implementation of the Adaptive Management Plan (AMP) for Bi-State Sage-Grouse Brood Rearing Habitat on LADWP lands in Long Valley.
- 272. Coordinate to replace the failing Eaton water diversion structure which is important to maintaining brood rearing habitat west of Convict Creek in Long Valley.
- 273. Continue working with ranchers and LADWP to recognize the importance of irrigated meadows traditionally used for livestock grazing for sage-grouse habitat, and work to retain the quality of that habitat.
- 274. Monitor existing watershed restoration projects at Clover Patch in Long Valley and maintain as needed.

Permitted Livestock Grazing

For actions related to mesic habitat availability associated with livestock grazing, see section *Mesic Habitat Availability*.

For actions related to fences associated with livestock grazing, see section *Small-Scale Infrastructure*.

- 275. Continue to monitor implementation of grazing permit terms and conditions in Sagehen.
- 276. Continue to monitor implementation of grazing permit terms and conditions in the Long Valley.
- 277. Work with ranchers to construct small exclosures around key mesic resources in Long Valley.

Research and Monitoring

- 278. Evaluate whether short-term translocation efforts can benefit small populations and in what scenarios (e.g. increasing genetic diversity/reversing observable inbreeding depression/ growing population sizes).

279. Inventory areas of the PMU where current information on sage-grouse distribution and use is limited and/or areas that are not occupied by sage-grouse for habitat suitability and potential use. Identify areas of currently suitable habitat that may support sage-grouse and areas of historical use that could support sage-grouse if habitat conditions were improved or restored. Review the results and conduct targeted pedestrian surveys to identify areas of active use. Priority survey areas include but are not limited to:
- Sagehen
  - Cowtrack Mountain
  - Adobe Valley
  - Southern Mono Basin
  - Volcanic Tableland
  - Blind Springs Hill
280. Monitor for bird presence using pedestrian and bird dogs at Sagehen to determine the extent to which habitat in the area is being actively used by grouse.
281. Evaluate the need to continue monitoring and/or the need to shift monitoring to understudied areas based on the 2024 Bi-State Sage-Grouse Research and Monitoring Plan.
282. Assess the impact of research and monitoring activities such as captures and nest monitoring on the Long Valley population.
283. Evaluate the extent to which drone usage negatively impacts sage-grouse and utilize data to develop best management practices for drone use.

## White Mountains PMU

### Wildfire

For actions related to invasive plant species post-wildfire, see section *Invasive Plant Species*.

284. Evaluate the potential of firebreaks to reduce the likelihood of wildfire spreading from the Wildland-Urban Interface surrounding Fish Lake Valley into adjacent sage-grouse habitat. Prioritize evaluation of lower slopes and drainage mouths near roads and developments where fire ignition risk is elevated. Install firebreaks if deemed likely to be effective.
285. Promote interagency cooperation in fire response on the east side of the White Mountains.
286. Work towards an interagency operations response plan for the east side of the White Mountains.

### Small-scale Infrastructure

For actions related to predation associated with small-scale infrastructure, see section *Predation*.

- 287. Monitor the need for existing infrastructure and remove as it becomes obsolete. Priority areas include but are not limited to:
  - Utility poles, research equipment, antenna, discs, and structures associated with the Barcroft and White Mountain Research Stations
- 288. Maintain existing fences and flight diverters to deter fence strikes. Remove extraneous fences that are no longer needed. Priority areas include but are not limited to:
  - White Mountains Wilderness
  - Crooked Creek
  - Cottonwood Drainage
  - Leidy
  - Barcroft and White Mountain Research Stations
  - Northeast side of Montgomery Pass
- 289. Evaluate the road network and identify opportunities to decommission redundant roads.

Large-Scale Infrastructure

- 290. Review published research and establish science-based recommendations to mitigate visual and aural disturbances, such as helicopter operations associated with operation and maintenance of transmission lines, which negatively impact sage-grouse and are associated with large-scale infrastructure projects.
- 291. Continue to work with Southern California Edison to reduce impacts of existing transmission lines and remove them completely from grouse habitat if possible. Where feasible and where net impacts to habitat will be less than overhead facilities, bury new or reconstructed utility lines to reduce negative effects on sage-grouse habitat and other resources. Priority areas include but are not limited to:
  - Area between Silver Canyon and Wyman Canyon

Urbanization

- 292. Secure conservation easements or agreements with willing landowners to conserve sage-grouse habitat, improve connectivity and protect important water sources in the White Mountains PMU.
- 293. Improve communication and coordination with Inyo, Esmeralda and Mineral counties and their Conservation Districts in the White Mountains PMU to provide them with the best available information on Bi-State sage-grouse.

## Recreation

294. Increase outreach to educate recreationalists on the importance of sage-grouse habitat and best practices to reduce negative impacts. Consolidate visitor information at points of entry and eliminate redundancy elsewhere. Priority locations include:
- Entrances to Silver Canyon and Wyman Canyon
  - Bristlecone Visitor Center intersection
  - Bristlecone Road entrance kiosk

## Motorized Recreation

295. Monitor and evaluate traffic including, but not limited to, off-highway vehicles and over-snow vehicles, on frequently used roads in sage-grouse habitat to identify locations where current traffic levels may pose a threat to sage-grouse. In areas where negative impacts are identified, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits or other protective measures as deemed necessary. Priority areas include but are not limited to:
- White Mountain Road
  - Trail Canyon Road
  - Chiatovitch Creek
  - Crooked Creek
  - Northeast side of Montgomery Pass
296. Minimize the creation of new rights-of-way where feasible. Instead, utilize existing public or private utility rights-of-way to reduce impacts on other resources.
297. Identify and monitor less well traveled roads in sage-grouse habitat in locations where increased traffic levels may pose a threat to sage-grouse. If vehicle use begins to approach levels linked to negative impacts, conduct the planning and environmental review necessary to implement mitigations such as seasonal or permanent closures, speed limits or other protective measures as deemed necessary. Priority areas include but are not limited to:
- Wyman Road
  - Crooked Creek Roads
  - Road adjacent to Dead Horse Meadow
  - Roads adjacent to the Basalt Lek

## Non-Motorized Recreation

298. Inventory dispersed camping sites in the White Mountains PMU
299. Monitor and evaluate non-motorized recreation including hiking, hunting, conflict with pets, and dispersed camping near lek, nesting and brood rearing sites. If recreational use is deemed to pose a threat to sage-grouse, conduct the planning and environmental review necessary to implement appropriate mitigations. Priority locations include:
- Chiatovich Flat
  - Crooked Creek

- 300. Monitor and evaluate commercial land use associated with recreation such as guide/outfitter services. If these services are deemed to pose a threat to sage-grouse, provide education and/or implement stricter requirements to ensure that professional services being provided are not in conflict with sage-grouse. Priority locations include but are not limited to:
  - Chiatovich Flat
  - Crooked Creek

Wild Horse Overpopulation and Range Expansion

- 301. Monitor the Montgomery Pass, White Mountain, Silver Peak, Fish Lake Valley, and Piper Mountain wild horse herds to determine the extent to which populations are over AML and/or expanding outside of their designated WH&BT/HMA.
- 302. Conduct environmental planning as appropriate to implement captures or other population control methods to maintain wild horse herds at AML and within the designated WH&BT/HMA
- 303. Implement captures or other population control methods to maintain wild horse herds at AML and within the designated WH&BT/HMA. Priority areas include:
  - East side of White Mountain
  - Canyons that access White Mountain ridge tops such as Trail Canyon, Boundary Peak, Chiatovich Creek
- 304. Conduct environmental planning as appropriate to implement captures of wild horses occurring within sage-grouse habitat that is outside of the designated WH&BT/HMA.
- 305. Implement captures of wild horses occurring within sage-grouse habitat that is outside of the designated WH&BT/HMA.

Predation

- 306. Evaluate and identify new areas where monitoring of raven populations is needed to determine impacts on sage-grouse during nesting and brood rearing seasons. If population level impacts are identified, identify and removing raven attractants. If necessary, consider implementing raven control methods.

Small Populations

- 307. Evaluate habitat suitability and carrying capacity for areas in the PMU with small, localized subpopulations that are at risk for extirpation if population declines continue. Where habitat quality is poor and carrying capacity is limited, prioritize habitat improvement and restoration actions to increase the likelihood of successful translocations and population augmentation efforts.
- 308. If local populations in the PMU decline to a level deemed to put them at risk for extirpation and habitat is suitable, consider translocations from larger source populations within the Bi-State area. The planning and implementation of any translocation effort(s) would be guided by the Bi-State sage-grouse translocation protocol.

## Invasive Plant Species

309. Monitor roadside invasive plants. Where needed, implement treatment to prevent weed infestations from establishing in core sagebrush habitats.
310. Minimize disturbance to intact native vegetation at elevations above 9,000 feet to the greatest extent possible due to the difficulty of effectively restoring high-elevation plant communities. If disturbance is necessary, follow best practices for high altitude restoration including, but not limited to,, the propagation of local ecotypes in homesite conditions. Consider testing restoration techniques to improve the probability of success.
311. Ensure that overland travel and disturbance outside the right-of-way used to implement utility maintenance by Southern California Edison (SCE) adhere to INF plan components for utilities and invasive species.
312. Evaluate areas with authorized and unauthorized OHV use to determine where the introduction of invasive plant species is a risk or has already occurred. Where necessary and practical, implement restoration actions including, but not limited to, soil stabilization, weed treatment and seeding or planting of native species. Priority areas include but are not limited to:
  - Portions of Queen Valley
  - Patriarch Grove vicinity
  - Crooked Creek
  - Wyman Canyon

## Conifer Expansion

313. Identify and evaluate areas where conifer expansion may be negatively impacting the health of sage-brush ecosystems. Prioritize projects that, in addition to improving sage-grouse habitat will also improve mesic resources, increase habitat connectivity, or reduce fire risk through fuel reduction. Follow best management practices for identifying, planning, and implementing pinyon and juniper removal projects (*Appendix F*). Tribal concerns, traditional ecological knowledge, and impacts to the pinyon jay should be considered during project design and implementation. Priority areas include but are not limited to:
  - Conifers reducing connectivity between low- and high-elevation sagebrush habitats on the east side the White Mountains
  - Dead Horse Meadow
  - Chiatovich Creek
  - Davis Meadow
  - Sagehen Springs
  - McBride Springs
  - Truman Meadows
  - Upper Pizona

- 314. Quantify the extent of conifer infilling and expansion in the greater Pizona area to identify where conifer treatments may improve sage-grouse habitat connectivity between the South Mono and White Mountains PMUs, reduce catastrophic fire risk, or improve mesic resources. Priority areas include:
  - The Truman portion of the White Mountains PMU
  - The Adobe portion of the South Mono PMU
- 315. Identify and evaluate low and mid-elevation areas of pinyon and/or juniper mortality for potential woodland protection and restoration projects. If suitable, initiate projects. If not, where possible, remove dead trees to provide better connectivity with higher elevation sage-grouse habitat. Priority areas include but are not limited to:
  - Northeast side of Montgomery Pass
  - Westguard Pass/Cedar Flat vicinity

Mesic Habitat Availability

For actions related to degradation of mesic resources by wild horses, see section *Wild Horse Over Population and Range Expansion*.

For actions related to degradation of mesic resources due to conifer expansion, see section *Conifer Expansion*.

- 316. Inventory and evaluate the condition of mesic resources near leks and/or within or adjacent to known and potential brood rearing and summer use areas for potential habitat improvement and ecological restoration work. Design site-specific habitat improvement projects based as needed to achieve the functioning condition that provides the greatest forb abundance and diversity while maintaining adequate hiding cover and ensuring long-term system function. Select management strategies that are appropriate for site characteristics, cost-effective, minimally invasive, and have a high likelihood of success. Priority areas include but are not limited to:
  - Leidy Creek
  - Indian Creek
  - Cottonwood Creek
  - Crooked Creek
  - Wildhorse Meadow
  - Northeast and west side of Montgomery Pass

Permitted Livestock Grazing

For actions related to fences associated with livestock grazing, see section *Small-Scale Infrastructure*.

For actions related to fences associated with livestock grazing, see section *Small-Scale Infrastructure*.

- 317. Continue to work with all permittees to manage their grazing in a collaborative interdisciplinary way.

## Research and Monitoring

318. Prioritize efforts to get good lek count data in the PMU. Implement infrared flights to identify new leks and detect activity at leks that are inaccessible.
319. Inventory areas of the PMU where current information on sage-grouse distribution and use is limited and/or areas not currently occupied by sage-grouse for habitat suitability and potential use. Identify areas of currently suitable habitat that may support sage-grouse and areas of historical use that could support sage-grouse if habitat conditions were improved or restored. Review the results and conduct targeted pedestrian surveys to identify areas of active use. Priority survey areas include but are not limited to:
  - Northeast portion of the White Mountains (NV including Kennedy, Mustang, and Sugarloaf areas north of Trail Canyon)
  - Truman Meadows portion of the PMU (NV including Truman Meadows, Upper Pizona, McBride Springs and Sagehen Flat areas northeast of the CA/NV state line)
  - Candelaria Hills
  - Silver Peak Range
  - Magruder Mountain
320. Work with Deep Springs College livestock permittees to facilitate research related to livestock grazing, sage-grouse use, and sage-grouse habitat in the PMU.
321. Evaluate the PMU boundary to determine if revisions are needed. Use historical data, current data, traditional ecological knowledge, and a combination of traditional and modern techniques to map current and historic habitat based on a compilation of the best available information. Refine the PMU boundary where supported.

## **VI. EXISTING MANAGEMENT PLANS**

### **BLM Resource Management Plans (RMPs)**

The following BLM Resource Management Plans (RMPs) provide land use plan guidance specific to greater sage-grouse habitat conservation and management for public lands within the Bi-State DPS.

#### Bishop Field Office

- [Bishop Resource Management Plan \(1993\)](#)

#### Carson City and Tonopah Field Offices

- [Carson City Field Office Consolidated Resource Management Plan and Associated Amendments \(2001\)](#)
- [Tonopah Resource Management Plan \(1997\)](#)
- [The Nevada and California Greater Sage-Grouse Bi-State Distinct Population Segment Land Use Plan Amendment \(2017\)](#), which amends the Carson City Field Office Consolidated RMP and the Tonopah Field Office RMP.



## National Forest Land and Resource Management Plans (LRMPs)

The following Land and Resource Management Plans (LRMPs) provide land use plan guidance specific to greater sage-grouse habitat conservation and management for National Forest lands within the Bi-State DPS.

### Humboldt-Toiyabe National Forest

- [Toiyabe National Forest Land and Resource Management Plan \(1986\)](#)
- [Greater Sage-grouse Bi-State Distinct Population Segment Forest Plan Amendment \(2016\)](#)

### Inyo National Forest

- [Land Management Plan for the Inyo National Forest \(2019\)](#)

## County Management Plans

Sage-grouse conservation policies can be found in the following county plans:

### Mono County

- [Mono County General Plan: Land Use Element](#)
- [Mono County General Plan: Conservation/Open Space Element](#)

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## APPENDIX A. USFWS LISTING DECISION HISTORY

**2002:** The Bi-State LAWG is established.

**2004:** The LAWG develops the first stakeholder-driven conservation plan for greater sage-grouse in the Bi-State area.

**2002 - 2006:** The Bi-State DPS, at this time known as the Mono Basin population of greater sage-grouse, is petitioned twice for listing under the Endangered Species Act of 1973. In both cases the USFWS finds that the petitions do not present sufficient evidence to warrant listing.

**2004 - 2011:** The LAWG implements the stakeholder-driven conservation plan and completes thousands of acres of habitat improvement projects.

**2008:** USFWS finds that two petitions to list the Bi-State DPS present substantial information indicating that listing may be warranted. A status review is initiated.

**2010:** The USFWS establishes the Bi-State population of the greater sage-grouse (formerly known as the Mono Basin population of greater sage-grouse) as a DPS and finds that listing is warranted but precluded by higher priority listing actions.

**2012:** The 2012 Action Plan is drafted. It summarizes prior conservation efforts and provides a roadmap for future conservation of the Bi-State DPS.

**2013:** The Service proposes to list the Bi-State DPS as threatened under the Endangered Species Act and to designate 1.8 million acres of critical sage-grouse habitat.

**2014:** Bi-State partners announce a \$45 million dollar commitment to implement the 2012 Action Plan over a 10-year period.

**2015:** The demonstrated commitment of Bi-State partners to conserve the Bi-State sage-grouse leads the Service to withdraw their proposed rule to list the Bi-State DPS as threatened with critical habitat.

**2018:** A federal judge grants a challenge to the USFWS' 2015 withdrawal. The proposed listing of the Bi-State DPS and designation of critical habitat is reinstated.

**2020:** After an extended and comprehensive analysis, the USFWS concludes that successful implementation of conservation actions to date are sufficient to ameliorate threats. The Bi-State DPS is again withdrawn from listing under the Endangered Species Act.

**2022:** A district court overturns the USFWS' 2020 withdrawal of the listing. This decision once again reinstates the 2013 proposed rule to list the Bi-State DPS as threatened under the Endangered Species Act and designates critical sage-grouse habitat. The Service initiates a new status review.

**2023:** Bi-State partners begin updating the Bi-State Action Plan to guide the future of Bi-State sage-grouse conservation.

**2024:** The Service is expected to release a final listing decision in the summer of 2024.



2002

The Bi-State Sage-Grouse Local Area Working Group is established



2004 - 2011

The LAWG implements the Plan and in doing so completes thousands of acres of habitat improvement projects



2013

The USFWS proposes to list the Bi-State DPS as threatened under the Endangered Species Act and to designate 1.8 million acres of critical sage-grouse habitat



2015

Given the demonstrated commitment to conservation, the USFWS determines that a listing for the Bi-State sage-grouse is no longer warranted



2019

The LAWG continues to implement the 2012 Action Plan. At this point, 89% of Action Plan objectives have been initiated and the EOC updates agency extends their commitments to the effort for another five years



2022

A district court overturns the 2020 withdrawal of the listing. The 2013 proposed rule is reinstated and the USFWS initiates a new status review

2004



The LAWG develops the first stakeholder-driven conservation plan for the Bi-State distinct population segment of the greater sage-grouse

2012



The 2012 Action Plan is drafted. It summarizes prior conservation efforts and provides a roadmap to conserve the Bi-State sage-grouse

2014



Bi-State partners announced a \$45 million-dollar commitment to implement the Action Plan over a 10-year period

2018



A federal judge grants a challenge to the USFWS's 2015 listing. The proposed designation and critical habitat status is reinstated

2020



After an extended comprehensive analysis of the best available science the Service concluded that successful implementation of conservation actions to date are sufficient to ameliorate threats. Bi-State sage-grouse are not listed under the Endangered Species Act

2023



Bi-State partners remain committed to conserving the Bi-State DPS regardless of the listing outcome and begin drafting the 2024 Action Plan



## **APPENDIX B. SCIENCE PRODUCTS**

The 2012 Action Plan identified priority research and monitoring needs required to improve the scientifically based adaptive management of the Bi-State DPS, guide the implementation of the plan, and to quantify conservation efficacy. As part of this effort, the USGS, in partnership with state and federal agencies and other Bi-State partners, developed a suite of scientific products required to implement the data-driven research, monitoring, and management objectives of the plan. Tools and models that have been developed over the last 10 years include the Conservation Planning Tool (CPT), the Targeted Annual Warning System (TAWS), Integrated Population Models (IPMs), and updated mapping products that integrate patterns of habitat selection with demographic information, for the first time in the Bi-State DPS.

### **Conservation Planning Tool (CPT)**

By integrating sage-grouse telemetry and space use data with high-resolution landcover data, and statistical and predictive modeling techniques, the CPT provides a quantitative basis for evaluating conservation action efficacy, ranking areas for conservation actions within each PMU, and for guiding future conservation efforts. The CPT simulates population responses to landcover changes including those implemented to improve sage-grouse population performance<sup>1,2</sup>. For example, managers can use the CPT to evaluate expected sage-grouse population responses to completed and simulated conservation actions such as conifer removal.

The design of the CPT can accommodate the future incorporation of additional data sets and functionality to evaluate conservation actions as additional data are gathered and additional analytical tools developed. For example, future versions of the CPT may allow managers to evaluate the effects of additional conservation action types, such as invasive weed treatments and post-fire sagebrush restoration and could incorporate ecological costs of proposed treatments (e.g. estimating the expected benefit of conifer treatment to sage-grouse populations as well as the costs to conifer associated species such as the pinyon jay).

### **Targeted Annual Warning System (TAWS)**

The TAWS was developed to provide an effective tool to monitor key indicators of population status to determine when critical thresholds have been reached and management interventions are required to maintain population stability. Sage-grouse populations are naturally dynamic and demonstrate cyclic fluctuations in abundance driven by interactions between climate fluctuations and density dependent factors<sup>3,4</sup>. Hence, effective monitoring of population trends requires the ability to separate background noise related to climatic fluctuation from aberrant population declines that require focal management action. The TAWS flags populations experiencing aberrant declines with watches and warnings which signal to land and wildlife managers when intensive monitoring or urgent management actions are needed. A web-based application developed by the USGS, currently in provisional release, allows managers to identify population trends, watches, and warnings at multiple temporal (nadir-to-nadir estimation) and spatial scales such as lek, neighborhood cluster (NC, i.e. subpopulation), and climate cluster levels<sup>5</sup>, as well as watches and warnings at leks and NCs.

### **Integrated Population Modeling (IPM)**

Integrated population models provide a means to leverage existing field data to evaluate population dynamics across nested spatial and temporal scales by integrating multiple data sources (e.g.

lek counts and demographic vital rate data) to estimate more precise population parameters and account for missing data<sup>6,7</sup>. The USGS developed an IPM for the Bi-State DPS to identify which demographic rates are driving subpopulation trends and whether those rates underlie observed decoupling between subpopulation trends and DPS-wide trends<sup>8,9</sup>.

## Mapping Products

The USGS has developed a suite of mapping products that identify patterns of both space use and demographic performance across different seasons and life-stages based on underlying habitat characteristics<sup>9</sup>. By linking selection with survival across different seasons and life-stages, and then intersecting that information with the currently occupied distribution of sage-grouse, these mapping products help identify priority habitats that support both high selection and survival. They can also help identify areas where selection and survival are misaligned. The former may be high priority areas for conservation while the latter may be areas to target for habitat restoration and enhancement.

## Appendix B Citations

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## APPENDIX C. SUBPOPULATION TRENDS

USGS, in cooperation with the USFWS, BLM, and 11 western state wildlife agencies, has developed range-wide sage-grouse monitoring tools, based on standardized lek count and data management protocols<sup>1,2,3</sup>. These include the development of hierarchical state-space-models of population abundance and rates of change for each region<sup>2</sup>. USGS used a similar modeling framework to develop a hierarchical state-space-model specifically for the Bi-State DPS<sup>4</sup>. USGS calculated nadir-to-nadir population rates of change across six different time periods (1969 – 2019, 1978 – 2019, 1983 – 2019, 1995 – 2019, 2002 – 2019, and 2008 – 2019) for each neighborhood cluster (i.e. subpopulation) within the Bi-State DPS based on lek count data from 1960 – 2019<sup>4</sup>. Here we provide summaries of the nadir-to-nadir population trends for subpopulations in the Bi-State area. Changes in population abundance from 2018 onward are not discussed here but can be found on page 12 of the Action Plan in the section *Subpopulation Performance*.

### Pine Nut PMU

Sage-grouse in the Pine Nut PMU exhibited negative population trends during all temporal periods from 1969 – 2008. From 2008 – 2019, those in the California portion of the Pine Nuts combined with the northern portion of the Desert Creek subpopulation (A-004), exhibited evidence of a positive trend, although the 95% credible interval (CRI) did not rule out neutrality or slightly negative growth ( $\lambda = 1.014$ , 95% CRI: 0.977 – 1.051). The northern Pine Nuts subpopulation (A-009) continued to experience negative trends through 2019, however the 2008 – 2019 estimate was the highest since 1969 ( $\lambda = 0.998$ , 95% CRI: 0.888 – 1.117). Current trend estimates are not available for the portions of the Pine Nut PMU contained within subpopulations A-008 and A-010.

### Desert Creek-Fales PMU

Other than those that are part of subpopulation A-004 (see above) or A-003 (see below, Bodie Hills and Mount Grant PMUs), sage-grouse in the Desert Creek-Fales PMU exhibited improving and positive population growth rates in the medium (1983 – 2019) and short/medium (1995 – 2019) term, however in the most recent population cycle (2008 – 2019) growth rates again declined below neutrality for subpopulation A-002 ( $\lambda = 0.982$ , 95% CRI: 0.952 – 1.012), which was also true from 2002 – 2019. Population trends in the Desert Creek-Fales PMU did improve slightly between 2008 – 2019, relative to the 2002 – 2019 period.

### Bodie Hills and Mount Grant PMUs

Sage-grouse in the Bodie Hills-Mount Grant PMUs (subpopulation A-003) exhibited improving and positive population growth rates in the medium (1983 – 2019) and short/medium (1995 – 2019) term, however in the two most recent population cycles (2002 – 2019 and 2008 – 2019) growth rates again declined below neutrality ( $\lambda = 0.986$ , 95% CRI: 0.972 – 1.001, from 2008 – 2019). Population trends in the Bodie Hills-Mount Grant PMUs between 2008 – 2019 did improve slightly, relative to the 2002 – 2019 period ( $\lambda = 0.981$ , 95% CRI: 0.968 – 0.991, from 2002 – 2019) but remained below the positive rate of change observed from 1995 – 2019 ( $\lambda = 1.007$ , 95% CRI: 0.990 – 1.018).

## South Mono PMU

Sage-grouse in the Long Valley subpopulation (A-007) exhibited negative growth rates across all time periods back to 1969. However, the trend was the highest in the most recent cycle (2008 – 2019) and suggested some evidence for positive growth based on the 95% credible interval ( $\lambda = 0.989$ , 95% CRI: 0.953 – 1.025). Those in the Parker Meadows subpopulation (A-006) exhibited negative population growth rates during all time periods, with recent trends (2002 – 2019 and 2008 – 2019) being the most negative observed, going back to 1969 (e.g.,  $\lambda = 0.92$ , 95% CRI: 0.853 – 0.998, from 2008 – 2019), despite being supplemented by individuals translocated from the Bodie Hills. Those in the Sagehen subpopulation (A-005) exhibited negative population trends across all periods going back to 1969 except during the most recent population cycle (2008 – 2019), when the estimated rate of population change was positive ( $\lambda = 1.05$ , 95% CRI: 0.994 – 1.109).

## White Mountains PMU

Sage-grouse populations in the White Mountains PMU (subpopulation A-001) exhibited negative population growth rates across all time periods going back to 1969, however the trend was the highest in the most recent cycle ( $\lambda = 0.99$  from 2008 – 2019) and there is some evidence for positive growth based on the 95% credible interval (95% CRI: 0.932 – 1.059).

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## **APPENDIX D. SPACE USE AND DISTRIBUTION**

Overall, the predicted spatial distribution of sage-grouse in the Bi-State DPS has contracted by approximately 156 km<sup>2</sup> since 1995<sup>1</sup>. During that period, the distribution of the Bi-State DPS has shifted among subpopulations with three subpopulations showing expansion in their area occupied and six subpopulations showing contraction. Among subpopulations, the largest contractions were in the Long Valley, Sagehen, Parker Meadow, and in the Northern Pine Nut PMU (NC A-009). Expanding distributions in the Bodie Hills, Mount Grant, Desert Creek-Fales and the California portion of the Pine Nut PMUs were insufficient to fully offset the losses in the others. Here, we summarize distributional patterns based on telemetered birds from 2008 to present. Telemetry efforts that preceded the 2012 Action Plan were carried out during 2001 – 2009 by the USGS and partner universities and agencies but were not included in the below summary.

### **Pine Nut PMU**

Based on telemetry from 2011 – 2014, largely coinciding with an extended period of drought conditions, overall and core population-level home range of sage-grouse in the Pine Nut PMU was largest during the winter and smallest during the summer. While spring use by nesting sage-grouse was concentrated in the northern Pine Nuts, the population made heavier use of the southern portion of the PMU beginning in summer, through the fall, and into the winter, when they began redistributing towards the north (Fig. 1).

### **Desert Creek-Fales PMU**

Desert Creek sage-grouse were monitored with telemetry from 2016 – 2018 and in 2024. Telemetry has not been conducted at Fales since the 2012 Action Plan. The overall core and population-level home ranges in the Desert Creek area were largest in the fall and winter and smallest in the summer. During the spring nesting season, space use was focused near leks, which are concentrated in the lowland valley of Desert Creek. This population made greater use of higher elevations during the summer and is largely connected to the neighboring Mount Grant population (Fig 2.).

### **Mount Grant PMU**

Mount Grant sage-grouse were monitored with telemetry from 2016 – 2018 and 2022 to 2024. The overall and core population-level home ranges in the Mount Grant PMU were largest in the spring and smallest in the fall. This population was largely connected to those in the southern Bodie Hills, which they used at all seasons, and sage-grouse made more extensive use of the lower elevations northeast of Mono Lake (Mono Valley) during the winter than at other seasons (Fig. 3).

### **Bodie Hills PMU**

Based on telemetry from 2013 – 2019 and 2021 – 2024, the core area of sage-grouse use in spring and summer were concentrated around leks including Bridgeport Canyon, Big Flat, 7-Troughs, Dry Lakes, and Little Mormon Meadow. Winter core use areas were concentrated on the Dry Lakes plateau and near the Big Flat and Biedman leks. The core and overall population-level home ranges in the Bodie Hills were overwhelmingly largest during the winter (when sage-grouse used peripheral portions of the PMU more extensively), smallest during the fall, and intermediate during the reproductive seasons of spring and summer (Fig. 4).

## **South Mono PMU**

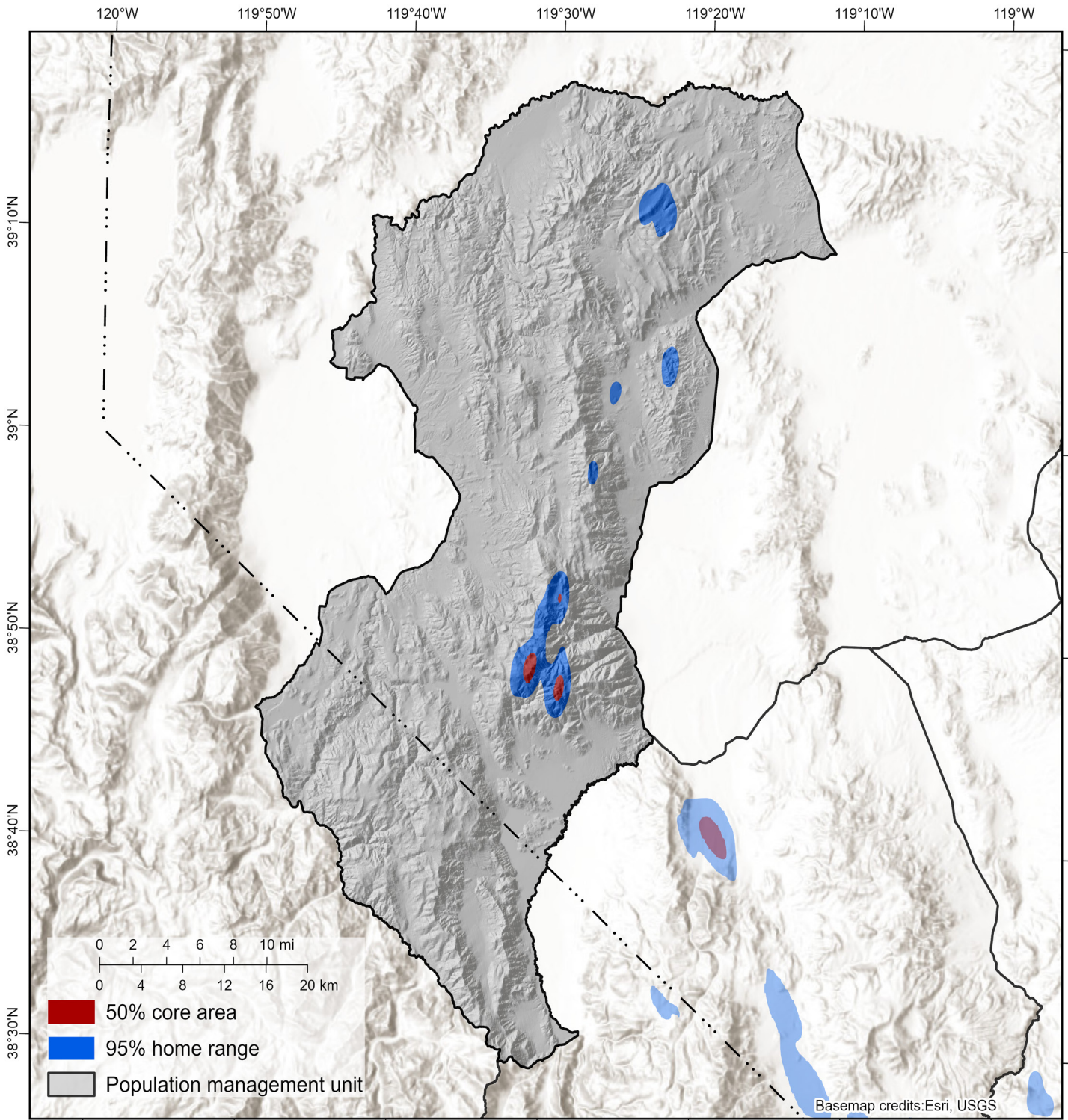
In the Long Valley area telemetry was conducted from 2016 – 2019 and 2021 – 2024. Spring habitat use in Long Valley was concentrated in the Tobacco Flat area west of U.S. Highway 395 and around leks between Crowley Lake and Benton Crossing Road. In summer, habitat use became concentrated in fields near Convict Creek north and northwest of Lake Crowley, and during the fall and winter seasons Long Valley sage-grouse used areas along and north of Benton Crossing Road and (during winter) the northeastern portion of Long Valley. Long Valley sage-grouse had relatively limited population-level home ranges, but their distribution was most widespread during the summer and least widespread during fall and winter (Fig. 5).

Telemetry in Parker Meadows began in 2017 – 2019 and 2021 – 2023. All birds monitored in Parker Meadows were translocated from Bodie Hills. This isolated population has remained relatively localized to Parker Meadows with some movements to the east and expanded space use noted mostly during the winter season.

Within the Sagehen PMU telemetry was conducted from 2014 – 2015. Sage-grouse in the Sagehen area were relatively immobile and showed the narrowest home range during the winter compared to other seasons.

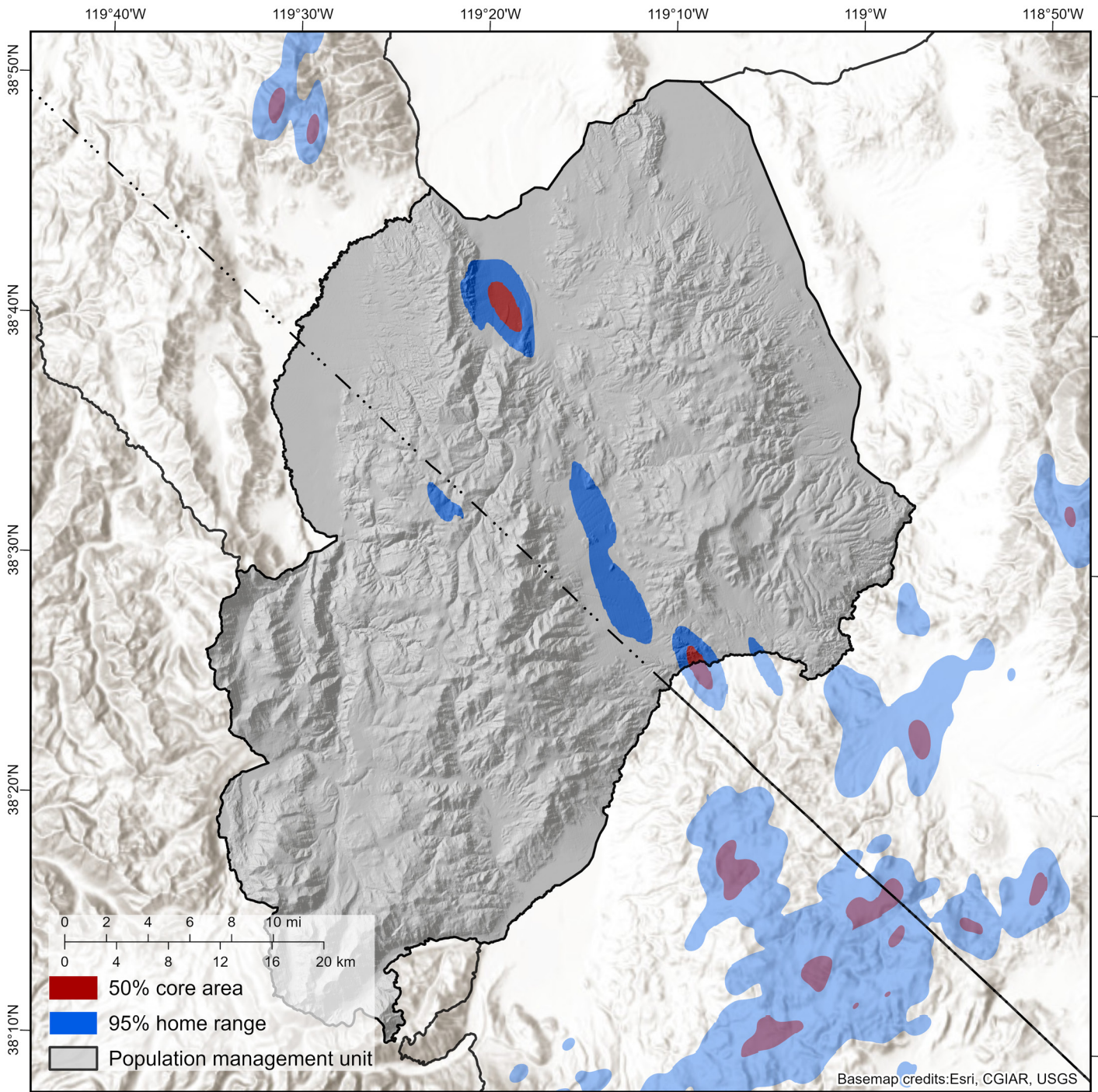
## **White Mountains PMU**

Seasonal population-level home ranges in the White Mountains from 2018 – 2019 and 2021 – 2024 were most extensive in winter, least extensive in the fall, and intermediate in the reproductive seasons of spring and summer, although their overall distribution was relatively static (Fig. 6).

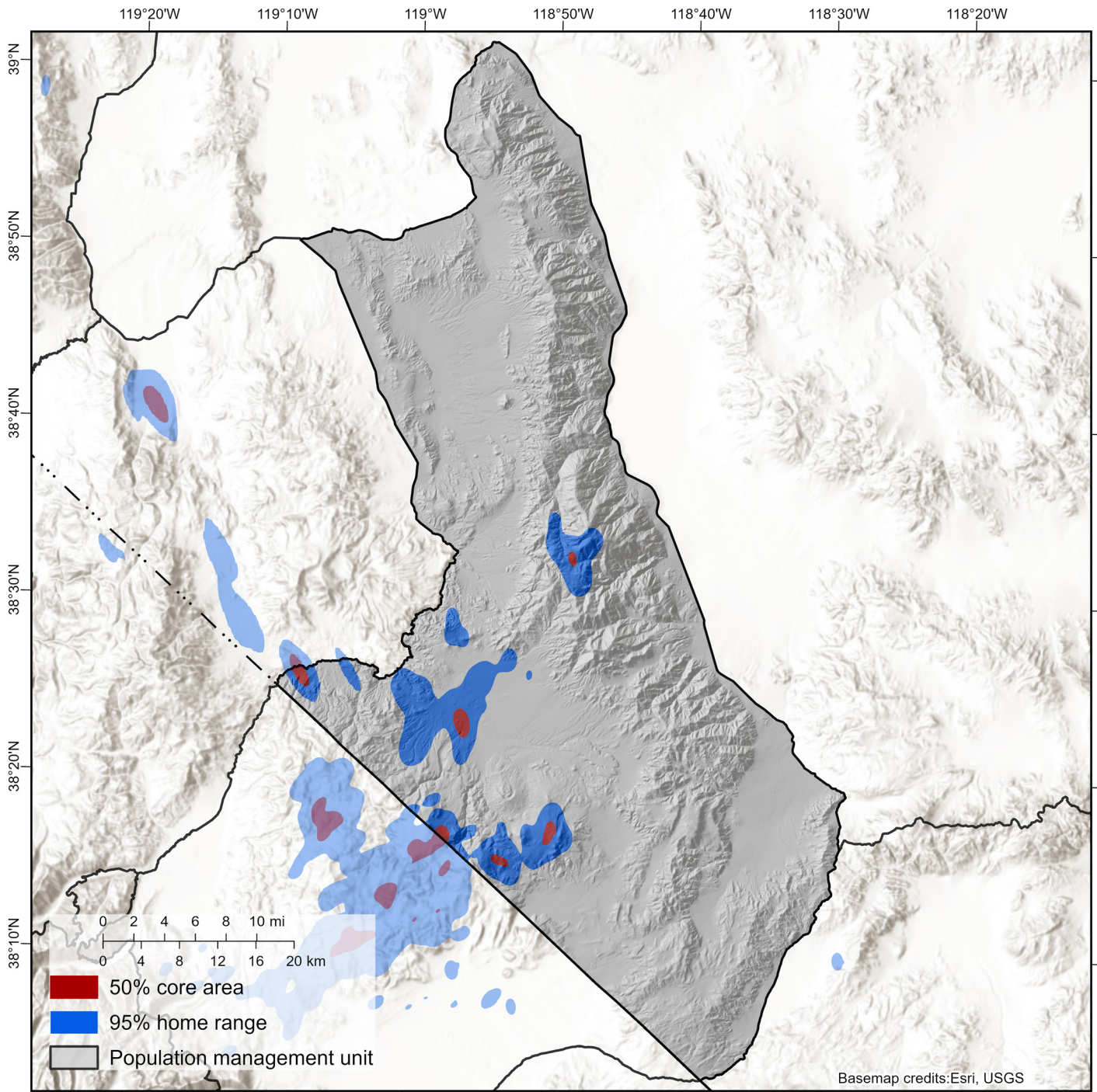


**Figure 1.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within the Pine Nuts PMU calculated from data collected from 2011 – 2023<sup>2</sup>.

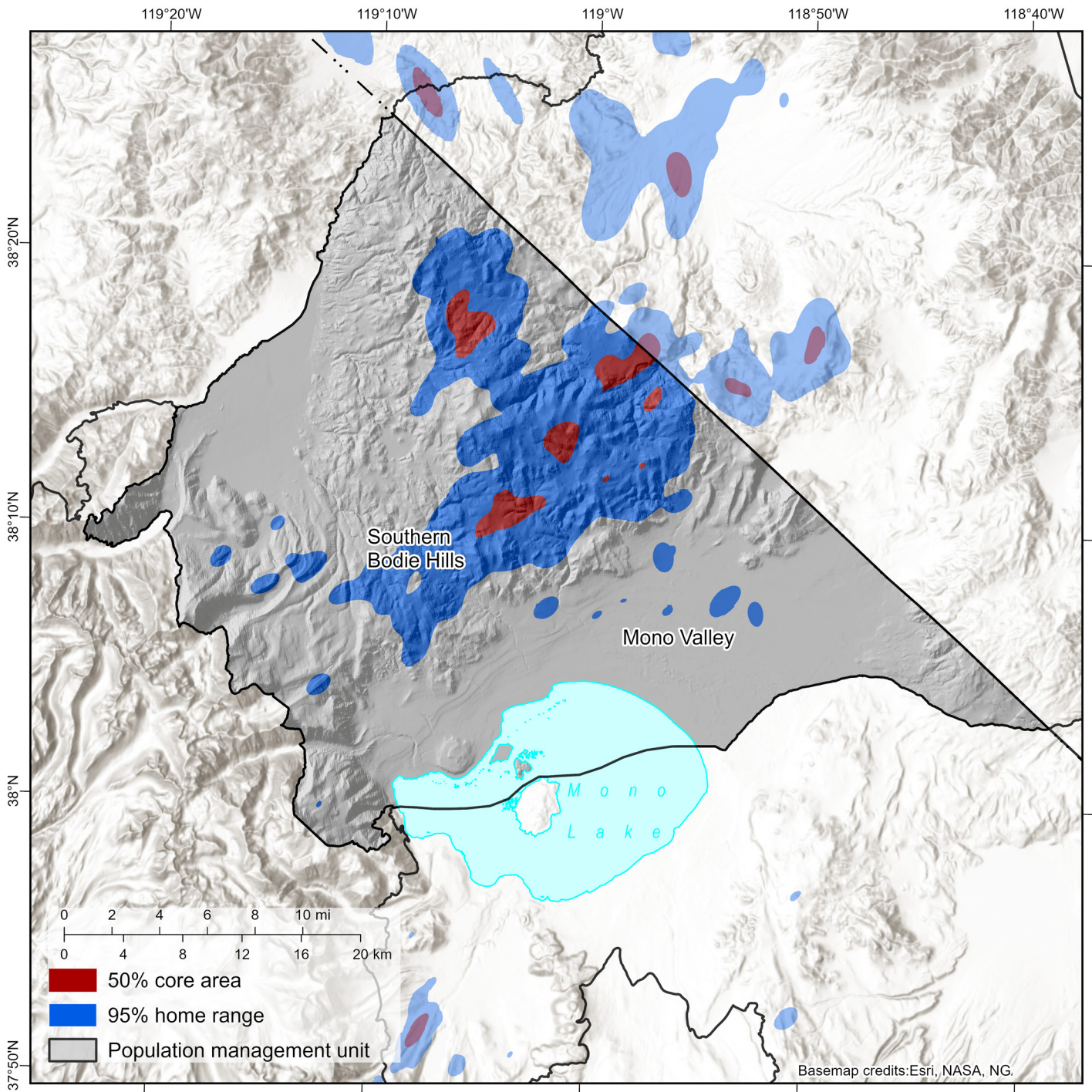




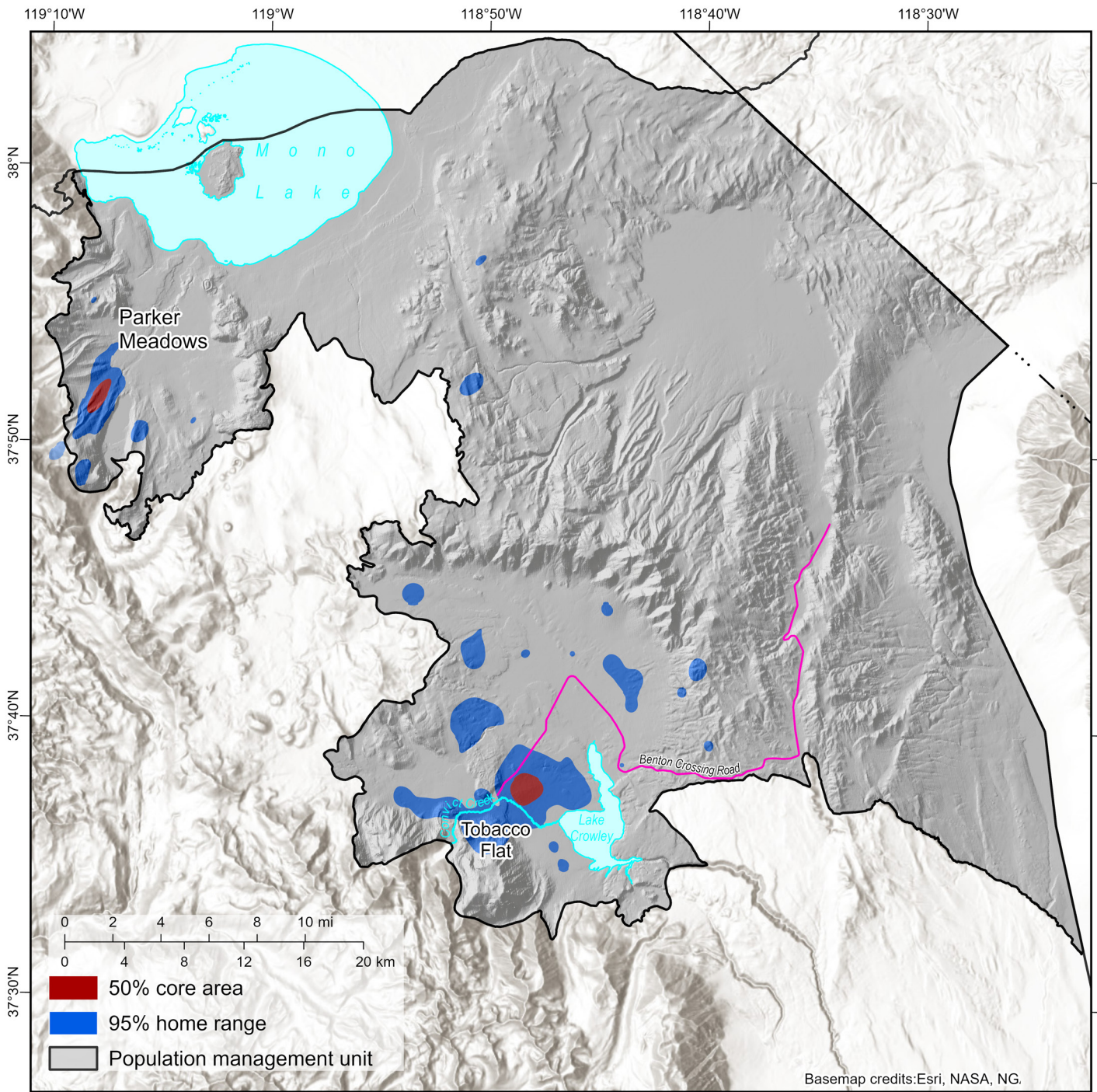
**Figure 2.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within the Desert Creek-Fales PMU calculated from data collected from 2011 – 2023<sup>2</sup>.



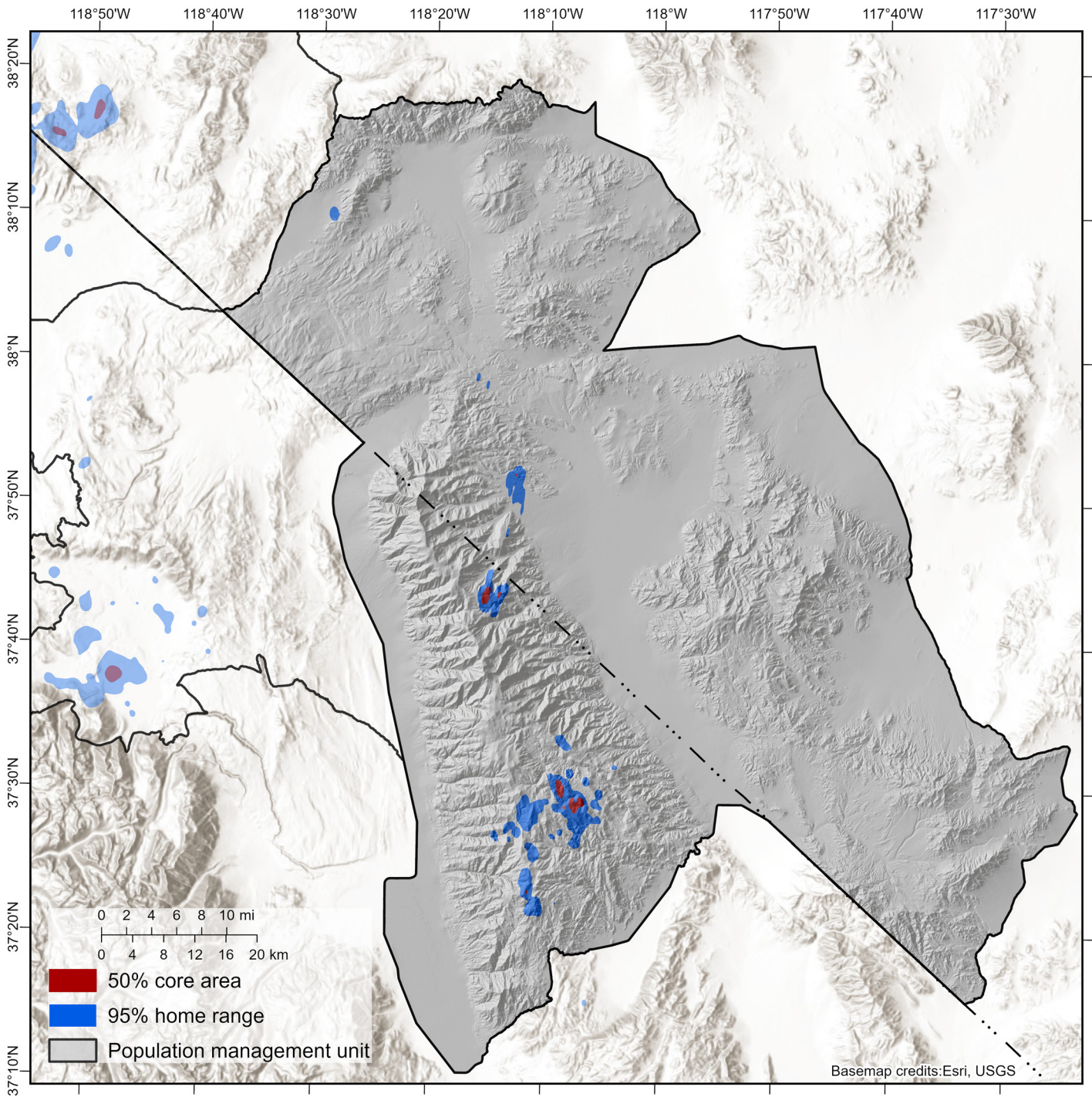
**Figure 3.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within the Mount Grant PMU calculated from data collected from 2011 – 2023<sup>2</sup>.



**Figure 4.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within the Bodie Hills PMU calculated from data collected from 2011 – 2023<sup>2</sup>.



**Figure 5.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within the South Mono PMU calculated from data collected from 2011 – 2023<sup>2</sup>.



**Figure 6.** Core (50% utilization distributions) and overall (95% utilization distributions) population-level home ranges within the White Mountains PMU calculated from data collected from 2011 – 2023<sup>2</sup>.

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# **APPENDIX E. WILDFIRE BEST MANAGEMENT PRACTICES**

## **Pre-Fire Operations Best Management Practices**

- Firefighter and public safety are the overriding priorities on all fires, and the conservation, protection, and restoration of habitat for threatened species including the sage-grouse is a critical natural resource objective.
- Develop sage-grouse toolboxes containing maps, a list of resource advisors, contact information, local guidance, and other relevant information.
- Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.
- Assign a sage-grouse resource advisor to all extended attack fires in or near key sage-grouse habitat areas. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals.
- Prioritize fire prevention patrols in sage-grouse habitat.
- On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.

## **During Fire Operations Best Management Practices**

- During periods of multiple fires, ensure line officers are involved in setting priorities.
- To the extent possible, locate wildfire suppression facilities (e.g. base camps, spike camps, drop points, staging areas, heli-bases, etc.) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas and grasslands near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.
- Power wash all firefighting vehicles to the extent possible prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread. This includes engines, water tenders, personnel vehicles, and ATVs.
- Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.
- Minimize burnout operations in key sage-grouse habitat areas by constructing a direct fireline whenever safe and practical to do so.
- Utilize retardant and mechanized equipment to minimize burned acreage during initial attack.
- As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.

- As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines to minimize fire spread.
- Adequately document fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

**Fuels Management Best Management Practices**

- Design fuels management projects in priority sage-grouse habitat to strategically and effectively reduce wildfire threats to the greatest area. This may require fuels treatments implemented in a more linear versus block design.
- Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns that benefit sage-grouse habitat.
- Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally by the birds.
- Use fire prescriptions that minimize undesirable effects on vegetation or soils (i.e. minimize mortality of desirable perennial plant species and reduce risk of hydrophobicity).
- Ensure proposed sagebrush treatments are planned with interdisciplinary input from agency wildlife biologists and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.
- Where appropriate, ensure that treatments are configured in a manner (e.g., strips or small, irregular patches with lots of edge) that promotes use by sage-grouse<sup>1</sup>.
- Where applicable, incorporate roads and natural fuel breaks into fuel break design.
- Power-wash all vehicles and equipment involved in fuels management activities prior to entering the area to minimize the introduction of undesirable and/or invasive plant species.

**Emergency Stabilization and Burned Area Rehabilitation Best Management Practices**

- Prioritize native seed allocation for use in sage-grouse habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from outside of priority sage-grouse. Whenever possible, native plant seeds should be prioritized based on availability, adaptation (site potential), and probability of success<sup>2</sup>. When probability of success or native seed availability is low, non-native seeds may be used as long as they meet sage-grouse habitat conservation objectives<sup>3</sup>. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.



- Design post-emergency stabilization and rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in activities (e.g. livestock grazing, wild horse and burro management or travel management) to achieve and maintain the desired condition of emergency stabilization and rehabilitation projects to benefit sage-grouse<sup>4</sup>.
- Consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from warmer areas within a species' current range for selection of native seed<sup>5</sup>.

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## APPENDIX F. CONIFER BEST MANAGEMENT PRACTICES

- Persistent pinyon-juniper woodlands (mature and old growth or sites that previously supported mature woodlands) should not be targeted for conifer expansion projects.
- When planning conifer expansion treatments consider potential benefits to current and future sage-grouse use and connectivity, potential benefits to mesic resources, potential impacts or benefits to pinyon jay populations, and cultural uses of pinyon pine among other factors to ensure that the project is focused, and negative impacts are minimized. Do careful on the ground site evaluations during planning with specialists who can identify old trees and habitat values.
- Ensure that tribal consultation includes the affected Tribes in the area from the earliest stages of project planning and includes both in person and field meetings. Consider ways to involve Tribes in project implementation and in projects that both improve sagebrush habitats and help protect or restore pinyon woodlands.
- Continue Tribal consultation and coordination during treatment if Tribes have expressed an interest in the treatments.
- Consider using the [guidelines from the pinyon jay working group](#) when planning projects to maximize benefit of conifer treatments for pinyon jay and other woodland edge species.
- As much as possible, projects should be designed to treat the earliest stages of pinyon-juniper expansion where the presence of smaller and/or widely spaced trees within the sagebrush ecosystem are characteristic of the treatment area.
- Consider the position of treatment units in the landscape and allow for pinyon expansion upwards in elevation and into cooler sites in response to climate change. Conversely, at low elevations where there is climate related pinyon mortality, it may be appropriate to cut dead and dying trees to facilitate transition to healthy shrublands.
- When possible, conifer removal treatments should be conducted using hand operated tools such as chainsaws, hand saws, or loppers. Crews should hike on foot to avoid unnecessary disturbance/destruction to the surrounding environment.
- Some trees should be retained within the units, especially at the edges, for visual and habitat benefit. Small inclusions that have older trees or very rocky substrates should also be retained. Retained trees should include any trees with characteristics that suggest they are 150 years or older as well as a diversity of age classes associated with those older trees.
- Within conifer treatment areas, where there is evidence of historic persistent woodlands (i.e. living trees over 150 years old or presence of historic stumps), retain old trees along with a grouping of any younger trees that occupy the same microsite (i.e., in the immediate vicinity and on the same shallow or rocky soils) to maintain the natural age class diversity of trees associated with the microsite/woodland soil inclusion.
- In areas where persistent conifer woodlands transition to adjacent open sagebrush, trees should be thinned in a multi-age variable density pattern with a graduated density from the open sagebrush to the adjacent pinyon woodland to provide habitat values for species that use the diffuse edge and for visual effects.

- In areas that are pre-approved as having no cultural resources or sensitive natural resources, consider allowing small seedling trees to be dug up and transplanted for use by local Tribes who have requested pinyon or juniper seedlings.
- Treatment implementation methods and timing should be done in a way that minimizes the potential for pinyon pest outbreaks such as bark beetles (*Pinyon ips*, *Ips confusus*). When possible, treatment should take place during fall and winter when beetles are not active and using methods that allow the cut slash to dry quickly.
- If portions of the conifer treatment area have larger trees and higher tree densities, cut trees should be hand piled and burned to avoid negative effects on fuel loading, cheatgrass resistance, wildlife use and aesthetics. If there is nearby road access chipping or removing the slash are also options.
- Where smaller and/or more widely spaced trees occur within the conifer treatment area, trees should be cut and scattered into sagebrush sites so that debris does not protrude above the brush layer.
- Construction of debris piles or scattering heavy slash in low sagebrush sites should be avoided. Where possible, add cut material from these sites to piles constructed in adjacent big sagebrush sites, or by constructing new piles in natural openings within adjacent big sagebrush sites.
- Do post-treatment monitoring in order to adapt future treatments and to identify post treatment needs such as maintenance treatments.
- If post treatment monitoring, especially in pile burn footprints, indicates that the native seedbank is not responding, locally collected native species should be hand seeded or planted to minimize the potential for invasion by cheatgrass or other non-native species.
- In coordination with the Bi-State Technical Advisory Committee, conduct monitoring and research to understand response of sage-grouse, pinyon jay and other species to the treatments and update these best management practices.
- Use the Bi-State Technical Advisory Committee as a resource in planning, implementing, and monitoring projects.

## **APPENDIX G. LIST OF AVAILABLE MANAGEMENT TOOLS**

### **USFWS National Wetlands Inventory**

Website: <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>

### **IWJV Wetland Evaluation Tool**

Website: <https://iwjv.org/solution-based-science/wet/>

### **Rangeland Analysis Platform**

Website: [https://rangelands.app/rap/?biomass\\_t=herbaceous&ll=39.0000,-98.0000&z=5](https://rangelands.app/rap/?biomass_t=herbaceous&ll=39.0000,-98.0000&z=5)

### **National Conservation Easement Database**

Website: <https://www.conservationeasement.us>

### **Resilient Landscapes Resource List**

Website: <https://iwjv.org/partnering-to-serve-sagebrush/resilient-landscape-resources/>

### **Historic Fire Map**

Website: <https://data-nifc.opendata.arcgis.com/datasets/nifc::interagencyfireperimeterhistory-all-years-view/explore?location=38.377089%2C-118.744935%2C10.61>

### **Science Based Management of Ravens Tool (SMaRT)**

Website: <https://www.usgs.gov/software/science-based-management-ravens-tool-smart>

### **Sage-grouse Initiative's Interactive Web App**

Website: <https://map.sagegrouseinitiative.com/wildlife/songbird-abundance?ll=43.4799,-110.7624&overlay=brsp&opacity=0.80&z=6&basemap=roadmap>

- NRCS Fence Collision GIS Layer

### **Conifer Conservation Planning Tool**

Website: <https://www.usgs.gov/software/conservation-planning-tool-bi-state-distinct-population-segment-greater-sage-grouse>

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## APPENDIX I. AREAS HISTORICALLY INHABITED BY SAGE-GROUSE

**Table 1.** Areas historically inhabited by sage-grouse

Location	PMU/County	Notes	Citation
Magruder Mountain/ Upper Tule Canyon	White Mountains Esmeralda Co.	Anecdotal evidence such as verbal communication and sightings from locals and sportsmen suggests that sage-grouse occurred here in low densities. Last unverified report occurred in 1998	Greater Sage-Grouse Conservation Plan for the Bi-State Plan Area of Nevada and Eastern California, June 2004
Lower Trail Canyon	White Mountains Esmeralda Co.	Anecdotal observations of both male (not strutting) and female sage-grouse in the lower Trail Canyon area of the White Mountains during recent aerial lek searches suggest the possible existence of a lek in this area. Likely occurred in low densities	Greater Sage-Grouse Conservation Plan for the Bi-State Plan Area of Nevada and Eastern California, June 2004
Silver Peak Range	White Mountains Esmeralda Co.	Anecdotal evidence, no sightings for many	Greater Sage-Grouse Conservation Plan for the Bi-State Plan Area of Nevada and Eastern California, June 2004
Truman Meadow and McBride Flats area	White Mountains Mineral Co.	Anecdotal evidence, verbal sighting reports suggest sage-grouse occurred here in low densities	Greater Sage-Grouse Conservation Plan for the Bi-State Plan Area of Nevada and Eastern California, June 2004
Miller Mountain and Candelaria Hills	White Mountains Mineral Co.	Historical observations suggest occurrence in low densities	Greater Sage-Grouse Conservation Plan for the Bi-State Plan Area of Nevada and Eastern California, June 2004
Pizona	White Mountains Mono Co.	Light population density in 1966	INF 1966 Sage-Grouse Habitat Management Plan
Sage Hen Flat	South Mono Inyo Co.	Light population density in 1966	INF 1966 Sage-Grouse Habitat Management Plan
Coyote Valley	White Mountains Inyo Co.	Had good populations in 1940	INF 1966 Sage-Grouse Habitat Management Plan
Adobe Valley	South Mono Inyo Co.	Had good populations in 1940. Light population density in 1966	INF 1966 Sage-Grouse Habitat Management Plan
Clover Patch	South Mono Mono Co.	Word of mouth that sage-grouse once inhabited this area	Email correspondence from Heather Stone (Bishop, BLM)

## APPENDIX J. LOCATIONS IN THE 2024 ACTION PLAN

**Table 1.** Locations described in the 2024 Action Plan, PMU(s) in which they occur and ID which corresponds to points on the PMU maps displayed in Figures 1- 6.

Map ID	PMU	Location Name/Description
1	Pine Nuts	Bagley Valley
2	Pine Nuts	Bald Mountain
3	Pine Nuts	Big Meadow Complex
4	Pine Nuts	Buckskin Valley
5	Pine Nuts	Buckskins
6	Pine Nuts	Hercules Spring
7	Pine Nuts	Leviathan-Monitor Pass
8	Pine Nuts	Mill Canyon
9	Pine Nuts	Mill Canyon Dry Lakebed
10	Pine Nuts	Mount Siegal
11	Pine Nuts	Singatse
12	Pine Nuts	Slinkard Valley
13	Pine Nuts	Mill Canyon
14	Pine Nuts	West side of Sunrise Pass
15	Desert Creek-Fales	Antelope Valley
16	Desert Creek-Fales	Bald Mountain
17	Desert Creek-Fales	Dead Ox Canyon
18	Desert Creek-Fales	Desert Creek Ranch
19	Desert Creek-Fales	Fales Hot Springs
20	Desert Creek-Fales	Huntoon Valley
21	Desert Creek-Fales	Mount Jackson
22	Desert Creek-Fales	Pine Grove Hills
23	Desert Creek-Fales	Rosaschi Ranch
24	Desert Creek-Fales	Sario Canyon
25	Desert Creek-Fales	Scierini Ranch
26	Desert Creek-Fales	Swauger Creek
27	Desert Creek-Fales	Sweet Water Flat
28	Desert Creek-Fales	Sweet Water Ranch
29	Desert Creek-Fales	Sweetwater Canyon
30	Desert Creek-Fales	Taylor Valley
31	Desert Creek-Fales	Wellington Hills
32	Desert Creek-Fales	Wheeler Flat
33	Desert Creek-Fales	Wheeler Lek

**Table 1. Continued**

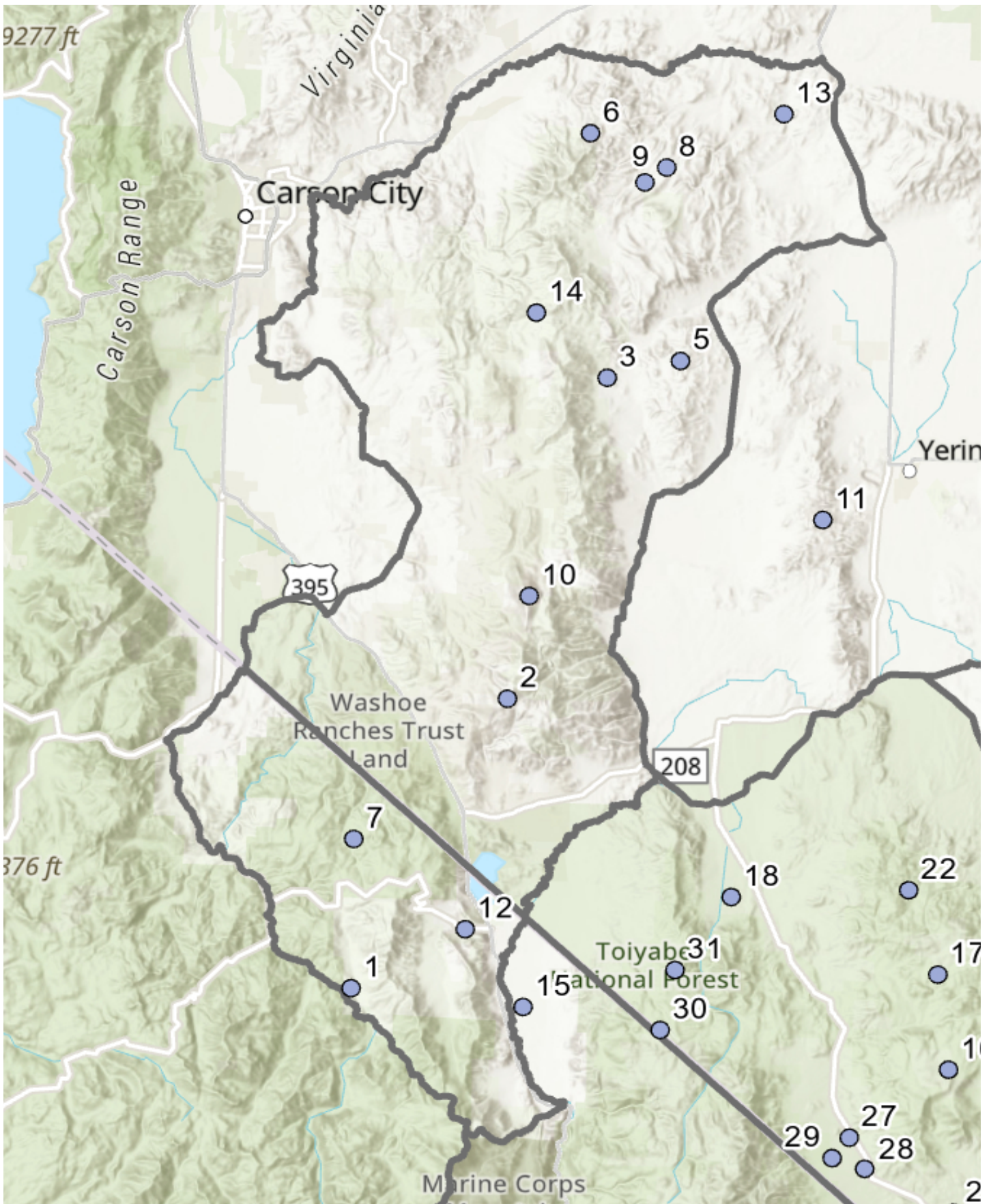
<b>Map ID</b>	<b>PMU</b>	<b>Location Name/Description</b>
34	Mount Grant	Aurora Peak
35	Mount Grant	Bald Peak
36	Mount Grant	Baldwin Canyon
37	Mount Grant	Cambridge Hills
38	Mount Grant	Fletcher Spring
39	Mount Grant	Lapon Meadows
40	Mount Grant	Lucky Boy Pass
41	Mount Grant	Nine Mile Ranch
42	Mount Grant	Powell Mountain
43	Mount Grant	Spring Peak
44	Bodie Hills/Mount Grant	Brawley Peaks
45	Bodie Hills	7-Troughs
46	Bodie Hills	Big Flat
47	Bodie Hills	Brawley Peaks
48	Bodie Hills	Bridgeport Canyon
49	Bodie Hills	Cinnabar Canyon
50	Bodie Hills	Clark Canyon
51	Bodie Hills	Conway Ranch
52	Bodie Hills	Cottonwood Canyon
53	Bodie Hills	Dry Lakes Plateau
54	Bodie Hills	Dynamo Pond
55	Bodie Hills	Larkin Lake
56	Bodie Hills	Little Mormon Meadow
57	Bodie Hills	Masonic Mountain
58	Bodie Hills	Mono Basin Flats
59	Bodie Hills	Mormon Meadows
60	Bodie Hills	Potato Peak
61	Bodie Hills	Rancheria Gulch
62	Bodie Hills	Red Wash Meadow
63	Bodie Hills	Rough Creek Drainage
64	Bodie Hills	Stringer Meadows
65	Bodie Hills	Truck Tank
66	Bodie Hills	Mexican Spring
67	Bodie Hills	Larkin Lake
68	Bodie Hills	Summers Meadows

**Table 1. Continued**

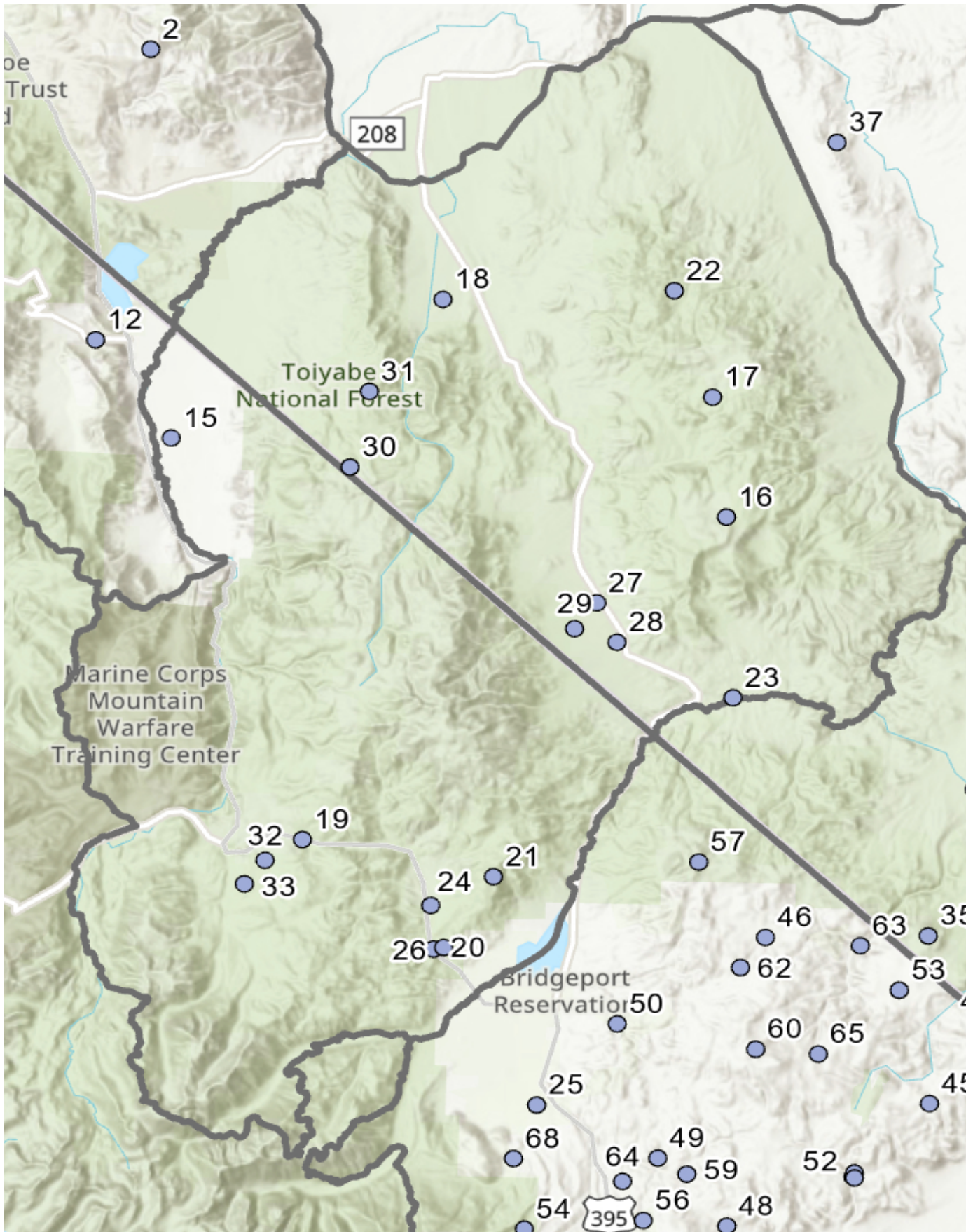
<b>Map ID</b>	<b>PMU</b>	<b>Location Name/Description</b>
69	South Mono PMU	Adobe Valley
70	South Mono PMU	Benton
71	South Mono PMU	Black Lake
72	South Mono PMU	Blind Springs Hill
73	South Mono PMU	Cowtrack Mountain
74	South Mono PMU	Crab Cooker Tub
75	South Mono PMU	Hot Creek Meadow
76	South Mono PMU	Indian Springs
77	South Mono PMU	Laurel Ponds
78	South Mono PMU	Layton Spring
79	South Mono PMU	Old Benton
80	South Mono PMU	Rock Tub Loop
81	South Mono PMU	Sagehen Summit
82	South Mono PMU	Shepard's Tub
83	South Mono PMU	Waterson Divide
84	South Mono PMU	Wild Rose Summit
85	White Mountains	Boundary Peak
86	White Mountains	Candelaria Hills
87	White Mountains	Cedar Flat
88	White Mountains	Chiatovich Creek
89	White Mountains	Chiatovich Key Area
90	White Mountains	Chiatovitch Flat
91	White Mountains	Cottonwood Drainage
92	White Mountains	Crooked Creek
93	White Mountains	Davis Meadow
94	White Mountains	Dead Horse Meadow
95	White Mountains	Kennedy Area
96	White Mountains	Leidy Creek
97	White Mountains	Magruder Mountain
98	White Mountains	McBride springs
99	White Mountains	Montgomery Pass
100	White Mountains	Mustang Area
101	White Mountains	Pizona
102	White Mountains	Queen Valley
103	White Mountains	Sagehen springs

**Table 1.** Continued

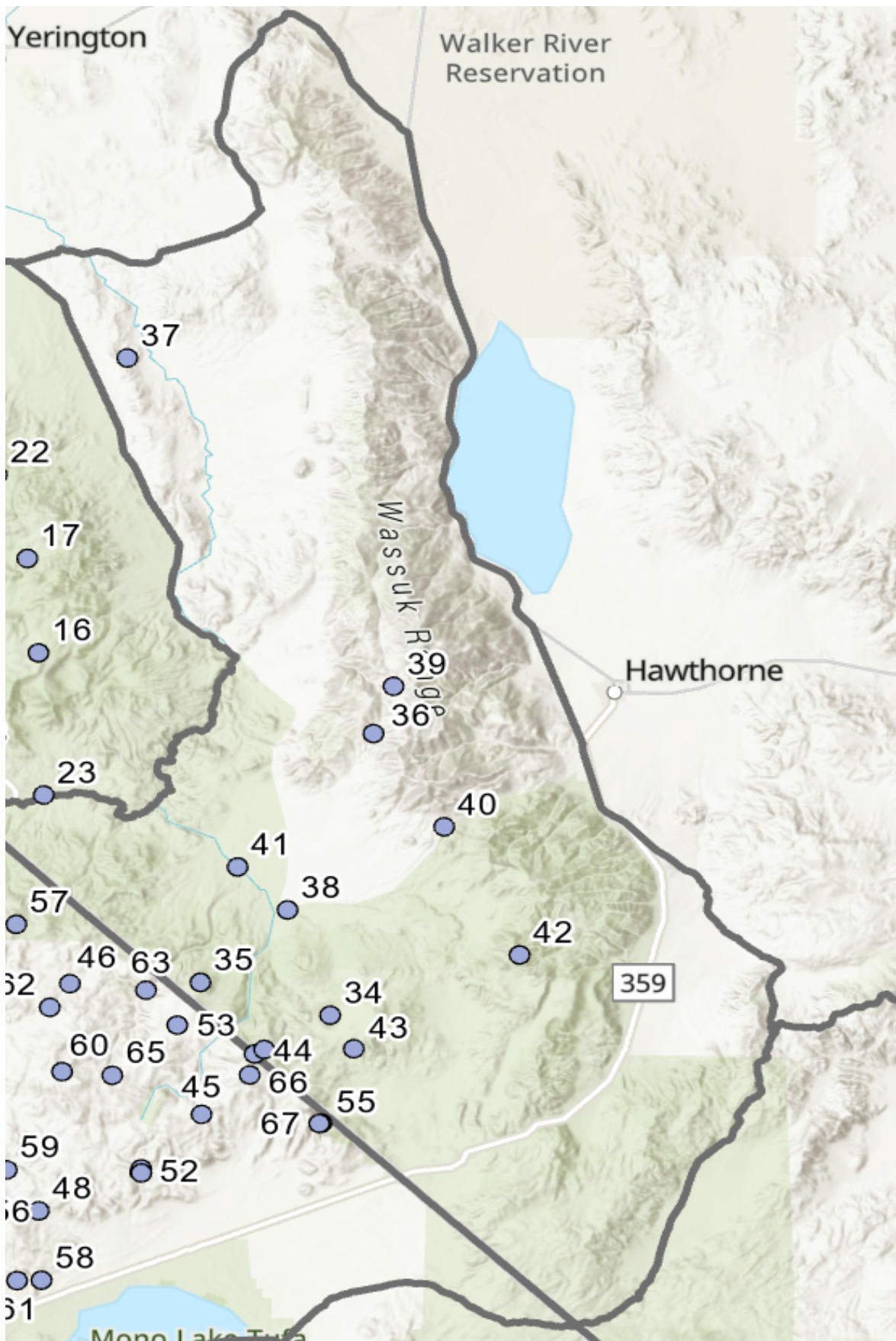
<b>Map ID</b>	<b>PMU</b>	<b>Location Name/Description</b>
104	White Mountains	Sagehen Flat
105	White Mountains	Silver Canyon
106	White Mountains	Silver Peak
107	White Mountains	Sugarloaf Area
108	White Mountains	Trail Canyon
109	White Mountains	Truman Meadows
110	White Mountains	Westguard Pass
111	White Mountains	Wildhorse Meadow
112	White Mountains	Wyman Canyon



**Figure 1.** General points for locations referenced in the 2024 Action Plan for the Pine Nuts PMU.

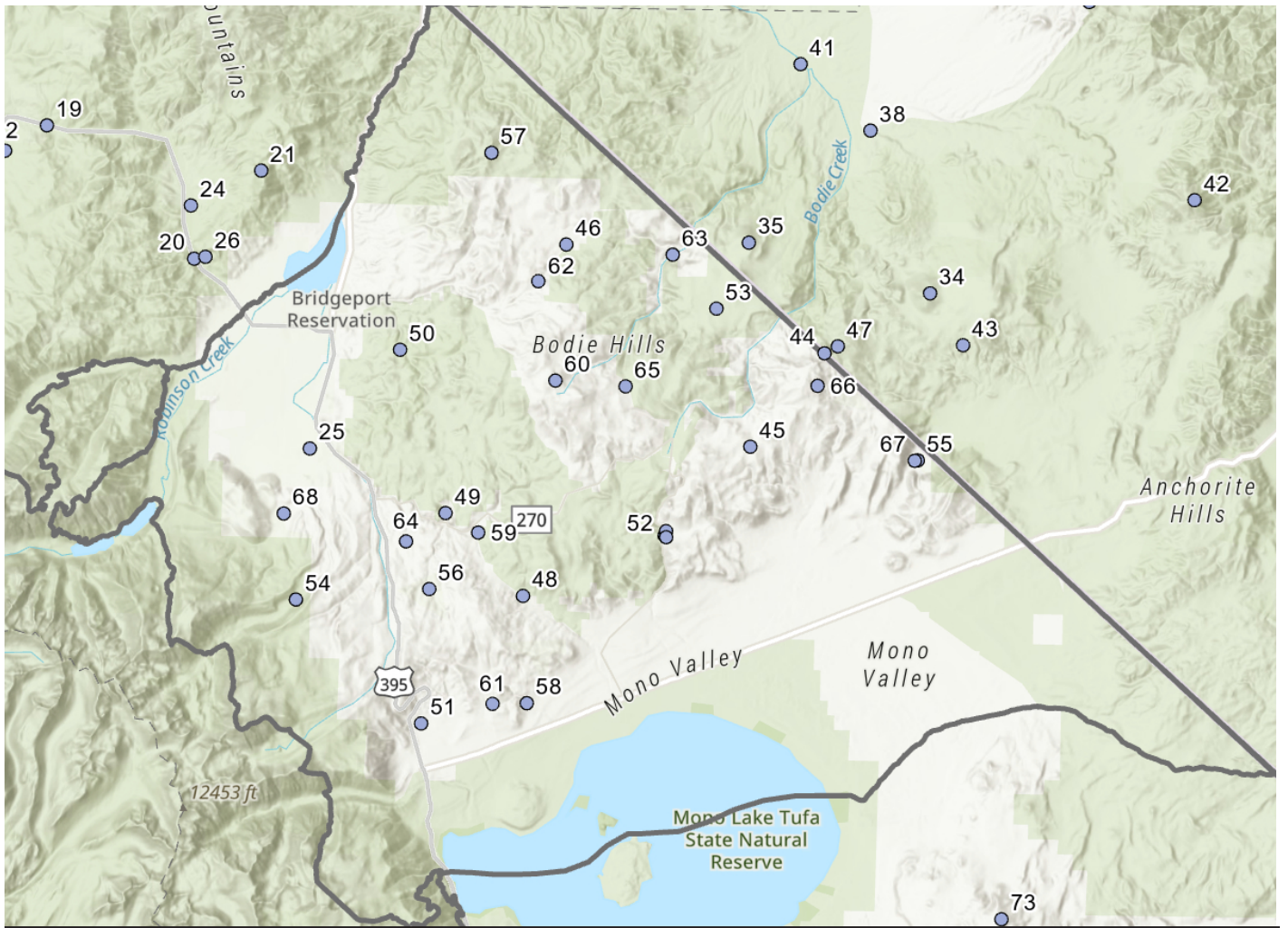


**Figure 2.** General points for locations referenced in the 2024 Action Plan for the Desert Creek-Fales PMU.

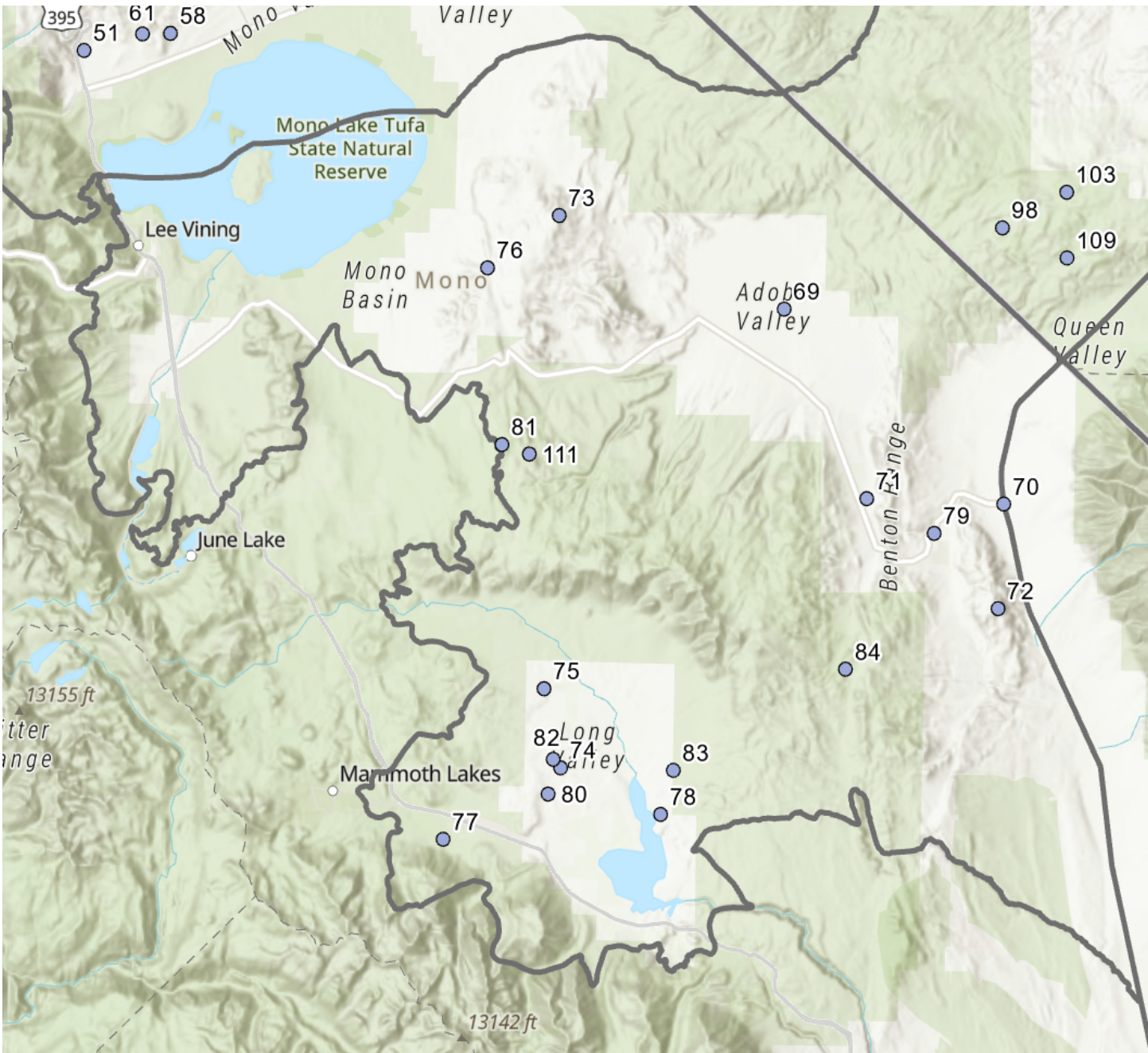


**Figure 3.** General points for locations referenced in the 2024 Action Plan for the Mount Grant PMU.

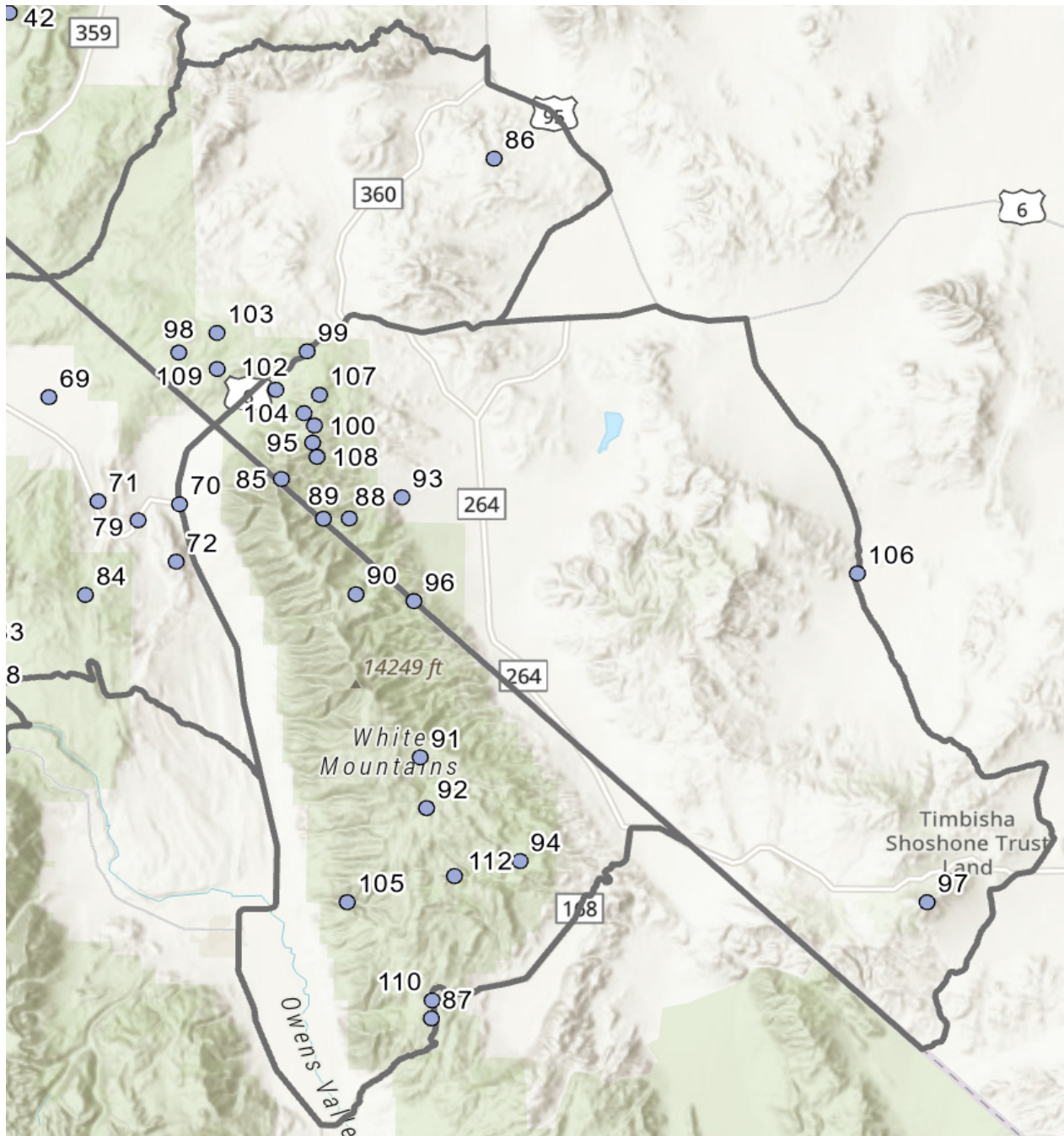




**Figure 4.** General points for locations referenced in the 2024 Action Plan for the Bodie Hills PMU.



**Figure 5.** General points for locations referenced in the 2024 Action Plan for the South Mono PMU.



**Figure 6.** General points for locations referenced in the 2024 Action Plan for the White Mountains PMU.