Nevada and Northeastern California Greater Sage-Grouse

Proposed

Land Use Plan Amendment and

Final Environmental Impact Statement

BLM

Forest Service

Volume Vb: Unprinted Appendices

US Department of the Interior

Bureau of Land Management

US Department of Agriculture

Forest Service

June 2015

The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

BLM/NV/NV/ES/15-09+1793

Cover Photo: Steve Ting

Appendix O

State of Nevada Alternative

APPENDIX O
STATE OF NEVADA ALTERNATIVE

This appendix contains the State of Nevada's Greater Sage-grouse Conservation Plan (Alternative E of the Proposed LUPA/Final EIS). The goals, objectives, and actions under this alternative reflect concurrent state-level planning efforts in the State of Nevada for the protection of GRSG and its habitat. This alternative would apply to BLM- and Forest Service-administered lands in Nevada only. Proposed management in California under Alternative E would be the same as Alternative A (current management).

The Sage-grouse management area (SGMA) represents the spatial extent of GRSG management described in the Nevada State Plan. The SGMA map (see Figure 2 on page 204 of the Nevada State Plan) defines the overall area where the state would like resources to be managed to maintain and expand GRSG populations. The SGMA includes core, priority, general, and non-habitat areas (see Figure 3 on page 206 of the Nevada State Plan). As described in Chapter 1 of this LUPA/EIS, State of Nevada "core" GRSG habitat corresponds with priority habitat under the other alternatives, while State of Nevada "priority" habitat corresponds with general habitat under the other alternatives. State of Nevada "general" habitat aligns with other management areas under the Proposed Plan and unmapped habitat for Alternative D. The SGMA map, and associated habitat categories, is based on Coates 2014 suitability mapping.

For the SGMA, the Nevada State Plan identifies goals, objectives, and management actions to address seven threats to GRSG in the state. The Nevada State Plan's GRSG conservation strategy is to protect sagebrush ecosystems through collaboration with other stakeholders and by employing the overriding conservation policy of "avoid, minimize, mitigate" to achieve no net unmitigated loss of GRSG habitat. The Nevada State Plan uses the Conservation Credit System to determine mitigation requirements for proposed disturbances in GRSG habitat. See Appendix L of this LUPA/EIS for information regarding the Conservation Credit System.

This page intentionally left blank

2014 Nevada Greater Sage-grouse Conservation Plan

Sagebrush Ecosystem Program
State of Nevada

October 1, 2014
(Within this Appendix version, Section 4.0 was updated reflecting changes made at the April 9, 2015 SEC meeting)

On April 22, 2013, the Sagebrush Ecosystem Council (SEC) recommended the development of the 2012 State Plan into a more comprehensive and detailed strategy. The SEC considered proposed revisions over a series of meetings starting in July 2013. Each SEC meeting was held in compliance with the Nevada Open Meeting Law, including multiple opportunities for public comment. The result of those efforts is this document, the 2014 Nevada Greater Sage-grouse Conservation Plan (2014 State Plan).

2014 Nevada Greater Sage-Grouse Conservation Plan

October 1, 2014

(Within this Appendix version, Section 4.0 was updated reflecting changes made at the April 9, 2015 SEC meeting)

Presented To:
Governor Brian Sandoval

Prepared Under the Direction of the:
Sagebrush Ecosystem Council

Allen Biaggi	Steve Boies
Doug Busselman*	Jeremy Drew*
Gerry Emm	J.J. Goicoechea
Starla Lacy	Bevan Lister
Kent McAdoo*	Chris MacKenzie
Tina Nappe	Sherm Swanson
Jim Barbee, Ex-Officio	Leo Drozdoff, Ex-Officio
Bill Dunkelberger, Ex-Officio	Ted Koch, Ex-Officio
Amy Leuders, Ex-Officio	Tony Wasley, Ex-Officio

* Denotes former Council member

Written by:
The Sagebrush Ecosystem Technical Team

John Copeland	Melissa Faigeles
Kelly McGowan	Lara Niell

Tim Rubald, Program Manager
Sagebrush Ecosystem Program
201 South Roop Street, Suite 101
Carson City, Nevada 89701
77.684.8600
http://sagebrusheco.nv.gov

CONTENTS

LIST OF ACRONYMS 3
1.0 INTRODUCTION 5
2.0 DEFINITIONS 8
3.0 CONSERVATION GOALS AND OBJECTIVES 11
3.1 Anthropogenic Disturbances 12
3.2 Acts of Nature – Fire and Invasive Species 19
4.0 DESIRED HABITAT CONDITIONS FOR GREATER SAGE-GROUSE IN NEVADA 21
5.0 IMPLEMENTATION RESPONSIBILITIES 22
6.0 MAPPING 30
7.0 THREAT ASSESSMENT—GOALS, OBJECTIVES, AND MANAGEMENT ACTIONS 33
7.1 Fire and Invasive Plants 34
7.2 Pinyon-Juniper Encroachment 42
7.3 Predation 46
7.4 Wild Horses and Burros Management 51
7.5 Livestock Grazing 57
7.6 Anthropogenic Disturbances 63
7.7 Recreation & Off-Highway Vehicle Activities 69
8.0 CONSERVATION CREDIT SYSTEM 71
9.0 MONITORING AND ADAPTIVE MANAGEMENT 75
REFERENCES 84
APPENDICES ..... **Error! Bookmark not defined.**
FIGURES ..... **Error! Bookmark not defined.**

LIST OF ACRONYMS

AML	Appropriate Management Level
AMP	Allotment Management Plan
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BAR	Burned Area Rehabilitation
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CCS	Conservation Credit System
CDP	Conservation Districts Program
DCNR	Department of Conservation and Natural Resources
DOD	Department of Defense
DRI	Desert Research Institute
EIS	Environmental Impact Statement
ERT	Expert Review Team
ES	Emergency Stabilization
ESA	Endangered Species Act
ESD	Ecological Site Description
FIAT	Fire and Invasives Assessment Team
HA	Herd Area
HMA	Herd Management Area
HTNF	Humboldt-Toiyabe National Forest
HQT	Habitat Quantification Tool
HSI	Habitat Suitability Index
ICS	Incident Command System
LAWG	Local Area Working Group
LUP(A)	Land Use Plan (Amendment)
MOU	Memorandum of Understanding
NAC	Nevada Administrative Code
NBMG	Nevada Bureau of Mines and Geology
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service

NRS	Nevada Revised Statutes
NWCG	National Wildfire Coordination Group
OHV	Off-Highway Vehicle
PFC	Proper Functioning Condition
P-J	Pinyon and juniper
PMU	Population Management Unit
ROW	Right-of-Way
RSF	Resource Selection Function
SAP	Strategic Action Plan
SD	Standard Deviation
SEC	Sagebrush Ecosystem Council
SEP	Sagebrush Ecosystem Program
SETT	Sagebrush Ecosystem Technical Team
SEZ	Solar Energy Zone
SGMA	Sage-grouse Management Area
SUA	Special-Use Authorization
TNR	Temporary Non-Renewable
UNR	University of Nevada, Reno
USDA- ARS	U.S. Department of Agriculture – Agricultural Research Service
USDA-	U.S. Department of Agriculture - Animal and Plant Health
APHIS	Inspection Service
USFS	U.S. Forest Service
USFWS	U.S .Fish and Wildlife Service
USGS	U.S. Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WHBT	Wild Horse and Burro Territory

1.0 INTRODUCTION

The greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) is a historically and culturally significant species in Nevada. Sage-grouse were a staple of the diet of Native American tribes in Nevada, including Northern Paiute and Western Shoshone (BLM 2013). In addition, sage-grouse play a prominent role in some tribal oral traditions (BLM 2013), as well in dances, customs, and celebrations (IDFG 1997, DOE 2007). Lewis and Clark noted the birds in their journey west in 1804 (IDFG 1997). Early pioneers dubbed them "sage chickens" and utilized them as an important food source over the next half century (IDFG 1997, DOE 2007). In Nevada, sage-grouse hunting laws began around 1890 (DOE 2007). From the early 1900s until the late 1920s, Nevada pursued reductions in the length of the hunting seasons and enforced bag limits due to decreasing bird populations (DOE 2007).

Sage-grouse increased in prominence as of species of interest in the West in the 1950s and 1960s due to a management need to learn more about basic sage-grouse biology (Stiver, personal communication 2014). Nevada has historically been a leader in sage-grouse conservation, including conducting one of the first ever scientific studies of sage-grouse in the O'Neil Basin and hosting the second ever Western Association of Fish and Wildlife Agencies (WAFWA) Sage-grouse Workshop in Elko (Stiver, personal communication 2014). State fish and game agencies began counting sage-grouse on breeding grounds, called "leks" as early as the 1930s (Stiver, personal communication 2014). Nevada has records of lek counts that date back to the 1950s (Stiver, personal communication 2014). In the later part of the twentieth century, Nevada continued its leadership role in sage-grouse conservation as a pioneer in sage-grouse monitoring techniques and scientific research, as well as by working with WAFWA to develop sage-grouse guidelines for habitat, population, and management (Stiver, personal communication 2014).

In 2000, then Governor Kenny Guinn appointed a task force representing various interest groups and agencies to develop a plan that would conserve and protect Nevada's sage-grouse and their habitat. In October 2001 the Nevada Sage-grouse Conservation Strategy identified challenges, offered potential solutions, and laid the groundwork for the formation of local area working groups (LAWG) and Population Management Units (PMU; Figure 1). It provided guidance for developing conservation plans and subsequent legislative endorsements in 2004 and 2010 reinforced Nevada's commitment to conserve the species.

From 2001 to 2004 the Governor's Sage-grouse Conservation Team under leadership of the Nevada Department of Wildlife (NDOW) completed an intensive planning effort for the State in which LAWGs developed plans for their respective areas and PMUs. In June 2004, the *1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California* (2004 State Plan) was completed. Between 2004 and the present, resource management agencies have implemented conservation projects and instituted policies to support the conservation goals in the 2004 State Plan.

On March 23, 2010, the U.S. Fish and Wildlife Service (USFWS) determined that listing the sage-grouse was warranted under the Endangered Species Act of 1973, as amended (ESA), but precluded due to higher priority species. Consequently, sage-grouse were placed on the federal candidate species list. The USFWS later entered into a court settlement with several environmental groups, which included a schedule for making listing determinations on over 200 candidate species, including the sage-grouse. A proposed decision for sage-grouse is scheduled for September 2015.

In response, the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) developed their National Greater Sage-grouse Planning Strategy in late 2011, a process to revise existing land use plans (LUPs) in order to provide regulatory mechanisms to conserve sage-grouse and their habitats. Secretary Salazar invited the states impacted by a potential sage-grouse listing to develop state-specific regulatory mechanisms to conserve the species which could be considered as an alternative in the BLM and USFS LUP revision process.

On March 30, 2012, Governor Sandoval fortified Nevada's commitment to sage-grouse conservation, by issuing Executive Order 2012-09, which established the Governor's Greater Sage-grouse Advisory Committee (Advisory Committee) with a directive to provide updated recommendations for sage-grouse conservation in Nevada in order to preclude the need to list sage-grouse under the ESA and provide an alternative for consideration in the BLM/ USFS LUP revision process for Nevada. Those efforts resulted in the *Strategic Plan for Conservation of Greater Sage-Grouse in Nevada* (2012 State Plan), completed on July 31, 2012, which consisted of a list of primary threats to sage-grouse in Nevada and recommendations to the Governor on strategies and actions to conserve sage-grouse in Nevada.

One of the main recommendations of the 2012 State Plan was the creation of the Sagebrush Ecosystem Program (SEP), which would consist of the Sagebrush Ecosystem Council (SEC) and the Sagebrush Ecosystem Technical Team (SETT; see Section 5.0). The SEC was originally established under Executive Order 2012-19, on November 19, 2012, and later codified under state statute NRS Chapter 232.162. The SETT began work on February 11, 2013. On April 22, 2013, the SEC directed the SETT to further develop the recommendation in the 2012 State Plan into a more comprehensive and detailed strategy. The SEC considered proposed revisions over a series of meetings starting in July 2013. Each SEC meeting was held in compliance with the Nevada Open Meeting Law, including multiple opportunities for public comment. The result of those efforts is this document, the *2014 Nevada Greater Sage-grouse Conservation Plan* (2014 State Plan).

The 2014 State Plan represents the best available scientific information, as well as stakeholder input, to develop a sage-grouse conservation plan specific to Nevada. This is meant to be a "working document" that will be updated as new science emerges and lessons are learned through implementation of the 2014 State Plan, through an adaptive management framework.

In addition to the 2014 State Plan, the SEP is in the process of developing a *Nevada Sage-grouse Strategic Action Plan* (SAP). The 2014 State Plan provides broad goals, objectives, and management actions to ameliorate the primary threats to sage-grouse in Nevada. The SAP will be a companion

document to the 2014 State Plan and will go into greater detail and identify areas to focus conservation efforts in order to achieve the broad goals and objectives outlined in the 2014 State Plan. The SAP will look to identify funding sources to implement the management actions recommended in the 2014 State Plan. The SAP will identify where the primary threats to sage-grouse habitat are located across the landscape and provide specific guidance on how to ameliorate these threats based on local area conditions, resistance and resilience regimes, and ecological site descriptions. The SAP will help guide how and where the management efforts identified in the 2014 State Plan are prioritized in order to achieve landscape-scale conservation of sage-grouse and the sagebrush (*Artemisia* spp.) ecosystem. The planning efforts of the Bi-State Distinct Population Segment Great Sage-grouse will serve as a general template for the SAP in terms of the level of specificity needed for project planning and commitment to funding (Bi-state Technical Advisory Committee Nevada and California 2012, Bi-State Executive Oversight Committee 2014).

2.0 DEFINITIONS

Acts of Nature – An event resulting from natural processes of the earth which occur outside human control and may be unpredictable, such as wildfires or drought.

Adaptive Management - An adaptive approach that involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions. **Anthropogenic Disturbance** – Any human-caused activity or action or human-created physical structures that may have adverse impacts on sage-grouse or their habitats. The term anthropogenic disturbance and its associated conservation policies includes, but is not limited to the following project categories: mineral development and exploration and its associated infrastructure; renewable and non-renewable energy production, transmission, and distribution and its associated infrastructure; paved and unpaved roads and highways; cell phone towers; landfills; pipelines; residential and commercial subdivisions; activities undertaken pursuant to special use permits and right-of-way grants; and other infrastructure development. Livestock operations and agricultural activities and infrastructure related to ranch and farm businesses (e.g. water troughs, fences, etc.) are not included in this definition.

Conservation – The wise sustainable use, preservation, enhancement, or restoration of the natural environment; including: ecosystem processes, vegetation, and wildlife.

Conservation Credit System (CCS) – A pro-active solution to ensure impacts from human activities generate a net benefit for the species, while enabling human activities vital to the Nevada economy and way of life. The Credit System creates new incentives for 1) human activities to avoid and minimize impacts to important habitats for the species, and 2) private landowners and public land managers to preserve, enhance, and restore important habitats, including reducing the threat of wildfire to important habitats for the species.

Enhancement – Manipulation of existing habitat to improve specific habitat functionality.

Habitat – An area that provides food, cover, water, and space for an organism. It is the resources and conditions present in an area that are required by a species to carry out its life. Habitat implies more than just vegetation or vegetation structure; it is the sum of the specific resources that are needed by an organism. Other resources that influence habitat include physical and biological characteristics, such as: climate, precipitation, elevation, topography, water availability, soil type, etc.

Specific to this State Plan:

Suitable Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values greater than 1.5 standard deviations below the mean value of the index. These areas are identified as generally meeting the needs for sage-grouse to survive and reproduce.

High Suitability Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values greater than 0.5 standard deviations below the mean.

Moderate Suitability Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values between 1.5 and 0.5 standard deviations below the mean.

Non-Habitat – Areas identified through the habitat suitability index (Section 6.0) with index values less than 1.5 standard deviations below the mean value of the index. These areas are identified as generally not meeting the needs for sage-grouse to survive and reproduce.

Habitat Quantification Tool (HQT) – The method for quantifying impacts ("debits") or benefits ("credits") to sage-grouse habitat characteristics generated by participants in the Nevada CCS. It is intended to provide an effective means for targeting credits and debits to the most beneficial locations for the sage-grouse, and tracking the contribution of the CCS to sage-grouse habitat and population goals.

Invasive Plants – A non-native plant that effectively reproduces, is able to outcompete native plants, may alter ecosystem processes, and may be difficult to control or eradicate. Invasive plants can be considered by the State Quarantine Officer for the designation of "noxious".

Lek – Traditional courtship display and mating areas attended by sage-grouse in or adjacent to sagebrush dominated nesting habitat. Leks are generally situated on gentle terrain in relatively open areas with less herbaceous and shrub cover than surrounding areas (Connelly et al 2004).

Noxious Weeds – Any species of plant which is currently or likely to become detrimental, destructive or difficult to control and is designated by the State Quarantine Officer as "noxious". These weeds are regulated by Nevada Revised Statute 555.130 – 555.201 and the designation and categorization of noxious weeds can be found in Nevada Administrative Code 555.010.

Population Management Units (PMUs) – General delineations of sage-grouse populations for management in Nevada. PMUs are based on aggregations of leks, understanding of habitats, and potential boundaries to populations (such as mountains and valleys). These were developed by NDOW for the 2001 State plan and refined in the 2004 State Plan (see Figure 1).

Preservation – Maintenance or retention of existing habitat quality and ecosystem functions currently used by or in close proximity to habitat used by sage-grouse through a variety of management tools, both active and passive.

Reclamation – Actions performed during or after an exploration project or mining operations to shape, stabilize, re-vegetate, or otherwise treat the land in order to return it to a safe, stable condition consistent with the establishment of a productive post-mining use of the land and the abandonment of a facility in a manner which ensures the public safety, as well as the encouragement of techniques which minimize the adverse visual effects (NRS Chapter 519A.100).

Rehabilitation – Re-vegetation of a site to achieve basic ecological functions, such as preventing soil erosion, but which does not return a site to its reference state according to its ecological site description.

Resource Selection Function (RSF) – Any model that yields values proportional to the probability of use of a resource unit. RSF models often are fitted using generalized linear models (GLMs) although a variety of statistical models might be used. RSFs were used in the development of the habitat suitability model (Section 6.0; Boyce et al. 2002).

Restoration – The reestablishment of ecologically important habitat or other ecosystem resource characteristics and function(s) at a site where they have ceased to exist, or where they exist in a substantially degraded state, and that renders a positive biological response by the habitat.

Sage-Grouse Management Area (SGMA) – The spatial extent of sage-grouse management in Nevada. The overarching objective of Nevada's plan is to achieve conservation through no net unmitigated loss of sage-grouse habitat due to new anthropogenic disturbances within the SGMA.

Core Management Areas – Areas of high estimated space use in suitable sage-grouse habitat in the State of Nevada. These areas represent the strongholds (or "the best of the best") for sage-grouse populations in the State and support the highest density of breeding populations.

Priority Management Areas – Areas that are determined to be highly suitable habitat for sage-grouse in areas of estimated low space use and areas of non-habitat which overlap with areas of estimated high space use.

General Management Areas – Areas determined to be moderately suitable habitat for sage-grouse in areas of estimated low space use.

Non-Habitat Management Areas – Areas within the SGMA determined to be unsuitable for sage-grouse.

Site Specific Consultation Based Design Features – Measures or actions designed to minimize adverse effects to sage-grouse and their habitats due to disturbances.

Space Use Index – Continuous surface mapping developed based on lek attendance and density coupled with probability of sage-grouse occurrence relative to distance to nearest lek.

WAFWA Management Zones – Range-wide sage-grouse management delineations based on populations within floristic provinces. These were developed to guide sage-grouse conservation goals and range-wide management outlined in the 2006 Greater Sage-grouse Comprehensive Conservation Strategy developed by WAFWA.

3.0 CONSERVATION GOALS AND OBJECTIVES

The State's goal for the conservation of sage-grouse in the State of Nevada is to provide for the long-term conservation of sage-grouse by protecting the sagebrush ecosystem upon which the species depends. Redundant, representative, and resilient populations of sage-grouse will be maintained through amelioration of threats; conservation of key habitats; mitigation for loss of habitat due to anthropogenic disturbances; and restoration or rehabilitation of habitat degraded or lost due to Acts of Nature.

Achieving the State's goal for the conservation of sage-grouse will provide benefits for the sagebrush ecosystem and for many other sagebrush obligate species. Sage-grouse are known to be an "umbrella species" for many sagebrush obligate and associated species (Hanser and Knick 2011). The enhancement and restoration measures that bring resiliency and restore ecological functions to sagebrush ecosystems will also serve to ensure quality habitat for sage thrasher, sage sparrow, Brewer's sparrow, sagebrush vole, pygmy rabbit, pronghorn antelope, mule deer, and many other species.

The State's goal will be met through specific conservation objectives for anthropogenic disturbances and Acts of Nature, principally large acreage wildland fires and subsequent invasion or potential domination by non-native species. This combined strategy creates the regulatory framework through which sage-grouse habitat can be conserved and the decline of sage-grouse populations can be stopped in the State of Nevada. This section of the Plan details related policies and an adaptive management approach that will provide guidance to achieve these objectives.

The guiding principles that create the balanced foundation and vision for a coordinated, management approach to conserve sage-grouse and the sagebrush ecosystem in Nevada are as follows:

- Conserve sage-grouse and their habitat in Nevada while maintaining the economic vitality of the State.
- Due to the broad reach of sage-grouse habitat, effective management and implementation of sage-grouse conservation actions must be conducted through a collaborative, interagency approach that engages private, non-governmental, local, state, Tribal and federal stakeholders to achieve sufficient conservation of the sage-grouse and their habitat.
- Monitoring and adaptive management will be employed at all levels of management in order to acknowledge potential uncertainty upfront and establish a sequential framework in which decision making will occur in order to learn from previous management actions.

3.1 Anthropogenic Disturbances

3.1.1 Conservation Objective – No net unmitigated loss due to new anthropogenic disturbances

The overarching objective of Nevada's plan is to achieve conservation through no net unmitigated loss of sage-grouse habitat due to new anthropogenic disturbances within the Sage-Grouse Management Area (SGMA; Figure 2) in order to stop the decline of sage-grouse populations. No net unmitigated loss is defined as the State's objective to maintain the current quantity and quality of sage-grouse habitat within the SGMA at the state-wide level by protecting existing sage-grouse habitat or by mitigating for loss due to anthropogenic disturbances. Mitigation requirements are determined by the Conservation Credit System. This objective will be measured by the credit to debit ratio.

Anthropogenic disturbance is defined here as any human-caused activity or action or human-created physical structures that may have adverse impacts on sage-grouse or their habitat. The term anthropogenic disturbance and its associated conservation policies will include, but not limited to the following project categories: mineral development and exploration and its associated infrastructure; renewable and non-renewable energy production, transmission, and distribution and its associated infrastructure; paved and unpaved roads and highways; cell phone towers; landfills; pipelines; residential and commercial subdivisions; activities undertaken pursuant to special use permits and right-of-way grants; and other infrastructure development. Livestock operations and agricultural activities and infrastructure related to ranch and farm businesses (e.g. water troughs, fences, etc.) are not included in this definition, though Section 7.5 and Appendix A address how to minimize impacts to sage-grouse and their habitat from these activities.

3.1.2 Conservation Policies – "Avoid, Minimize, Mitigate"

The State of Nevada's overriding policy for all management actions within the SGMA is to "avoid, minimize, and mitigate" impacts to sage-grouse habitat.

This is a fundamental hierarchical decision process that seeks to:

Avoid – Eliminate conflicts by relocating disturbance activities outside of sage-grouse habitat in order to conserve sage-grouse and their habitat. Avoidance of a disturbance within sage-grouse habitat is the preferred option. If impacts are not avoided, the adverse effects will need to be both minimized and mitigated.

Minimize – Impacts will be minimized by modifying proposed actions or developing permit conditions to include measures that lessen the adverse effects to sage-grouse and their habitat. This will be accomplished through Site Specific Consultation Based Design Features (Design Features), such as reducing the disturbance footprint, seasonal use limitations, co-location of structures, etc. Minimization does not preclude the need for

mitigation of a disturbance. Any disturbance in habitat within the SGMA will require both minimization and mitigation.

Mitigate – If impacts are not avoided, after required minimization measures are specified, residual adverse effects on designated sage-grouse habitat are required to be offset by implementing mitigation actions that will result in replacement or enhancement of the sage-grouse habitat that will result in no net unmitigated loss of habitat from the disturbance activity. This will be accomplished through the Conservation Credit System.

Proposed anthropogenic disturbances within the SGMA will trigger timely consultation with the SETT for assessment of impacts to sage-grouse and their habitats and compliance with SEC and other relevant agency policies. All currently mapped sage-grouse habitat is located within the SGMA. Specifics of the SETT Consultation will be detailed in a Memorandum of Understanding (MOU) between the applicable State and Federal agencies, still under development. SETT Consultation is designed to provide a regulatory mechanism to ensure that sage-grouse conservation policies are applied consistently throughout the State and streamline the federal permitting process.

Determination of sage-grouse habitat will be based on the Nevada Habitat Suitability Map (Figure 3)[1]. At the onset of a proposed project, habitat evaluations or "ground-truthing" of the project site and its surrounding areas shall be conducted by a qualified biologist with sage-grouse experience using methods as defined in Stiver et al (2010), or other mutually agreed to scientifically valid techniques, to confirm habitat type. Evaluations can be conducted by the SETT or NDOW at the request of the project proponent.

The specific steps for the implementation of the "avoid, minimize, mitigate" policy are as follows:

Avoid

Project proponents must first seek to avoid disturbance in sage-grouse habitat within the SGMA. If the project is located entirely outside of habitat, but within the SGMA it will still be analyzed for indirect effects, such as noise and visual impacts. A project will only be considered to have avoided impacts if it is physically located in non-habitat and it is determined to have no indirect impacts affecting designated habitat within the SGMA. If this is determined, no further consultation with the SETT is required.

It is important to note that the avoid step is not an "all or nothing" concept. If the entirety of a project cannot be relocated to non-habitat, alternatives will be explored to relocate portions of the project to non-habitat. (For example, if a mine cannot be relocated into non-habitat, power distribution lines associated with the project may be relocated to non-habitat.) This may reduce minimization and mitigation requirements for the project proponent.

[1] Higher resolution maps are available at:
http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/HSM/3-%20NV%20Management%20Categories%20Version%202.pdf

Anthropogenic disturbances should be avoided within the SGMA. If avoidance cannot be reasonably accomplished, the project proponent must demonstrate why it cannot be reasonably accomplished (as described in Table 3-1) in order for the SETT to consider minimization and mitigation alternatives. The process to demonstrate that avoidance cannot be reasonably accomplished (the "avoid process") is determined by four management categories (Figure 4), which consider both sage-grouse breeding population density and habitat suitability within the SGMA. This approach was taken in order to minimize impacts to areas with higher estimated sage-grouse use and habitat quality. Definitions and methods for developing the management categories are provided in Section 6.0.

The burden of proof to demonstrate that avoidance cannot reasonably be accomplished within the SGMA will be on the project proponent and will require the project proponent to demonstrate the specified criteria listed in Table 3-1 as determined by the management categories the proposed project is located in. Exemptions to the avoid policy will be granted if all the criteria in Table 3-1 are met. A higher burden of proof is set for project proponents to demonstrate that avoidance cannot be reasonably accomplished in areas that have higher densities of sage-grouse populations and suitable habitat.

Table 3-1. The Avoid Process for Proposed Anthropogenic Disturbances within the SGMA

Anthropogenic disturbances should be avoided in habitats within the SGMA. If project proponents wish to demonstrate that a disturbance cannot be avoided, exemptions will be granted if the criteria listed in the table can be met for the applicable management category.

Core Management Areas ("best of the best")	Priority Management Areas	General Management Areas	Non-habitat Management Areas
• Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible; • Demonstrate that the individual and cumulative impacts of the project would not result in habitat fragmentation or other impacts that would cause sage-grouse populations to decline through consultation with the SETT; • Demonstrate that sage-grouse population trends within the PMU are stable or increasing over a ten-year rolling average; • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible; • Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and, • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System. Mitigation rates will be higher for disturbances within this category.	• Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible; • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. If co-location is not possible, siting should reduce individual and cumulative impact to sage-grouse and their habitat; • Demonstrate that the project should not result in unnecessary and undue habitat fragmentation that may cause decline in sage-grouse populations within the PMU through consultation with the SETT; • Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and, • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System.	• Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible; • Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible; • Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and, • Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System.	• Demonstrate that the project will not have indirect impacts to sage-grouse and their habitats. If it cannot be demonstrated, the project proponent will be required to develop Site Specific Consultation Based Design Features to minimize impacts and compensatory mitigation will be required.

Core Management Areas

The Core Management Areas support high densities of sage-grouse and areas of high estimated space use in suitable habitat (See Section 6.0 for details on technical language). These areas include approximately 85% of space use by sage-grouse in the State of Nevada. These areas represent the strongholds (or "the best of the best") for sage-grouse populations in the State of Nevada and support the highest density of breeding populations. Thus, the management strategy is to conserve these areas by avoidance of anthropogenic disturbances in order to maintain or improve current sage-grouse population levels.

Project proponents must seek to avoid disturbances within the SGMA. If the project proponent wishes to demonstrate that avoidance cannot be reasonably accomplished within these areas, exemptions will be granted to this restriction as part of the SETT Consultation. The project proponent must demonstrate that all of the following criteria listed below (also see Table 3-1) are met as part of the SETT Consultation process in order to be granted an exemption:

- Demonstrate that the project cannot be reasonably accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible;
- Demonstrate that the individual and cumulative impacts of the project would not result in habitat fragmentation or other impacts that would cause sage-grouse populations to decline through consultation with the SETT;
- Demonstrate that sage-grouse population trends within the PMU are stable or increasing over a 10-year rolling average;
- Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible;
- Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and
- Mitigate unavoidable impacts through compensatory mitigation via the Conservation Credit System. Mitigation rates will be higher for disturbances within this category.

Priority Management Areas

The Priority Management Areas encompass areas that are determined to be highly suitable habitat for sage-grouse by the Nevada Habitat Suitability Model and areas of high space use that are not contained within the Core Management Areas (See Section 6.0 for details on technical language).

Management in these areas provides more flexibility to project proponents, though avoidance in these areas is still the preferred option and project proponents are encouraged to develop outside of these areas whenever possible. Anthropogenic disturbances will be permitted in these areas if the criteria listed below (also see Table 3-1) are met as part of the SETT Consultation process:

- Demonstrate that the project cannot be reasonably or feasibly accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible;
- Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible. If co-location is not possible, siting should reduce individual and cumulative impacts to sage-grouse and their habitat;
- Demonstrate that the project should not result in unnecessary and undue habitat fragmentation that may cause declines in sage-grouse populations within the PMU through consultation with the SETT;
- Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and
- Mitigate for unavoidable impacts through compensatory mitigation via the Conservation Credit System.

General Management Areas

The General Management Areas encompass areas determined to be suitable habitat for sage-grouse, though less suitable than Priority Management Areas and are not contained within the Core Management Areas (See Section 6.0 for details on technical language). Management of these areas provides the greatest flexibility to project proponents. Anthropogenic disturbances will be permitted in these areas if the criteria listed below (also see Table 3-1) are met as part of the SETT Consultation process:

- Demonstrate that the project cannot be reasonably or feasibly accomplished elsewhere – the purpose and need of the project could not be accomplished in an alternative location, or that locating the project elsewhere is not technically or economically feasible;
- Demonstrate that project infrastructure will be co-located with existing disturbances to the greatest extent possible;
- Develop Site Specific Consultation Based Design Features to minimize impacts through consultation with the SETT; and
- Mitigate for unavoidable impacts through compensatory mitigation via the Conservation Credit System.

Non-Habitat Management Areas

The Non-Habitat Management Areas encompass areas determined to be unsuitable for sage-grouse by the Nevada Habitat Suitability Model (See Section 6.0 for details on technical language). As specified above, all proposed projects within the SGMA, including in non-habitat within SGMAs must conduct habitat evaluation or ground-truthing to confirm presence or absence of sage-grouse habitat. If areas are confirmed by habitat evaluations to be non-habitat, an analysis for indirect impacts on sage-grouse within their habitat in the SGMA will be required to determine if Site Specific Consultation Based Design Features to minimize impacts and compensatory mitigation are necessary as part of the SETT Consultation process (also see Table 3-1).

Minimize

If a project cannot avoid adverse effects (direct or indirect) to sage-grouse habitat within the SGMA, the project proponent will be required to implement Site Specific Consultation Based Design Features (Design Features) that minimize the project's adverse effects to sage-grouse habitat to the extent practicable.

Minimization will include timely consultation with the SETT to determine which Design Features would be most applicable to the project when considering site conditions, types of disturbance, etc. Some general examples could include: reducing the footprint of the project, siting infrastructure in previously disturbed locations with low habitat values, noise restrictions near leks during breeding season, and washing vehicles and equipment to reduce the spread of invasive species. Land use specific Design Features are included in Appendix A.

A list of Design Features for the project must be specified and agreed upon by the SETT and project proponent prior to the start of the project and will become part of the permit/ contract requirements issued for the project. The project proponent will be required to implement, maintain, and monitor the required Design Features in good working order throughout the duration of the project.

Mitigate

Mitigation involves the successful restoration, enhancement, or preservation of sage-grouse habitat and is designed to offset the negative impacts caused by an anthropogenic disturbance. Mitigation will be required for all anthropogenic disturbances impacting sage-grouse habitat within the SGMA. Mitigation requirements will be determined by the State's Conservation Credit System (Section 8.0).

Options for mitigation will be identified in the State's Strategic Action Plan. The State's Strategic Action Plan will identify prioritized areas on public and private lands to implement a landscape scale restoration effort. The plan will identify where the primary threats to sage-grouse habitat are located throughout the State and provide management guidance for how to ameliorate the threats based on local area conditions and ecological site descriptions. The prioritization will include efforts to use mitigation funding in areas where sage-grouse will derive the most benefit, even if those areas are not adjacent to or in the vicinity of impacted populations. This Strategic Action Plan will be updated at least every five years to reflect improvements in understanding, science, and technology for mitigation activities.

3.1.3 Adaptive Management

The SETT, in close coordination with applicable federal and state agencies, will evaluate and assess the effectiveness of these policies at achieving the objective of no net unmitigated loss and will provide a report to the SEC annually. The objective will be considered to have been met if there is a positive credit to debit ratio within the Conservation Credit System on an annual basis. If the State falls short of its objective, the SEC will reassess and update polices and management actions based on recommendations from the SETT using the best available science to adaptively manage sage-grouse habitat.

3.2 Acts of Nature – Fire and Invasive Species

3.2.1 Conservation Objectives –

The overarching objectives of Nevada's plan is to achieve conservation through the following short and long term objectives for Acts of Nature in order to stop the decline of sage-grouse populations and restore and maintain a functioning sagebrush ecosystem:

Short Term:

- *Reduce the amount of sage-grouse habitat loss due to large acreage wildfires and invasion* or potential domination *by non-native plants.*

Long Term:

- *Maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of non-native plants and resilient after disturbances, such as wildfire.*

- *Restore wildfire return intervals to within a spatial and temporal range of variability that supports sustainable populations of sage-grouse and other sagebrush obligate species.*

The Greater Sage-grouse Advisory Committee, using the best available science, identified fire and invasive plant species, principally cheatgrass (*Bromus tectorum*), as the primary threat to sage-grouse and their habitat in the State of Nevada. The State acknowledges these threats must be adequately addressed in order to achieve the conservation goal for sage-grouse within the State of Nevada; however, it is not economically or ecologically feasible to restore all fire damaged or invasive species dominated landscapes at this point, nor is it possible to prevent all fires. The State will put forth a best faith effort to reduce the rate of sage-grouse habitat loss due to fire and invasive plant species. This objective will be measured by evaluating the amount of habitat lost due to fire over a five year rolling period. This will include an evaluation of the amount of habitat gained through post-fire sagebrush re-establishment for those communities with higher resistance and resilience, and the amount of habitat lost post fire which is subsequently dominated by invasive plant species.

3.2.2a Conservation Policies – Fire Management: Paradigm Shift

In order to address the threats of fire and invasive species, which has long challenged land managers throughout the western United States, the State proposes a paradigm shift. This would entail a more proactive, rather than reactive approach, to stop the dominance of invasive species and restore fire to within a range of variability to support sustainable populations of sage-grouse. For specific management actions associated with these policies, refer to Section 7.1 of this State Plan.

3.2.2b Conservation Policies – Invasive Plants: Prevent, Detect, Control, Restore, and Monitor

While wildfire is commonly the vector for the spread of invasive plants, such as cheatgrass, invasive plants are currently widespread throughout the Great Basin and can spread without the aid of wildfire. In order to address the general threat of invasive plants, the State proposes a policy of Prevent, Detect, Control, Restore, and Monitor. For specific management actions associated with these policies, refer to Section 7.1 of this State Plan.

3.2.3 Adaptive Management

Fire and the subsequent reestablishment of plant species (native or not) is a natural process, and consequently this threat is extremely challenging across the western United States as humans are still limited in our ability to directly control this cycle. However, scientific understanding of ecological processes and resource management techniques continues to improve. Adaptive management approaches, committed to by the State, will provide an opportunity to continue to gain a greater understanding of the ecological mechanisms that drive these processes and will subsequently lead to improvements in resource management practices that reduce the occurrence of catastrophic wildfire and minimize the risk of crossing ecological thresholds due to the invasion and subsequent potential domination by invasive annual grasses.

The SETT will evaluate and assess the effectiveness of these policies at achieving the stated short and long term objectives and will provide a report to the SEC annually. The objectives will be met if there is a decrease or leveling off of the amount of habitat loss due to the effect of wildland fire within the SGMA over a five year period. If the State and federal agencies fall short of this objective, the SEC will reassess and update polices and management actions based on recommendations from the SETT using the best available science to adaptively manage sage-grouse habitat.

4.0 DESIRED HABITAT CONDITIONS FOR GREATER SAGE-GROUSE IN NEVADA

The desired habitat conditions for sage-grouse describe what is generally considered to be the highest quality seasonal habitat for greater sage-grouse, specific to Nevada. The desired habitat conditions do not specify what is and what is not habitat, but depict the characteristics of seasonal habitats that sage-grouse in Nevada are using most successfully, based on research in Nevada and the Great Basin. The desired habitat conditions are based on current knowledge of sage-grouse selection and demographic rates related to habitat conditions in Nevada and the Great Basin. Management to work towards these desired habitat conditions must be implemented using professional judgement that assesses ecological site descriptions (including current state and potential), adaptive management, and knowledge of authorized land uses and plans. Vegetation community responses to management techniques can be highly variable and may take years to reach desired conditions depending on a multitude of factors. Vegetation communities go through natural and human influenced successional stages over time that may or may not be progressing sites towards the desired habitat conditions. Therefore, monitoring and data collection must be conducted over a sufficient period of time to allow for an accurate accounting of whether or not a site is making progress toward the desired conditions.

The desired habitat conditions will be used to evaluate management actions and site conditions in sage-grouse habitat to ensure that 1) habitats are maintained if meeting desired conditions, or 2) habitats are trending toward these conditions if they are not being met. Management actions in sage-grouse habitats will include site-specific objectives using these desired habitat conditions as guidelines, while taking into account ecological site descriptions tied to state and transitions models. Progress of management actions will be evaluated through long-term monitoring and adaptive management. When habitat within the State is identified as not meeting these desired conditions and there are opportunities and resources available, the State will seek to work with private and public land managers to assess the causal factors and recommend adjustments in management to work towards the desired conditions. The desired habitat conditions in table 4-1 should not be used to conduct land health assessments and are not regulatory, but are intended to help guide planning for current and future management using adaptive management as a part of the process. In implementation, managers must have flexibility to manage for these desired sage-grouse habitat conditions along with other desired conditions on the site, taking into consideration existing permitted uses and corresponding management plans; as well, some sites may not have the potential to meet all desired sage-grouse habitat conditions specific to the site.

The State of Nevada recognizes that a resilient and resistant sagebrush ecosystem should be heterogeneous (a mosaic of multiple seral states) across the landscape and that achievement of these desired habitat conditions resulting in a large-scale homogenous landscape is not desirable within the State of Nevada. Thus, the State will work with land managers and advisors to work towards achieving or the continued maintenance of the desired conditions in Table 4-1, and to incorporate new science, adaptive management, and incentives in the future that will allow this to occur.

The desired conditions in Table 4-1 should not be reviewed, measured, or managed for, independently. Sage-grouse habitat suitability should be determined by the relationship among several indicator values

including ecological site descriptions (including current state and potential) along with the relative abundance of habitat types across the landscape. These conditions apply to an area being used by sage-grouse for the appropriate life stage (microsites) and not across the entire site or landscape. The desired conditions for each seasonal habitat should only be assessed during the appropriate season of use (dates can vary annually based on climatic conditions) and in areas spatially mapped as the relevant seasonal habitat (expected from USGS in May 2015). Habitat types may not be mutually exclusive and therefore may have to be managed to meet multiple conditions or selected for the more limiting habitat in the area. It is important to understand that the desired conditions described for these habitat types are based on average plant productivity, structural data, supporting scientific literature, and expert opinion relative to sage-grouse use of sagebrush communities and they may not apply to all sagebrush communities in the planning area (Davies et al. 2006). These measures also do not account for inter-annual climate variation (e.g., precipitation) (Davies et al. 2006). Herbaceous vegetation, in particular, varies dramatically year to year; measurements for a single given year should not necessarily be used to adjust management decisions or actions. Individual indicator values do not define site suitability and overall site suitability descriptions require an interpretation of the relationships between the indicators, ecological site descriptions (including current state and potential), and other factors. In order to provide recommendations for management changes and adaptive management, professional expertise and judgment are required to properly assess current conditions. This should include but not be limited to inter-annual climate variation, and authorized uses and their associated plans.

These desired habitat conditions were developed by a team consisting of representatives from the USFWS, NDOW, USFS, USGS, and BLM. The team reviewed the Connelly et al. (2000) guidelines adding considerable detail and making adjustments based on regionally and locally derived data and analysis by the USGS. The State of Nevada's Science Work Group provided input on the science behind the desired habitat conditions.

Desired Habitat Conditions for Greater Sage-Grouse.

Site-specific objectives should be defined based on ecological site descriptions and current ecological state.

Life Requisite	Habitat Indicator	Objective	Notes
GENERAL/LANDSCAPE-LEVEL			
All Life Stages	Rangeland Health Indicator Assessments	Conduct assessments in sage-grouse habitat and develop site-specific objectives based off assessments	Pellant et al. 2005
Cover (Nesting)	Seasonal Habitat Needed	>65% of the landscape in sagebrush dominated cover	Aldridge and Boyce 2007
	Annual Grasses	<%5	Blomberg et al. 2012
Security (Nesting)	Conifer Encroachment	<3% phase I (>0- <25%cover) No phase II (25–50% cover) No phase III (>50% cover)	Casazza et al. 2011 USGS (In prep) (A)
Cover and Food (Winter)	Conifer Encroachment	<5% phase I (>0 - <25% cover) No phase II (25–50% cover) No phase III (>50%)	USGS (In prep) (A) USGS (In prep) (B)
	Sagebrush Extent	>85% sagebrush dominated land cover	USGS (In prep) (A) Doherty et al. 2008
LEK (Seasonal Use Period: 1 March – 15 May)			
Cover	Availability of Sagebrush Cover	Has adjacent sagebrush cover	Connelly et al. 2000 Blomberg et al. 2012 Stiver et al. (In press) HAF
Security[1]	Pinyon and/or Juniper Cover	<3% landscape canopy cover within 1 km of leks	Connelly et al. 2000 (modified) Stiver et al. (In press) HAF Baruch-Mordo et al. 2013 Coates et al. 2013 Manier et al. 2014
	Proximity of Tall Structures[2]	None within 3 miles (5 kilometers)	
NESTING[3] (Seasonal Use Period: 1 April- 30 June)			
Cover	Sagebrush Canopy Cover	≥20%	Kolada et al. 2009a Kolada et al. 2009b
	Residual and Live Perennial Grass Cover	≥10% if shrub cover is <25%	Coates et al. 2013 Coates and Delehanty 2010 Kolada et al. 2009a Kolada et al. 2009b
	Annual Grass Cover	<5%	Lockyer et al. (In press)
	Total Shrub Cover	≥30%	Coates and Delehanty 2010 Kolada et al. 2009a Lockyer et al. (In press)
	Perennial Grass Height	Provide overhead and lateral concealment from predators	Connelly et al. 2000 Stiver et. al. (In press) HAF Connelly et al. 2003 Hagen et al. 2007

Security[1]	Proximity of Tall Structures[2] (1 meter above shrub canopy)	None within 3 miles (5 kilometers)	Coates et al. 2013 Gibson et. al. 2013 Manier et al. 2014
BROOD-REARING/SUMMER[3] (Seasonal Use Period: 15 May- 15 September) Early brood-rearing seasonal use period: 15 May- 15 June Late brood-rearing seasonal use period: 15 June- 15 September			
All brood-rearing sites			
Cover	Perennial Grass Canopy Cover and Forbs	>15% combined perennial grass and forb canopy cover	Connelly et al. 2000 Hagen et al. 2007
Cover and Food	Perennial Forb Canopy Cover	≥5% arid ≥15% mesic	Casazza et al. 2011
Early and late brood-rearing – Upland Sites Only			
Cover	Sagebrush Canopy Cover	10-25%	Connelly et al. 2000
Late brood-rearing- Riparian Sites Only			
Cover and Food	Riparian Areas/Meadows	PFC[5]	Prichard et al. 1998 Prichard et al. 1999 Dickard et al. 2015 Stiver et al. (In press) HAF
Security	Riparian Area/Meadow Interspersion with Adjacent Sagebrush	Has adjacent sagebrush cover	Casazza et al. 2011 Stiver et al. (In press) HAF
Cover	Perennial Grass Height	Provide overhead and lateral cover from predators, for thermoregulation, insects, etc.[6]	Connelly et al. 2000 Stiver et. al. (In press) HAF Connelly et al. 2003 Hagen et al. 2007
Late brood-rearing – Both Upland and Riparian Sites			
Food	Perennial Forb Availability and Understory Species Richness	Understory Species Richness- > 5 grass and forb species present	Casazza et al. 2011
WINTER[3] (Seasonal Use Period: 1November – 28 February)			
Cover and Food	Sagebrush Canopy Cover	≥10% above snow depth	Connelly et al. 2000 USGS (In prep) (C)
	Sagebrush Height	>9.8 inches (25 centimeters) above snow depth	Connelly et al. 2000 USGS (In prep) (C)

[1]Applicable to Phase I and Phase II pinyon and/or juniper.
[2] Does not include fences.
[3]Field collection data for these seasonal habitat delineations should only be taken in the areas mapped as that habitat type (maps expected from USGS in May 2015) and during the appropriate seasonal use period. Seasonal use periods are standardized for the purposes of this table, but may fluctuate annually due to climatic conditions.
[4]Species richness should include some forb species, with consideration given to sage-grouse preferred forb species listed in Stiver et al. In Press.
[5]Site does not have to meet PFC but should be showing progress in trending toward proper functioning condition or have an upward trend if functioning at risk.
[6] Applies to grasses within sagebrush-shrub communities adjacent to riparian area. Sage-grouse generally select for perennial grass heights that are greater than what is randomly available in a given site (USGS unpublished data). Selected heights in Nevada on average range from 4" - 8" (average droop height of live plants) depending upon resistance and resilience mapping and ecological site descriptions (USGS unpublished data). Generally, sites in the northern portion of the management area trend toward the upper end and those in the southern portion trend toward the lower end of the height range (USGS unpublished data).

5.0 IMPLEMENTATION RESPONSIBILITIES

The creation of the Sagebrush Ecosystem Program (SEP) was one of the main recommendations of the 2012 Governor's Sage-grouse Advisory Committee. The SEP consists of the Sagebrush Ecosystem Council (SEC) and the Sagebrush Ecosystem Technical Team (SETT). The program is established under the Department of Conservation and Natural Resources – Division of State Lands. The program is a collaborative, multi-stakeholder approach, charged to carry out programs to preserve, restore, and enhance sagebrush ecosystems in the State of Nevada. In addition, the SEP will work with Local Area Working Groups (LAWGs) and Conservation Districts to help identify and implement on-the-ground sage-grouse and sagebrush ecosystem conservation efforts. Also, the SEP will work with local governments to avoid conflicts with sage-grouse habitat, including but not limited to urbanization issues.

Sagebrush Ecosystem Council (SEC)

The SEC was originally established under Executive Order 2012-19 and later codified under state statute NRS Chapter 232.162. The SEC consists of a nine voting member board, appointed by the Governor with representatives from the following interests: agriculture, energy, general public, conservation and environmental, mining, ranching, local government, Native American tribes, and Board of Wildlife Commissioners. In addition, the state directors of the Nevada Departments of Conservation and Natural Resources (DCNR), Wildlife (NDOW), and Agriculture (NDA), as well as the state directors for the federal agencies of BLM, USFWS, and HTNF will serve as ex-officio members. The SEC is responsible for determining policy associated with the sagebrush ecosystem and sage-grouse.

The objective of the SEC is to establish and guide a consistent, transparent process to coordinate disturbance and conservation activities and set policy in the SGMA in order to provide for a resilient and resistant sagebrush ecosystem and stable or increasing sage-grouse populations.

The specific duties of the SEC include:

- Consider the best science available in its determinations regarding the conservation of sage-grouse and sagebrush ecosystems in this State;
- Establish and carry out strategies for: 1) the conservation of the sage-grouse and sagebrush ecosystems in this State; and 2) managing land that includes those sagebrush ecosystems, taking into consideration the importance of those sagebrush ecosystems and the interests of the State;
- Establish and carry out a long-term system for carrying out strategies to manage sagebrush ecosystems in this State using an adaptive management framework and providing for input from interested persons and governmental entities;
- Oversee the SETT;
- Establish and set policy for the Conservation Credit System (CCS);

- Solicit suggestions and information and, if necessary, prioritize projects concerning the enhancement of the landscape, the restoration of habitat, the reduction of nonnative plants and the mitigation of damage to, or the expansion of, scientific knowledge of sagebrush ecosystems;
- If requested, provide advice for the resolution of conflict concerning the management of the sage-grouse or a sagebrush ecosystem in this State;
- Coordinate and facilitate discussion among persons, federal and state agencies, and local governments concerning the maintenance of sagebrush ecosystems and the conservation of the sage-grouse;
- Provide information and advice to persons, federal and state agencies and local governments concerning any strategy, system, program or project carried out under this State Plan;
- Provide direction to state agencies concerning any strategy, system, program or project carried out pursuant to this State Plan and resolve any conflict with any direction given by another state board, commission, or department jointly with that board, commission or department, as applicable;
- Submit semi-annual program progress reports to the Governor;
- Pursuant to the "Inter-Tribal Council of Nevada, Inc. Resolution & Letter of Support," (Appendix C) integrate Tribal participation in the statewide conservation effort, and acknowledge traditional Tribal ecological knowledge when available to update SGMA;
- Establish policies for the identification and prioritization of landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and other data that will contribute to decision making informed by science to increase resiliency; and
- Encourage and facilitate land management education and training for all user groups of sage-grouse habitat.

Sagebrush Ecosystem Technical Team (SETT)

The SETT is a multi-disciplinary, interagency team with representation from DCNR – Divisions of State Lands and Forestry, NDOW, and NDA. The SETT serves as staff to the SEC and advises them on the best available science.

The objective of the SETT is to implement a multi-disciplinary approach for the administration of this State Plan that incorporates various scientific and technical expertises and provides a well-defined process for assessing impacts and permitting activity in the SGMA.

The specific duties of the SETT include:

- Serve as staff to the SEC and advise the SEC on the best available science in order for them to set policy;

- Develop a comprehensive State Plan based on the recommendations from the Governor's Sage-grouse Advisory Council;
- Oversee the day-to-day implementation of the goals, objectives, and management actions established under this State Plan. Propose revisions to the State Plan as needed;
- Coordinate the development of the CCS. In accordance with SEC policy, administer and operate the CCS once it is established;
- Work with the USGS and other technical experts to development sage-grouse habitat and management maps;
- Establish and manage a process in cooperation with applicable federal and state agency partners to update sage-grouse habitat and management maps using the best available science;
- Coordinate with the BLM and USFS and other federal and state agencies on the development of the Nevada and Northeastern California Greater Sage-grouse Land Use Plan Amendment (LUPA) and Environmental Impact Statement (EIS);
- Enter into an MOU with the BLM and USFS for agency coordination on sage-grouse management and administration of the CCS;
- Compile and submit state-wide data for the USFWS data call for the sage-grouse listing decision;
- Work with scientific and technical experts for advice on the best available science for implementing and updating management actions;
- Identify and prioritize landscape-scale enhancement, restoration, fuel reduction, and mitigation projects based upon ecological site potential, state and transition models, and other data that will contribute to decision making informed by science to increase resiliency following wildfire;
- Provide timely consultation for project proponents who want to conduct activities in the SGMA to avoid, minimize, and mitigate impacts to sage-grouse. This will likely include robust ground-truthing for the presence or absence of habitat. Foster and maintain collaborative processes with state and federal agencies to expedite state and federal permitting, while providing for the conservation of sage-grouse;
- Secure grants and other funding opportunities to implement habitat enhancement and restoration projects;
- Develop and oversee a monitoring and adaptive management program and provide recommendations to the SEC on how to update policies based on new information learned; and
- Establish a geographic database repository to maintain the inventory of development and mitigation projects, population data, and monitoring results.

Local Area Working Groups (LAWGs)

The LAWGs provide all stakeholders with an opportunity to work together in actively managing and restoring landscapes across boundaries. Even with collaboration there is a realization that to be successful there is a need for more investment from all sources to achieve sage-grouse conservation objectives. LAWG membership includes representation from private land owners, tribes, federal land management agencies, local governments, conservation districts, USFWS, USGS, NDOW, NGO, USDA-ARS, UNR, NRCS, DOD, sportsmen, mining, energy, Off-Highway Vehicle (OHV) users, agricultural and environmental interests.

The SEP will work with the LAWGs to:

- Develop and implement site-specific plans to accomplish enhancement and restoration projects in areas that are identified by the SEP as important areas for sage-grouse conservation;
- Monitor and adaptively manage conservation actions;
- Identify potential habitat enhancement and restoration projects; and
- Provide local, site-specific expertise on a variety of issues.

Conservation Districts Program (CDP)

The CDP provides administrative support to the State Conservation Commission, which develops policy and regulations for Nevada's twenty-eight locally elected conservation districts. The CDP is comprised of a program coordinator and three staff specialists stationed in Elko, Ely, and Winnemucca. The CDP's role in the implementation of this State Plan is to assist in the development of on-the-ground conservation projects.

The SEP will work with the CDP to:

- Implement on-the-ground conservation and mitigation projects identified by the SEP and LAWGs, including perusing grants and other funding opportunities. Provide recommendations to the SEP on possible additional projects; and
- Facilitate communication between individual CDs, SEP, LAWGs, and other stakeholders in order to more effectively achieve on-the-ground conservation.

Local Governments

Thirteen of Nevada's seventeen counties, as well as several cities are located within the SGMA.

The SEP will work with local governments:

- When a county or city considers a change to its master plan for a land use of higher intensity affecting the SGMA.
- To address any potential conflicts with sage-grouse habitat.

6.0 MAPPING

The SEP contracted with the USGS to serve as the lead technical and science advisor for the development of habitat suitability index (HSI) for sage-grouse in Nevada using resource selection function (RSF) modeling. The SEP used the HSI to develop habitat and management maps to be implemented through this State Plan. The SETT assembled an Expert Review Team, comprised of local sage-grouse technical experts from the UNR, BLM, NDOW, USFWS, and HTNF to advise the SETT on technical aspects of the mapping process.

Methods

The State's process for developing spatially explicit maps for sage-grouse habitat and sage-grouse management areas was completed in four stages: 1) development of the HSI; 2) classification of the HSI into suitability categories; 3) development of a space use index; and 4) merging the habitat suitability categories and space use index to develop management categories. The methods for each of these stages are outlined below.

Habitat suitability index

Model averaged RSFs were used to develop HSIs that ranked areas of the State based on a continuum of sage-grouse selection, from highly selected for to strongly avoided. The modeling is driven by actual location data obtained using radio-telemetry information, informed by >31,000 telemetry locations from >1,500 radio-marked sage-grouse across 12 study areas within Nevada and California collected over a 15-year period, and by environmental factors including land cover composition, water resources, habitat configuration, elevation, and topography, each at multiple spatial scales that are relevant to sage-grouse movement patterns. The modeling process contrasted these environmental factors for sites used by sage-grouse (telemetry data) with available sites (randomly generated locations). Contrasting the environmental factors of used versus available sites provided information about what factors were correlated with greater sage-grouse selection or avoidance (e.g., streams, pinyon-juniper).

RSFs were applied to calculate an overall probability of use per pixel[2]. This created a single sage-grouse HSI and resulted in a surface of predicted use by sage-grouse across Nevada. This surface, the HSI, is represented by probability values that range across a continuous spectrum of 0.0 to 1.0 (Figure 5).

Habitat Suitability Categories

To identify suitable habitat, the HSI described above was classified into three categories of suitability (high, moderate, and non-habitat) using cutoff values based on the standard deviation (SD) from the mean HSI ($\bar{x}$) value. High suitability habitat was comprised of all HSI values greater than 0.5 SD below $\bar{x}$. Moderate suitability habitat was comprised of HSI values between 1.5 and 0.5 SD below $\bar{x}$. Non-suitable habitat was comprised of HSI values 1.5 SD below $\bar{x}$. This bottom cut-off point was validated by a cost-benefit ratio looking at the trade-off between additional area to telemetry points. The equalization

[2] Pixels are the 30 x 30 meter resolution of the RSFs.

point occurs at 1.5 SD. The resulting habitat categories were then aggregated at the 1 km scale to account for corridors and smoothed at the 1.2 km scale to remove "islands" (Figure 3).

Space use index

An index of space use was developed based on lek attendance and density coupled with probability of sage-grouse occurrence relative to distance to nearest lek. This index was then categorized into two categories high use and low to no use area. High use areas consisted of areas that included up to 85 percent of the highest space use index density and low-to-no use areas consisted of areas with less than 15 percent.

Management Categories

To create a management prioritization for the implementation of this State Plan, the habitat suitability classes were intersected with the space use categories as follows:

Core Management Areas – areas of suitable sage-grouse habitat use found within areas of estimated high space use;

Priority Management Areas – high suitability habitats that are found in areas of estimated low space use and areas of non-habitat that overlaps with areas of estimated high space use;

General Management Areas – moderate suitability habitats that are found in areas of estimated low space use; and

Non-habitat Management Areas – non-suitable habitats that are found in areas of estimated low space use (Figure 4).

Full methods for the development of the Nevada HSI, Habitat Suitability Map, and Management Category Map are detailed in "Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management" (Coates et al. 2014).

The Nevada sage-grouse habitat and management mapping process is a product of the SETT and is a collaborative group process with state and federal agency review and input and with the USGS serving as the scientific contractor on the habitat suitability model.

<u>Map revisions</u>

This mapping effort is iterative and is intended to inform and better define aspects of the State Plan. To that end, the habitat and management mapping process will be reviewed and refined every 3 to 5 years. New or improved spatial data (*e.g.*, additional sage-grouse telemetry data, updated or improved vegetation community data) will be incorporated during the refinement process. The review and refinement process will be scientifically based and include review and input from SETT, NDOW, BLM, USFS, and USFWS. Other stakeholders will be encouraged to participate in the process by submitting relevant information to the listed agencies. It is anticipated that the habitat suitability modeling processes will be the basis for refinements, unless more rigorous methods are developed.

Project assessment under SETT Consultation will be based on the map that is current at the commencement of the review process. If a new map becomes available after the review process has begun, the previous version of the map will continue to be used. If the project proponent proposes changes in scope of the project, then the assessment will be based on the revised map. In addition, individual projects will typically include on the ground habitat determinations for the presence or absence of habitat.

7.0 THREAT ASSESSMENT—GOALS, OBJECTIVES, AND MANAGEMENT ACTIONS

Threats to sage-grouse and their habitats in Nevada were based on those identified in USFWS' 2010 proposed rule for sage-grouse and further developed in their Conservation Objectives Team Report, as well as from input by local areas experts. The list of threats and proposed actions was originally determined by the Advisory Committee and further developed in greater detail by the SEP.

7.1 Fire and Invasive Plants

In 2012, Nevada's Greater Sage-grouse Advisory Committee, using the best available science, identified fire and invasive plants, principally cheatgrass, as the primary threat to sage-grouse and their habitat in the state of Nevada. Wildland fires and the subsequent invasion or potential domination by cheatgrass and other invasive plants continue to create large-scale habitat loss and fragmentation (Figure 6 and Figure 7). This current rate of habitat loss is not sustainable for long-term sage-grouse population persistence.

While the vast majority of fires in sage-grouse habitat are suppressed in the initial attack phase, the continued loss of large areas in sage-grouse habitat occurs most often during periods of 'Extreme Fire Danger Conditions' when fire behavior has the greatest impact on suppression capabilities. These 'Extreme' conditions can exist simultaneously over large areas of the western U.S, creating a shortage of regional/national firefighting assets due to pre-existing large fires with greater values at risk (Murphy et al. 2013).

In Nevada and throughout the western United States, the years in which the highest number of acres burned occurred after wet productive growing seasons that produced abundant fine fuels. Consecutive wet years can add to residual fine fuels. An unprecedented series of four wet years in 1995-1998 was followed by an unprecedented three years in 1999-2001 during which more than 2.75 million acres burned in Nevada (Littell et al. 2009). Woody fuels become most flammable when lack of fire or a fire surrogate vegetation management allows woody fuel to accumulate. Many areas of Nevada that prehistorically burned every few decades have not burned for over a century (Gruell and Swanson 2013).

The State acknowledges these threats must be adequately addressed in order to achieve the conservation goal for sage-grouse and actions must be taken to increase overall preparedness, strategically locating fuels management projects using resistance and resilience concepts (Chambers et al. 2014), increase local suppression capabilities, and improving rehabilitation/restoration capabilities.

To this end, the State has begun to address these threats by creating the Sagebrush Ecosystem Program, composed of the Sagebrush Ecosystem Council, with its attendant Sagebrush Ecosystem Technical Team, to develop and approve a state plan that facilitates best available science review and technology transfer to State and local agencies and works in coordination with federal land managers and other public and private partners. In addition, the State has also approved and is implementing the Nevada Division of Forestry's (NDF) Wildland Fire Protection Program, which allows for full implementation of Nevada Revised Statute, Chapter 472, improving delivery of financial, technical and equipment/human resources to Nevada counties in fuels reduction planning and implementation, wildfire management and suppression and restoration of burned areas.

As well, the SAP, to be developed subsequently to this State Plan, will draw on concepts of resistance and resilience as a multi-scale approach to prioritize management actions for sage-grouse. Chambers et al (2014) outlines the role of these concepts relative to fire cycle and the role of annual invasive grasses. The SETT will participate in the interagency collaborative Fire, Invasive Assessment Team (FIAT) that has

developed a step-down process (FIAT 2014) based on Chambers et al. 2014 to identify management projects focused in key sage-grouse habitat to address the continual threat of fire and invasives, as well as conifer encroachment. Projects identified in through the FIAT will be incorporated into the SAP, as appropriate.

Nevada Revised Statute (NRS), Chapter 555 and Nevada Administrative Code (NAC), Chapter 555 address both noxious and invasive plants, their status, and any regulations regarding the control of such plants. The State has established a priority list of noxious weeds that require some form of control. Other widespread invasive plants, such as cheatgrass, while not on the noxious weed priority lists, pose a significant threat to Nevada's landscapes and habitats and will be addressed on a priority basis, particularly when they compromise sage-grouse desired habitat conditions (see Section 4.0).

The introduction of exotic invasive plant species in Nevada has likely been occurring since the early European settlers arrived and has been knowingly and unknowingly occurring since that time. While some species may go seemingly unnoticed, many currently pose significant threats to the sagebrush ecosystem, wildlife habitats, and our landscape in general. While all of these identified species are currently considered by the State as invasive plants, some warrant further declaration as 'noxious'. Noxious weeds are defined in NRS 555.130 as: "Any species of plant which is likely to be detrimental, destructive or difficult to control, but is not already introduced and established in the State to such an extent as to make its control or eradication impracticable in the judgment of the State Quarantine Officer". Plants that do not meet this definition are generally considered to be invasive or nuisance weeds. Cheatgrass falls into the 'invasive' category due to its expansive footprint within Nevada's sagebrush ecosystem.

Cheatgrass is an exotic species from the Middle East that was introduced in North America in the late nineteenth century and has become one of the most adaptive and dominant invasive plants in the Western U.S. This is especially true following fire and other major ground disturbing activities in sagebrush ecosystems, particularly at lower elevations and precipitation zones in Nevada.

Many factors will be considered when prioritizing treatments for fire and invasive plants (i.e. noxious weed presence, sage-grouse breeding densities, habitat suitability (abundance, quality, and connectivity), existing additional threats, resistance, resilience, ecological site description, state and transition models, etc.). Additionally, further prioritization may be determined by the type of action required (conservation related, prevention based, or restoration or rehabilitation activities), presence of or proximity to sage-grouse habitat, and the amount of funding available for treatment in a given year.

Goals, Objectives, and Management Actions

The overarching direction of Nevada's plan is to stop the decline of sage-grouse populations and restore and maintain a functioning sagebrush ecosystem. Currently, it is not economically or ecologically feasible to restore all fire damaged or invasive plant dominated landscapes, nor is it possible to prevent all fires, though the State acknowledges that this threat must be addressed in order to provide for the conservation of sage-grouse. In order to achieve this goal, the State will take a phased approach through a series of short term and long term objectives and management actions. The State will first

seek to reduce the amount of habitat loss, with the long-term objective of restoring ecosystem functions and processes. This will require a concerted and consistent commitment to achieve these objectives over the long-term.

The State has already taken steps to achieve these objectives through statewide adoption and implementation of the Nevada Division of Forestry's Wildland Fire Protection Program, creating a tiered system that gives equal priority to cooperative pre-suppression fire prevention projects; adopting and incorporating National Wildfire Coordination Group (NWCG) approved training and firefighting techniques that can help preserve habitat; and, cooperative post-suppression rehabilitation and restoration activities in and around areas of important habitat.

Goal 1: Ameliorate the threat of fire and invasive plants in order to provide for the conservation of sage-grouse and their habitat.

Short term objectives and management actions:

Objective 1.1: Reduce the amount of sage-grouse habitat loss due to large acreage wildfires and invasion or potential domination by non-native plants.

Pre-suppression

In order to address the threat of fire and invasive plants, which continues to challenge land managers throughout the western United States, the State proposes a paradigm shift. This entails a shift in focus from the current suppression-centric approach to a more nuanced, cost effective, and proactive approach focusing on pre-suppression activities; which if adequately supported, will contribute greatly to Federal, State and local efforts to stop the dominance of invasive plants, reduce catastrophic wildfire incidence, and restore fire to within a range of variability to support sustainable populations of sage-grouse in Nevada.

Management Action 1.1.1a: Develop, and provide sustainable, predictable federal, state, and local funding sources for pre-suppression activities (including maintenance) separate from funding for suppression and post-fire rehabilitation activities.

Management Action 1.1.1b: Dedicate funding to plan and implement cost effective pre-suppression activities with an emphasis on strategic, scalable cooperative projects informed by best available science; utilize cost efficient methods and tools; and follow up with effective, repeatable monitoring.

Management Action 1.1.1c: Make decisions regarding pre-suppression planning and fuels management projects based on best available science. This information will be incorporated into the planning process to inform locations of landscape and local scale fuels management projects and to provide protection to areas of sage-grouse habitat that have compromised resilience, resistance, and heterogeneity

Management Action 1.1.1d: Prioritize pre-suppression fuels management projects, fire prevention planning, and invasive plant control activities in and around Core and Priority Management Areas. Pre-suppression projects will be identified, designed and prioritized so that they facilitate firefighter safety, protect private property, prioritize important sage-grouse habitat, and work to maintain natural resource functions.

Management Action 1.1.1e: Establish, maintain, and fund an effective, repeatable pre-suppression monitoring and adaptive management program that informs future project planning and implementation.

Suppression

State and federal agencies will provide safe, cost-effective fire management programs that support the conservation of sage-grouse habitat through collaborative planning, coordination, training, staffing, resource allocation, and fire management oversight.

Management Action 1.1.2a: Support robust, coordinated, and rapid fire suppression management using a diversity of agencies, including federal, state, tribal and local government, as well as creating, empowering and training (to latest Nevada and National Wildfire Coordinating Group (NWCG) standards) Rural Fire Associations, Fire Protection Districts and Wildfire Support Groups.

Management Action 1.1.2b: Support and improve interagency wildfire prevention activities and education statewide, including: interagency agreement updates, wildfire workshops, demonstration projects, and public service announcements on wildfire and sage-grouse habitat loss.

Management Action 1.1.2c: When prioritizing wildland firefighting actions in the Sage Grouse Management Area (SGMA), give priority to Core Management Areas, followed by Priority and General Management Areas during fire operations.

Management Action 1.1.2d: **Use w**ildland fire strategically to accomplish resource management objectives. Fire may not have to be suppressed in all instances. Resource and fire managers should consider beneficial fire use if located in areas that may benefit sage-grouse habitats, but only if:

- it would not risk the net spread of invasive plants;
- human lives, property, and important natural resource functions are not at risk;
- wildland fires exhibit prescribed/desired fire behavior characteristics and are located in designated sage-grouse habitats appropriate for beneficial fire use.

Management Action 1.1.2e: Manage wildland fires in sage-grouse habitat to retain as much habitat as possible. Interior unburned islands of vegetation in areas of habitat should be

protected through follow-up mop-up of the island's perimeter and interior, when fire crew safety is not at risk.

Post-Fire Restoration/ Rehabilitation

Emergency stabilization (ES) and burned area rehabilitation (BAR) funding streams are instrumental in the process of stabilizing soils and reestablishing adapted perennial vegetation on federal lands post-fire. Currently, these programs provide funding for rehabilitation treatment immediately post-fire, which does not reflect the need to accommodate for poor initial success due to lack of precipitation and other environmental variables.

Management Action 1.1.3a Work with federal, tribal, and local governments to develop dedicated funding sources that allow for up to five years of additional post-fire restoration treatments in order to better ensure projects meet goals and objectives.

Management Action 1.1.3b Until such time as dedicated funding sources for multi-year post-fire restoration treatments can be developed, federal, state, tribal, and local governments should submit budget requests and projections that reflect the need for funding that will cover actual and contingent yearly costs associated with successful multiyear post-fire rehabilitation efforts.

Management Action 1.1.3c: Use the concepts of resistance and resilience and products developed by BLM's FIAT (Fire and Invasives Assessment Team) group to determine if post-fire restoration actions are necessary to trend towards sage-grouse desired habitat conditions (see Section 4.0).

Management Action 1.1.3d: Control the spread of invasive plants post-fire.

Management Action 1.1.3e: Use collaborative and strategic approaches in post-fire rehabilitation efforts in sage-grouse habitat. Federal, state, tribal and local agencies should coordinate and collaborate on rehabilitation projects in sage-grouse habitat where responsibilities and land ownership interests intersect.

Management Action 1.1.3f: Design post-fire restoration treatments in Core, Priority, and General Management Areas to trend towards sage-grouse desired habitat conditions (see Section 4.0). Consider the use of native plant materials based on availability and probability of success. When native plant materials are not available or the probability of success is low, use non-native plant materials that will best work towards achieving sage-grouse desired habitat conditions. All seed used on rehabilitation and restoration projects must be certified seed. All mulch, straw or gravel/earth materials used in rehabilitation and restoration projects must be certified weed free to the North American Invasive Species Management Association (NAISMA) standards.

Management Action 1.1.3g: Monitor post-fire restoration treatments to ensure long term persistence of restored habitat, and that the monitoring continues at least until treatment objectives are met.

Invasive plants

While wildfire is commonly the facilitator for the domination of invasive plants, such as cheatgrass, invasive plants are currently widespread throughout the Great Basin and can spread without the aid of wildfire. In order to address the general threat of invasive plants, the State will pursue a strategy of Prevent, Detect, Control, Restore, and Monitor, using the best available science. The Nevada Department of Agriculture (NDA) will utilize its EDDMapS program to assist the State in the implementation of these efforts.

***Management Action 1.1.4a*:** *Prevent* the establishment of invasive plants into uninvaded sage-grouse habitat. This will be achieved by conducting systematic and strategic detection surveys, data collection, and mapping of these areas and engaging in early response efforts if invasion occurs. This will be achieved by further developing federal and state partnerships and working with counties, cities, and local groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts. This is a priority for invasive plant control in the state of Nevada.

Management Action 1.1.4b: Apply Design Features to proposed anthropogenic disturbance (see Appendix A) in order to minimize land disturbance and prevent the spread of invasive plants.

Management Action 1.1.4c: Require anthropogenic disturbance proponents to monitor for the existence of invasive plants pre-disturbance and to report all findings to the NV EDDMapS database. Pre- and post-disturbance activities must include prevention strategies prior to entering sites, control, restoration, and monitoring for a minimum of three years or until the site is deemed noxious and invasive weed free following the disturbance. All sites must be certified weed free prior to any relinquishment of obligations that authorized the disturbance.

Management Action 1.1.4d: *Detect* new invasive plant infestations, whether it is a single plant or a small patch. If it can be detected and mapped early in the invasion and control begins immediately, then the likelihood for eradication will increase dramatically. NDA will use its EDDMapS program to assist in the effective and efficient implementation of this action.

Management Action 1.1.4e: Within sage-grouse habitat, and where funding may be a limiting factor, prioritize the control of invasive plants that are compromising attainment of sage-grouse desired habitat conditions (see Section 4.0).

Management Action 1.1.4f: Rehabilitate sites that are ecologically functioning, but at risk of crossing an ecological threshold and becoming nonfunctional due to already being compromised

by invasive plants, to trend towards sage-grouse desired habitat conditions(see Section 4.0). Rehabilitation may include re-vegetating sites with native plants cultivated locally or locally adapted, or non-native plant species where appropriate. Any rehabilitation project where invasive plants already occur or may be found in close proximity should include an invasive plant treatment and monitoring component within the plan.

Management Action 1.1.4g: Use ecological site descriptions and associated state and transition models to identify target areas for resiliency enhancement or restoration. Maintaining or enhancing resilience should be given top priority. In the Great Basin sagebrush-bunchgrass communities, invasion resistance and successional resilience following disturbance are functions of a healthy perennial bunchgrass component. Therefore a combination of active and passive management will be required to ensure this functionality. Areas that are in an invaded state that will likely transition to an annual grass monoculture if a disturbance occurs and are located within or near sage-grouse habitat should be prioritized for pre-fire management favoring native and adapted perennials and post-fire restoration efforts to increase resistance and resilience.

Management Action 1.1.4h: Engage climatological and meteorological professionals and their agencies to identify opportunities to increase both effectiveness and efficiency in the timing of restoration activities. Additional activities could include weather augmentation through cloud seeding, and assistance with both short term and longer term weather prediction model guidance or shorter term weather indicators.

Management Action 1.1.4i: Monitor and adaptively manage to ensure effectiveness of efforts to prevent, detect, control and restore. Use the resource mapping functions within EDDMapS to identify and map infestations as well as any prevention, restoration, or rehabilitation efforts.

Long term objectives and management actions:

Objective 2a: Maintain an ecologically healthy and intact sagebrush ecosystem that is resistant to the invasion of non-native species and resilient after disturbances, such as wildfire.

Objective 2b: Restore wildfire return intervals to within a spatial and temporal range of variability that supports sustainable populations of sage-grouse and other sagebrush obligate species.

Management Action 1.2.1 Develop consistent and dedicated funding sources in order to provide a consistent commitment to pre-suppression, suppression, post-fire restoration, and invasive plant management actions described above.

Management Action 1.2.2: Work collaboratively with federal, state, tribal, and local governments, as well as private entities to consistently implement the management actions described above.

Management Action 1.2.3: Monitor all management actions to evaluate and assess their effectiveness at achieving objectives and use this knowledge to adapt management plans.

Management Action 1.2.4: Emphasize continued research and provide funding for research and monitoring to enhance knowledge and understanding of how to further reduce the prevalence of catastrophic wildfire. Minimize the risk of crossing ecological thresholds due to the invasion and subsequent potential domination by invasive annual grasses, use fire behavior prediction to optimize fire management and improve rehabilitation/ restoration techniques.

7.2 Pinyon-Juniper Encroachment

In Nevada, pinyon and juniper (P-J) woodlands are composed of single leaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) (Figure 8). In northwestern Nevada pinyon and Utah juniper are replaced with western juniper (*J. occidentalis*). P-J woodlands currently cover 13% of Nevada, or approximately 9.1 million acres (Mitchell and Roberts 1999). Of the 9.1 million acres in Nevada, approximately 64% is found on BLM land, 26% on USFS land, 5% on private land, and the remaining 5% on other lands (DOD, NRC, USFWS, BIA, etc.)(DCNR-NDF 2010).

From a historical standpoint, the area occupied by pinyon or juniper has increased 125 to 625 percent since 1860. The increase in trees is a result of infill into shrub-steppe communities that contained low numbers of trees, and expansion of P-J into areas that previously did not support trees. (Miller et al. 2008). Potential reasons for the expansion may include: altered fire regimes, improper livestock grazing, natural range expansion, and changing climate (Romme et al. 2009).

In Nevada, P-J encroachment is ranked as the second highest threat to sage-grouse, after fire and invasive plants. This continued woodland expansion is a challenge for land and wildlife managers, with two primary concerns being the continuing steady conversion of sagebrush habitat to woodland and increased risk of large area destructive wildfires that may convert woodlands to monocultures of invasive annual grasses and other weedy species.

Pinyon – Juniper Woodland Encroachment into Sagebrush Communities – Characterization

P-J woodland encroachment is characterized by three phases (Miller et al 2005):

Phase I – Trees are present but shrubs and herbaceous vegetation are the dominant vegetation that influences ecological processes on the site;

Phase II – Trees are co-dominant with shrubs and herbaceous vegetation and all three vegetation layers influence ecological processes on the site; and

Phase III – Trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site.

If a wildfire occurs before Phase III is reached, the original vegetation community has an opportunity to return to the site via successional pathway that is dependent upon the fire's surviving plant species, seed produced by the remaining shrubs, surviving herbaceous vegetation, or their viable seed remaining in the soil seed bank. This return to the original community is also dependent on the native plants being abundant enough to out compete any on-site invasive annual grasses like cheatgrass or medusahead grass (*Taeniatherum caput-medusae*) and perennial invasive weeds (e.g. knapweeds, etc.) following the fire.

With time, and little or no fire, these invaded brush communities become Phase III woodlands, characterized by very little understory, the only evidence of the former plant community being skeletons of sagebrush and other woody brush species and a sparse population of weakened herbaceous plants . At this point, run-off from the soil surface of spaces between trees increases, due to

the loss of herbaceous ground cover. In turn, the increased rate and speed of soil erosion can trigger difficult to reverse changes to the biogeochemical cycles of the plant community. If a fire burns through the woodland at this point, the potential for the area to return to a sagebrush plant community is greatly reduced, particularly if cheatgrass, medusahead, or perennial invasive weeds are present in the understory.

The risk of conversion to annual and perennial invasive plants increases as trees grow from phase II to phase III, with the threshold occurring at about >40% relative cover of trees compared to <60% cover of shrubs and herbaceous plants. Prior to this threshold, fire sustains long-term sagebrush ecosystem resilience. After this threshold, fire leads to potential domination by invasive annuals or perennials without effective re-vegetation by perennial grasses (Miller et al. 2005).

In the Great Basin there are approximately 100,000 + acres a year moving into Phase III woodlands. (Miller et al.2008). At this rate of encroachment, management of sagebrush habitats becomes a race between a potentially permanent loss of sagebrush habitat to P-J woodland versus how much Phase I and II woodlands can reasonably be treated each year before they reach Phase III.

Land managers have to consider removal of trees from areas that historically have been sagebrush dominated as a priority activity. Numerous studies have documented the expansion of P-J woodlands into sagebrush communities (Cottam and Stewart 1940; Adams 1975; Burkhardt and Tisdale 1976; Tausch et al. 1981; Tausch and West 1988, 1995; Gedney and others, 1999; Miller and Rose 1995, 1999; Miller et al. 2005). In recent years, research has looked at woodland dynamics and new approaches to measure the extent that P-J has replaced or are encroaching sagebrush communities, versus dynamics on sites that have supported woodlands in the past (Miller et al.2008).

Another area of recent research increasing land managers understanding of vegetation dynamics and increasing decision making options is the inclusion of concepts of resistance and resilience. These concepts can be used in conjunction with sage-grouse habitat requirements to develop lists of appropriate management actions and to identify effective management strategies at landscape scales (Wisdom and Chambers 2009 & Chambers et al. 2014).

Pinyon – Juniper Woodland Encroachment into Sagebrush Communities – Greater Sage-grouse Impacts
The continued expansion of woodland has become a primary threat to greater sage-grouse and other sagebrush obligate wildlife species. In the instance of sage-grouse, woodland expansion contributes to the loss of important seasonal habitats. It also increases raptor presence and predation associated with the coniferous trees (Commons et al. 1999). Several studies demonstrate that sage-grouse avoid areas encroached by P-J, show that P-J removal will increase sage-grouse habitat quality, and provide some evidence that sage-grouse will return to an area once P-J is removed:

- During both the breeding and summer seasons, sage-grouse preferred cover types with less than 5% juniper canopy cover compared to those same cover types with greater than 5% juniper canopy cover. (Freese 2009).

- Juniper can also indirectly influence sage-grouse avoidance of habitats through its influences on plant community compositional and structural changes, such as a reduction in the herbaceous understory (Knapp and Soule 1998, Miller et al. 2000).

- Sage-grouse avoided conifers at the 0.65 km scale (850m x 850m). Sage-grouse avoided mixed sagebrush/tree (≤40 trees/ha) at scales of 7.3 and 159.2 ha. Avoidance was most statistically supported when patch widths exceeded 200 m (Doherty 2008).

- Sage-grouse avoid areas encroached by P-J at scales of 7.9 ha to 226.8 ha (Casazza et al 2011).

- Recent modeling efforts by the Sage-grouse Initiative have shown that no leks remained active when P-J cover exceeded >4% and recommended focusing P-J removal treatments in Phase I stands (Baruch-Mordo et al 2013).

- Research focused on treatment effectiveness indicated that mechanical tree thinning increased native understory biomass by 200 percent (Brockway et al 2002).

- Removal, by cutting, of pinyon- juniper trees/shrubs in association with brush-beating to reduce height of mountain big sagebrush and deciduous brush resulted in doubling numbers of male sage grouse counted on treatment leks in years 2 and 3 post-treatment (Commons 1999).

Goals, Objectives, and Management Actions

Goal 1: Establish and maintain a resilient sagebrush ecosystem and restore sagebrush vegetation communities in order to provide for the conservation of sage-grouse and their habitat.

Objective 1.1: Reduce the expansion of P-J woodlands into otherwise suitable sage-grouse habitat.

Management Action 1.1.1: Inventory and prioritize areas for treatment of Phase I and Phase II encroachment that is contiguous with suitable sage-grouse habitat in Core, Priority, and General Management Areas in order to achieve sage-grouse desired habitat conditions (Table 4.1). Treat areas that have the greatest opportunity for recovery to suitable sage-grouse habitat based on ecological site potential.

Management Action 1.1.2: Prioritize areas for treatment of Phase III pinyon-juniper encroachment in strategic areas only to break up continuous, hazardous fuel beds, create movement corridors, or connect habitats. Treat areas that have the greatest opportunity for recovery to suitable sage-grouse habitat based on ecological site potential. Old growth trees should be protected on woodland sites.

Management Action 1.1.3*:* Aggressively implement plans to remove Phase I and Phase II encroachment in areas contiguous with suitable sage-grouse habitat. Only treat areas in Phase III encroachment to reduce the threat of severe conflagration, create movement corridors, or connect habitats. Phase III treatments may need additional rehabilitation/restoration actions if perennial understory vegetation is absent.

Management Action 1.1.4: Allow temporary road access to P-J encroached treatment areas. Construct temporary access roads where access is needed with minimum design standards to avoid and minimize impacts. Remove and restore temporary roads upon completion of treatment.

Management Action 1.1.5: Seek sufficient resources to address habitat loss and degradation in the next ten years.

Management Action 1.1.6: Share project funding among all appropriate agencies and jurisdictions by designing and completing NEPA for large-scale, watershed-based treatments over a period of years.

***Management Action 1.1.7*:** Incentivize and assist in the development of bio-fuels and other commercial uses of pinyon and juniper resources, where utilization is appropriate and can expand site-specific restoration and rehabilitation goals and objectives

Management Action 1.1.8: Increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years.

Management Action 1.1.9: Work with federal, state, local, tribal, and private partners to treat at least 100,000 acres annually. Monitor, adaptively manage, and report progress to the Nevada Sagebrush Ecosystem Council.

Management Action 1.1.10: Use pre-suppression fuels management treatments in strategic areas so fire in P-J areas can be managed appropriately.

Management Action 1.1.11: Work with federal, state, and local fire management partners to pre-plan for fire use and prescribed natural fire where and when appropriate.

7.3 Predation

Predation is a natural factor operating on all sage-grouse populations. Historically, given appropriate quality and quantity of habitat, sage-grouse populations have persisted despite naturally high levels of predation with which they evolved (Schroeder and Baydack 2001, Hagen 2011). Prey species have evolved ways to avoid predation such as coloration that conceals them, behavioral adaptations, and specialized reproductive strategies. Sage-grouse populations typically mitigate impacts of predation through cryptic nesting, increased chick production, re-nesting efforts, and response to annual habitat variation. When population levels become depressed below a particular threshold, quantity and quality of habitat may be diminished, or predator populations may become abundant enough to serve as a limiting factor, the behaviors and life-history strategies of prey species may not be able to compensate for losses from predators depending on numerous factors influencing predator densities and effects. These factors include: predator search efficiency, prey switching, and food subsidies (Cote and Sutherland 1997, Schroeder and Baydack 2001, Hagen 2011).

Predator Species

Predators can affect sage-grouse during various life stages in three ways: 1) nesting success, 2) survival of chicks during the first few weeks after hatch, and 3) annual survival of breeding age birds (Schroeder and Baydack 2001). Table 7-1 outlines potential predator species in Nevada that may influence each life stage.

Table 7-1 Potential Sage-grouse Predator Species in Nevada

	Life Stage		
Predator Species	**Nest**	**Chick**	**Juvenile and Adult**
American badger (*Taxidea taxis*)	X		X
Bobcat (*Lynx rufus*)	X		
Coyote (*Canus latrans*)	X		X
Fox (*Vulpes* spp.)	X		
Great Basin gopher snake (*Pituophis catenifer*)		X	
Raptors (*Buteo* spp., *Aquila* spp. *Circus* spp, etc.)			X
Common raven (*Corvus corax*)	X	X	
Weasels (*Mustela* spp.)	X	X	

(Connelly et al. 2004, Coates et al. 2008, Lockyer et al. 2013)

None of these predators depend on sage-grouse as their primary prey species. Many depend primarily on rodents or lagomorphs but will opportunistically consume sage-grouse, especially during specific life phases (e.g. badgers during the nesting season (Coates and Delehanty 2010).

The common raven (*Corvus corax*) is identified as the most frequent predator during nesting season in sage-grouse predator studies conducted recently in the Great Basin (Coates et al. 2008, Lockyer et al. 2013). Raven populations have increased over 200 percent from 1992 to 2012 in both the Great Basin and in Nevada, based upon USGS Breeding Bird Survey results (Sauer et al. 2014). Subsidized food sources such as landfills and road kill; elevated nest platforms provided by transmission lines; and landscape alterations such as transitions to annual grasses, can increase raven populations (Boarman 2003, Boarman and Heinrich 1999, Webb et al. 2004). Raven abundance is often tied to habitat quality, particularly in areas where recently burned areas abut unburned habitat (Howe et al. 2014, Coates et al., In Review). Raven control has been shown to be an effective, short-term, tool during the early nesting season to gain increased survival through the nesting and early brood life cycle stages (Coates et al. 2007) when ravens are the limiting factor affecting nest success. Long-term effects at the population level are still not understood.

Given that ravens have been found to be increasing across the West and juvenile survival of ravens is tied to anthropogenic subsidies (Webb et al. 2004), localized lethal efforts are not likely to be successful in reducing state-wide populations (Webb et al. 2004). Thus, effective raven management needs to also include efforts to reduce food, water, and nesting subsidies.

Current State Predation Management Efforts for Sage-grouse

The following presents information on the State of Nevada's current predator control efforts to benefit sage-grouse populations.

Predator control

NDOW is partnered with USDA-APHIS-Wildlife Services for predator control focusing on carnivores (primarily badgers and coyotes) and ravens. NDOW currently has a depredation permit from the FWS for 2,500 ravens. Much of the take under this permit is conducted using poisoned eggs (hard-boiled chicken eggs that contain DRC-1339, an avicide). Poisoned eggs are placed at specific leks for ravens as a means of limiting raven populations during the sage-grouse nesting season. (See Appendix D for additional details regarding FWS depredation permits for ravens.)

Road kill removal

In cooperation with NDOT, county road crews, USFWS, and UNR, NDOW has hired wildlife technicians to experimentally remove road carrion from three treatment areas in northern Nevada, in and around priority sage-grouse nesting habitat.

Landfill management

NDOW is working in cooperation with city and county municipalities, private entities, and the USFWS in

Eureka, Humboldt, and Lander Counties to improve waste stream policies to minimize access by predator species and to increase the frequency of food waste and dead animal pit burials.

Goals, Objectives, and Management Actions

Goal 1: Reduce sage-grouse mortality due to predation where predation mortality is likely additive or is a limiting factor influencing sage-grouse population.

The following three objectives should be carried out concurrently as part of an integrated predator management plan.

The management actions identified under Objective 1.1 should be carried out at the state-wide level, or at a more localized, targeted scale, as appropriate.

Objective 1.1: Reduce anthropogenic subsidies to ravens, such as food sources (e.g. road kill, landfills), and nesting substrates (e.g. power lines), especially cognizant in landscapes with heterogeneous land cover, such as burned and unburned areas.

Management Action 1.1.1*:* Coordinate with NDOT and local governments to identify high density road kill areas to focus interagency road kill removal efforts. Provide information to agency staff that explains the need for the effort and outlines disposal options and procedures.

Management Action 1.1.2*:* Work with city and county governments to develop and adopt procedures that minimize availability of refuse in the urban interface that acts as food and water sources for predators.

Management Action 1.1.3*:* At landfills and waste transfer facilities, work with Nevada Division of Environmental Protection and facility managers to develop and adopt procedures that eliminate food and water sources for predators.

Management Action 1.1.4*:* Work with livestock owners, land managers, and regulatory authorities to develop and implement effective methods to reduce or eliminate exposed animal carcasses or other livestock by-products that may provide a food subsidy for predators.

Management Action 1.1.5*:* Collaborate with and provide informational material to stakeholders, such as Nevada Association of Counties, League of Cities, sportsmen's groups, Nevada Cattlemen's Association, and the general public on raven subsidy issues; such as refuse in urban areas, livestock carcasses and by-products, and wildlife carcasses (coyote, squirrels, rabbits).

Management Action 1.1.6*:* Research and develop management techniques to limit or reduce the availability of water subsidies to ravens. This may be very challenging and will likely require new technologies and techniques given Nevada's arid environment, distance between natural water sources, and the need for anthropogenic watering sites accessible to both livestock and wildlife.

Management Action 1.1.7: Reduce and eliminate artificial hunting perches and nesting substrate for aerial predators (e.g., removal of non-operational fences and power lines, installation of anti-perch devices on new power lines). Consideration for retrofit of existing power lines can be done on a case by case basis, where technology and economic factors allow.

Management Action 1.1.8: Encourage continued research in the development of more effective perching and nesting deterrent options.

Management Action 1.1.9: Monitor the effects of efforts to reduce anthropogenic subsidies on raven populations and adapt management accordingly.

Objectives 1.2 and 1.3 should be implemented in localized areas where predation has been identified as a limiting factor on sage-grouse population. Use the "Process to Prioritize Integrated Predator Management Projects" (See Appendix E) before engaging in Objectives 1.2 and 1.3.

Objective 1.2: Maintain or improve habitat integrity by increasing visual cover to reduce detection by predators or by reducing fragmentation to limit habitat for ravens.

Management Action 1.2.1: Maintain a mosaic of shrub cover conditions with areas of nesting habitat having ≥20% sagebrush cover and ≥30 percent total shrub cover to provide increased cover for nesting and escape (Gregg et al. 1994, Coates and Delehanty 2010) and decrease opportunities for large fires using pre-suppression strategies.

Management Action 1.2.2: Maintain residual grass cover in nesting habitat to provide cover for nesting and escape (Gregg et al. 1994, Gregg and Crawford 2009, Coates and Delehanty 2008). This factor is more important if shrub cover is low.

Management Action 1.2.3: Where appropriate, begin recovery of degraded sites to reduce fragmentation by decreasing edge of non-native annual grasses next to intact Core or Priority Management Areas and to reduce fragmentation.

Management Action 1.2.4: Minimize disturbance activities near leks during lek season (i.e., when males are inattentive and most vulnerable to predation) and near nest sites during nesting season that may result in adults flushing off nests or away from young. (In this instance, disturbance activities are anything that may cause birds to flush such as startling noise [explosions], road traffic, human presence, etc.). Use seasonal restrictions on activities, when appropriate, to minimize disturbances.

Objective 1.3: Conduct targeted predator control, based on monitoring and adaptive management. Objective 1.3 should be implemented pursuant to steps to achieve objectives 1 and 2.

Management Action 1.3.1: From the outcome of the Process to Prioritize Integrated Predator Management Projects (see below), establish a predator control program based on biological assessments appropriate to local conditions. Conduct predator control to coincide with the life

stage impacted by predation. Program development needs to include specific goals and objectives and identification of triggers or endpoints for management practices. Monitor pre- and post-treatment predator numbers or densities as appropriate, and effects of predator control on sage-grouse vital rates (e.g. nest success, chick survival) and adapt control strategies accordingly.

Management Action 1.3.2: When conducting raven control programs using DRC-1339, the methods outlined in Coates et al. (2007) should be followed. The following points should be evaluated when conducting raven control programs:

- The assumed ratio of number of ravens removed to baited eggs placed
- Need for pre-baiting to accustom ravens to their presence
- Length of time eggs should be left in the environment
- Spacing of egg and number of eggs placed together
- Consideration to implement treatment yearly, based on monitoring of raven population response
- Treatment should be conducted early in sage-grouse incubation period (within the first 40 days following first average nest initiation for the season) to coincide with greatest raven predation period (Coates and Delehanty 2008, Lockyer 2013)

The SETT will work with subject experts (USGS, NDOW, Wildlife Services) to develop a standardized protocol for effective raven removal efforts.

Management Action 1.3.3*:* Consider option to oil or addle eggs in nests of territorial ravens found on anthropogenic structures as part of raven control program, when appropriate.

Management Action 1.3.4: Document success through a rigorous monitoring, analysis, and reporting of population responses to control efforts. For raven control programs, if there is a demonstrated benefit to sage-grouse via scientifically valid documentation, submit a request to USFWS for increased allowable take of ravens, assuming personnel availability from NDOW and Wildlife Services to appropriately identify locations and conduct work.

7.4 Wild Horses and Burros Management

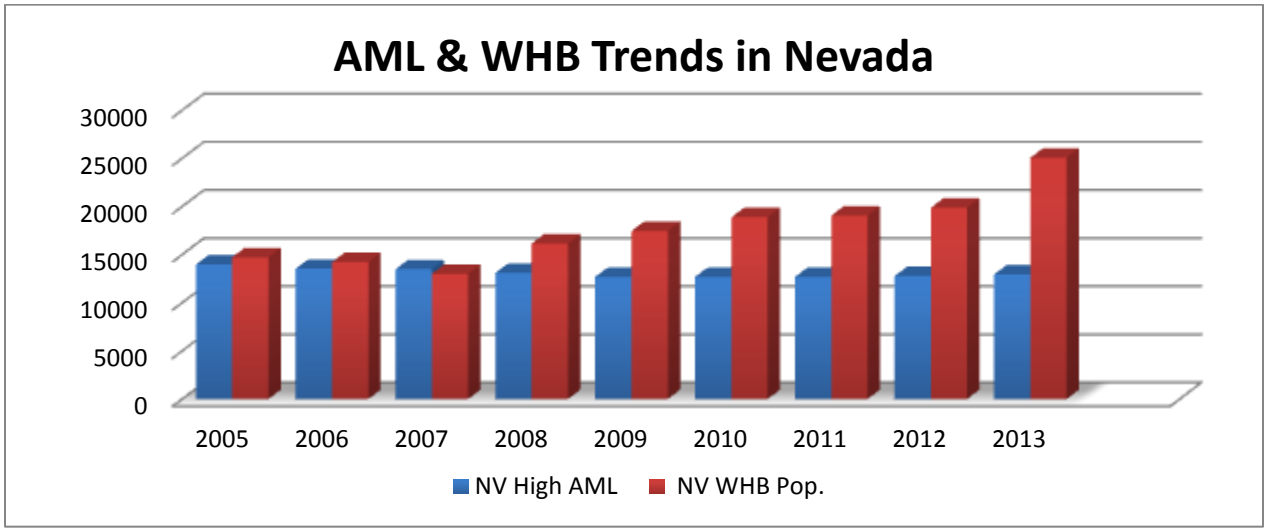
The State of Nevada supports multiple uses on public lands and the responsible and active management of those lands uses, including wild horses and burros, which are protected by the Wild Free-Roaming Horses and Burros Act (the Act) of 1971. While that Act protects them from harassment and unjustified removal or destruction, it also allows for the proper management of wild horse and burro populations within the Herd Management Areas (HMAs) on BLM land and Wild Horse and Burro Territories (WHBTs) on USFS land that are within Herd Areas (HAs). Proper management of herd populations serves to protect their health as well as that of the habitat they and other species rely upon. The Act acknowledges the need to maintain the wild horses and burros within established Appropriate Management Levels (AMLs). This State supports the Act as it was initially authorized and offers recommendations for alternative management actions necessary to attain and maintain herd sizes that promote the continued health and diversity among wild horses and burros and allows for a sustainable sagebrush ecosystem that is mutually beneficial to all land uses and users.

How HAs, HMAs, WHBTs, and AMLs were established

Under the Act, BLM and USFS are required to manage wild horses and burros only in HAs where they were found when the Act passed in 1971. Through land use planning, the BLM and USFS evaluated each HA to determine if it had adequate food, water, cover, and space to sustain healthy and diverse wild horse and burro populations over the long-term. The areas which met these criteria were then designated as HMAs and WHBTs (BLM 2013, BLM 2014) (Figure 9).

BLM and USFS also evaluated each HMA to determine how much forage is available for use. The available forage is then allocated among wildlife, wild horses and burros and domestic livestock. The number of horses and burros which can graze without causing damage to the range is called the AML (BLM 2013, BLM 2014).

Nevada's annual AML as compared to Wild Horse and Burro (WHB) population estimates (http://www.blm.gov/wo/st/en/prog/whbprogram/herd_management/Data.html 2/28/1014)



Current estimates of wild horses from the BLM and USFS are as follows (Shepherd 2014, BLM 2013):

- National: 37,300
- Nevada: 24,000-26,500
- National AML: 26,600
- Nevada AML: 12,688
- 84.3 percent of Nevada HMAs are at or exceed AML
- 70 of the 83 HMAs statewide are at or exceed AML
- 49 of the 62 HMAs overlapping sage-grouse habitat are at or exceed AML
- 10 of the 14 WHBTs overlapping sage-grouse habitat are at or exceed AML
- Nationally, over 50,000 horses are currently held in captivity in either short term holding facilities or long term private pastures

Wild horses are capable of increasing their numbers by 18 percent to 25 percent annually, resulting in the doubling of wild horse populations about every 4 years (Wolfe et al. 1989; Garrott et al. 1991). Wild horses are a long-lived species with survival rates estimated between 80 and 97 percent (Wolfe et al. 1980; Eberhardt et al. 1982; Garrrott and Taylor 1990) and they are a non-self-regulating species. There are 62 HMAs and 14 WHBTs that overlap with sage-grouse habitat in Nevada (BLM 2013, BLM 2014).

While nationally more than 220,000 wild horses and burros have been adopted by private citizens since the program began in 1971, the levels of adoption have decreased dramatically since 2007 (Shepherd, personal communication). In 2013 nationally there were 4,221 horses removed and 2,400 were either adopted or sold. In 2013 in Nevada there were 2,787 horses removed and 89 were adopted or sold (Shepherd 2014). In order to maintain current population levels in Nevada (most are currently near or exceeding the high range of AML), approximately 4,300 – 6,600 horses would need to be removed annually statewide, in the absence of using effective population growth suppression techniques.

The State of Nevada will work closely with federal agencies to develop new, and expand on existing strategies, policies, and best management practices to attain sustainable wild horse and burro populations within HMAs and WHBTs. The State of Nevada will also engage Congressional representatives and their staff to secure assistance in the implementation of the management activities authorized within the Act.

Goals, Objectives, and Management Actions

Goal 1: Support, promote, and facilitate full implementation of the Wild Free-Roaming Horses and Burros Act of 1971, as amended, including to preserve and maintain a thriving natural ecological balance and multiple-use relationship, without alteration of its implementation by subsequent Congresses or Presidential administrations.

Recognizing that if action is not taken until herd health has become an issue, the range and water resources are likely to be in a highly degraded and potentially irreversible state. Non-active management (e.g. let nature take its course, wait until horse health or resource conditions are critical) is

not acceptable management. Non-management will negatively impact or potentially create irreversible habitat impacts within the SGMA; therefore, use all tools available to actively manage wild horses and burros within HMAs and WHBTs.

Objective 1.1: Maintain healthy and diverse wild horse and burro populations in the State of Nevada in a manner that maintains or is actively managed to trend towards sage-grouse desired habitat conditions, as applicable (see Table 4.1).

Management Action 1.1.1: Focus expenditures of appropriated funds on management of wild horses and burros on public lands over care in captivity.

Management Action 1.1.2: Even if current AML is not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, established AMLs within the HMAs or WHBTs should be reduced through the NEPA process and monitored annually to help determine future management decisions. Unless already meeting the lowest established AMLs, during periods of drought, AMLs should be reduced to remain consistent with the declining levels of available forage).

Management Action 1.1.3: Methods that were used to initially establish AMLs should be reevaluated to determine if they are still sufficient to maintain or achieve sage-grouse desired habitat conditions, as applicable (see Table 4.1).

Management Action 1.1.4: Use professionals (botanists, rangeland ecologists, wildlife biologists, hydrologists, etc.) from diverse backgrounds to conduct land health, and riparian proper functioning condition assessments.

Management Action 1.1.5: Conduct annual site specific wild horse and burro grazing response indices (Swanson et al. 2006) assessments, and habitat objective assessments.

Management Action 1.1.6: When implementing management activities, water developments, or rangeland improvements for wild horses or burros, consider both direct and indirect effects on sage-grouse and use the applicable Site Specific Consultation Based Design Features (Design Features; see Appendix A) to minimize potential impacts or disturbances.

Management Action 1.1.7: To expedite recovery time and enhance restoration efforts following wildfire or sage-grouse habitat enhancement projects, consider a significant reduction and temporary removal or exclusion of all wild horses and burros within or from burned areas where HMAs and WHBTs overlap with sage-grouse Core, Priority, and General Management Areas. Wild horse grazing behaviors and specialized physiological requirements make unmanaged grazing on recently burned/treated areas problematic for reestablishment of burned or seeded vegetation (Arnold and Dudzinski 1978, Rittenhouse et al. 1982, Duncan et al. 1990, Hanley 1982, Wagner 1983, Menard et al. 2002, Stoddart et al. 1975, Symanski1994).

Management Action 1.1.8: If current AML is being exceeded, consider emergency short-term measures to reduce or avoid degradation of sage-grouse habitat from HMAs or WHBTs that are in excess of established AMLs within the SGMA.

Plan for and implement an immediate reduction in herd size to a level that would enable the area to trend towards desired habitat conditions in Table 4.1 and to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area. Consider lowering the AML levels to prevent future damage.

Management Action 1.1.9: If monitored sites are not meeting sage-grouse desired habitat conditions, as applicable in Table 4.1, even if AML is being met, and it is determined that wild horses or burros are the primary causal factor, then implement protective measures as applicable in addressing similar emergencies (e.g. fire, flood, drought, etc.).

Management Action 1.1.10: Consider exclusionary or controlled use pasture fencing of riparian or other mesic sites and implement water developments (following the Design Features as described in Appendix A) to ensure dispersal or avoidance of sites heavily impacted by wild horses (Feist 1971, Pellegrini 1971, Ganskopp and Vavra 1986, Naiman et al. 1992). A water source should be provided, as horses traditionally do not leave known water sources just because they are fenced.

Management Action 1.1.11: As climate data become available, adjust wild horse and burro and rangeland management practices to allow for Core, Priority, and General Management Areas to sustain or restore the sagebrush ecosystem resiliency and resistance.

Management Action 1.1.12: Collaborate with weather and climate professionals and agencies (UNR, DRI, NOAA, etc.) to proactively manage the rangeland resources and adjust, as necessary, the current wild horse and burro management policies. Ensure that sufficient ongoing public and political education is provided.

Objective 1.2: Evaluate conflicts with HMA designations in SGMAs and modify LUPs to avoid negative impacts on sage-grouse.

Management Action 1.2.1: Even if current AML is not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, reduce established AMLs within the HMAs or WHBTs and monitor resource objectives annually to help determine future management decisions. Unless already meeting the lowest established AMLs, during periods of drought, AMLs should be reduced to levels that are consistent with the declining levels of available forage. *(same as Management Action 1.1.2)*

Management Action 1.2.2: Ensure that Herd Management Area Plans and WHBT plans are developed or amended within the Core, Priority, and General management areas, identified in the State's management areas map, taking into consideration the sage-grouse desired habitat conditions (see Table 4.1).

Management Action 1.2.3: Conduct herd management activities, as originally authorized, to avoid conflicts between the potential implementation of regulations within the Wild Free-Roaming Horses and Burros Act and the Endangered Species Act

Goal 2: As authorized in the Wild Free-Roaming Horses and Burros Act of 1971: Achieve and maintain wild horses and burros at or below established AMLs within the SGMA and mange for zero horse populations in non-designated areas within the SGMA to reduce impacts to sage-grouse habitat.

Objective 2.1: Meet established AMLs in all HMAs and WHBTs in Core, Priority, and General Management Areas within five years.

Management Action 2.1.1: Focus expenditures of appropriated funds on management of wild horses and burros on public lands over care in captivity. *(same as Management Action1.1.1)*

Management Action 2.1.2: Even if current AMLs are not being exceeded, yet habitat within the SGMA continues to become degraded, at least partially due to wild horses or burros, reduce established AMLs within the HMAs or WHBTs and monitor resource objectives annually to help determine future management decisions. Unless already meeting the lowest established AMLs, during periods of drought, AMLs should be reduced to a level that is consistent with maintaining or trending towards sage-grouse desired habitat conditions, as applicable (see Table 4.1). *(same as Management Action 1.1.2)*

Management Action 2.1.3: *Reevaluate m*ethods that were used to initially establish AMLs to determine if they are still sufficient to maintain or trend towards sage-grouse desired habitat conditions, as applicable (see Table 4.1). (same as Management Action 1.1.3)

Management Action 2.1.4: Given their capability to increase their numbers by 18%-25% annually, resulting in the doubling in population every 4-5 years (Wolfe et al. 1989; Garrott et al. 1991), conduct wild horse gathers to attain the lowest levels of AML. This in combination with continued and expanded use and development of effective forms of population growth suppression techniques will enable AMLs to be maintained for longer periods and reduce the frequency of gathers and associated cost and effort.

Management Action 2.1.5: If current AMLs are being exceeded, consider emergency short-term measures to reduce or avoid degradation of sage-grouse habitat from HMAs or WHBTs that are in excess of established AMLs within the SGMA.

Plan for and implement an immediate reduction in herd size to a level that would enable the area to trend towards the desired habitat conditions, as applicable in Table 4.1 and to preserve and maintain a thriving natural ecological balance and multiple-use relationship in that area. Consider lowering the AMLs to prevent future damage. *(same as Management Action 1.1.7)*

Management Action 2.1.6: Prioritize gathers for removal or population growth suppression techniques in HMAs, HAs, and WHBTs first within the State's Core Management Areas and then

within the Priority and General Management Areas. Additional prioritization should be given for HMAs and WHBTs that are near AMLs or where a reduction would serve the most beneficial purpose. Proactively and adaptively manage herd sizes taking into consideration climate variability and other natural phenomena, similar to the restrictions placed on livestock managers.

Goal 3: Support and conduct science based research and monitoring to more efficiently and effectively maintain AMLs in HMAs and WHBTs.

Objective 3.1: Implement more effective methods to conduct surveys and monitor wild horse and burro activities, populations, and responses to different herd management techniques.

Management Action 3.1.1: Work with professionals from other federal and state agencies, researchers at universities, and others to continue to develop, expand, and test more effective population growth suppression techniques, including contraception options.

Management Action 3.1.2: Implement a telemetry monitoring program for wild horses. Research regarding the direct interactions between, and indirect effects of wild horses on sage-grouse, has been identified as a need that could further assist the agencies in the development of habitat selection maps (Beever and Aldridge et al. 2011) as well as offer a general understanding of the intensity, timing, and duration of use by wild horses within the SGMA.

Management Action 3.1.3: Investigate the use of automated or time-lapse cameras or other monitoring methods to differentiate horse and livestock use impacts at key areas such as late brood-rearing habitats, use appropriate management methods where combined use does not meet resource objectives. Subsequently, make management changes based upon monitoring data and resource objectives.

7.5 Livestock Grazing

Farming and ranching on private lands in unison with authorized livestock grazing on public lands has been a long standing arrangement for many private landowners in the State of Nevada. Historically, many homesteaders began to farm and ranch much of Nevada's riparian and mesic landscapes due to the availability of surface water or springs. Once developed, many of these mesic areas were expanded by the artificial spreading of water or irrigation. These larger, irrigation induced, privately and publicly owned meadows served to support many species of wildlife in addition to livestock. This expansion of late brood rearing habitat and an increase in sagebrush acreage due to an absence of fire after consumption of fine fuels, (Burkhardt and Tisdale 1976) may be causes of sage-grouse population expansion in the late 1800s and early 1900s (Gruel and Swanson 2012). Today, by allowing for the authorized use of proper and targeted livestock grazing on public lands, private landowners and wildlife habitat managers can serve to protect or even benefit each other if managed properly (by reductions in fuels, targeted grazing of specific habitats and cheatgrass, etc.). The State of Nevada recognizes and supports this long standing beneficial relationship and the property interests associated with grazing permits (Figure 10).

Livestock grazing (primarily sheep and cattle) has occurred on the Nevada landscape for over 170 years at varying levels. Many variables have contributed to the growth and reduction of the size and number of homesteads, as well as the number of livestock using the range, over the past century. The State supports the proper management of livestock grazing on allotted public lands in Nevada. Davies et al. (2011, p. 2575) concluded based on literature review that "Though appropriately managed grazing is critical to protecting the sagebrush ecosystem, livestock grazing per se is not a stressor threatening the sustainability of the ecosystem. Thus, cessation of livestock grazing will not conserve the sagebrush ecosystem."

Dependent on many factors, livestock grazing can have a negative effect, a positive effect, or a neutral effect on sage-grouse habitat (Davies et al. 2009; Knopf 1996; Oakleaf 1971; Svejcar et al. 2014; Whitehurst and Marlow 2013). If implemented appropriately, the recommended actions listed in this section will assist landowners and land managers in managing appropriately to avoid or minimize negative impacts to sage-grouse habitat due to livestock grazing. The actions should also help to maintain the existing resistance and resilience of sagebrush communities and to protect the future persistence and sustainability of the diversity of other sage-grouse habitat types within the sagebrush ecosystem for those who depend on it.

The State supports grazing practices that incorporate a high level of flexibility through adaptive management to achieve the overall management and resource objectives agreed upon by the permittee and the land manager. The State will provide technical support to landowners through its combined resources and through partnerships with other governmental agencies and private industry. The State will continue to support the further understanding and development of rangeland management, resource conservation, rehabilitation, restoration, and protection that can be applied and supported, at least in part, by permittees and other land managers.

The State encourages private landowners to develop and implement conservation plans that serve to

maintain or strengthen financial viability that also work to conserve or protect the renewable natural resources of Nevada, including sage-grouse and other wildlife species habitat.

The State will continue to support current, and development of new, public outreach and educational programs that assist with the proper understanding and implementation of the actions listed below to achieve the goals and objectives within this plan.

The State will also work with federal land managers and livestock owners to develop acceptable procedures to conduct consistent rangeland or resource monitoring with appropriate frequency. This should allow for greater flexibility in administering adaptive management decisions to achieve targeted goals and objectives.

The State encourages federal agencies to ensure that any loss of grazing allotment rights that were not directly attributable to the permittees actions or inactions are mitigated to attain a no-net-loss of AUMs.

Conservation Goal, Objective, and Management Actions

Goal 1: Ensure that existing grazing permits maintain or enhance sage-grouse habitat. Utilize livestock grazing when appropriate as a management tool to improve sage-grouse habitat quantity and quality, or to reduce wildfire threats. Based on a comprehensive understanding of seasonal sage-grouse habitat requirements, and in conjunction with the need for flexibility in livestock operations, make cooperative, timely, seasonal range management decisions to meet vegetation management objectives, including fuels reduction.

Objective 1.1: In sage-grouse habitat, manage for vegetation composition and structure that maintains or is actively managed to trend towards sage-grouse seasonal desired habitat conditions, as applicable (see Table 4.1), enhancing resilience and resistance based upon the ability of the ecological site to respond to management. This objective recognizes spatial and temporal variations across seral stages.

Management Action 1.1.1: Within sage-grouse habitat, incorporate sage-grouse desired habitat conditions, as applicable (see Table 4.1), and management considerations into all BLM and Forest Service grazing allotments through allotment management plans (AMP), multiple use decisions, or permit renewals or Forest Service Annual Operating Instructions.

Implement appropriate prescribed grazing actions, at scales sufficient to influence a positive response in sage-grouse habitats, such as NRCS Conservation Practice Standard 528 for prescribed grazing (NRCS 2011).

Management Action 1.1.2: In sage-grouse habitat, work cooperatively on integrated ranch planning within sage-grouse habitat so operations with deeded land, and BLM or Forest Service allotments, can be planned as single units, providing flexibility and adaptive management across all ownerships and not altering stocking rates on operations for progressive management decisions.

Management Action 1.1.3: Continue the use of land health assessments on BLM-administered lands or the Sierra and Central/Eastern Nevada Riparian Field Guides and the Resource Implementation Protocol for Rapid Assessment Matrices on Forest Service-administered lands in sage-grouse habitat to evaluate current conditions as compared to sage-grouse desired habitat conditions described in Table 4.1. Incorporate the results of BLM and Forest Service monitoring and land health assessments into future management applications to ensure the maintenance or active management to trend towards sage-grouse desired habitat conditions. Incorporate terms and conditions into grazing permits and adjust these as needed through monitoring and adaptive management to meet sage-grouse desired habitat conditions.

Management Action 1.1.4: Where current permitted livestock grazing is identified as the causal factor of not meeting the desired habitat conditions, implement management actions (grazing decisions, Annual Operating Instructions [Forest Service only], AMP/Conservation Plan development, or other agreements) to modify grazing management to trend towards desired habitat conditions, as applicable in Table 4.1. Consider singly, or in combination, changes in:

1. Season, timing (duration) or rotation of use;
2. Distribution of livestock use;
3. Intensity of use;
4. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats; Briske et al. 2011); and
5. Numbers/ AUMs of livestock and other ungulates (includes temporary nonrenewable (TNR) use, and nonuse).

   Before imposing grazing restrictions or seeking changes in livestock stocking rates or seasons of permitted use, federal agencies in coordination with grazing permittees must identify and implement all economically and technically feasible livestock distribution, forage production enhancement, weed control, prescribed grazing, off-site water development by the water rights holder, shrub and pinyon/juniper control, livestock salting/supplementing, and riparian pastures and herding. (Eureka County Master Plan 2010)

Management Action 1.1.5: At a minimum, use grazing management strategies for riparian areas and wet meadows to maintain or trend towards riparian Proper Functioning Condition (PFC) and promote brood rearing/summer desired habitat conditions, as described in Table 4.1, within sage-grouse habitat. Within sage-grouse habitat, manage wet meadows to maintain a component of available perennial forbs with diverse species richness to facilitate brood rearing and stabilizing riparian species (Burton et al. 2011) near where water flows to achieve or maintain PFC. Use Ecological Site Descriptions (ESD) or locally relevant information about soils, hydrology, soil moisture, and site potential to set realistic objectives and evaluate assessments and monitoring data (Swanson et al. 2006). Also conserve or enhance wet meadow complexes to maintain or increase amount of edge and cover near that edge to minimize elevated mortality during the late brood rearing period (Hagen et al. 2007; Kolada et al. 2009a; Atamian et al. 2010) as observed throughout the stream/watershed and not limited to only easily accessible sites.

Some defined areas of concentrated livestock use may be necessary to protect and enhance the overall riparian area.

Management Action 1.1.6: Authorize new water development for diversion from spring or seep sources only when sage-grouse habitat would not be net negatively affected by the development. This includes developing new water sources for livestock as part of an AMP/conservation plan to improve sage-grouse habitat.

Management Action 1.1.7: Analyze springs, seeps and associated pipelines to find mutually beneficial enhancement opportunities for livestock and wildlife that restores functionality to riparian and mesic areas within sage-grouse habitat, and allow them to be developed.

Management Action 1.1.8: In sage-grouse habitat, encourage and allow vegetation treatments that conserve, enhance, or adaptively restore resilience and resistance over time. This includes adaptive management as part of an AMP/Conservation Plan to improve sage-grouse habitat.

Management Action 1.1.9: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses that are in and adjacent to sage-grouse habitat to determine if additional efforts should be made to restore sagebrush or to improve habitat quality for sage-grouse. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving, enhancing, or protecting the rest of the sage-grouse habitat, then no restoration may be necessary. Assess the compatibility of these seedings for sage-grouse habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011), or other analyses such as the Humboldt-Toiyabe Resource Implementation Protocol for Rapid Assessment Matrices (USDAFS - HTNF 2007).

Management Action 1.1.10: In sage-grouse habitat, ensure that the design of any new structural range improvements and the location of supplements (salt or protein blocks) to enhance sage-grouse habitat or minimize impacts in order to maintain or trend towards sage-grouse desired habitat conditions, as applicable (see Table 4.1). Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or their increase following construction must be considered in the project plan and then monitored, treated, and rehabilitated post-construction.

Management Action 1.1.11: Locate salting and supplemental feeding locations, and temporary or mobile watering and new handling facilities (corrals, chutes, etc.) at least 1/2-mile from riparian zones, springs, meadows, or 1 mile from active leks in sage-grouse habitat, unless the pasture is too small or another location offers equal or better habitat benefits. The distance should be based on local conditions.

Management Action 1.1.12: To reduce sage-grouse strikes and mortality, remove, modify or mark fences in high risk areas within sage-grouse habitat based on proximity to lek, lek size, and topography (Christiansen 2009; Stevens 2011). Consideration of the utility of the fence should also be taken into consideration to ensure that its removal does not promote degradation of the overall management for habitat or other desired conditions (Swanson et al. 2006).

Management Action 1.1.13: In sage-grouse habitat, monitor, treat and, if necessary, restore sites with invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007). State listed noxious weeds (NRS Chapter 555) should be given the highest priority. In general, monitor, map, treat (using integrated pest management and associated tools), and restore sites that have invasive and noxious weed species, especially those associated with disturbance activities.

Management Action 1.1.14: Consider all options to allow responsible management of livestock grazing on an allotment before any voluntary withdrawal of a grazing permit is considered, in conformance with the multiple use sections of the Taylor Grazing Act. All permit relinquishments should be voluntary.

Management Action 1.1.15: Prior to implementation, establish project monitoring sites where vegetation treatment is planned and monitor at least annually during the recovery period. To ensure effective recovery, monitoring should continue for a number of years immediately following the livestock exclusion period and following livestock reintroduction, depending on local site conditions.

Management Action 1.1.16: When conditions, i.e., climatic variations (such as drought) and wildfire, require unique or exceptional management, work to protect sage-grouse habitat on a case by case basis and implement adaptive management to allow for vegetation recovery that meets resistance, resilience, and sage-grouse life cycle needs in sage-grouse habitat as needed on an individual allotment basis.

Management Action 1.1.17: During the annual grazing application, work with permittees to avoid consistent concentrated turn-out locations for livestock within approximately 3 miles of known lek locations during the March 1 to May 15 period. During the March 1 to May 15 period, avoid domestic sheep use, bedding areas, and herder camps within at least 1.24 miles (2 kilometers) of known lek locations. Utilize land features and roads on maps provided to the permittee to help demarcate livestock use avoidance areas. Require terms and conditions language for affected livestock grazing permits regarding livestock turnout locations during the lekking period. During the lekking period, use best management practices to avoid livestock aggregation around the lekking grounds.

Management Action 1.1.18: Strive to improve and maintain regular communication at the allotment level between land management agency and the permittee to encourage proper

management techniques. Land management agencies should coordinate with relevant state, local and tribal government agencies and permittees to conduct regular trend monitoring at the allotment level. Actively pursue and implement cooperative permittee monitoring, such as described in Perryman et al. 2006, Swanson et al. 2006.

Management Action 1.1.19: Promote and implement proper livestock grazing practices that promote the health of the perennial herbaceous vegetation component. Perennial grasses, especially, are strong competitors with cheatgrass (Booth et al. 2003; Chambers et al. 2007; Blank and Morgan 2012). Field research has demonstrated that moderate levels of livestock grazing can increase the resiliency of sagebrush communities, reduce the risk and severity of wildfire, and decrease the risk of exotic weed invasion (Davies et al. 2009 and Davies et al. 2010).

Management Action 1.1.20: To reduce the risk of fire and enhance restoration in large contiguous blocks of cheatgrass-dominated sagebrush or sage-grouse habitats that are next to highly flammable cheatgrass dominated lands, create local NEPA documented plans to use tools (e.g. dormant season TNR AUM authorizations and stewardship contracted grazing), to reduce fuels in areas dominated by invasive plants (Schmelzer et al. 2014) especially after high production growing seasons with favorable moisture. Use adaptive management to allow the use of TNR during other seasons, if science emerges demonstrating effectiveness of such practices. Planning should be conducted on an allotment specific basis, and may be contained in AMPs, multiple use decisions, or permit renewals.

Management Action 1.1.21: To aid in planning adaptive management for the purpose of maintaining health of important forage plants (perennials needed for resilience and resistance), cooperatively strategize how various areas in sage-grouse habitat allotments can be managed differently each year to achieve positive grazing response index scores (Perryman et al. 2006; Reed et al. 1999; Wyman et al. 2006; and USDA USFS 1996) and meet resource objectives.

7.6 Anthropogenic Disturbances

Anthropogenic disturbances, as defined in Section 3.0 of this State Plan, are a threat to sage-grouse and their habitat in Nevada; however these activities are a vital part of Nevada's economy. The State of Nevada seeks a balanced approach that allows for the preservation of Nevada's economy, while conserving and protecting sage-grouse populations and the sagebrush ecosystem upon which they need to survive. Nevada's strategy is to provide consultation for project planning to first avoid and minimize impacts to sage-grouse (see Section 3.0) and then to offset residual impacts through compensatory mitigation via the Conservation Credit System (see Section 8.0).

Anthropogenic disturbances can negatively impact sage-grouse both directly and indirectly, and through various mechanisms. Anthropogenic disturbances can directly impact sage-grouse by causing direct loss of habitat, avoidance behavior to infrastructure (Doherty et al. 2008) and to otherwise suitable habitat (Lyon and Anderson 2003, Holloran 2005, Kaiser 2006, Doherty et al. 2008), direct mortality through collision with infrastructure (Beck et al. 2006, Stevens et al. 2012) and mosquitos carrying the West Nile virus (Walker and Naugle 2011) associated with certain artificial ponds created by development (Zou et al 2006), and negative impacts to survival and reproduction (Lyon and Anderson 2003, Holloran 2005, Kaiser 2006, Aldridge and Boyce 2007, Holloran et al. 2007). Indirect impacts on sage-grouse demographics can be caused by noise produced from operations (Braun et al. 2002, Holloran 2005, Kaiser 2006, Blickley et al. 2012), vehicle traffic on associated roads (Lyon and Anderson 2003), and increased predation by raptors perching on associated power lines (Ellis 1984). Moreover, anthropogenic disturbances can lead to an increase in the presence of cheatgrass and other invasive plant species (Bradley and Mustard 2006, Manier et al. 2014). In addition, habitat fragmentation resulting from cumulative effects of multiple anthropogenic disturbances across the landscape has been shown to have long term negative impacts on sage-grouse populations (Johnson et al. 2011, Knick and Hanser 2011, Knick et al. 2013).

Mining

Mining is a vital part of the State of Nevada's economy both currently and historically. The initial discovery of the Comstock Lode silver ore deposit in Virginia City in the 1850s was central to the settling and development of Nevada, as well as a major reason for Nevada's admission into the United States in 1864. The Nevada Department of Taxation currently estimates the net assessed mineral value in the State to be approximately $5.1 billion (State of Nevada 2014) and the Nevada Bureau of Mines and Geology (NBMG) estimates the total production value at $10.76 billion (NBMG 2014)[3]. The annual tax revenue collected in fiscal year 2013 was approximately $236 million (State of Nevada 2014). It is estimated that Nevada's mining economic output contributes a 6% share of Nevada's statewide GDP (Nevada Mining Association 2011).

The primary type of mineral exploration and development in the state of Nevada is locatable minerals, including gold, silver, and copper. Locatable mineral development and exploration is governed under the General Mining Law of 1872 and is a non-discretionary activity on federal lands. Additional federal,

[3] The State of Nevada 2014 estimate is for FY 12-13 (June 2012 – July 2013) and the NBMG estimate is for calendar year 2012. Both estimates also include geothermal energy and petroleum production.

state, and local laws also govern locatable minerals. Salable and non-energy leasable mineral exploration and development also occurs, though to a lesser extent. Salable mineral materials, which are common varieties of construction materials and aggregates, such as sand, stone, and gravel are governed under the Materials Acts of 1947. Government and non-profit organizations may obtain these resources free of charge for community purposes on BLM and USFS administered lands. The Nevada Department of Transportation and local governments are the primary users of gravel and sand resources on federal lands in Nevada. Non-energy leasable minerals, such as potassium and sodium, which are governed under the Mineral Leasing Act of 1920 are also present, however there are currently no leases in sage-grouse habitat in Nevada (BLM 2013).

The extent of mining activities across the state of Nevada overlaps with the range of sage-grouse habitat. There are approximately 2 million acres of locatable mineral claims in sage-grouse habitat in Nevada (BLM 2013). The total "footprint" of mining in Nevada is estimated at 169,029 and 181,340 acres by BLM and NDEP respectively (Johnson personal communication 2014, Holmgren personal communication 2014). Mining and its associated facilities and infrastructure may result in habitat fragmentation, direct habitat loss, and indirect impacts decreasing the suitability of otherwise suitable habitat (USFWS 2013). The specific impacts of mining on sage-grouse and their habitat have not been studied in the peer reviewed literature (Manier 2013).

Non-Renewable Energy Production

There is currently little oil and gas development in Nevada. Oil production in Nevada has been on a steady decline and is currently limited to approximately 336,000 barrels of oil production annually (Nevada Division of Minerals 2014a). Within sage-grouse habitat it is limited to two major basins, including the Railroad Valley and Pine Valley, with Railroad Valley being the predominant oil-producing valley in Nevada (BLM 2013). However, with recent federal approval of oil and gas exploration in, Nevada (BLM 2014), coupled with the emergence of new technologies, there may be potential for increased oil and gas production in the State pending results of exploration.

In a comprehensive literature review of the impacts of energy development, principally oil and gas, on sage-grouse conducted by Naugle et al (2011), all studies reported negative effects, while no positive impacts to sage-grouse populations or habitat were reported. Negative responses of sage-grouse were consistent regardless of whether lek dynamics or demographic rates were studied (Naugle et al. 2011). The specific direct and indirect impacts are described above.

Renewable Energy Production

The development, transmission, and distribution of renewable and non-renewable energy are a high priority for the state of Nevada. Shifting national and state energy policies, as well as Nevada's favorable conditions for different types of renewable energy resources, renewable energy development is likely to increase in the State. The SEP supports Nevada's Renewable Portfolio Standard goal of 25% of Nevada's energy coming from renewable sources by 2025. In addition, the Nevada Public Utilities Commission this year ruled in accordance with Nevada S.B. 123 requiring the retirement of no less than 300 MW of coal-fired electrical generating capacity on or before December 31, 2014, and not less than

250 MW of coal-fired electrical generating capacity on or before December 31, 2017 (Public Utilities Commission of Nevada 2014).

Renewable energy resources in Nevada include geothermal, wind, solar, and biomass. Nevada has vast geothermal resources and is leading the way in geothermal energy development in the United States. As of the end of 2013, of the 3442 MW of installed generating capacity in the U.S. (Matek 2014), Nevada contributes 586 MW (Nevada Division of Minerals 2014b), representing approximately 17% of total installed capacity in the U.S. Nevada is outpacing the rest of the country in developing geothermal projects. Nevada accounted for approximately 41% of the total number of projects under development in the U.S. since 2011 (Matek 2014). Nevada currently has 22 operating geothermal plants at 14 different locations (Nevada Division of Minerals 2014b). There are significant geothermal resources in northern Nevada that coincide with the sage-grouse habitat range. Recent geothermal projects that coincide with sage-grouse habitat include the Tuscarora, McGinness Hills, and Jersey Valley Geothermal Power Plants.

Wind energy is one of the fastest growing renewable energy sectors in the U.S.; however the potential viability for development of this resource in Nevada is currently limited. Analysis conducted as part of BLM's Wind Energy Development Programmatic EIS showed most of Nevada's wind power classification rated as poor to fair, with only small pockets classified as good to outstanding (BLM 2005). Some of those pockets however, overlap with sage-grouse habitat. Currently there is one wind generation facility in Nevada, the Spring Valley Wind Project; an approximately 150 MW facility located approximately 30 miles east of Ely, NV.

The BLM, as part of a Programmatic EIS for Solar Energy Development, developed Solar Energy Zone (SEZ), defined as an area well suited for utility scale production of solar energy. Five SEZs were identified for Nevada; all located in Clark, southern Nye, and Lincoln counties, outside the range of sage-grouse (BLM 2012). There are currently no solar energy rights of ways within sage-grouse habitat in Nevada (BLM 2013).

There is currently no significant commercial conifer biomass energy economy in Nevada (BLM 2013); however considering that pinyon-juniper expansion is one of the major threats facing sage-grouse in Nevada, the SEP encourages exploring and incentivizing biomass energy development in the State.

Renewable energy development can negatively impact sage-grouse both directly and indirectly through various mechanisms. Impacts to sage-grouse from geothermal energy development have not been assessed in the scientific literature because the development has been too recent to identify immediate and lag effects (Knick et al. 2011). There are currently no commercial solar projects operating in sage-grouse habitats at this time, so the impacts cannot be assessed. There has been one study on the effects on sage-grouse from wind energy developments recently completed in south-central Wyoming, which demonstrated that the relative probabilities of sage-grouse nest and brood success decreased with proximity to wind turbines (LeBeau 2012). Wind energy generation also requires tall structures, which can provide artificial nesting and perching substrate for sage-grouse predators (Knight and Kawashima 1993). Renewable energy development requires many of the same features for construction

and operation as non-renewable energy, so it is anticipated that the potential impacts from direct habitat loss, habitat fragmentation through roads and power lines, noise, and increased human presence would most likely be similar to those for non-renewable energy production (USFWS 2010).

Infrastructure

Infrastructure, whether related to energy production, mining, or any other purpose, can adversely impact sage-grouse. Infrastructure can result in habitat loss and fragmentation as well as sage-grouse avoidance of otherwise suitable habitat. In addition, infrastructure can provide a source for the spread of invasive species and provide artificial subsidies for predators (USFWS 2013). Infrastructure most common in Nevada includes transmission lines, distribution lines and roads. Other types of infrastructure may also include, but is not limited to, pipelines, communication towers, and fences.

Transmission and distribution lines (hereafter collectively referred to as power lines) are necessary for transmitting energy from power production facilities and distributing that power to homes and businesses. Power lines may directly impact sage-grouse through habitat loss and fragmentation (Knick et al. 2013), as well as direct mortality due to collisions (Beck et al. 2006). Indirect habitat loss due to avoidance of vertical structures, presumably due to increases in predator populations is also a concern (Manier 2013). Power lines have been shown to decrease male lek attendance (Ellis 1985) and probability of lek persistence (Walker et al. 2007), as well as causing avoidance behavior of brood-rearing habitat (LeBeau 2012). Power lines have been shown to increase predator distributions and hunting efficiency resulting in increased predation on sage-grouse (Connelly et al. 2004). Preliminary results from a ten-year study on the impacts of the Falcon-Gonder transmission line on sage-grouse population dynamics in Eureka County, Nevada show a significant negative effect of the transmission line on nest success and female survival, weak negative effect on male survival, and no support for impacts on nest site selection and female nesting propensity (Gibson et al. 2013). Nest success and female survival, along with chick survival, are the demographic rates that have been shown to be important for population growth (Taylor et al. 2012).

Roads are widespread through the sage-grouse range and can impact sage-grouse through a variety of mechanisms. A study along I-80 in Wyoming and Utah between 1970 and 2003 found no leks within 1.25 miles of the interstate, and fewer birds on leks within 4.7 miles of the interstate, than further distances (Connelly et al. 2004). Roads can negatively impact sage-grouse through direct mortality due to vehicle collision, decreased male lek attendance due to increased traffic (Holloran 2005), avoidance behavior (Lyon and Anderson 2003, LeBeau 2012), and reduced nest initiation rates (Lyon and Anderson 2003). Roads can also facilitate the spread of invasive species (Gelbard and Belnap 2003).

Goals, Objectives, and Management Actions

Goal 1: Manage anthropogenic disturbance development in a manner that provides for the long-term conservation of sage-grouse and their habitat, while balancing the need for continued development of the resources.

Objective 1.1: Achieve no net unmitigated loss of sage-grouse habitat due to new anthropogenic disturbances and any associated facilities and infrastructure within the Sage-Grouse Management Area (SGMA) in order to maintain stable or increasing sage-grouse populations.

Management Action 1.1.1: All new proposed anthropogenic disturbances within the SGMA will trigger timely SETT Consultation for application of the "avoid, minimize, mitigate" process (see Section 3.0). This will serve as a centralized impact assessment process that provides consistent evaluation, reconciliation and guidance for project development.

Management Action 1.1.2: Avoid new anthropogenic disturbance activities and its associated facilities and infrastructure within the SGMA. Locate activities, facilities, and infrastructure in non-habitat wherever possible. Avoidance of a disturbance within sage-grouse habitat is the preferred option. If avoidance cannot be reasonably accomplished, the project proponent must demonstrate why it cannot be reasonably accomplished in order for the SETT to consider minimization and mitigation alternatives. The process to demonstrate that avoidance cannot be reasonably accomplished (the "avoid process") is determined by the four management categories. (See Table 3-1 for more details on the avoid process.) If development cannot be sited in non-habitat, it should occur in the least suitable habitat.

Management Action 1.1.3: If adverse impacts to sage-grouse and their habitat cannot be avoided, require project proponents to minimize impacts by employing Site Specific Consultation-Based Design Features (Design Features; see Appendix A) appropriate for the project. This may include seasonal operational restrictions, noise restrictions, clustering disturbances, and placing infrastructure in previously disturbed locations.

Management Action 1.1.4: Technically evaluate and where reliability is not adversely impacted, seek to site new linear features in existing corridors (Figure 11) or, at a minimum, co-locate with existing linear features in Core, Priority, and General Management Areas.

Management Action 1.1.5: Reduce and eliminate artificial hunting perches and nesting substrate for aerial predators. This can be achieved by installing anti-nesting and anti-perching devices on new power lines (see Section 7.3) or burying power lines. Bury distribution power lines of up to 35kV where ground disturbance can be minimized, and where technically and economically feasible. Where technology and economic factors allow, bury higher kV power lines (see Appendix A). Sage-grouse desired habitat conditions (see Section 4.0) will be incorporated when reclaiming the site.

Management Action 1.1.6: Encourage continued research in the development of more effective perching and nesting deterrent options (see Section 7.3).

Management Action 1.1.7: Aggressively engage in rehabilitation/weed control efforts during pre- and post-project construction.

Management Action 1.1.8: If impacts from anthropogenic disturbances cannot be avoided and after minimization options have been exhausted, residual adverse impacts are required to be offset through compensatory mitigation. Mitigation obligations will be determined through the Conservation Credit System (see Section 8.0).

Objective 1.2: Explore options to minimize impacts from existing and abandoned anthropogenic disturbances and associated infrastructure.

Management Action 1.2.1: While SETT Consultation and the "avoid, minimize, mitigate" process do not apply retroactively to existing anthropogenic disturbances, encourage existing operators to incorporate the Design Features outlined in Appendix A and contact the SETT for timely input on techniques and practices to avoid and minimize existing impacts to sage-grouse and their habitat.

Management Action 1.2.2: Inventory abandoned mine sites within sage-grouse habitat, where practical, and reclaim sites to trend towards sage-grouse desired habitat conditions (see Section 4.0). Coordinate with the Abandoned Mine Lands Program on this effort.

Management Action 1.2.3: Work with the energy industry to explore opportunities to install anti-nesting and anti-perching devices on existing power lines and tall structures and to bury existing power lines where technology and economic factors allow.

Management Action 1.2.4: Inventory power lines and utility structures that are no longer in use and look for opportunities to decommission the lines and reclaim the sites to trend towards sage-grouse desired habitat conditions (see Section 4.0).

7.7 Recreation & Off-Highway Vehicle Activities

Nevada offers some of the most robust recreational and OHV experiences in the nation due, in large part, to its high percentage of accessible federally managed public lands. Recreation, in all of its forms, creates a significant benefit to local and statewide economies. Extensive networks of roads and trails offer recreationists excellent access to most of Nevada's expansive basin and range high desert ecosystems. This extensivity of roads and trails may also create impacts on sagebrush habitats and sage-grouse that may be difficult to measure.

While recreational and off-highway vehicle use is one of the many acceptable multiple-uses on our federal public lands, it also requires frequently reviewed and updated policies that allow for greater adaptive management. This may assist in ongoing efforts to protect and preserve sensitive land forms, plants, and animals from levels or types of disturbance that create unnatural or unduly negative impacts. Potential impacts on sage-grouse and their habitat associated with recreational activities include but are not limited to: increases in noise levels, distribution of invasive plants, generation of fugitive dust, and effects on predator prey relationships (Manier 2013).

In Nevada, the recent creation of the Commission on Off-Highway Vehicles provides a mechanism and a funding source to educate users on how to responsibly use off-highway vehicles. Educational efforts will focus on minimizing adverse effects due to uses in or near sage-grouse habitats during certain seasons and times of day. It may also provide a funding source to allow the State to join with the federal agencies to better plan, develop, and manage a coordinated and designated system of off-road vehicle trails in Nevada. The off-highway vehicle registration system allows state law enforcement personnel to access vehicle registration information and identify vehicle titleholders in instances where state or federal laws pertaining to off-road access or use are violated.

Conservation Goals, Objectives, and Management Actions

Goal 1: Conserve sage-grouse and their habitat while allowing for continued recreational access to public lands.

Objective 1.1: Avoid or minimize recreation and OHV negative direct and indirect impacts to sage-grouse and their habitats and monitor sites for potential impacts.

Management Action 1.1.1: Establish appropriate ambient noise levels for undisturbed sage-grouse leks. Noise restrictions should generally apply between the hours of 6:00 p.m. to 9:00 a.m. as these are the hours most critical for communications of sage-grouse and auditory detection of predators (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

Management Action 1.1.2: Take measures to minimize or reduce activities and to avoid an ambient noise level increase >10 dB at the edge of leks during the lekking season generally, March 1 through May 15 from one hour before sunrise until 9:00 a.m.

Management Action 1.1.3: Assist in efforts to enhance collaborative monitoring through volunteer organizations, recreational groups, etc., to collect data that would assist in the protection, enhancement, or restoration of sage-grouse habitats.

Management Action 1.1.4: Support studies that further the understanding of the relationship between recreational uses and their potential impacts on sage-grouse.

Management Action 1.1.5: Utilize sage-grouse habitat mapping to inform state and federal recreation management plans.

Management Action 1.1.6: Where feasible locate recreation trails strategically to create or augment fuel breaks in the margins of sage-grouse habitats and landscapes and not create roads or trails where they cause net negative direct and indirect impacts.

Objective 1.2: Support and implement efforts to reduce the potential for additional sage-grouse habitat fragmentation from unauthorized 'trail making'.

Management Action 1.2.1: Support and promote efforts by state, local, and federal agencies and recreational groups to promote educational campaigns that encourage responsible OHV and recreation activities that avoid or minimize negative impacts to sage-grouse and their habitat, including the spread of invasive species.

Management Action 1.2.2: Work with state, local, and federal agencies and recreational groups to inventory unauthorized trails in Core, Priority, and General Management Areas and where feasible restore trails to trend towards sage-grouse desired habitat conditions (see Table 4-1).

Objective 1.3: Promote the leveraging of funding from all sources when addressing sage-grouse habitat enhancement, restoration, or preservation projects.

Management Action 1.3.1: Develop a database to share with interested agencies and groups to maximize efforts and leverage funding.

Management *Action 1.3.2:* Encourage and support the Commission on Off-Highway Vehicles to expend OHV registration funds to enhance, restore, or protect sage-grouse habitat.

8.0 CONSERVATION CREDIT SYSTEM

The Nevada Conservation Credit System (CCS)[4] is a pro-active solution that provides net conservation benefits for sage-grouse, while balancing the need for continued human activities vital to the Nevada economy and way of life. The CCS creates new incentives for private landowners and public land managers to preserve, enhance, restore, and reduce impacts to important habitat for the species.

The CCS is a market-based mechanism that quantifies conservation outcomes (credits) and impacts from new anthropogenic disturbances (debits), defines standards for market transactions, and reports the overall progress from implementation of conservation actions throughout the sage-grouse range within Nevada. The CCS establishes the policy, operations, and tools necessary to facilitate effective and efficient conservation investments. The CCS is intended to provide regulatory certainty for industries by addressing compensatory mitigation needs whether or not the species is listed under the ESA.

Goal and Scope

The goal of the CCS is to achieve no net unmitigated loss of sage-grouse habitat due to new anthropogenic disturbances within the Sage-grouse Management Area (SGMA; Figure 2), in order to stop the decline of sage-grouse populations. Proposed anthropogenic disturbances, as defined in Section 3.0 of this plan, must seek to avoid, minimize, and mitigate impacts to sage-grouse habitat. After all practicable economically and technically feasible possibilities to avoid and minimize impacts to sage-grouse habitat have been exhausted, residual adverse impacts are required to be offset by mitigation requirements as determined through the CCS.

Anthropogenic disturbances occurring on BLM and USFS lands within the SGMA require timely consultation with the SETT. Private landowners are not required to mitigate anthropogenic disturbances on their land, but are welcome to voluntarily generate, sell, or purchase credits in the CCS. The CCS scope can be expanded in the future to support additional conservation needs or to include other states within the sage-grouse range.

Roles and Responsibilities

The *DCNR Division of State Lands*, holds ultimate authority over CCS design, operations, and management. The *SEC* oversees CCS operations and approves changes to the program. *The Administrator* manages the CCS's day-to-day operations, ongoing program improvements, facilitates transactions, and reports programmatic results. CCS operations are also informed by *Resource Managers* (e.g. BLM, NDOW, USFS, USFWS) and by a *Science Committee* to ensure it functions according to current laws, policies, and regulations and is consistent with the best available science.

Credit Developers are landowners, land managers, organizations, or agencies, that generate, register, or sell credits in the CCS. *Credit Buyers* are entities that purchase mitigation credits to offset impacts from new anthropogenic disturbances or to meet other conservation objectives.

[4] For more information please refer to *The Nevada Conservation Credit System Manual* on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

What are Credits and Debits?

Credits are the currency of the CCS. A credit represents a verified *"functional acre"* that meets the durability criteria defined by the CCS, such as committing to a Customized Management Plan that outlines actions to maintain habitat performance and to limit risks from future impact for the duration of the project. A functional acre is based on habitat quality ("function") relative to optimal conditions, and quantity (acres). This is determined through the Habitat Quantification Tool (HQT; see below).

Debits are similar to credits, but are the quantified and verified units of functional acres lost due to a new anthropogenic disturbance.

Generating and Purchasing Credits

The steps for generating and purchasing credits are depicted below. Blue chevrons signify the steps undertaken to generate credits and green chevrons represent the purchase of credits.

Calculating Credits and Debits

Habitat Quantification Tool (HQT)[5]

The HQT is a method to estimate habitat quality and quantify debits and credits. The HQT uses a set of metrics, applied at multiple spatial scales, to evaluate vegetation and environmental conditions related to sage-grouse habitat quality and quantity. The HQT enables the CCS to create incentives to generate credits in the most beneficial locations for the sage-grouse, and to minimize impacts to existing high quality habitat.

The HQT is used to calculate scores for each type of seasonal habitat. Habitat condition is expressed in functional acres, relative to optimal conditions. The functional acre score is adjusted to account for indirect effects of the local area surrounding the site. Mitigation ratios are then applied.

Mitigation Ratios

Mitigation ratios incorporate biologically significant factors that cannot currently be incorporated into the HQT. They enable offset transactions to achieve a net benefit for the species by ensuring the functional acres of credit acquired is greater than the functional acres of debit. The mitigation ratios create incentives for avoidance of impacts and preservation, enhancement, and restoration of habitat in important areas. This includes avoiding and protecting seasonal habitats that are scarce for a particular population. Mitigation ratios are determined by the:

- Habitat Importance Factor: The value is influenced by the location of a credit or debit site in Core, Priority, or General Management Areas (Figure 4)
- Seasonal Habitat Scarcity Factor: This is determined by the portion of seasonal habitat type (nesting, late-brood rearing, and winter) impacted.

[5] For more information please refer to *The Habitat Quantification Tool Scientific Methods Document* on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

Debits are adjusted based on proximity to potential credit sites (Proximity Factor) to determine the credit obligation that must be purchased to offset a debit project. Credit obligation increases if the credits purchased are located outside the same population as the debits. This incentivizes mitigation in close proximity to debit sites.

Regulatory Assurances

Verification

Credit and debit projects require verification to ensure that calculations represent a true and accurate account of on-the-ground implementation and habitat function and assurances that projects are maintained over time. *Third-party Verifiers*, trained and certified by the Administrator, conduct independent checks using the HQT methods. *Credit Verification* is required before credit release and every fifth year. *Debit Verification* is required before the project begins, during project implementation, and when debits end or decrease. Periodic spot checks and audits are also required.

Reserve Account

The *Reserve Account* is a pool of credits, functioning like an insurance fund, that replace credits that are invalidated due to a force majeure event, mismanagement, or competing land uses. A percentage of credits from each credit transaction are deposited into the reserve account. Factors that determine the Reserve Account contribution are: base contribution, probability of wildfire, and probability of competing land uses. In the case of unintentional credit reversal due to force majeure or competing land use events, the Administrator withdraws credits from the reserve account to cover the invalidated credits at no cost to the Credit Developer for a limited duration until the original credits are replaced.

Additionality and Stacking of Multiple Payments

Projects that generate credits must be additional to activities that would occur in the absence of the CCS. On private and public lands, a credit project is additional if the land manager is not already performing or planning to perform conservation actions using funding sources other than the CCS. *Stacking* allows a Credit Developer to receive multiple payments for conservation actions on the same area of land, but only receive credit for the additional conservation benefits.

Durability

The CCS uses *performance assurances* on private and public lands to ensure the durability of credits generated throughout the life of the credit project. Performance assurances are implemented through contract terms and financial instruments. The *durability of projects on public lands* is safeguarded using land protection mechanisms (e.g. right-of-ways), financial instruments (e.g. contract performance bonds) and the Reserve Account.

Additional Policy Considerations

The *Service Area*, the area in which credits can be exchanged, for the CCS is the SGMA.

Baseline is the starting point from which credits and debits are measured. Credits and debits represent the change from baseline that results from implementing a project. *Credit baseline* is a state-wide standard for each seasonal habitat type equivalent to the average habitat functionality. Project sites

must be at the credit baseline, at a minimum to begin generating credits. *Debit baseline* is the pre-project habitat function value for each seasonal habitat type for a proposed debit project.

Credit release occurs when performance criteria milestones which increase habitat function are achieved on a credit site. Specific performance criteria are defined in each project's *Customized Management Plan*. Credit release can occur in single or multiple increments depending on credit project type; including: *preservation projects*, *enhancement projects*, and *restoration projects*.

The CCS requires that the *project life* of a credit project must be equal to or greater than the duration of the impacts of the debit project it is offsetting.

Credit variability may occur due to annual climatic or other natural conditions affecting habitat functionality. As a result, a *tolerance threshold* of above or below 10% habitat function is applied.

9.0 MONITORING AND ADAPTIVE MANAGEMENT

Monitoring and adaptive management are key components of successful resource management plans in order to derive the greatest environmental benefit given limited agency resources. Incorporation of these strategies in the planning process will help ensure management actions identified in this State Plan are implemented and effective at achieving the intended goals and objectives for the benefit of sage-grouse. Adaptive management allows for information learned through monitoring to be integrated into iterative decision making that can be adjusted as outcomes from management actions become better understood (Williams et al. 2009). Management that does not achieve intended goals and objectives can be modified through adaptive management and contribute to the emerging understanding of management action response, sage-grouse habitat requirements, sage-grouse behavior, and sagebrush ecosystem processes.

Monitoring

Two main categories of monitoring will occur for the State Plan: 1) inventory monitoring and 2) management action monitoring. These are described below. Within each of these categories, additional concepts will need to be considered: short and long-term monitoring, monitoring at multiple scales (e.g., site, landscape) (Swanson et al. 2006), and, for management action monitoring, monitoring for implementation and for effectiveness.

Inventory monitoring assesses the status/extent/condition of sage-grouse populations (e.g., sage-grouse population trends over time), sage-grouse habitats (e.g., gain/loss of sage-grouse habitats over time), and of the threats to sage-grouse (as identified in the State Plan, e.g., how many acres of PJ encroachment are occurring each year). Inventory monitoring provides a quantified understanding of changes in condition and extent of sage-grouse populations, habitat, and threats over time and space, can help prioritize efforts, and can help evaluate success in meeting short and long-term goals and objectives. Many of the state and federal agencies already provide a level of inventory monitoring appropriate for the needs of the state plan and this will be incorporated into the state's monitoring plan- more detail is provided below.

This State Plan identified many management actions to address specific threats. Monitoring of management actions is necessary to ensure that individual actions are accomplishing what they are intended to do. The state will require that monitoring plans be developed for all management actions that occur under direction of the State Plan, including those intended to ameliorate threats outlined in Section 7.0. These plans will include monitoring for implementation and monitoring for effectiveness. Monitoring associated with the Conservation Credit System (see Section 8.0) is detailed in the Habitat Quantification Tool Scientific Methods Document[6] {currently under development}.

Management Action monitoring for implementation includes: 1) a brief description of the project and the work completed, 2) pre- and post-project photographs, 3) short term monitoring of weather

[6] For more information please refer to The Habitat Quantification Tool Scientific Methods Document on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

(especially precipitation and when it occurs) and other events (e.g., fire, floods, insects, infestations, etc.) and on-going management (e.g., season of livestock use or livestock, horse, and wildlife population levels) (Swanson et al. 2006), 4) lessons learned during implementation, 5) discussion of impacts to uses and other resources, 6) recommendations on the implementation of future projects, 7) maintenance performed, and 8) accounting of expenditures.

Management Action monitoring for effectiveness can play a key role in demonstrating the accountability, success, and value of management investments. Effectiveness monitoring is designed to determine if the project is effective at meeting its biological and ecological goals and objectives. Project-scale effectiveness monitoring measures environmental parameters to ascertain whether management actions were effective in creating the desired change(s) in habitat conditions and species response. There are at least three important reasons to conduct project-scale effectiveness monitoring on a management action or a change in management: 1) to determine the biotic and abiotic changes resulting on, and adjacent to, the treatment area; 2) to determine if treatment and management actions were effective in meeting the objective(s); and 3) to learn from the management actions and to incorporate new knowledge in future treatment design.

The following concepts should be addressed in all monitoring plans:

- Identify the site conditions and the reasons for implementing management action(s) at the site.
- Set monitoring objectives and indicators – these should quantitatively or qualitatively evaluate the project objectives that will be used to evaluate project implementation and effectiveness in meeting objectives. Effectiveness in meeting objectives will need to be evaluated for both habitat changes and when appropriate and feasible, sage-grouse response.
- Identify anticipated site attribute changes in response to the management action, target values, and time frame under which changes are anticipated. Swanson et al. (2006) explain characteristics of useful and effective resource objectives (**S**pecific, **M**easureable, **A**chievable, **R**elevant, and **T**rackable).
- Select monitoring sites and determine appropriate, effective methods. Include control or reference sites in method design. Baseline data on these will allow before, after, with, and without comparisons.
- Monitoring will be conducted for a minimum of three years or until management objects are met. If, as part of the treatment, grazing was restricted for a time period, post-treatment, monitoring should be conducted for three year following resumption of grazing practices. In addition, monitoring will be conducted at 10 years post-treatment as a follow-up for long-term monitoring.
- Any monitoring plans will be prepared jointly between a project proponent, relevant stakeholders (such as permittees), and land management agency, with final approval from the land management agency.

See resources listed at end of this section for development on monitoring plans.

Adaptive Management

Adaptive management as it relates to sage-grouse and their habitats is a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reduce uncertainty over time through continued monitoring. Because adaptive management is based on a learning system, it improves long term management outcomes. The challenge in using the adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcomes based on current knowledge (Allan and Stankey 2009).

> "An adaptive management approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions" (Williams et al. 2009).

Adaptive management takes monitoring to the next level by establishing, prior to implementation, a framework from which an iterative implementation and learning process can be instituted. Adaptive management implements "learning by doing" and provides flexibility to act in the face of uncertainty.

The following are additional steps to monitoring that need to be addressed to successfully implement adaptive management (Adapted from Williams et al. 2009):

- Identify and record potential drivers of change in the system, threats to the system, and opportunities for beneficial actions. These should be incorporated in the model of response for each management action.
- Development of "models" or hypotheses of the expected response and rationale.
- Development of how management actions should be adjusted following results from monitoring (this should include a set of potential alternatives to management based on the outcome of specific monitoring, allowing for flexibility while based on best available science).
- Implementation of iterative adjustments to management actions following implementation of actions and results of monitoring, following the process outlined in previous bullet.
- Project and management plans should incorporate the ability to change methods when monitoring of the projects or management actions indicate or when new science from research or other monitoring project emerges.

Consideration of when adaptive management is appropriate:

- Decision making must be able to be made in an iterative process
- Monitoring data must be available to decision makers
- It is not appropriate when risks associated with learning based-decision making are too high (i.e., if risk of management action is unknown and worst case scenario has irreversible consequences) in comparison to the risks of not doing so (i.e., the consequences of doing nothing).

See resources listed at end of this section for development on adaptive management plans.

Incorporation of Monitoring and Adaptive Management into the State Plan

A multi-scale monitoring approach is necessary as sage-grouse are a landscape species and conservation is scale dependent to the extent that management actions are implemented within or across seasonal habitats to benefit populations. The state should track the extent of threats to sage-grouse (e.g., fire, pinyon-juniper encroachment, etc.), through inventory monitoring, as well as the efforts to manage the threats (e.g., number of acres of pinyon-juniper treated), through management action monitoring to promote effective species management and understand whether the state is making progress towards the goals and objectives outlined in this plan. Many of the components of inventory monitoring are already being monitored by state and federal agencies. The SETT will work to compile annual monitoring reports that provide a synopsis of these monitoring efforts and metrics relevant to the state plans goals and objectives. The state will engage with stakeholders responsible for these components to facilitate when possible and ensure monitoring occurs. For components that are not currently under the purview of other state and federal agencies, the SETT will work to engage relevant stakeholders to develop a monitoring program. The SETT will develop a comprehensive database to store all monitoring information which will be accessible to the public.

To meet the need for the management action monitoring requirement, all management actions overseen by the SEP will develop monitoring plans following guidance provided in this section. If participating in projects developed by BLM/USFS, NDOW, NDA, NDF, or other agencies, projects should include similar aspects to those outlined here, if not all. As well, all management actions should be reviewed and those appropriate for the adaptive management process should additionally develop an adaptive management plan in coordination with the monitoring plan.

Table 9.1 presents the components (sage-grouse threats, habitats, and populations) that will be monitored to be able to better understand the level of threat to sage-grouse and sagebrush ecosystems and what can be done to respond to the threat for sage-grouse. Elements for inventory monitoring and management action monitoring are outlined as well as the relevant agencies from which monitoring information will be gathered. Monitoring information will be collected across the extent of SGMA and provided at the site, landscape, PMU and state levels and by core, priority, and general management areas. In addition, known changes in extent between years will be documented and total extent of treatments will be summarized.

Additional monitoring components may be identified in the future for inclusion in the annual monitoring report (above and beyond those monitoring components listed in Table 9.1). As additional threats to sage-grouse and sage-grouse habitats are identified, components and leading indicators should be included in inventory monitoring and management action monitoring to better assess and understand the severity of threat and progress in ameliorating the threat.

In addition to the annual monitoring report and database, the state of Nevada will develop a methods document for monitoring plans and adaptive management plans that provide recommended, standardized protocols and methods for objective based monitoring that are consistent with other land jurisdictions and agencies, including BLM, USFS, NDOW, and others.

Table 9.1. Inventory and Management Action Monitoring for the State Plan

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
Sage-grouse Parameters			
Sage-grouse habitats	NDOW, BLM, USFS, SETT CCS	• Land Health Assessments (BLM) (site, landscape, and state scale) • Resource Implementation Protocol for Condition Assessment Matrices (USFS) • Sagebrush landscape cover (BLM EIS)[8] (landscape scale) • CCS- functional acres lost due to debit projects, functional acres gained due to credit projects (concept of no net unmitigated loss)	• Treatment conducted and effectiveness of treatments (these would be treatments not included in subsequent monitoring components, e.g., meadow restoration)
Sage-grouse populations	NDOW, BLM, USGS	• Lek, lek cluster, PMU counts, populations and trends (all scales) • Telemetry data collection (site to landscape scale-project dependent)	• At this point, the state plan does not outline management actions directly influencing sage-grouse numbers. Management actions outlined directly affect habitat and indirectly affect populations.
Threat			
Fire	BLM, USFS, NDF, NDOW[9]	• Number of fire starts per year • Number and size of fires in each vegetation community, and resistance and resilience classes	• Number of fires "successfully" suppressed (<1,000 acres) • Number of catastrophic fires • Fuels management treatments (conducted and effectiveness of treatments) • Rehabilitation efforts for each fire (implementation and effectiveness of treatments) • Document coordination efforts that aid in efficient and effective fire pre-suppress and suppression management
Cheatgrass	SETT will coordinate with researchers to determine extent BLM, USFS, NDOW, Nevada Cheatgrass Action Team	• Extent (spatial distribution, acres, and density of invasion)	• Treatments conducted and effectiveness of treatments (includes restoration efforts or efforts to improve resilience/resistance) •
Noxious weeds[10]	NDA, NDOW, University	• Extent (spatial distribution,	• Treatments conducted and

[7] Scale of Management Action Monitoring is dependent on management action details specified in Section 7.0

[8] As part of the Greater Sage-grouse Northern California and Nevada Sub-regional EIS/LUPA, the BLM/USFS have developed a Monitoring Framework (Appendix E of that document) that outlines monitoring for habitat loss, habitat degradation, and population trend (in coordination with NDOW) at the 1st, 2nd, and 3rd order scale (Stiver et al. 2010).

[9] NDOW is engaged with BLM on post –fire treatment monitoring and provides monitoring in conjunction with these agencies post ES&R efforts.

[10] Weed species in Nevada identified as having, generally, greatest impact to sage-grouse habitats (S. Espinosa, B. Schultz personal communication

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
Medusahead Hoary cress (*Cardaria draba*) Russian knapweed (*Acroptilon repens*) Leafy spurge (*Euphorbia esula*) Perennial pepperweed (*Lepidium latifolium*) Canada thistle (*Cirsium arvense*) Rush skeleton weed (*Chondrilla juncea*) Yellow starthistle (*Centaurea solstitialis*) Musk thistle (*Carduus nutans*) Spotted knapweed (*Centaurea maculosa*) Scotch thistle (*Onopordum acanthium*) Mediterranean sage (*Salvia aethiopis*) **Other weeds** Red Brome (*Bromus rubens*) Rattlesnake chess (*Bromus briziformis*) Halogeton (*Halogeton gomeratus*) Purple mustard (*Chorispora tenella*)	of Nevada Cooperative Extension, and SETT	acres, and density of invasion) •	effectiveness of treatments
Pinyon juniper encroachment	BLM, USFS, NDF, NDOW, SETT, all stakeholders (including researchers at University of Nevada, Reno, and USGS)	• Extent (spatial distribution, acres, and density of invasion)	• Treatments conducted and effectiveness of treatments
Predation	NDOW, Wildlife Services, NDA, and SETT,	• Baseline data collected prior to treatments- data will likely be site specific, not SGMA wide (road kill inventories, raven counts, habitat parameters, etc.)	• Treatments conducted and effectiveness of treatments • Documentation of coordination efforts with city counties, landfills waste managers, livestock owners, research on perching and nest deterrent technology
WHB populations	BLM, USFS	• HMA/WHBT populations • Extent of resources damaged by WHB • Understand their timing of use on seasonal habitats • Trend monitoring regarding maintenance of a thriving natural ecological balance for adjusting AML (BLM 2010)	• Gathers conducted • Treatments conducted and effectiveness of treatments
Livestock grazing	BLM, USFS, permittees	• Allotment standards and	• Documentation of changes in

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
	and stakeholders	guidelines • Dates of use or intensity of use by allotment • Monitoring of attainment of management objectives (Swanson et al. 2006)	management prescriptions to improve management, when appropriate
Anthropogenic disturbances	SETT, BLM, USFS, other federal agencies, all stakeholders	• CCS- functional acres lost due to debit projects, functional acres gained due to credit projects (concept of no net unmitigated loss) • Surface acres impacted • Indirect acres impacted • Identification of existing infrastructure that could be retrofitted, as appropriate (inclusion on the list does not require retrofitting, simply identifying the opportunity)	• Management actions to mitigation for anthropogenic disturbances will be accounted for under the appropriate threat or under habitat and in reporting will be noted as credit projects. • Documentation of implementation of Site Specific Consultation Based Design Features
Recreation and OHVs	SETT, BLM, USFS, Commission on Off-Highway Vehicles and other stake holders	• Permitted activities • Extent of authorized and unauthorized recreational trails and facilities	• Treatments conducted to restore areas impacted by recreational activities and effectiveness of treatments • Documentation of coordination efforts with recreational groups
Weather Variability	NOAA, DRI, State Climatologist, NRCS Water and Climate Center, USGS BLM, USFS, and other stakeholders	• U.S. Drought Monitor • Hydrologic Report • Climate data records (current and historic)	• Tracking changes in management actions due to weather variability
Land Ownership	All agencies	• Tracking of land ownership changes	• Tracking of how changes in management actions due to land ownership affects habitat

Existing monitoring and adaptive management plans and methods

There are several key plans and methods that have been developed for use in Nevada and across the range of the sage-grouse. These should be referenced in the development of resource objectives, management action monitoring plans, and adaptive management plans. The following are recommended for consideration in the State Plan:

<u>Monitoring</u>

Swanson, S., B. Bruce, R. Cleary, B. Dragt, G. Brackley, G. Fults, J. Linebaugh, G. McCuin, V. Metscher, B. Perryman, P. Tueller, D. Weaver and D. Wilson. 2006. Nevada rangeland monitoring handbook. Second Edition. Educational Bulletin 06-03. University of Nevada Cooperative Extension, Natural Resources Conservation Service, Bureau of Land Management, U.S. Forest Service. USA. 84 pp. Available at: https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf

Stiver, S.J., E.T. Rinkes, and D.E. Naugle. 2010. Sage-grouse Habitat Assessment Framework. U.S. Bureau of Land Management. Unpublished Report. U.S. Bureau of Land Management, Idaho State Office, Boise, Idaho. Available at: http://sagemap.wr.usgs.gov/docs/rs/SG%20HABITAT%20ASESSMENT%202010.pdf

Bureau of Land Management. 2010 Wild Horses and Burros Management Handbook. H-4700-1. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.11148.File.dat/H-4700-1.pdf

BLM AIM Strategy

Toevs, G.R., J.W. Karl, J.J. Taylor, C.S. Spurrier, M. Karl, M.R. Bobo, and J.E. Herrick. 2011. Consistent Indicators and Methods and a Scalable Sample Design to Meet Assessment, Inventory, and Monitoring Information Needs Across Scales. Rangelands: 14-20.

Toevs, G.R., J.J. Taylor, C.S. Spurrier, W.C. MacKinnon, and M.R. Bobo. 2011. Bureau of Land Management Assessment, Inventory, and Monitoring Strategy: For Integrated Renewable Resources Management. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/ib_attachments/2012.Par.53766.File.dat/IB2012-080_att1.pdf

BLM AIM Monitoring Methods

Herrick, J.E., J.W. Van Zee, K.M. Havstad, L.M. Burkett, and W.G. Whitford. 2009. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. Volume I: Quick Start. Department of Agriculture, Agricultural Research Service, Jornada Experimental Range, Las Cruces, NM. Available at: http://www.ntc.blm.gov/krc/uploads/281/Monitoring%20Manual%20for%20Grassland,%20Shrubland%20and%20Savanna%20Ecosystems%20Vol.%20I_Quick%20Start.pdf

Herrick, J.E., J.W. Van Zee, K.M. Havstad, L.M. Burkett, and W.G. Whitford. 2009. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. Volume II: Design, Supplementary Methods and Interpretation. Department of Agriculture, Agricultural Research Service, Jornada Experimental Range, Las Cruces, NM. Available at: http://www.ntc.blm.gov/krc/uploads/281/Monitoring%20Manual%20for%20Grassland,%20Shrubland%20and%20Savanna%20Ecosystems%20Vol.%20.II.pdf

<u>Adaptive Management</u>

Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2009. Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC. Available at: http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf

Cooperative monitoring

The state of Nevada recognizes the value of monitoring as well as the time and effort required to do so. Given limiting staffing and resources of agencies, the SETT will encourage and facilitate cooperative monitoring by interested stakeholders. The BLM has established a cooperative monitoring agreement for grazing allotment permittees to help conduct rangeland health assessments on their permitted allotments (See Appendix F). In compilation of the first annual monitoring report and through discussions with stakeholders, the SETT will work to develop similar cooperative monitoring agreements for additional resources with additional agencies and will facilitate development of such to meet the needs for training and quality control.

See resources below for monitoring guides for ranchers and other stakeholders.

Oregon Cattlemen's Association (2014). Oregon Resources Monitoring Guide: The Rancher's Guide to Improved Grazing.

Peterson, Eric. 2010. Implementing a Cooperative Permittee Monitoring Program. Sublette County Extension. University of Wyoming Cooperative Extension Service. B-1169. 28 pp. Available at: http://www.wyoextension.org/agpubs/pubs/B1169.pdf _____

Swanson, S., Ben, B, Rex, C, Bill, D, Gary, B, Gene, F, James, L, Gary, M, Valerie, M, Barry, P, Paul, T, Diane, W and Duane, W.2006. Nevada rangeland monitoring handbook. Second Edition. Educational Bulletin 06-03. University of Nevada Cooperative Extension, Natural Resources Conservation Service, Bureau of Land Management, U.S. Forest Service. USA. 84 pp. Available at: https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf

Perryman, B.L., L.B. Bruce, S.R. Swanson, and P.T. Tueller (2006). *Rancher's Monitoring Guide* , Educational Bulletin 06-04. University of Nevada Cooperative Extension, University of Nevada, Reno, College of Agriculture, Biotechnology and Natural Resources. USA. 48 pp. Available at: http://www.unce.unr.edu/publications/files/ag/2006/eb0604.pdf

Bureau of Land Management. 2004. Memorandum of Understanding with Public Lands Council. BLM MOU WO220-2004-01. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2006.Par.82823.File.dat/im2006-100attach2.pdf

REFERENCES

3. Blomberg, E. J. (2012). Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations. *Ecosphere* , 3(6):55.

Adams, A. (1975). *A Brief History of Juniper and Shrub Populations in Southern Oregon.* Wildlife Research Report, Number 6, Research Division, Oregon State Wildlife Commission, Corvallis, Oregon. 33 p.

Aldridge, C. (2005). *Identifying Habitats for Persistence of Greater Sage-grouse (Centrocercus urophasianus) in Alberta, Canada.* University of Canada, Doctoral Dissertation.

Aldridge, C., & Boyce, M. (2007). Linking occurance and fitness persistence: habitat-based approach for endangered Greater Sage-Grouse. *Ecological Applications* , 17:508-526.

Aldridge, C., & Brigham, R. (2002). Sage-grouse Nesting and Brood Habitat Use in Southern Canada. *Journal of Wildlife Management*, 66:433-444.

Allan, C., & Stankey, G. (2009). *Adaptive Environment Management: A Practitioner's Guide.* Netherlands: Dordrecht Publisher, ISBN 978-90-270-8.

Arnold, G., & Dudzinski, M. (1978). *Ethology of Free-Living Domestic Animals.* Elsevier, Amsterdam, The Netherlands.

Atamian, M., Sedlinger, J., Heaton, J., & Blomberg, E. (2010). Landscape-Level Assessment of Brood Rearing Habitat for Greater Sage-grouse in Nevada. *Journal of Wildlife Management*, 74:1533-1543.

Baruch-Mordo, S., Evans, J., Severson, J. P., Naugle, D., Maestas, J., Kiesecker, M., . . . Reese, K. (2013). *Biological Conservation.* 167: 233-241.

Beck, J., Reese, K., Connelly, J., & Lucia, M. (2006). Movements and survival of juvenile greater sage-grouse in southeastern Idaho. *Wildlife Society Bulletin*, 34:1070–1078.

Beck, J., Reese, K., Connelly, J., & Lucia, M. (2006). Movements and survival of juvenile greater sage-grouse in southeastern Idaho. *Wildlife Society Bulletin*, 34:1070–1078.

Beever, E., & Aldridge, C. (2011). Influences of Free-Roaming Equids on Sagebrush Ecosystems with a Focus on Sage-grouse. In S. Knick, & J. Connelley, *Greater Sage Grouse: Ecology and Conservation of a Landscape Species and its Habitats* (Vol. Studies in Avian Biology 38, pp. 273-290). Berkeley, CA: University of California Press.

Bergquist, E., Evangelista, P., Stohlgren, T., & Alley, N. (2007). Invasive Species and Coal Bed Methane Development in the Powder River Basin, Wyoming. *Environmental Monitoring and Assessment*, 28:381-394.

Bi-State Executive Oversight Committee. (2014). *Executive Oversight Committee Materials in Support of Implementation and Effectiveness for the Bi-State Distinct Population Segment of Greater Sage-grouse.* Available at: http://www.ndow.org/Nevada_Wildlife/Sage_Grouse/Bi-State_FWS/.

Bi-State Technical Advisory Committee. (2012). *Bi-State Action Plan: Past, Present, and Future Actions for the Conservation of the Greater Sage-grouse Distinct Population Segment.* Available at:http://www.ndow.org/uploadedFiles/ndoworg/Content/Nevada_Wildlife/Sage_Grouse/Bi-State-Action-Plan.pdf.

Blank, R., & Morgan, T. (2012). Cheatgrass Invasion Engineers the Soil to Facilitate its Growth. *Society for Range Management*, 65:0162.

Blickley, J., Blackwood, D., & Patricelli, G. (2012). Experimental evidence for the effects of chronic anthropogenic noise on abundance of Greater Sage-Grouse at leks. *Conservation Biology*, 26:461-471.

Boarman, W. (2003). *Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises.* Environmental Management, 32:205-217.

Boarman, W., & Heinrich, B. (1999). *Common Raven (Corvus corax).* Philadelphia, PA: The Academy of Natural Sciences and The American Ornithologists' Union.

Booth, M. S., Caldwell, M. M., & Stark, J. M. (2003). Overlapping resource use in three Great Basin species: implications for community invisibility and vegetation dynamics. *Journal of Ecology*, 91(1):36-48.

Boyce, M., Vernier, P., Nielson, S., & Schmiegelow, F. (2002). Evaluating Resource Selection Functions. *Ecological Modeling*, 157:281-300.

Bradley, B., & J.F., M. (2006). Characterizing the landscape dynamics of an invasive plant and risk of invasion using remote sensing. *Ecological Applications*, 16(3):1132-1147.

Braun, C., Oedekoven, O., & Aldridge, C. (2002). Oil and gas development in western North America: effects on sagebrush steppe avifauna with particular emphasis on Sage-Grouse. *Transactions of the North America Wildlife and Natural Resources Conference*, 67:337-349.

Briske, D., Derner, J., Milchunas, D., & Tate, K. (2011). An Evidence-Based Assessment of Prescribed Grazing Practices. In D. Briske, *Conservation Benefits of Rangeland Resources: Assessment, Recommendations, and Knowledge Gaps* (pp. 23-74). Washington, DC: USDA, National Resources Conservation Service.

Brockway, D., Gatewood, R., & Paris, R. (2002). *Restoring Grassland Savannas from Degraded Pinyon-Juniper Woodlands: Effects of Mechanical Overstory Reduction and Slash Treatment Alternatives.* Journal of Environmental Management, 64:179-197.

Bureau of Land Management (BLM). (2010). *Wild Horses and Burros Management Handbook, H-4700-1.* http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.PAR.11148.File.dat/H-4700-1.pdf.

Bureau of Land Management (BLM). (2013). *Nevada and Northeastern California Greater Sage-grouse Draft Land Use Plan Amendment and Environmental Impact Statement, Vol. 2, 3:452.* Bureau of Land Management.

Bureau of Land Management (BLM). (2014). *BLM Nevada Wild Horses and Burros Program.* Accessed: May 2014, http://www.blm.gov/nv/st/en/prog/wh_b.html.

Bureau of Land Management (BLM). (2014). *Rangeland Administration System.* U.S. Department of the Interior. http://www.blm.gov/landandresourcesreports/rptapp/menu.cfm?appCd=6.

Bureau of Land Management. (2005). *Wind Energy Final Programmatic Environmental Impact Statement.*

Bureau of Land Management. (2012). *Solar Energy Development in Six Southwestern States Final Programmatic Environmental Impact Statement.*

Bureau of Land Management. (2014). *Mary's River Oil and Gas Exploration Project Environmental Assessment.*

Burkhart, J., & Tisdale, E. (1976). *Causes of Juniper Invasion in Southwestern Idaho.* Ecology, 57:472-484.

Burton, T., Smith, S., & Cowley, E. (2011). *Riparian Area Management: Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation.* Denver, CO: Bureau of Land Management, National Operations Center.

Casazza, M., Coates, P., & Overton, C. (2011). Linking Habitat Selection and Brood Success in Greater Sage-grouse. In B. Sandercock, K. Martin, & G. Segelbacher, *Ecology, Conservation, and Management of Grouse. Studies in Avian Biology (no. 39)* (pp. 151-167). Berkeley, California: University of California Press.

Chambers, J. C., Roundy, B. A., Blank, R. R., Meyer, S. E., & Whittaker, A. (2007). What makes great basin Sagebrush ecosystems invasible by Bromus tectorum? . *Ecological Monographs*, 77(1):117-145.

Chambers, J., Pyke, D., Maestis, J., Pellant, M., Boyd, C., Campbell, S., . . . Wuenschel, A. (2014). *Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-grouse--A Strategic Multi-scale Approach.* Gen. Tech. Rep. RMRS-GTR326. Fort Collins, CO: U.S. Department of Agriculture, Forest Service Rocky Mountain Research Station.

Christiansen, T. (2009). *Fence Marking to Reduce Greater Sage-grouse Collisions and Mortality Near Farson, Wyoming--Summary of Interim Results.* Unpublished interim report. Wyoming Game and Fish Department.

Coates, P. S., Casazza, M. L., Blomberg, E. J., Gardner, S. C., Espinosa, S. P., Yee, J. L., . . . Halstead, a. B. (2013). . Evaluating greater sage-grouse seasonal space use relative to leks: implications for surface use designations in sagebrush ecosystems. *Journal of Wildlife Management* , 77: 1598–1609.

Coates, P., & Casazza, M. (In Prep (A)). Avoidance by greater sage-grouse of pinyon pine and juniper tree encroachment within sagebrush ecosystem.

Coates, P., & Casazza, M. (In prep (B)). Winter habitat selection of greater sage-grouse in the Bi-State DPS.

Coates, P., & Delehanty, D. (2008). *Effects of Environmental Factors on Incubation Patterns of Greater Sage-grouse.* Condor, 110:627-638.

Coates, P., & Delehanty, D. (2010). *Nest Predation of Greater Sage-grouse in Relation to Microhabitat Factors and Predators.* Journal of Wildlife Management, 74:240-248.

Coates, P., Casazza, M., Brusee, B., Ricca, M., Gustafson, B., Overton, C., . . . Delehanty, D. (2014). *Spatially Explicit Modeling of Greater Sage-grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management.* U.S. Geological Survey Open File Report 2014-1163, 84 p.

Coates, P., Connelly, J., & Delehanty, D. (2008). *Predators of Greater Sage-grouse Nests Identified by Video Monitoring.* Journal of Field Ornithology, 79:421-428.

Coates, P., Howe, K., Casazza, M., & Delehanty, D. (In Review.). *Common Raven Occurrence in Relation to Energy Transmission Line Corridors Transiting Human-Altered Sagebrush Steppe.*

Coates, P., Spencer Jr., J., & Delehanty, D. (2007). *Efficacy of CPTH-Treated Egg Baits for Removing Ravens.* Human-Wildlife Conflicts, 1(2):224-234.

Commons, M., Baydack, R., & Braun, C. (1999). Sage-grouse Response to Pinyon-Juniper Management. In S. Monsen, & R. Stevens, *Proceedings: ecology and management of pinyon-juniper communities within the Interior West.* U.S. Department of Agriculture, Forest Service, RMRS-P-9.

Connelly, J. W., Knick, S., Shroeder, M., & Stiver, S. J. (2004). *Conservation and Assessment of Greater Sage-grouse and Sagebrush Habitats.* Cheyenne, Wyoming: Western Association of Fish and Wildlife Agencies.

Connelly, J., Reese, K., & Schroeder, M. (2003). *Monitoring of Greater Sage-grouse Habitats and Populations.* Moscow, Idaho: College of Natural Resources Experiment Station, University of Idaho. Station Bulletin 80.

Connelly, J., Schroeder, M., Sands, A., & Braun, a. C. (2000). Guidelines to manage sage-grouse populations and their habitats. *Wildlife Society Bulletin* , 28:967-985.

Cote, I., & Sutherland, W. (1997). *The Effectiveness of Removing Predators to Protect Bird Populations.* Conservation Biology, 11(2):395-405.

Cottam, W., & Stewart, G. (1940). *Plant Succession as a Result of Grazing and Meadow Desiccation by Erosion Since Settlement in 1862.* Journal of Forestry, 38: 613-626.

Crawford, J., Olson, R., West, N., Mosley, J., Schroeder, M., Whitson, T., & Miller, R. (2004). *Ecology and Management of Sage-grouse and Sage-grouse Habitat.* Journal of Range Management. 57:2-19.

Davies, K., Bates, J., Svejcar, T., & Boyd, C. (2010). *Effects of Long-term Livestock Grazing on Fuel Characteristics in Rangelands: An Example from the Sagebrush Steppe.* Rangeland Ecology & Management. 63:662-669.

Davies, K., Boyde, C., Beck, J., Bates, J., Svejcar, T., & Gregg, J. (2011). *Saving the Sagebrush Sea: An Ecosystem Conservation Plan for Big Sagebrush.* Biological Conservation. 144:2573-2584.

Davies, K., Svejcar, T., & Boyd, C. (2009). *Interaction of Historical and Nonhistorical Disturbances Maintains Native Plant Communities.* Ecological Applications. 19:1536-1545.

Department of Conservation & Natural Resources. (2010). *State Natural Resource Assessment.* Nevada Division of Forestry.

Doherty, K., Naugle, D., Copeland, H., Pocewicz, A., & Kiesecker, J. (2011). Energy Development and Conservation Tradeoffs: Systematic Planning for Greater Sage-grouse. In J. Connelly, & S. Knick, *Greater Sage-grouse: Ecology of a Landscape, Species and Its Habitats.* Studies in Avian Biology Vol 38. Berkeley, CA: University of California Press, Cooper Onithological Society.

Doherty, K., Naugle, D., Walker, B., & Graham, J. (2008). *Greater Sage-grouse Winter Habitat Selection and Energy Development.* Journal of Wildlife Management, 72:187-195.

Duncan, P., Foose, T., Gordone, I., Gakahu, C., & Lloyd, M. (1990). *Comparative Nutrient Estraction from Forages by Grazing Bovids and Equids: A Test of the Nutritional Model of Equid/Bovid Completion and Coexistence.* Oecologia, 84:411-418.

Eberhardt, L., Majorowicz, A., & Wilcox, J. (1982). *Apparent Rate of Increase for Two Feral Horse Herds.* Journal of Wildlife Management, 46(2):367-374.

Ellis, K. (1985). *Effects of a new transmission line on distribution and aerial predation of breeding male sage grouse: Final report.*

Feist, J. (1971). *Behavior of Feral Horses in the Pryor Mountain Wild Horse Range.* Ann Arbor, MI: M.S. ThesisM.S. Thesis. University of Michigan.

Fire and Invasives Assessment Team. (2014). *Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment.* Unpublished BLM Report. To be available in the Nevada and

Northeastern California Greater Sage-Grouse Draft Land Use Plan Amendments and Final Environmental Impact Statement.

Freese, M. (2009). *Linking Greater Sage-grouse Habitat Use and Suitability Across Spatiotemporal Scales in Central Oregon.* Corvallis, OR: Masters Thesis. Oregon State University.

Ganskopp, D., & Vavra, M. (1986). *Habitat Use by Feral Horses in the Northeastern Sagebrush Steppe.* Journal of Range Management, 39:207-212.

Garrott, R., & Taylor, L. (1990). *Dynamics of a Feral Horse Population in Montana.* Journal of Wildlife Management, 54(4):603-612.

Garrott, R., Siniff, D., & Eberhardt, L. (1991). *Growth Rates of Feral Horse Populations.* Journal of Wildlife Management, 55(4):641-648.

Gedney, D., Azuma, D., Bolsinger, C., & McKay, N. (1999). *Western Juniper in Eastern Oregon.* Gen. Tech. Rep. NW-GTR-464. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.

Gelbard, J., & Belnap, J. (2003). *Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape.* Conservation Biology. 17:420-432.

Gibson, D., Blomberg, E., & Sedinger, J. (2013). *Dynamics of Greater Sage-grouse (Centrocercus urophasianus) Populations in Response to Transmission Lines in Central Nevada, Progress Report: Final, December 2013.*

Gregg, M., & Crawford, J. (2009). *Survival of Greater Sage-grouse Chicks and Broods in the Northern Great Basin.* Journal of Wildlife Management, 73:904-913.

Gregg, M., Crawford, M., Drut, M., & DeLong, A. (1994). *Vegetational Cover and Predation of Sage-grouse Nests in Oregon.* Journal of Wildlife Management, 58:162-166.

Gruell, G. E., & Swanson, S. (2013). *Nevada's changing wildlife habitat: an ecological history.* University of Nevada Press, 192 p.

Hagen, C. (2011). Predation of Greater Sage-grouse: Facts, Process, and Effects. In S. Knick, & J. Connelly, *Greater Sage-grouse: Ecology and Conservation of a Landscape Species and its Habitats.* Berkeley, CA: University of California Press, Studies in Avian Biology, Vol. 38.

Hagen, C., Connelly, J., & Schroeder, M. (2007). *A Meta-analysis for Greater Sage-grouse Nesting and Brood Rearing Habitats.* Wildlife Biology. 13 (Supplement 1):42-50.

Hanley, T., & Hanly, K. (1982). *Food Resource Partitioning by Sympatric Ungulates on Great Basin Rangeland.* Journal of Range Management, 35:152-158.

Hanser, S., & Knick, S. (2011). Greater Sage-grouse as an Umbrella Species for Shrubland Passerine Birds. In S. Knick, & J. Connelly, *Greater Sage-grouse: ecology and conservation of a landscape species*

and its habitats. (pp. 473-487). Studies in Avian Biology Vol: 38. Berkeley, CA: University of California Press.

Herrick, J., Van Zee, J., Havstad, K., Burkett, L., & Whitford, W. (2009). *Monitoring Manual for Grassland, Shrubland, and Savana Ecosystems, Volume II: Desigh, Supplementary Methods, and Interpretation.* Las Cruces, NM: Department of Agriculture, Agricultural Research Service, Jornada Experimental Range.

Herrick, J., Van Zee, J., Havstad, K., Burkett, L., & Whitford, W. (2009). *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I: Quick Start.* Las Cruces, NM: Department of Agriculture, Agricultural Research Service, Jornada Experiment Range.

Holloran, M. (2005). *Greater Sage-Grouse (Centrocercus urophasianus) population response to natural gas field development in western Wyoming.* Ph.D. dissertation, University of Wyoming, Laramie, WY.

Holloran, M., Kaiser, R., & Hubert, W. (2007). *Populations response of yearling Greater Sage-Grouse to the infrastructure of natural gas fields in southwestern Wyoming. Completion Report.* Laramie, WY: USDI Geological Survey.

Holmgren, B. (July 2, 2014). *Permitted Land Area.* Email to Allen Biaggi.

Howe, K., Coates, P., & Delehanty, D. (2014). *Selection of Anthropogenic Features and Vegetation Characteristics by Nesting Common Ravens in the Sagebrush Ecosystem.* Condor, 116(1):25-49.

Idaho Department of Fish and Game. (1998). *Sage Grouse: A Part of Idaho's High Desert Heritage. Upland Game Program*. Retrieved from http://www.blm.gov/pgdata/etc/medialib/blm/id/publications.Par.71018.File.dat/sage_grouse.pdf. Accessed: September 2014.

Johnson, D., Holloran, M., Connelly, J., Hanser, S., Amundson, C., & Knick, S. (2011). Influences of environmental and anthropogenic features on greater sage-grouse populations. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 407-450). Berkley, CA: University of California Press, Cooper Ornithological Union.

Johnson, G. (July 2, 2014). *Permitted Mining Acres.* Email to Allen Biaggi.

Kaiser, R. (2006). *Recruitment by Greater Sage-Grouse in association with natural gas development in Western Wyoming.* M.S. thesis, University of Wyoming, Laramie, WY.

Knapp, P., & Soule, P. (1988). *Recent Juniperus Occidentalis (Western Juniper) Expansion on a Protected Site in Central Oregon.* Global Change Biology. 4: 347-411.

Knick, S. S. (2013). Modeling ecological minimum requirements for distribution of greater sage-grouse leks: implications for population connectivity across their western range, U.S.A. Ecology and Evolution . *Ecology and Evolution*, 3(6):1539-1551.

Knick, S., & Hanser, S. (2011). Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 383-405). Berkeley, CA: University of California Press, Copper Ornithological Union.

Knight, R., & Kawashima, J. (1993). Responses of raven and red-tail hawk populations to linear right-of-ways. Journal of Wildlife Management . 57:266-271.

Knopf, F. (1996). Perspectives on Grazing Nongame Bird Habitats. In P. Krausman, *Rangeland Wildlife* (pp. 51-59). Denver, CO: Society for Rangeland Management.

Kolada, E., Sedinger, J., & Casazza, M. (2009). *Nest Site Selection by Greater Sage-grouse in Mono County, California.* Journal of Wildlife Managment. 73:1333-1340.

Kolada, E., Sedinger, J., & Casazza, M. (2009b). Ecological factors influencing nest survival of greater sage-grouse in Mono County, California. *Journal of Wildlife Management*, 73:1341-1347.

LeBeau, C. (2012). *Evaluation of Greater Sage-Grouse reproductive habitat and response to wind energy development in south-central, Wyoming .* Laramie, University of Wyoming, M.S. thesis.

lerjfoldskfsadf. (sdfsadf). *sdfads.* sdfsdf.

Littell, J. S., McKenzie, D., Peterson, D. L., & Westerling, A. L. (2009). Climate and wildfire area burned in the western U.S. ecoprovinces. *Ecological Applications*, 19(4): 1003-1021.

Lockyer, Z., Coates, P., Casazza, M., Espinosa, S., & Delehant, D. (In Review). Linking nest site selection to nest survival in greater sage-grouse.

Lockyer, Z., Coates, P., Casazza, M., Espinosa, S., & Delehanty, D. (2013). Greater Sage-grouse Nest Predators in the Virginia Mountains of Northwestern Nevada. *Journal of Fish and Wildlife Management.*, 4(2):242-254.

Lyon, A., & S.H., A. (2003). Potential gas development impacts on Sage Grouse nest initiation and movement. *Wildlife Society Bulletin* , 31:486-491.

Manier, D., Wood, D., Bowen, Z., Donovan, R., Holloran, M., Juliusson, L., . . . Titolo, A. (2013). *Summary of Science, Activities, Programs, and Policies that Influence the Rangewide Conservation of the Greater Sage-grouse (Centrocercus urophasianus).* U.S. Geological Survey Open File Report 2013-1098, 170 p.

Matek, B. (2014). *2014 Annual U.S. Global Geothermal Power Production Report.* Geothermal Energy Association.

Menard, C., Duncan, P., Fleurance, G., Georges, J., & Lila, M. (2002). *Comparative Foraging and Nutrition of Horse and Cattle in European Wetlands.* Journal of Applied Ecology, 39:120-133.

Miller, R., & Rose, J. (1995). *Historic Expansion of Juniperus Occidentalis (Western Juniper) in Southeaster Oregon.* Great Basin Naturalist, 55: 37-45.

Miller, R., & Rose, J. (1999). *Fire History and Western Juniper Encroachment in Sagebrush Steppe.* Journal of Range Management, 52: 550-559.

Miller, R., Bates, J., Svejcar, T., Pierson, F., & Eddleman, L. (2005). *Biology, Ecology, and Management of Western Juniper.* Oregon State University, Agricultural Experiment Station. Technical Bulletin 152. 77 p. .

Miller, R., Svejcar, T., & Rose, J. (2000). *Impacts of Western Juniper on Plant Community Composition and Structure.* Journal of Range Management, 53:574-585.

Miller, R., Tausch, R., McArthur, E., Johnson, D., & Sanderson, S. (2008). *Age Structure and Expansion of Pinyon-Juniper Woodlands: A Regional Perspective in the Intermountain West.* Research Paper RMRS-RP-69. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 15 p.

Mitchell, J., & Roberts, T. (1999). Distribution of Pinyon-Juniper in the Western United States. In S. Monsen, & R. Stevens, *Proceedings: ecology and management of pinyon-juniper communities within the Interior West.* (pp. 146-154). U.S. Department of Agriculture, Forest Service RMRS-P-9.

Murphy, T., Naugle, D. E., Eardley, R., Maestas, J., Griffiths, T., Pellant, M., & Stiver, S. (2013). Trial by Fire: Improving Our Ability to Reduce Wildfire Impacts to Sage-grouse and Sagebrush Ecosystems through Accelerated Partner Collaboration. *Rangelands* , 35(3):2-11.

Naiman, R., Decamps, H., & Pollock, M. (1992). *The Role of Riparian Corridors in Maintaining Regional Biodiversity.* Ecological Applications, 3:209-212.

Naugle, D., Doherty, K., Walker, B., Holloran, M., & Copeland, H. (2011). Energy development and Greater Sage-Grouse. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 489-504). Berkeley, CA: University of California Press, Cooper Ornithological Union.

Nevada Bureau of Mines and Geology. (2014). *The Nevada Mineral Industry 2012. Special Publication MI-2012.* Mackay School and Earth Sciences and Engineering, College of Science, University of Nevada, Reno.

Nevada Division of Minerals. (2014a, June 13). *Oil Production in Nevada by Producing Field 1954 to 2013 (In Barrels).* Retrieved from http://minerals.state.nv.us/forms/ogg/OilProdinNVbyProducingField1954-2013.pdf

Nevada Division of Minerals. (2014b, June 13). *Nevada Geothermal Resources and Production.* Retrieved from http://minerals.state.nv.us/ogg_nvgeorespro.htm

Nevada Governor's Sage-grouse Conservation Team. (2010). *Nevada energy and infrastructure development standards to conserve greater sage-grouse populations and their habitats. Pp 9-11.*

Nevada Mining Association . (2011). *Nevada Mining Industry: Summary of the Industry's Economic Impact in Nevada.* Retrieved from http://www.nevadamining.org/issues_policy/pdfs/NMA-Brief05-Economic%20Impact%20Summary.pdf.

Oakleaf, R. (1971). *The Relationship of Sage-grouse to Upland Meadows in Nevada.* Thesis. Reno, NV: University of Nevada.

Oregon Cattlemen's Association. (2014). *Oregon Resources Monitoring Guide: The Rancher's Guide to Improved Grazing.*

Patricelli, G., Blickley, J., & Hooper, S. (Fall 2013). *Recommended Management Strategies to Limit Anthropogenic Noise Impacts on Greater Sage-grouse in Wyoming.* Human Wildlife Interactions. 7(2):230-249.

Pellant, M. P. (2005). *Interpreting indicators of rangeland health, version 4.* Technical Reference 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center, Denver, CO. BLM/WO/ST-00/001+1734/REV05. 122 pp.

Pellegrini, S. (1971). *Home Range, Territoriality and Movement Patterns of Wild Horses in the Wassuk Range of Western Nevada.* M.S. Thesis. Reno, NV: University of Nevada.

Perryman, B., Bruce, L., Tueller, P., & Swanson, S. (2006). *Ranchers' Monitoring Guide.* Reno, NV: University of Nevada, Cooperative Extension. Educational Bulletin-06-04, 48pp., http://www.unce.unr.edu/publications/files/ag/2006/eb0604.pdf.

Peterson, E. (2010). *Implementing a Cooperative Permittee Monitoring Program.* University of Wyoming, Cooperative Extension Service, Sublette County Extension.

Public Utilities Commission of Nevada. (2014, June 13). *Rulemaking to address an emissions reduction and capacity replacement plan and other matter related thereto in accordance with Senate Bill 123. Docket No. 13-06023*. Retrieved from http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2010_THRU_PRESENT/2013-6/34768.pdf

Reed, F., Roath, R., & Bradford, D. (1999). *The Grazing Response Index: A Simple and Effective Method to Evaluate Grazing Impacts.* Rangelands. 21(4):3-6.

Rittenhouse, L., Johnson, D., & Borman, M. (1982). *A Study of Food Consumption Rates and Nutrition of Horses and Cattle.* Washington, DC: Bureau of Land Management.

Romme, W., Allen, C., Bailey, J., Baker, W., Bestelmeyer, B., Brown, P., . . . Weisberg, P. (2009). *Historical and Modern Disturbance Regimes, Stand Structures, and Landscape Dynamics in Pinyon-Juniper Vegetation of the Western United States.* Rangeland Ecology and Management, 62:208-222.

Sauer, J., Hines, J., Fallon, J., Pardieck, K., Ziolkowski Jr., D., & Link, W. (2014). *The North American Breeding Bird Survey, Results and Analysis 1966-2012, Version 02.19.2014.* USGS Patuxent Wildlife Research Center, U.S. Geological Survey, Laurel, MD. Retrieved April 2014, from http://www.mbr.pwrc.usgs.gov/bbs/bbs.html.

Schmelzer, L., Perryman, B., Bruce, B., Schultz, B., McAdoo, K., McCuin, G., . . . Conley, K. (2014). *Reducing Cheatgrass (Bromus tectorum L.) Fuel Loads Using Fall Cattle Grazing.* The Professional Animal Scientist. 30 (2014):270-278.

Schroeder, M., & Baydack, R. (2001). *Predation and the Management of Prairie Grouse.* Wildlife Society Bulletin, 29(1):24-32.

Shepherd, A. (2014). *Nevada Wild Hourse and Burro Program.* Presentation: Sagebrush Ecosystem Council.

State of Nevada. (2014). *Department of Taxation Annual Report Fiscal 2012 – 2013.* Retrieved from Website: http://tax.nv.gov/uploadedFiles/taxnvgov/Content/TaxLibrary/AnnualReport_FY13_final.pdf

Stevens, B. (2011). *Impacts of Fences on Greater Sage-grouse in Idaho: Collision, Mitigation, and Spatial Ecology.* Thesis. Moscow, ID: University of Idaho.

Stevens, B., Reese, K., Connelly, J., & Musil, D. (2012). Greater Sage-Grouse and Fences: Does Marking Reduce Collisions? *Wildlife Society Bulletin* , 36(2):297–303 .

Stiver, S. (September 19, 2014). *Telephone conversation with M. Faigeles.*

Stiver, S., Rinks, E., & Naugle, D. (2010). *Sage-grouse Habitat Assessment Framework.* Boise, ID: U.S. Bureau of Land Management, Idaho State Office.

Stoddart, L., Smith, A., & Box, T. (1975). *Range Management.* New York, NY: McGraw-Hill.

Svejcar, T., Boyd, C., Davies, K., Madsen, M., Bates, J., & Sheley, R. (2014). *Western Land Managers Will Need All Available Tools for Adapting to Climate Change, Including Grazing: A Critique of Beschta et al.* Environmental Managment. 53(6):1035-8.

Swanson, S., Bruce, B., Cleary, R., Dragt, B., Brackley, G., Fults, G., . . . Wilson, D. (2006). *Nevada Rangeland Monitoring Handbook, 2nd. Edition.* University of Nevada, Cooperative Extension; Natural Resources Conservation Service; Bureau of Land Management; U.S. Forest Service. Educational Bulletin 06-03; https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf.

Swanson, S., Wyman, S., & Evans, C. (In Press). *Practical Grazing Management to Meet Riparian Objectives.* Journal of Rangeland Applications.

Symanski, R. (1994). *Contested Realities: Feral Horses in Outback Australia.* Annals of the Association of American Geographers, 84:251-269.

Tausch, R., & West, N. (1988). *Differential Establishment of Pinyon and Juniper Following Fire.* American Midland Naturalist, 119: 174-184.

Tausch, R., & West, N. (1995). Plan Species Composition Patterns with Differences in Tree Dominance on a Southwestern Utah Pinyon-Juniper Site. In D. Shaw, E. Aldon, C. LoSapio, & tech. coords., *Desired future conditions for pinyon-juniper ecosystems 1994, August 8-12. Flagstaff, AZ. Gen. Tech. Rep. RM GTR-258* (pp. 16-23). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 16-23.

Tausch, R., West, N., & Nabi, A. (1981). *Tree Age and Dominance Patterns in Great Basin Pinyon-Juniper Woodlands.* Journal of Range Management, 34: 259-264.

Taylor, R., Walker, B., Naugle, D., & Mills, L. (2012). Managing multiple vital rates to maximize sage-grouse population growth. *The Journal of Wildlife Management* , 76(2): 336-347.

Toevs, G., Karl, J., Taylor, J., Spurrier, C., Karl, M., Bobo, M., & Herrick, J. (2011). *Consistent Indicators and Methods and a Scalable Sample Design to Meet Assessment, Inventory, and Monitoring Needs Across Scales.* Rangelands: 14-20.

Toevs, G., Taylor, J., Spurrier, C., MacKinnon, W., & Bobo, M. (2012). *Assessment, Inventory, and Monitoring Strategy: For Integrated Renewable Resources Management.* Denver, CO: Department of the Interior, Bureau of Land Management, National Operations Center.

U.S. Department of Agriculture (USDA). (1996). *Rangeland Analysis and Management Training Guide.* Denver, CO: Forest Service, Rocky Mountain Region.

U.S. Department of Agriculture (USDA). (2007). *Resource Implementation Protocol for Rapid Assessment Matrices.* Forest Service, Humboldt Toiyabe National Forest.

U.S. Department of Energy. (2007). *The History and Current Conditions of the Greater Sage Grouse in Regions with Energy Development.* Retrieved from http://bogc.dnrc.mt.gov/PDF/Final%20Greater%20Sage%20Grouse%20White%20Paper3-15-07%20(2).pdf. Accessed: September 2014

U.S. Fish and Wildlife Service. (2010). *Endangered and threatened wildlife and plants, 12-month findings for petitions to list the Greater Sage-Grouse (Centrocercus urophasianus) as threatened or endangered.* Washington, D.C., FWS–R6–ES–2010–0018, Federal Register, v. 75, no. 55 (March 23, 2010), 107 p.

U.S. Fish and Wildlife Service. (2013). *Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report.* U.S. Fish and Wildlife Service: Denver, CO. February 2013.

Wagner, F. (1983). *Status of Wild Horse and Burro Management on Public Rangelands.* Transactions of the North American Wildlife and Natural Resources Conference, 48:116-133.

Walker, B., & Naugle, D. (2011). West Nile Virus Ecology in Sagebrush Habitat and Impacts on Greater Sage-grouse Populations. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 126-141). Berkeley, CA: University of California Press, Cooper Ornithological Union.

Walker, B., Naugle, D., & Doherty, K. (2007). Greater Sage-Grouse population response to energy development and habitat loss. *Journal of Wildlife Management*, 71:2644–2654.

Webb, C., Boarman, W., & Rotenberry, J. (2004). *Common Raven Juvenile Survival in a Human-Augmented Landscape.* Condor, 106:517-528.

Whitehurst, W., & Marlowe, C. (2013). *Forb Nutrient Density for Sage-grouse Broods in Mountain Big Sagebrush Communities.* Montana: Rangelands.35:18-25.

Williams, B., Szaro, R., & Shapiro, C. (2009). *Adaptive Management: The U.S. Department of the Interior Technical Guide.* Washington, DC: Department of the Interior, Adaptive Management Working Group.

Wisdom, M., & Chambers, J. (2009). *A Landscape Approach for Ecologically Based Management of Great Basin Shrublands.* Restoration Ecology.17:740-749.

Wolfe, M. (1980). *Feral Horse Demography: A Preliminary Report.* Journal of Range Management, 33(5):354-360.

Wolfe, M., Ellis, L., & MacMullin, R. (1989). *Reproductive Rates of Feral Horses and Burros.* Journal of Wildlife Management, 53(4):916-919.

Wyman, S., Bailey, D., Borman, M., Cote, S., Eisner, J., Elmore, W., . . . Winward, A. (2006). *Riparian Area Management: Grazing Management Processes and Strategies for Riparian-Wetland Areas.* Denver, CO: BLM, Bureau of Land Management, National Science and Technology Center.

Zou, L., Miller, S., & Schmidtmann, E. (2006). Mosquito Larval Habitat Mapping Using Remote Sensing and GIS: Implications of Coalbed Methane Development and West Nile Virus. *Journal of Medical Entomology* , 43:1034-1041.

EIS showed most of Nevada's wind power classification rated as poor to fair, with only small pockets classified as good to outstanding (BLM 2005). Some of those pockets however, overlap with sage-grouse habitat. Currently there is one wind generation facility in Nevada, the Spring Valley Wind Project; an approximately 150 MW facility located approximately 30 miles east of Ely, NV.

The BLM, as part of a Programmatic EIS for Solar Energy Development, developed Solar Energy Zones (SEZ), defined as areas well suited for utility scale production of solar energy. Five SEZs were identified for Nevada; all located in Clark, southern Nye, and Lincoln counties, outside the range of sage-grouse (BLM 2012). There are currently no solar energy rights of ways within sage-grouse habitat in Nevada (BLM 2013).

There is currently no significant commercial conifer biomass energy economy in Nevada (BLM 2013); however considering that pinyon-juniper expansion is one of the major threats facing sage-grouse in Nevada, the SEP encourages exploring and incentivizing biomass energy development in the State.

Renewable energy development can negatively impact sage-grouse both directly and indirectly through various mechanisms. Impacts to sage-grouse from geothermal energy development have not been assessed in the scientific literature because the development has been too recent to identify immediate and lag effects (Knick et al 2011). There are currently no commercial solar projects operating in sage-grouse habitats at this time, so the impacts cannot be assessed. There has been one study on the effects on sage-grouse from wind energy developments recently completed in south-central Wyoming, which demonstrated that the relative probabilities of sage-grouse nest and brood success decreased with proximity to wind turbines (LeBeau 2012). Wind energy generation also requires tall structures, which can provide artificial nesting and perching substrate for sage-grouse predators (Knight and Kawashima 1993). Renewable energy development requires many of the same features for construction and operation as non-renewable energy, so it is anticipated that the potential impacts

from direct habitat loss, habitat fragmentation through roads and power lines, noise, and increased human presence would most likely be similar to those for non-renewable energy production (USFWS 2010).

Infrastructure

Infrastructure, whether related to energy production, mining, or any other purpose, can adversely impact sage-grouse. Infrastructure can result in habitat loss and fragmentation as well as sage-grouse avoidance of otherwise suitable habitat. In addition, infrastructure can provide a source for the spread of invasive species and provide artificial subsidies for predators (USFWS 2013). Infrastructure most common in Nevada includes transmission lines, distribution lines and roads. Other types of infrastructure may also include, but is not limited to, pipelines, communication towers, and fences.

Transmission and distribution lines (hereafter collectively referred to as power lines) are necessary for transmitting energy from power production facilities and distributing that power to homes and businesses. Power lines may directly impact sage-grouse through habitat loss and fragmentation (Knick et al 2013), as well as direct mortality due to collisions (Beck et al 2006). Indirect habitat loss due to avoidance of vertical structures, presumably due to increases in predator populations is also a concern (Manier 2013). Power lines have been shown to decrease male lek attendance (Ellis 1985) and probability of lek persistence (Walker et al 2007), as well as causing avoidance behavior of brood-rearing habitat (LeBeau 2012). Power lines have been shown to increase predator distributions and hunting efficiency resulting in increased predation on sage-grouse (Connelly et al 2004). Preliminary results from a ten-year study on the impacts of the Falcon-Gonder transmission line on sage-grouse population dynamics in Eureka County, Nevada show a significant negative effect of the transmission line on nest success and female survival, weak negative effect on male survival, and no support for impacts on nest site selection and female nesting propensity (Gibson et al 2013). Nest

success and female survival, along with chick survival, are the demographic rates that have been shown to be important for population growth (Taylor et al 2012).

Roads are widespread through the sage-grouse range and can impact sage-grouse through a variety of mechanisms. A study along I-80 in Wyoming and Utah between 1970 and 2003 found no leks within 1.25 miles of the interstate, and fewer birds on leks within 4.7 miles of the interstate, than further distances (Connelly et al 2004). Roads can negatively impact sage-grouse through direct mortality due to vehicle collision, decreased male lek attendance due to increased traffic (Holloran 2005), avoidance behavior (Lyon and Anderson 2003, LeBeau 2012), and reduced nest initiation rates (Lyon and Anderson 2003). Roads can also facilitate the spread of invasive species (Gelbard and Belnap 2003).

Goals, Objectives, and Management Actions

Goal 1: Manage anthropogenic disturbance development in a manner that provides for the long-term conservation of sage-grouse and their habitat, while balancing the need for continued development of the resources.

Objective 1.1: Achieve no net unmitigated loss of sage-grouse habitat due to new anthropogenic disturbances and any associated facilities and infrastructure within the Sage-Grouse Management Area (SGMA) in order to maintain stable or increasing sage-grouse populations.

Management Action 1.1.1: All new proposed anthropogenic disturbances within the SGMA will trigger timely SETT Consultation for application of the "avoid, minimize, mitigate" process (see Section 3.0). This will serve as a centralized impact assessment process that provides consistent evaluation, reconciliation and guidance for project development.

Management Action 1.1.2: Avoid new anthropogenic disturbance activities and its associated facilities and infrastructure within the SGMA. Locate activities, facilities, and infrastructure in non-habitat wherever possible. Avoidance of a disturbance within sage-grouse habitat is the preferred option. If avoidance cannot be reasonably accomplished, the project proponent must demonstrate why it cannot be reasonably accomplished in order for the SETT to consider minimization and mitigation alternatives. The process to demonstrate that avoidance cannot be reasonably accomplished (the "avoid process") is determined by the four management categories. (See Table 3-1 for more details on the avoid process.) If development cannot be sited in non-habitat, it should occur in the least suitable habitat.

Management Action 1.1.3: If adverse impacts to sage-grouse and their habitat cannot be avoided, require project proponents to minimize impacts by employing Site Specific Consultation-Based Design Features (Design Features; see Appendix A) appropriate for the project. This may include seasonal operational restrictions, noise restrictions, clustering disturbances, and placing infrastructure in previously disturbed locations.

Management Action 1.1.4: Technically evaluate and where reliability is not adversely impacted, seek to site new linear features in existing corridors (Figure 11) or, at a minimum, co-locate with existing linear features in Core, Priority, and General Management Areas.

Management Action 1.1.5: Reduce and eliminate artificial hunting perches and nesting substrate for aerial predators. This can be achieved by installing anti-nesting and anti-perching devices on new power lines (see Section 7.3) or burying power lines. Bury distribution power lines of up to 35kV where ground

disturbance can be minimized, and where technically and economically feasible. Where technology and economic factors allow, bury higher kV power lines (see Appendix A). Sage-grouse habitat objectives (see Section 4.0) will be incorporated when reclaiming the site.

Management Action 1.1.6: Encourage continued research in the development of more effective perching and nesting deterrent options (see Section 7.3).

Management Action 1.1.7: Aggressively engage in rehabilitation/weed control efforts during pre- and post-project construction.

Management Action 1.1.8: If impacts from anthropogenic disturbances cannot be avoided and after minimization options have been exhausted, residual adverse impacts are required to be offset through compensatory mitigation. Mitigation obligations will be determined through the Conservation Credit System (see Section 8.0).

Objective 1.2: Explore options to minimize impacts from existing and abandoned anthropogenic disturbances and associated infrastructure.

Management Action 1.2.1: While SETT Consultation and the "avoid, minimize, mitigate" process do not apply retroactively to existing anthropogenic disturbances, encourage existing operators to incorporate the Design Features outlined in Appendix A and contact the SETT for timely input on techniques and practices to avoid and minimize existing impacts to sage-grouse and their habitat.

Management Action 1.2.2: Inventory abandoned mine sites within sage-grouse habitat and, where practical, reclaim sites to meet sage-grouse habitat objectives (see Section 4.0). Coordinate with the Abandoned Mine Lands Program on this effort.

Management Action 1.2.3: Work with the energy industry to explore opportunities to install anti-nesting and anti-perching devices on existing power lines and tall structures and to bury existing power lines where technology and economic factors allow.

Management Action 1.2.4: Inventory power lines and utility structures that are no longer in use and look for opportunities to decommission the lines and reclaim the sites to meet sage-grouse habitat objectives (see Section 4.0).

7.7 Recreation & Off-Highway Vehicle Activities

Nevada offers some of the most robust recreational and off-highway vehicle experiences in the nation due, in large part, to its high percentage of accessible federally managed public lands. Recreation, in all of its forms, creates a significant benefit to local and statewide economies. Extensive networks of roads and trails offer recreationists excellent access to most of Nevada's expansive basin and range high desert ecosystems. This extensivity of roads and trails may also create impacts on sagebrush habitats and sage-grouse that may be difficult to measure.

While recreational and off-highway vehicle use is one of the many acceptable multiple-uses on our federal public lands, it also requires frequently reviewed and updated policies that allow for greater adaptive management. This may assist in ongoing efforts to protect and preserve sensitive land forms, plants, and animals from levels or types of disturbance that create unnatural or unduly negative impacts. Potential impacts on sage-grouse and their habitat associated with recreational activities include but are not limited to: increases in noise levels, distribution of invasive plants, generation of fugitive dust, and effects on predator prey relationships (Manier 2013).

In Nevada, the recent creation of the Commission on Off-Highway Vehicles provides a mechanism and a funding source to educate users on how to responsibly use off-highway vehicles. Educational efforts will focus on minimizing adverse effects due to uses in or near sage-grouse habitats during certain seasons and times of day . It may also provide a funding source to allow the State to join with the federal agencies to better plan, develop, and manage a coordinated and designated system of off-road vehicle trails in Nevada. The off-highway vehicle registration system allows state law enforcement personnel to access vehicle registration information and identify vehicle titleholders in instances where state or federal laws pertaining to off-road access or use are violated.

Conservation Goals, Objectives, and Management Actions

Goal 1: Conserve sage-grouse and their habitat while allowing for continued recreational access to public lands.

Objective 1.1: Avoid or minimize recreation and OHV negative direct and indirect impacts to sage-grouse and their habitats and monitor sites for potential impacts.

Management Action 1.1.1: Establish appropriate ambient noise levels for undisturbed sage-grouse leks. Noise restrictions should generally apply between the hours of 6:00 p.m. to 9:00 a.m. as these are the hours most critical for communications of sage-grouse and auditory detection of predators (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

Management Action 1.1.2: Take measures to minimize or reduce activities and to avoid an ambient noise level increase >10 dB at the edge of leks during the lekking season generally, March 1 through May 15 from one hour before sunrise until 9:00 a.m.

Management Action 1.1.3: Assist in efforts to enhance collaborative monitoring through volunteer organizations, recreational groups, etc., to collect data that would assist in the protection, enhancement, or restoration of sage-grouse habitat.

Management Action 1.1.4: Support studies that further the understanding of the relationship between recreational uses and their potential impacts on sage-grouse.

Management Action 1.1.5: Utilize sage-grouse habitat mapping to inform state and federal recreation management plans

Management Action 1.1.6: Where feasible locate recreation trails strategically to create or augment fuel breaks in the margins of sage-grouse habitats and landscapes and not create roads or trails where they cause net negative direct and indirect impacts.

Objective 1.2: Support and implement efforts to reduce the potential for additional sage-grouse habitat fragmentation from unauthorized 'trail making'.

Management Action 1.2.1: Support and promote efforts by state, local, and federal agencies and recreational groups to promote educational campaigns that encourage responsible OHV and recreation activities that avoid or minimize negative impacts to sage-grouse and their habitat, including the spread of invasive species.

Management Action 1.2.2: Work with state, local, and federal agencies and recreational groups to inventory unauthorized trails in Core, Priority, and General Management Areas and where feasible restore trails to meet sage-grouse habitat objectives (see Table 4-1).

Objective 1.3: Promote the leveraging of funding from all sources when addressing sage-grouse habitat enhancement, restoration, or preservation projects.

Management Action 1.3.1: Develop a database to share with interested agencies and groups to maximize efforts and leverage funding.

Management *Action 1.3.2:* Encourage and support the Commission on Off-Highway Vehicles to expend OHV registration funds to enhance, restore, or protect sage-grouse habitat.

8.0 CONSERVATION CREDIT SYSTEM

The Nevada Conservation Credit System (CCS)[4] is a pro-active solution that provides net conservation benefits for sage-grouse, while balancing the need for continued human activities vital to the Nevada economy and way of life. The CCS creates new incentives for private landowners and public land managers to preserve, enhance, restore, and reduce impacts to important habitat for the species.

The CCS is a market-based mechanism that quantifies conservation outcomes (credits) and impacts from new anthropogenic disturbances (debits), defines standards for market transactions, and reports the overall progress from implementation of conservation actions throughout the sage-grouse range within Nevada. The CCS establishes the policy, operations, and tools necessary to facilitate effective and efficient conservation investments. The CCS is intended to provide regulatory certainty for industries by addressing compensatory mitigation needs whether or not the species is listed under the ESA.

Goal and Scope

The goal of the CCS is to achieve no net unmitigated loss of sage-grouse habitat due to new anthropogenic disturbances within the Sage-grouse Management Area (SGMA; Figure 2), in order to stop the decline of sage-grouse populations. Proposed anthropogenic disturbances, as defined in Section 3.0 of this plan, must seek to avoid, minimize, and mitigate impacts to sage-grouse habitat. After all practicable economically and technically feasible possibilities to avoid and minimize impacts to sage-grouse habitat have been exhausted, residual adverse impacts are required to be offset by mitigation requirements as determined through the CCS.

Anthropogenic disturbances occurring on BLM and USFS lands within the SGMA require

[4] For more information please refer to *The Nevada Conservation Credit System Manual* on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

timely consultation with the SETT. Private landowners are not required to mitigate anthropogenic disturbances on their land, but are welcome to voluntarily generate, sell, or purchase credits in the CCS. The CCS scope can be expanded in the future to support additional conservation needs or to include other states within the sage-grouse range.

Roles and Responsibilities

The *DCNR Division of State Lands*, holds ultimate authority over CCS design, operations, and management. The *SEC* oversees CCS operations and approves changes to the program. *The Administrator* manages the CCS's day-to-day operations, ongoing program improvements, facilitates transactions, and reports programmatic results. CCS operations are also informed by *Resource Managers* (e.g. BLM, NDOW, USFS, USFWS) and by a *Science Committee* to ensure it functions according to current laws, policies, and regulations and is consistent with the best available science.

Credit Developers are landowners, land managers, organizations, or agencies, that generate, register, or sell credits in the CCS. *Credit Buyers* are entities that purchase mitigation credits to offset impacts from new anthropogenic disturbances or to meet other conservation objectives.

What are Credits and Debits?

Credits are the currency of the CCS. A credit represents a verified *"functional acre"* that meets the durability criteria defined by the CCS, such as committing to a Customized Management Plan that outlines actions to maintain habitat performance and to limit risks from future impact for the duration of the project. A functional acre is based on habitat quality ("function") relative to optimal conditions, and quantity (acres). This is determined through the Habitat Quantification Tool (HQT; see below).

Debits are similar to credits, but are the quantified and verified units of functional acres lost due to a new anthropogenic disturbance.

Generating and Purchasing Credits

The steps for generating and purchasing credits are depicted below. Blue chevrons signify the steps undertaken to generate credits and green chevrons represent the purchase of credits.

Calculating Credits and Debits

Habitat Quantification Tool (HQT)[5]

The HQT is a method to estimate habitat quality and quantify debits and credits. The HQT uses a set of metrics, applied at multiple spatial scales, to evaluate vegetation and environmental conditions related to sage-grouse habitat quality and quantity. The HQT enables the CCS to create incentives to generate credits in the most beneficial locations for the sage-grouse, and to minimize impacts to existing high quality habitat.

The HQT is used to calculate scores for each type of seasonal habitat. Habitat condition is expressed in functional acres, relative to optimal conditions. The functional acre score is adjusted to account for indirect effects of the local area surrounding the site. Mitigation ratios are then applied.

Mitigation Ratios

Mitigation ratios incorporate biologically significant factors that cannot currently be incorporated into the HQT. They enable offset transactions to achieve a net benefit for the species by ensuring the functional acres of credit acquired is greater than the functional acres of debit. The mitigation ratios create incentives for avoidance of impacts and preservation, enhancement, and restoration of habitat in important areas. This includes avoiding and protecting seasonal habitats that are scarce for a particular population. Mitigation ratios are determined by the:

[5] For more information please refer to *The Habitat Quantification Tool Scientific Methods Document* on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/

- Habitat Importance Factor: The value is influenced by the location of a credit or debit site in Core, Priority, or General Management Areas (Figure 4)
- Seasonal Habitat Scarcity Factor: This is determined by the portion of seasonal habitat type (nesting, late-brood rearing, and winter) impacted.

Debits are adjusted based on proximity to potential credit sites (Proximity Factor) to determine the credit obligation that must be purchased to offset a debit project. Credit obligation increases if the credits purchased are located outside the same population as the debits. This incentivizes mitigation in close proximity to debit sites.

Regulatory Assurances

Verification

Credit and debit projects require verification to ensure that calculations represent a true and accurate account of on-the-ground implementation and habitat function and assurances that projects are maintained over time. *Third-party Verifiers*, trained and certified by the Administrator, conduct independent checks using the HQT methods. *Credit Verification* is required before credit release and every fifth year. *Debit Verification* is required before the project begins, during project implementation, and when debits end or decrease. Periodic spot checks and audits are also required.

Reserve Account

The *Reserve Account* is a pool of credits, functioning like an insurance fund, that replace credits that are invalidated due to a force majeure event, mismanagement, or competing land uses. A percentage of credits from each credit transaction are deposited into the reserve account. Factors that determine the Reserve Account contribution are: base contribution, probability of wildfire, and probability of competing land uses. In the case of unintentional credit reversal due to force majeure or competing land use events, the Administrator withdraws credits from the reserve

account to cover the invalidated credits at no cost to the Credit Developer for a limited duration until the original credits are replaced.

Additionality and Stacking of Multiple Payments

Projects that generate credits must be additional to activities that would occur in the absence of the CCS. On private and public lands, a credit project is additional if the land manager is not already performing or planning to perform conservation actions using funding sources other than the CCS. *Stacking* allows a Credit Developer to receive multiple payments for conservation actions on the same area of land, but only receive credit for the additional conservation benefits.

Durability

The CCS uses *performance assurances* on private and public lands to ensure the durability of credits generated throughout the life of the credit project. Performance assurances are implemented through contract terms and financial instruments. The *durability of projects on public lands* is safeguarded using land protection mechanisms (e.g. right-of-ways), financial instruments (e.g. contract performance bonds) and the Reserve Account.

Additional Policy Considerations

The *Service Area*, the area in which credits can be exchanged, for the CCS is the SGMA.

Baseline is the starting point from which credits and debits are measured. Credits and debits represent the change from baseline that results from implementing a project. *Credit baseline* is a state-wide standard for each seasonal habitat type equivalent to the average habitat functionality. Project sites must be at the credit baseline, at a minimum to begin generating credits. *Debit baseline* is the pre-project habitat function value for each seasonal habitat type for a proposed debit project.

Credit release occurs when performance criteria milestones which increase habitat function are achieved on a credit site. Specific performance criteria are defined in each project's *Customized Management Plan*. Credit release can occur in single or multiple

increments depending on credit project type; including: *preservation projects*, *enhancement projects*, and *restoration projects*.

The CCS requires that the *project life* of a credit project must be equal to or greater than the duration of the impacts of the debit project it is offsetting.

Credit variability may occur due to annual climatic or other natural conditions affecting habitat functionality. As a result, a *tolerance threshold* of above or below 10% habitat function is applied.

9.0 MONITORING AND ADAPTIVE MANAGEMENT

Monitoring and adaptive management are key components of successful resource management plans in order to derive the greatest environmental benefit given limited agency resources. Incorporation of these strategies in the planning process will help ensure management actions identified in this State Plan are implemented and effective at achieving the intended goals and objectives for the benefit of sage-grouse. Adaptive management allows for information learned through monitoring to be integrated into iterative decision making that can be adjusted as outcomes from management actions become better understood (Williams et al. 2009). Management that does not achieve intended goals and objectives can be modified through adaptive management and contribute to the emerging understanding of management action response, sage-grouse habitat requirements, sage-grouse behavior, and sagebrush ecosystem processes.

Monitoring

Two main categories of monitoring will occur for the State Plan: 1) inventory monitoring and 2) management action monitoring. These are described below. Within each of these categories, additional concepts will need to be considered: short and long-term monitoring, monitoring at multiple scales (e.g., site, landscape) (Swanson et al. 2006), and, for management action monitoring, monitoring for implementation and for effectiveness.

Inventory monitoring assesses the status/extent/condition of sage-grouse populations (e.g., sage-grouse population trends over time), sage-grouse habitat (e.g., gain/loss of sage-grouse habitat over time), and of the threats to sage-grouse (as identified in the State Plan, e.g., how many acres of PJ encroachment are occurring each year). Inventory monitoring provides a quantified understanding of changes in condition and extent of sage-grouse populations, habitat, and threats over time and space, can help prioritize efforts, and can help evaluate success in meeting short and long-term goals and objectives. Many of the state and federal agencies already provide a level of

inventory monitoring appropriate for the needs of the state plan and this will be incorporated into the state's monitoring plan- more detail is provided below.

This State Plan identified many management actions to address specific threats. Monitoring of management actions is necessary to ensure that individual actions are accomplishing what they are intended to do. The state will require that monitoring plans be developed for all management actions that occur under direction of the State Plan, including those intended to ameliorate threats outlined in Section 7.0. These plans will include monitoring for implementation and monitoring for effectiveness. Monitoring associated with the Conservation Credit System (see Section 8.0) is detailed in the Habitat Quantification Tool Scientific Methods Document[6] {currently under development}.

Management Action monitoring for implementation includes: 1) a brief description of the project and the work completed, 2) pre- and post-project photographs, 3) short term monitoring of weather (especially precipitation and when it occurs) and other events (e.g., fire, floods, insects, infestations, etc.) and on-going management (e.g., season of livestock use or livestock, horse, and wildlife population levels) (Swanson et al. 2006), 4) lessons learned during implementation, 5) discussion of impacts to uses and other resources, 6) recommendations on the implementation of future projects, 7) maintenance performed, and 8) accounting of expenditures.

Management Action monitoring for effectiveness can play a key role in demonstrating the accountability, success, and value of management investments. Effectiveness monitoring is designed to determine if the project is effective at meeting its biological and ecological goals and objectives. Project-scale effectiveness monitoring measures environmental parameters to ascertain whether management actions were effective in creating the desired change(s) in habitat conditions and species response. There are at

[6] For more information please refer to The Habitat Quantification Tool Scientific Methods Document on the Sagebrush Ecosystem Program's Website: http://sagebrusheco.nv.gov/CCS/ConservationCreditSystem/[7] Scale of Management Action Monitoring is dependent on management action details specified in Section 7.0

least three important reasons to conduct project-scale effectiveness monitoring on a management action or a change in management: 1) to determine the biotic and abiotic changes resulting on, and adjacent to, the treatment area; 2) to determine if treatment and management actions were effective in meeting the objective(s); and 3) to learn from the management actions and to incorporate new knowledge in future treatment design.

The following concepts should be addressed in all monitoring plans:

- Identify the site conditions and the reasons for implementing management action(s) at the site.
- Set monitoring objectives and indicators – these should quantitatively or qualitatively evaluate the project objectives that will be used to evaluate project implementation and effectiveness in meeting objectives. Effectiveness in meeting objectives will need to be evaluated for both habitat changes and when appropriate and feasible, sage-grouse response.
- Identify anticipated site attribute changes in response to the management action, target values, and time frame under which changes are anticipated. Swanson et al. (2006) explain characteristics of useful and effective resource objectives (**S**pecific, **M**easureable, **A**chievable, **R**elevant, and **T**rackable).
- Select monitoring sites and determine appropriate, effective methods. Include control or reference sites in method design. Baseline data on these will allow before, after, with, and without comparisons.
- Monitoring will be conducted for a minimum of three years or until management objects are met. If, as part of the treatment, grazing was restricted for a time period, post-treatment, monitoring should be conducted for three year following resumption of grazing practices. In addition, monitoring will be conducted at 10 years post-treatment as a follow-up for long-term monitoring.

- Any monitoring plans will be prepared jointly between a project proponent, relevant stakeholders (such as permittees), and land management agency, with final approval from the land management agency.

See resources listed at end of this section for development on monitoring plans.

Adaptive Management

Adaptive management as it relates to sage-grouse and their habitat is a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reduce uncertainty over time through continued monitoring. Because adaptive management is based on a learning system, it improves long term management outcomes. The challenge in using the adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcomes based on current knowledge (Allan and Stankey 2009).

> "An adaptive management approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions" (Williams et al. 2009).

Adaptive management takes monitoring to the next level by establishing, prior to implementation, a framework from which an iterative implementation and learning process can be instituted. Adaptive management implements "learning by doing" and provides flexibility to act in the face of uncertainty.

The following are additional steps to monitoring that need to be addressed to successfully implement adaptive management (Adapted from Williams et al. 2009):

- Identify and record potential drivers of change in the system, threats to the system, and opportunities for beneficial actions. These should be incorporated in the model of response for each management action.
- Development of "models" or hypotheses of the expected response and rationale.
- Development of how management actions should be adjusted following results from monitoring (this should include a set of potential alternatives to management based on the outcome of specific monitoring, allowing for flexibility while based on best available science).
- Implementation of iterative adjustments to management actions following implementation of actions and results of monitoring, following the process outlined in previous bullet.
- Project and management plans should incorporate the ability to change methods when monitoring of the projects or management actions indicate or when new science from research or other monitoring project emerges.

Consideration of when adaptive management is appropriate:

- Decision making must be able to be made in an iterative process
- Monitoring data must be available to decision makers
- It is not appropriate when risks associated with learning based-decision making are too high (i.e., if risk of management action is unknown and worst case scenario has irreversible consequences) in comparison to the risks of not doing so (i.e., the consequences of doing nothing).

See resources listed at end of this section for development on adaptive management plans.

Incorporation of Monitoring and Adaptive Management into the State Plan

A multi-scale monitoring approach is necessary as sage-grouse are a landscape species and conservation is scale dependent to the extent that management actions are

implemented within or across seasonal habitats to benefit populations. The state should track the extent of threats to sage-grouse (e.g., fire, pinyon-juniper encroachment, etc.), through inventory monitoring, as well as the efforts to manage the threats (e.g., number of acres of pinyon-juniper treated), through management action monitoring to promote effective species management and understand whether the state is making progress towards the goals and objectives outlined in this plan. Many of the components of inventory monitoring are already being monitored by state and federal agencies. The SETT will work to compile annual monitoring reports that provide a synopsis of these monitoring efforts and metrics relevant to the state plans goals and objectives. The state will engage with stakeholders responsible for these components to facilitate when possible and ensure monitoring occurs. For components that are not currently under the purview of other state and federal agencies, the SETT will work to engage relevant stakeholders to develop a monitoring program. The SETT will develop a comprehensive database to store all monitoring information which will be accessible to the public.

To meet the need for the management action monitoring requirement, all management actions overseen by the SEP will develop monitoring plans following guidance provided in this section. If participating in projects developed by BLM/USFS, NDOW, NDA, NDF, or other agencies, projects should include similar aspects to those outlined here, if not all. As well, all management actions should be reviewed and those appropriate for the adaptive management process should additionally develop an adaptive management plan in coordination with the monitoring plan.

Table 9.1 presents the components (sage-grouse threats, habitat, and populations) that will be monitored to be able to better understand the level of threat to sage-grouse and sagebrush ecosystems and what can be done to respond to the threat for sage-grouse. Elements for inventory monitoring and management action monitoring are outlined as well as the relevant agencies from which monitoring information will be gathered. Monitoring information will be collected across the extent of SGMA and provided at the

site, landscape, PMU and state levels and by core, priority, and general management areas. In addition, known changes in extent between years will be documented and total extent of treatments will be summarized.

Additional monitoring components may be identified in the future for inclusion in the annual monitoring report (above and beyond those monitoring components listed in Table 9.1). As additional threats to sage-grouse and sage-grouse habitats are identified, components and leading indicators should be included in inventory monitoring and management action monitoring to better assess and understand the severity of threat and progress in ameliorating the threat.

In addition to the annual monitoring report and database, the state of Nevada will develop a methods document for monitoring plans and adaptive management plans that provide recommended, standardized protocols and methods for objective based monitoring that are consistent with other land jurisdictions and agencies, including BLM, USFS, NDOW, and others.

Table 9.1. Inventory and Management Action Monitoring for the State Plan

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
Sage-grouse Parameters			
Sage-grouse habitat	NDOW, BLM, USFS, SETT CCS	• Land Health Assessments (BLM) (site, landscape, and state scale) • Resource Implementation Protocol for Condition Assessment Matrices (USFS) • Sagebrush landscape cover (BLM EIS)[8] (landscape scale)	• Treatment conducted and effectiveness of treatments (these would be treatments not included in subsequent monitoring components, e.g., meadow restoration)

[7] Scale of Management Action Monitoring is dependent on management action details specified in Section 7.0

[8] As part of the Greater Sage-grouse Northern California and Nevada Sub-regional EIS/LUPA, the BLM/USFS have developed a Monitoring Framework (Appendix E of that document) that outlines

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
		• CCS- functional acres lost due to debit projects, functional acres gained due to credit projects (concept of no net unmitigated loss)	
Sage-grouse populations	NDOW, BLM, USGS	• Lek, lek cluster, PMU counts, populations and trends (all scales) • Telemetry data collection (site to landscape scale- project dependent)	• At this point, the state plan does not outline management actions directly influencing sage-grouse numbers. Management actions outlined directly affect habitat and indirectly affect populations.
Threat			
Fire	BLM, USFS, NDF, NDOW[9]	• Number of fire starts per year • Number and size of fires in each vegetation community, and resistance and resilience classes	• Number of fires "successfully" suppressed (<1,000 acres) • Number of catastrophic fires • Fuels management treatments (conducted and effectiveness of treatments) • Rehabilitation efforts for each fire (implementation and effectiveness of treatments) • Document coordination efforts that aid in efficient and effective fire pre-suppress and suppression management
Cheatgrass	SETT will coordinate with researchers to determine extent BLM, USFS, NDOW, Nevada Cheatgrass Action Team	• Extent (spatial distribution, acres, and density of invasion)	• Treatments conducted and effectiveness of treatments (includes restoration efforts or efforts to improve resilience/resistance) •
Noxious weeds[10] Medusahead Hoary cress (*Cardaria draba*) Russian knapweed (*Acroptilon*	NDA, NDOW, University of Nevada Cooperative Extension, and SETT	• Extent (spatial distribution, acres, and density of invasion) •	• Treatments conducted and effectiveness of treatments

monitoring for habitat loss, habitat degradation, and population trend (in coordination with NDOW) at the 1st, 2nd, and 3rd order scale (Stiver et al. 2010).

[9] NDOW is engaged with BLM on post –fire treatment monitoring and provides monitoring in conjunction with these agencies post ES&R efforts.

[10] Weed species in Nevada identified as having, generally, greatest impact to sage-grouse habitats (S. Espinosa, B. Schultz personal communication

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
repens) Leafy spurge (*Euphorbia esula*) Perennial pepperweed (*Lepidium latifolium*) Canada thistle (*Cirsium arvense*) Rush skeleton weed (*Chondrilla juncea*) Yellow starthistle (*Centaurea solstitialis*) Musk thistle (*Carduus nutans*) Spotted knapweed (*Centaurea maculosa*) Scotch thistle (*Onopordum acanthium*) Mediterranean sage (*Salvia aethiopis*) **<u>Other weeds</u>** Red Brome (*Bromus rubens*) Rattlesnake chess (*Bromus briziformis*) Halogeton (*Halogeton gomeratus*) Purple mustard (*Chorispora tenella*)			
Pinyon juniper encroachment	BLM, USFS, NDF, NDOW, SETT, all stakeholders (including researchers at University of Nevada, Reno, and USGS)	• Extent (spatial distribution, acres, and density of invasion)	• Treatments conducted and effectiveness of treatments
Predation	NDOW, Wildlife Services, NDA, and SETT,	• Baseline data collected prior to treatments- data will likely be site specific, not SGMA	• Treatments conducted and effectiveness of treatments • Documentation of coordination efforts with city

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
		wide (road kill inventories, raven counts, habitat parameters, etc.)	counties, landfills waste managers, livestock owners, research on perching and nest deterrent technology
WHB populations	BLM, USFS	• HMA/WHBT populations • Extent of resources damaged by WHB • Understand their timing of use on seasonal habitats • Trend monitoring regarding maintenance of a thriving natural ecological balance for adjusting AML (BLM 2010)	• Gathers conducted • Treatments conducted and effectiveness of treatments
Livestock grazing	BLM, USFS, permittees and stakeholders	• Allotment standards and guidelines • Dates of use or intensity of use by allotment • Monitoring of attainment of management objectives (Swanson et al. 2006)	• Documentation of changes in management prescriptions to improve management, when appropriate
Anthropogenic disturbances	SETT, BLM, USFS, other federal agencies, all stakeholders	• CCS- functional acres lost due to debit projects, functional acres gained due to credit projects (concept of no net unmitigated loss) • Surface acres impacted • Indirect acres impacted • Identification of existing infrastructure that could be retrofitted, as appropriate (inclusion on the list does not require retrofitting, simply identifying the opportunity)	• Management actions to mitigation for anthropogenic disturbances will be accounted for under the appropriate threat or under habitat and in reporting will be noted as credit projects. • Documentation of implementation of Site Specific Consultation Based Design Features
Recreation and	SETT, BLM, USFS,	• Permitted activities	• Treatments conducted to

Monitoring Component	Agency/Entity	Inventory Monitoring Elements	Management Action Monitoring Elements[7]
OHVs	Commission on Off-Highway Vehicles and other stake holders	• Extent of authorized and unauthorized recreational trails and facilities	restore areas impacted by recreational activities and effectiveness of treatments • Documentation of coordination efforts with recreational groups
Weather Variability	NOAA, DRI, State Climatologist, NRCS Water and Climate Center, USGS BLM, USFS, and other stakeholders	• U.S. Drought Monitor • Hydrologic Report • Climate data records (current and historic)	• Tracking changes in management actions due to weather variability
Land Ownership	All agencies	• Tracking of land ownership changes	• Tracking of how changes in management actions due to land ownership affects habitat

Existing monitoring and adaptive management plans and methods

There are several key plans and methods that have been developed for use in Nevada and across the range of the sage-grouse. These should be referenced in the development of resource objectives, management action monitoring plans, and adaptive management plans. The following are recommended for consideration in the State Plan:

<u>Monitoring</u>

Swanson, S., B. Bruce, R. Cleary, B. Dragt, G. Brackley, G. Fults, J. Linebaugh, G. McCuin, V. Metscher, B. Perryman, P. Tueller, D. Weaver and D. Wilson. 2006. Nevada rangeland monitoring handbook. Second Edition. Educational Bulletin 06-03. University of Nevada Cooperative Extension, Natural Resources Conservation Service, Bureau of Land Management, U.S. Forest Service. USA. 84 pp. Available at: https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf

Stiver, S.J., E.T. Rinkes, and D.E. Naugle. 2010. Sage-grouse Habitat Assessment Framework. U.S. Bureau of Land Management. Unpublished Report. U.S. Bureau of Land Management, Idaho State Office, Boise, Idaho. Available at:

http://sagemap.wr.usgs.gov/docs/rs/SG%20HABITAT%20ASESSMENT%202010.pdf

Bureau of Land Management. 2010 Wild Horses and Burros Management Handbook. H-4700-1. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.11148.File.dat/H-4700-1.pdf

BLM AIM Strategy

Toevs, G.R., J.W. Karl, J.J. Taylor, C.S. Spurrier, M. Karl, M.R. Bobo, and J.E. Herrick. 2011. Consistent Indicators and Methods and a Scalable Sample Design to Meet Assessment, Inventory, and Monitoring Information Needs Across Scales. Rangelands: 14-20.

Toevs, G.R., J.J. Taylor, C.S. Spurrier, W.C. MacKinnon, and M.R. Bobo. 2011. Bureau of Land Management Assessment, Inventory, and Monitoring Strategy: For Integrated Renewable Resources Management. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/ib_attachments/2012.Par.53766.File.dat/IB2012-080_att1.pdf

BLM AIM Monitoring Methods

Herrick, J.E., J.W. Van Zee, K.M. Havstad, L.M. Burkett, and W.G. Whitford. 2009. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. Volume I: Quick Start. Department of Agriculture, Agricultural Research Service, Jornada Experimental Range, Las Cruces, NM. Available at: http://www.ntc.blm.gov/krc/uploads/281/Monitoring%20Manual%20for%20Gr

assland,%20Shrubland%20and%20Savanna%20Ecosystems%20Vol.%20I_Quick%20Start.pdf

Herrick, J.E., J.W. Van Zee, K.M. Havstad, L.M. Burkett, and W.G. Whitford. 2009. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. Volume II: Design, Supplementary Methods and Interpretation. Department of Agriculture, Agricultural Research Service, Jornada Experimental Range, Las Cruces, NM. Available at: http://www.ntc.blm.gov/krc/uploads/281/Monitoring%20Manual%20for%20Grassland,%20Shrubland%20and%20Savanna%20Ecosystems%20Vol.%20.II.pdf

Adaptive Management

Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2009. Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC. Available at: http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf

Cooperative monitoring

The state of Nevada recognizes the value of monitoring as well as the time and effort required to do so. Given limiting staffing and resources of agencies, the SETT will encourage and facilitate cooperative monitoring by interested stakeholders. The BLM has established a cooperative monitoring agreement for grazing allotment permittees to help conduct rangeland health assessments on their permitted allotments (See Appendix F). In compilation of the first annual monitoring report and through discussions with stakeholders, the SETT will work to develop similar cooperative monitoring agreements for additional resources with additional agencies and will facilitate development of such to meet the needs for training and quality control.

See resources below for monitoring guides for ranchers and other stakeholders.

Oregon Cattlemen's Association (2014). Oregon Resources Monitoring Guide: The Rancher's Guide to Improved Grazing.

Peterson, Eric. 2010. Implementing a Cooperative Permittee Monitoring Program. Sublette County Extension. University of Wyoming Cooperative Extension Service. B-1169. 28 pp. Available at: http://www.wyoextension.org/agpubs/pubs/B1169.pdf _____

Swanson, S, Ben, B, Rex, C, Bill, D, Gary, B, Gene, F, James, L, Gary, M, Valerie, M, Barry, P, Paul, T, Diane, W and Duane, W.2006. Nevada rangeland monitoring handbook. Second Edition. Educational Bulletin 06-03. University of Nevada Cooperative Extension, Natural Resources Conservation Service, Bureau of Land Management, U.S. Forest Service. USA. 84 pp. Available at: https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf

Perryman, B.L., L.B. Bruce, S.R. Swanson, and P.T. Tueller (2006). *Rancher's Monitoring Guide* , Educational Bulletin 06-04. University of Nevada Cooperative Extension, University of Nevada, Reno, College of Agriculture, Biotechnology and Natural Resources. USA. 48 pp. Available at: http://www.unce.unr.edu/publications/files/ag/2006/eb0604.pdf

Bureau of Land Management. 2004. Memorandum of Understanding with Public Lands Council. BLM MOU WO220-2004-01. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2006.Par.82823.File.dat/im2006-100attach2.pdf

REFERENCES

Adams, A. (1975). *A Brief History of Juniper and Shrub Populations in Southern Oregon.* Wildlife Research Report, Number 6, Research Division, Oregon State Wildlife Commission, Corvallis, Oregon. 33 p.

Aldridge, C. (2005). *Identifying Habitats for Persistence of Greater Sage-grouse (Centrocercus urophasianus) in Alberta, Canada.* University of Canada, Doctoral Dissertation.

Aldridge, C., & Boyce, M. (2007). Linking occurance and fitness persistence: habitat-based approach for endangered Greater Sage-Grouse. *Ecological Applications* , 17:508-526.

Aldridge, C., & Brigham, R. (2002). Sage-grouse Nesting and Brood Habitat Use in Southern Canada. *Journal of Wildlife Management*, 66:433-444.

Allan, C., & Stankey, G. (2009). *Adaptive Environment Management: A Practitioner's Guide.* Netherlands: Dordrecht Publisher, ISBN 978-90-270-8.

Arnold, G., & Dudzinski, M. (1978). *Ethology of Free-Living Domestic Animals.* Elsevier, Amsterdam, The Netherlands.

Atamian, M., Sedlinger, J., Heaton, J., & Blomberg, E. (2010). Landscape-Level Assessment of Brood Rearing Habitat for Greater Sage-grouse in Nevada. *Journal of Wildlife Management*, 74:1533-1543.

Baruch-Mordo, S., Evans, J., Severson, J. P., Naugle, D., Maestas, J., Kiesecker, M., . . . Reese, K. (2013). *Biological Conservation.* 167: 233-241.

Beck, J., Reese, K., Connelly, J., & Lucia, M. (2006). Movements and survival of juvenile greater sage-grouse in southeastern Idaho. *Wildlife Society Bulletin*, 34:1070–1078.

Beck, J., Reese, K., Connelly, J., & Lucia, M. (2006). Movements and survival of juvenile greater sage-grouse in southeastern Idaho. *Wildlife Society Bulletin*, 34:1070–1078.

Beever, E., & Aldridge, C. (2011). Influences of Free-Roaming Equids on Sagebrush Ecosystems with a Focus on Sage-grouse. In S. Knick, & J. Connelley, *Greater*

Sage Grouse: Ecology and Conservation of a Landscape Species and its Habitats (Vol. Studies in Avian Biology 38, pp. 273-290). Berkeley, CA: University of California Press.

Bergquist, E., Evangelista, P., Stohlgren, T., & Alley, N. (2007). Invasive Species and Coal Bed Methane Development in the Powder River Basin, Wyoming. *Environmental Monitoring and Assessment*, 28:381-394.

Blomberg, E. J. (2012). Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations. *Ecosphere* , 3(6):55.

Bi-State Executive Oversight Committee. (2014). *Executive Oversight Committee Materials in Support of Implementation and Effectiveness for the Bi-State Distinct Population Segment of Greater Sage-grouse.* Available at: http://www.ndow.org/Nevada_Wildlife/Sage_Grouse/Bi-State_FWS/.

Bi-State Technical Advisory Committee. (2012). *Bi-State Action Plan: Past, Present, and Future Actions for the Conservation of the Greater Sage-grouse Distinct Population Segment.* Available at:http://www.ndow.org/uploadedFiles/ndoworg/Content/Nevada_Wildlife/Sage_Grouse/Bi-State-Action-Plan.pdf.

Blank, R., & Morgan, T. (2012). Cheatgrass Invasion Engineers the Soil to Facilitate its Growth. *Society for Range Management*, 65:0162.

Blickley, J., Blackwood, D., & Patricelli, G. (2012). Experimental evidence for the effects of chronic anthropogenic noise on abundance of Greater Sage-Grouse at leks. *Conservation Biology*, 26:461-471.

Boarman, W. (2003). *Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises.* Environmental Management, 32:205-217.

Boarman, W., & Heinrich, B. (1999). *Common Raven (Corvus corax).* Philadelphia, PA: The Academy of Natural Sciences and The American Ornithologists' Union.

Booth, M. S., Caldwell, M. M., & Stark, J. M. (2003). Overlapping resource use in three Great Basin species: implications for community invisibility and vegetation dynamics. *Journal of Ecology*, 91(1):36-48.

Boyce, M., Vernier, P., Nielson, S., & Schmiegelow, F. (2002). Evaluating Resource Selection Functions. *Ecological Modeling*, 157:281-300.

Bradley, B., & J.F., M. (2006). Characterizing the landscape dynamics of an invasive plant and risk of invasion using remote sensing. *Ecological Applications*, 16(3):1132-1147.

Braun, C., Oedekoven, O., & Aldridge, C. (2002). Oil and gas development in western North America: effects on sagebrush steppe avifauna with particular emphasis on Sage-Grouse. *Transactions of the North America Wildlife and Natural Resources Conference*, 67:337-349.

Briske, D., Derner, J., Milchunas, D., & Tate, K. (2011). An Evidence-Based Assessment of Prescribed Grazing Practices. In D. Briske, *Conservation Benefits of Rangeland Resources: Assessment, Recommendations, and Knowledge Gaps* (pp. 23-74). Washington, DC: USDA, National Resources Conservation Service.

Brockway, D., Gatewood, R., & Paris, R. (2002). *Restoring Grassland Savannas from Degraded Pinyon-Juniper Woodlands: Effects of Mechanical Overstory Reduction and Slash Treatment Alternatives.* Journal of Environmental Management, 64:179-197.

Bureau of Land Management (BLM). (2010). *Wild Horses and Burros Management Handbook, H-4700-1.* http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.PAR.11148.File.dat/H-4700-1.pdf.

Bureau of Land Management (BLM). (2013). *Nevada and Northeastern California Greater Sage-grouse Draft Land Use Plan Amendment and Environmental Impact Statement, Vol. 2, 3:452.* Bureau of Land Management.

Bureau of Land Management (BLM). (2014). *BLM Nevada Wild Horses and Burros Program.* Accessed: May 2014, http://www.blm.gov/nv/st/en/prog/wh_b.html.

Bureau of Land Management (BLM). (2014). *Rangeland Administration System.* U.S. Department of the Interior. http://www.blm.gov/landandresourcesreports/rptapp/menu.cfm?appCd=6.

Bureau of Land Management. (2005). *Wind Energy Final Programmatic Environmental Impact Statement.*

Bureau of Land Management. (2012). *Solar Energy Development in Six Southwestern States Final Programmatic Environmental Impact Statement.*

Bureau of Land Management. (2014). *Mary's River Oil and Gas Exploration Project Environmental Assessment.*

Burkhart, J., & Tisdale, E. (1976). *Causes of Juniper Invasion in Southwestern Idaho.* Ecology, 57:472-484.

Burton, T., Smith, S., & Cowley, E. (2011). *Riparian Area Management: Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation.* Denver, CO: Bureau of Land Management, National Operations Center.

Casazza, M., Coates, P., & Overton, C. (2011). Linking Habitat Selection and Brood Success in Greater Sage-grouse. In B. Sandercock, K. Martin, & G. Segelbacher, *Ecology, Conservation, and Management of Grouse. Studies in Avian Biology (no. 39)* (pp. 151-167). Berkeley, California: University of California Press.

Chambers, J. C., Roundy, B. A., Blank, R. R., Meyer, S. E., & Whittaker, A. (2007). What makes great basin Sagebrush ecosystems invasible by Bromus tectorum? . *Ecological Monographs*, 77(1):117-145.

Chambers, J., Pyke, D., Maestis, J., Pellant, M., Boyd, C., Campbell, S., . . . Wuenschel, A. (2014). *Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-grouse--A Strategic Multi-scale Approach.* Gen. Tech. Rep. RMRS-GTR326. Fort Collins, CO: U.S. Department of Agriculture, Forest Service Rocky Mountain Research Station.

Christiansen, T. (2009). *Fence Marking to Reduce Greater Sage-grouse Collisions and Mortality Near Farson, Wyoming--Summary of Interim Results.* Unpublished interim report. Wyoming Game and Fish Department.

Coates, P. S., Casazza, M. L., Blomberg, E. J., Gardner, S. C., Espinosa, S. P., Yee, J. L., . . . Halstead, a. B. (2013). . Evaluating greater sage-grouse seasonal space use relative to leks: implications for surface use designations in sagebrush ecosystems. *Journal of Wildlife Management* , 77: 1598–1609.

Coates, P., & Casazza, M. (In Prep (A)). Avoidance by greater sage-grouse of pinyon pine and juniper tree encroachment within sagebrush ecosystem.

Coates, P., & Casazza, M. (In prep (B)). Winter habitat selection of greater sage-grouse in the Bi-State DPS.

Coates, P., & Delehanty, D. (2008). *Effects of Environmental Factors on Incubation Patterns of Greater Sage-grouse.* Condor, 110:627-638.

Coates, P., & Delehanty, D. (2010). *Nest Predation of Greater Sage-grouse in Relation to Microhabitat Factors and Predators.* Journal of Wildlife Management, 74:240-248.

Coates, P., Casazza, M., Brusee, B., Ricca, M., Gustafson, B., Overton, C., . . . Delehanty, D. (2014). *Spatially Explicit Modeling of Greater Sage-grouse Habitat in Nevada and Northeastern California: A Decision Support Tool for Management.* U.S. Geological Survey Open File Report 2014-1163, 84 p.

Coates, P., Connelly, J., & Delehanty, D. (2008). *Predators of Greater Sage-grouse Nests Identified by Video Monitoring.* Journal of Field Ornithology, 79:421-428.

Coates, P., Howe, K., Casazza, M., & Delehanty, D. (In Review.). *Common Raven Occurrence in Relation to Energy Transmission Line Corridors Transiting Human-Altered Sagebrush Steppe.*

Coates, P., Spencer Jr., J., & Delehanty, D. (2007). *Efficacy of CPTH-Treated Egg Baits for Removing Ravens.* Human-Wildlife Conflicts, 1(2):224-234.

Commons, M., Baydack, R., & Braun, C. (1999). Sage-grouse Response to Pinyon-Juniper Management. In S. Monsen, & R. Stevens, *Proceedings: ecology and management of pinyon-juniper communities within the Interior West.* U.S. Department of Agriculture, Forest Service, RMRS-P-9.

Connelly, J. W., Knick, S., Shroeder, M., & Stiver, S. J. (2004). *Conservation and Assessment of Greater Sage-grouse and Sagebrush Habitats.* Cheyenne, Wyoming: Western Association of Fish and Wildlife Agencies.

Connelly, J., Reese, K., & Schroeder, M. (2003). *Monitoring of Greater Sage-grouse Habitats and Populations.* Moscow, Idaho: College of Natural Resources Experiment Station, University of Idaho. Station Bulletin 80.

Connelly, J., Schroeder, M., Sands, A., & Braun, a. C. (2000). Guidelines to manage sage-grouse populations and their habitats. *Wildlife Society Bulletin* , 28:967-985.

Cote, I., & Sutherland, W. (1997). *The Effectiveness of Removing Predators to Protect Bird Populations.* Conservation Biology, 11(2):395-405.

Cottam, W., & Stewart, G. (1940). *Plant Succession as a Result of Grazing and Meadow Desiccation by Erosion Since Settlement in 1862.* Journal of Forestry, 38: 613-626.

Crawford, J., Olson, R., West, N., Mosley, J., Schroeder, M., Whitson, T., & Miller, R. (2004). *Ecology and Management of Sage-grouse and Sage-grouse Habitat.* Journal of Range Management. 57:2-19.

Davies, K., Bates, J., Svejcar, T., & Boyd, C. (2010). *Effects of Long-term Livestock Grazing on Fuel Characteristics in Rangelands: An Example from the Sagebrush Steppe.* Rangeland Ecology & Management. 63:662-669.

Davies, K., Boyde, C., Beck, J., Bates, J., Svejcar, T., & Gregg, J. (2011). *Saving the Sagebrush Sea: An Ecosystem Conservation Plan for Big Sagebrush.* Biological Conservation. 144:2573-2584.

Davies, K., Svejcar, T., & Boyd, C. (2009). *Interaction of Historical and Nonhistorical Disturbances Maintains Native Plant Communities.* Ecological Applications. 19:1536-1545.

Department of Conservation & Natural Resources. (2010). *State Natural Resource Assessment.* Nevada Division of Forestry.

Doherty, K., Naugle, D., Copeland, H., Pocewicz, A., & Kiesecker, J. (2011). Energy Development and Conservation Tradeoffs: Systematic Planning for Greater Sage-grouse. In J. Connelly, & S. Knick, *Greater Sage-grouse: Ecology of a Landscape, Species and Its Habitats.* Studies in Avian Biology Vol 38. Berkeley, CA: University of California Press, Cooper Onithological Society.

Doherty, K., Naugle, D., Walker, B., & Graham, J. (2008). *Greater Sage-grouse Winter Habitat Selection and Energy Development.* Journal of Wildlife Management, 72:187-195.

Duncan, P., Foose, T., Gordone, I., Gakahu, C., & Lloyd, M. (1990). *Comparative Nutrient Estraction from Forages by Grazing Bovids and Equids: A Test of the Nutritional Model of Equid/Bovid Completion and Coexistence.* Oecologia, 84:411-418.

Eberhardt, L., Majorowicz, A., & Wilcox, J. (1982). *Apparent Rate of Increase for Two Feral Horse Herds.* Journal of Wildlife Management, 46(2):367-374.

Ellis, K. (1985). *Effects of a new transmission line on distribution and aerial predation of breeding male sage grouse: Final report.*

Feist, J. (1971). *Behavior of Feral Horses in the Pryor Mountain Wild Horse Range.* Ann Arbor, MI: M.S. ThesisM.S. Thesis. University of Michigan.

Fire and Invasives Assessment Team. (2014). *Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment.* Unpublished BLM Report. To be available in the Nevada and Northeastern California Greater Sage-Grouse Draft Land Use Plan Amendments and Final Environmental Impact Statement.

Freese, M. (2009). *Linking Greater Sage-grouse Habitat Use and Suitability Across Spatiotemporal Scales in Central Oregon.* Corvallis, OR: Masters Thesis. Oregon State University.

Ganskopp, D., & Vavra, M. (1986). *Habitat Use by Feral Horses in the Northeastern Sagebrush Steppe.* Journal of Range Management, 39:207-212.

Garrott, R., & Taylor, L. (1990). *Dynamics of a Feral Horse Population in Montana.* Journal of Wildlife Management, 54(4):603-612.

Garrott, R., Siniff, D., & Eberhardt, L. (1991). *Growth Rates of Feral Horse Populations.* Journal of Wildlife Management, 55(4):641-648.

Gedney, D., Azuma, D., Bolsinger, C., & McKay, N. (1999). *Western Juniper in Eastern Oregon.* Gen. Tech. Rep. NW-GTR-464. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 53 p.

Gelbard, J., & Belnap, J. (2003). *Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape.* Conservation Biology. 17:420-432.

Gibson, D., Blomberg, E., & Sedinger, J. (2013). *Dynamics of Greater Sage-grouse (Centrocercus urophasianus) Populations in Response to Transmission Lines in Central Nevada, Progress Report: Final, December 2013.*

Gregg, M., & Crawford, J. (2009). *Survival of Greater Sage-grouse Chicks and Broods in the Northern Great Basin.* Journal of Wildlife Management, 73:904-913.

Gregg, M., Crawford, M., Drut, M., & DeLong, A. (1994). *Vegetational Cover and Predation of Sage-grouse Nests in Oregon.* Journal of Wildlife Management, 58:162-166.

Gruell, G. E., & Swanson, S. (2013). *Nevada's changing wildlife habitat: an ecological history.* University of Nevada Press, 192 p.

Hagen, C. (2011). Predation of Greater Sage-grouse: Facts, Process, and Effects. In S. Knick, & J. Connelly, *Greater Sage-grouse: Ecology and Conservation of a Landscape Species and its Habitats.* Berkeley, CA: University of California Press, Studies in Avian Biology, Vol. 38.

Hagen, C., Connelly, J., & Schroeder, M. (2007). *A Meta-analysis for Greater Sage-grouse Nesting and Brood Rearing Habitats.* Wildlife Biology. 13 (Supplement 1):42-50.

Hanley, T., & Hanly, K. (1982). *Food Resource Partitioning by Sympatric Ungulates on Great Basin Rangeland.* Journal of Range Management, 35:152-158.

Hanser, S., & Knick, S. (2011). Greater Sage-grouse as an Umbrella Species for Shrubland Passerine Birds. In S. Knick, & J. Connelly, *Greater Sage-grouse: ecology and conservation of a landscape species and its habitats.* (pp. 473-487). Studies in Avian Biology Vol: 38. Berkeley, CA: University of California Press.

Herrick, J., Van Zee, J., Havstad, K., Burkett, L., & Whitford, W. (2009). *Monitoring Manual for Grassland, Shrubland, and Savana Ecosystems, Volume II: Desigh, Supplementary Methods, and Interpretation.* Las Cruces, NM: Department of Agriculture, Agricultural Research Service, Jornada Experimental Range.

Herrick, J., Van Zee, J., Havstad, K., Burkett, L., & Whitford, W. (2009). *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume I: Quick Start.* Las Cruces, NM: Department of Agriculture, Agricultural Research Service, Jornada Experiment Range.

Holloran, M. (2005). *Greater Sage-Grouse (Centrocercus urophasianus) population response to natural gas field development in western Wyoming.* Ph.D. dissertation, University of Wyoming, Laramie, WY.

Holloran, M., Kaiser, R., & Hubert, W. (2007). *Populations response of yearling Greater Sage-Grouse to the infrastructure of natural gas fields in southwestern Wyoming. Completion Report.* Laramie, WY: USDI Geological Survey.

Holmgren, B. (July 2, 2014). *Permitted Land Area.* Email to Allen Biaggi.

Howe, K., Coates, P., & Delehanty, D. (2014). *Selection of Anthropogenic Features and Vegetation Characteristics by Nesting Common Ravens in the Sagebrush Ecosystem.* Condor, 116(1):25-49.

Idaho Department of Fish and Game. (1998). *Sage Grouse: A Part of Idaho's High Desert Heritage. Upland Game Program*. Retrieved from http://www.blm.gov/pgdata/etc/medialib/blm/id/publications.Par.71018.File.dat/sage_grouse.pdf. Accessed: September 2014.

Johnson, D., Holloran, M., Connelly, J., Hanser, S., Amundson, C., & Knick, S. (2011). Influences of environmental and anthropogenic features on greater sage-grouse populations. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 407-450). Berkley, CA: University of California Press, Cooper Ornithological Union.

Johnson, G. (July 2, 2014). *Permitted Mining Acres.* Email to Allen Biaggi.

Kaiser, R. (2006). *Recruitment by Greater Sage-Grouse in association with natural gas development in Western Wyoming.* M.S. thesis, University of Wyoming, Laramie, WY.

Knapp, P., & Soule, P. (1988). *Recent Juniperus Occidentalis (Western Juniper) Expansion on a Protected Site in Central Oregon.* Global Change Biology. 4: 347-411.

Knick, S. S. (2013). Modeling ecological minimum requirements for distribution of greater sage-grouse leks: implications for population connectivity across their western range, U.S.A. Ecology and Evolution . *Ecology and Evolution*, 3(6):1539-1551.

Knick, S., & Hanser, S. (2011). Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 383-405). Berkeley, CA: University of California Press, Copper Ornithological Union.

Knight, R., & Kawashima, J. (1993). Responses of raven and red-tail hawk populations to linear right-of-ways. Journal of Wildlife Management . 57:266-271.

Knopf, F. (1996). Perspectives on Grazing Nongame Bird Habitats. In P. Krausman, *Rangeland Wildlife* (pp. 51-59). Denver, CO: Society for Rangeland Management.

Kolada, E., Sedinger, J., & Casazza, M. (2009). *Nest Site Selection by Greater Sage-grouse in Mono County, California.* Journal of Wildlife Managment. 73:1333-1340.

Kolada, E., Sedinger, J., & Casazza, M. (2009b). Ecological factors influencing nest survival of greater sage-grouse in Mono County, California. *Journal of Wildlife Management*, 73:1341-1347.

LeBeau, C. (2012). *Evaluation of Greater Sage-Grouse reproductive habitat and response to wind energy development in south-central, Wyoming .* Laramie, University of Wyoming, M.S. thesis.

lerjfoldskfsadf. (sdfsadf). *sdfads.* sdfsdf.

Littell, J. S., McKenzie, D., Peterson, D. L., & Westerling, A. L. (2009). Climate and wildfire area burned in the western U.S. ecoprovinces. *Ecological Applications*, 19(4): 1003-1021.

Lockyer, Z., Coates, P., Casazza, M., Espinosa, S., & Delehant, D. (In Review). Linking nest site selection to nest survival in greater sage-grouse.

Lockyer, Z., Coates, P., Casazza, M., Espinosa, S., & Delehanty, D. (2013). Greater Sage-grouse Nest Predators in the Virginia Mountains of Northwestern Nevada. *Journal of Fish and Wildlife Management.*, 4(2):242-254.

Lyon, A., & S.H., A. (2003). Potential gas development impacts on Sage Grouse nest initiation and movement. *Wildlife Society Bulletin* , 31:486-491.

Manier, D., Wood, D., Bowen, Z., Donovan, R., Holloran, M., Juliusson, L., . . . Titolo, A. (2013). *Summary of Science, Activities, Programs, and Policies that Influence the Rangewide Conservation of the Greater Sage-grouse (Centrocercus urophasianus).* U.S. Geological Survey Open File Report 2013-1098, 170 p.

Matek, B. (2014). *2014 Annual U.S. Global Geothermal Power Production Report.* Geothermal Energy Association.

Menard, C., Duncan, P., Fleurance, G., Georges, J., & Lila, M. (2002). *Comparative Foraging and Nutrition of Horse and Cattle in European Wetlands.* Journal of Applied Ecology, 39:120-133.

Miller, R., & Rose, J. (1995). *Historic Expansion of Juniperus Occidentalis (Western Juniper) in Southeaster Oregon.* Great Basin Naturalist, 55: 37-45.

Miller, R., & Rose, J. (1999). *Fire History and Western Juniper Encroachment in Sagebrush Steppe.* Journal of Range Management, 52: 550-559.

Miller, R., Bates, J., Svejcar, T., Pierson, F., & Eddleman, L. (2005). *Biology, Ecology, and Management of Western Juniper.* Oregon State University, Agricultural Experiment Station. Technical Bulletin 152. 77 p. .

Miller, R., Svejcar, T., & Rose, J. (2000). *Impacts of Western Juniper on Plant Community Composition and Structure.* Journal of Range Management, 53:574-585.

Miller, R., Tausch, R., McArthur, E., Johnson, D., & Sanderson, S. (2008). *Age Structure and Expansion of Pinyon-Juniper Woodlands: A Regional Perspective in the Intermountain West.* Research Paper RMRS-RP-69. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 15 p.

Mitchell, J., & Roberts, T. (1999). Distribution of Pinyon-Juniper in the Western United States. In S. Monsen, & R. Stevens, *Proceedings: ecology and management of pinyon-juniper communities within the Interior West.* (pp. 146-154). U.S. Department of Agriculture, Forest Service RMRS-P-9.

Murphy, T., Naugle, D. E., Eardley, R., Maestas, J., Griffiths, T., Pellant, M., & Stiver, S. (2013). Trial by Fire: Improving Our Ability to Reduce Wildfire Impacts to Sage-grouse and Sagebrush Ecosystems through Accelerated Partner Collaboration. *Rangelands* , 35(3):2-11.

Naiman, R., Decamps, H., & Pollock, M. (1992). *The Role of Riparian Corridors in Maintaining Regional Biodiversity.* Ecological Applications, 3:209-212.

Naugle, D., Doherty, K., Walker, B., Holloran, M., & Copeland, H. (2011). Energy development and Greater Sage-Grouse. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 489-504). Berkeley, CA: University of California Press, Cooper Ornithological Union.

Nevada Bureau of Mines and Geology. (2014). *The Nevada Mineral Industry 2012. Special Publication MI-2012.* Mackay School and Earth Sciences and Engineering, College of Science, University of Nevada, Reno.

Nevada Division of Minerals. (2014a, June 13). *Oil Production in Nevada by Producing Field 1954 to 2013 (In Barrels).* Retrieved from http://minerals.state.nv.us/forms/ogg/OilProdinNVbyProducingField1954-2013.pdf

Nevada Division of Minerals. (2014b, June 13). *Nevada Geothermal Resources and Production.* Retrieved from http://minerals.state.nv.us/ogg_nvgeorespro.htm

Nevada Governor's Sage-grouse Conservation Team. (2010). *Nevada energy and infrastructure development standards to conserve greater sage-grouse populations and their habitats. Pp 9-11.*

Nevada Mining Association . (2011). *Nevada Mining Industry: Summary of the Industry's Economic Impact in Nevada.* Retrieved from http://www.nevadamining.org/issues_policy/pdfs/NMA-Brief05-Economic%20Impact%20Summary.pdf.

Oakleaf, R. (1971). *The Relationship of Sage-grouse to Upland Meadows in Nevada.* Thesis. Reno, NV: University of Nevada.

Oregon Cattlemen's Association. (2014). *Oregon Resources Monitoring Guide: The Rancher's Guide to Improved Grazing.*

Patricelli, G., Blickley, J., & Hooper, S. (Fall 2013). *Recommended Management Strategies to Limit Anthropogenic Noise Impacts on Greater Sage-grouse in Wyoming.* Human Wildlife Interactions. 7(2):230-249.

Pellegrini, S. (1971). *Home Range, Territoriality and Movement Patterns of Wild Horses in the Wassuk Range of Western Nevada.* M.S. Thesis. Reno, NV: University of Nevada.

Perryman, B., Bruce, L., Tueller, P., & Swanson, S. (2006). *Ranchers' Monitoring Guide.* Reno, NV: University of Nevada, Cooperative Extension. Educational Bulletin-06-04, 48pp., http://www.unce.unr.edu/publications/files/ag/2006/eb0604.pdf.

Peterson, E. (2010). *Implementing a Cooperative Permittee Monitoring Program.* University of Wyoming, Cooperative Extension Service, Sublette County Extension.

Public Utilities Commission of Nevada. (2014, June 13). *Rulemaking to address an emissions reduction and capacity replacement plan and other matter related thereto in accordance with Senate Bill 123. Docket No. 13-06023*. Retrieved from http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2010_THRU_PRESENT/2013-6/34768.pdf

Reed, F., Roath, R., & Bradford, D. (1999). *The Grazing Response Index: A Simple and Effective Method to Evaluate Grazing Impacts.* Rangelands. 21(4):3-6.

Rittenhouse, L., Johnson, D., & Borman, M. (1982). *A Study of Food Consumption Rates and Nutrition of Horses and Cattle.* Washington, DC: Bureau of Land Management.

Romme, W., Allen, C., Bailey, J., Baker, W., Bestelmeyer, B., Brown, P., . . . Weisberg, P. (2009). *Historical and Modern Disturbance Regimes, Stand Structures, and Landscape Dynamics in Pinyon-Juniper Vegetation of the Western United States.* Rangeland Ecology and Management, 62:208-222.

Sauer, J., Hines, J., Fallon, J., Pardieck, K., Ziolkowski Jr., D., & Link, W. (2014). *The North American Breeding Bird Survey, Results and Analysis 1966-2012, Version 02.19.2014.* USGS Patuxent Wildlife Research Center, U.S. Geological Survey, Laurel, MD. Retrieved April 2014, from http://www.mbr.pwrc.usgs.gov/bbs/bbs.html.

Schmelzer, L., Perryman, B., Bruce, B., Schultz, B., McAdoo, K., McCuin, G., . . . Conley, K. (2014). *Reducing Cheatgrass (Bromus tectorum L.) Fuel Loads Using Fall Cattle Grazing.* The Professional Animal Scientist. 30 (2014):270-278.

Schroeder, M., & Baydack, R. (2001). *Predation and the Management of Prairie Grouse.* Wildlife Society Bulletin, 29(1):24-32.

Shepherd, A. (2014). *Nevada Wild Hourse and Burro Program.* Presentation: Sagebrush Ecosystem Council.

State of Nevada. (2014). *Department of Taxation Annual Report Fiscal 2012 – 2013.* Retrieved from Website: http://tax.nv.gov/uploadedFiles/taxnvgov/Content/TaxLibrary/AnnualReport_FY13_final.pdf

Stevens, B. (2011). *Impacts of Fences on Greater Sage-grouse in Idaho: Collision, Mitigation, and Spatial Ecology.* Thesis. Moscow, ID: University of Idaho.

Stevens, B., Reese, K., Connelly, J., & Musil, D. (2012). Greater Sage-Grouse and Fences: Does Marking Reduce Collisions? *Wildlife Society Bulletin* , 36(2):297–303 .

Stiver, S. (September 19, 2014). *Telephone conversation with M. Faigeles.*

Stiver, S., Rinks, E., & Naugle, D. (2010). *Sage-grouse Habitat Assessment Framework.* Boise, ID: U.S. Bureau of Land Management, Idaho State Office.

Stoddart, L., Smith, A., & Box, T. (1975). *Range Management.* New York, NY: McGraw-Hill.

Svejcar, T., Boyd, C., Davies, K., Madsen, M., Bates, J., & Sheley, R. (2014). *Western Land Managers Will Need All Available Tools for Adapting to Climate Change, Including Grazing: A Critique of Beschta et al.* Environmental Managment. 53(6):1035-8.

Swanson, S., Bruce, B., Cleary, R., Dragt, B., Brackley, G., Fults, G., . . . Wilson, D. (2006). *Nevada Rangeland Monitoring Handbook, 2nd. Edition.* University of Nevada, Cooperative Extension; Natural Resources Conservation Service; Bureau of Land Management; U.S. Forest Service. Educational Bulletin 06-03; https://www.unce.unr.edu/publications/files/ag/2006/eb0603.pdf.

Swanson, S., Wyman, S., & Evans, C. (In Press). *Practical Grazing Management to Meet Riparian Objectives.* Journal of Rangeland Applications.

Symanski, R. (1994). *Contested Realities: Feral Horses in Outback Australia.* Annals of the Association of American Geographers, 84:251-269.

Tausch, R., & West, N. (1988). *Differential Establishment of Pinyon and Juniper Following Fire.* American Midland Naturalist, 119: 174-184.

Tausch, R., & West, N. (1995). Plan Species Composition Patterns with Differences in Tree Dominance on a Southwestern Utah Pinyon-Juniper Site. In D. Shaw, E. Aldon, C. LoSapio, & tech. coords., *Desired future conditions for pinyon-juniper ecosystems 1994, August 8-12. Flagstaff, AZ. Gen. Tech. Rep. RM GTR-258* (pp. 16-23). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 16-23.

Tausch, R., West, N., & Nabi, A. (1981). *Tree Age and Dominance Patterns in Great Basin Pinyon-Juniper Woodlands.* Journal of Range Management, 34: 259-264.

Taylor, R., Walker, B., Naugle, D., & Mills, L. (2012). Managing multiple vital rates to maximize sage-grouse population growth. *The Journal of Wildlife Management* , 76(2): 336-347.

Toevs, G., Karl, J., Taylor, J., Spurrier, C., Karl, M., Bobo, M., & Herrick, J. (2011). *Consistent Indicators and Methods and a Scalable Sample Design to Meet Assessment, Inventory, and Monitoring Needs Across Scales.* Rangelands: 14-20.

Toevs, G., Taylor, J., Spurrier, C., MacKinnon, W., & Bobo, M. (2012). *Assessment, Inventory, and Monitoring Strategy: For Integrated Renewable Resources Management.* Denver, CO: Department of the Interior, Bureau of Land Management, National Operations Center.

U.S. Department of Agriculture (USDA). (1996). *Rangeland Analysis and Management Training Guide.* Denver, CO: Forest Service, Rocky Mountain Region.

U.S. Department of Agriculture (USDA). (2007). *Resource Implementation Protocol for Rapid Assessment Matrices.* Forest Service, Humboldt Toiyabe National Forest.

U.S. Department of Energy. (2007). *The History and Current Conditions of the Greater Sage Grouse in Regions with Energy Development.* Retrieved from http://bogc.dnrc.mt.gov/PDF/Final%20Greater%20Sage%20Grouse%20White%20Paper3-15-07%20(2).pdf. Accessed: September 2014

U.S. Fish and Wildlife Service. (2010). *Endangered and threatened wildlife and plants, 12-month findings for petitions to list the Greater Sage-Grouse (Centrocercus urophasianus) as threatened or endangered.* Washington, D.C., FWS–R6–ES–2010–0018, Federal Register, v. 75, no. 55 (March 23, 2010), 107 p.

U.S. Fish and Wildlife Service. (2013). *Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report.* U.S. Fish and Wildlife Service: Denver, CO. February 2013.

Wagner, F. (1983). *Status of Wild Horse and Burro Management on Public Rangelands.* Transactions of the North American Wildlife and Natural Resources Conference, 48:116-133.

Walker, B., & Naugle, D. (2011). West Nile Virus Ecology in Sagebrush Habitat and Impacts on Greater Sage-grouse Populations. In S. Knick, & J. Connelly, *Greater Sage-Grouse: ecology of a landscape species and its habitats* (pp. 126-141). Berkeley, CA: University of California Press, Cooper Ornithological Union.

Walker, B., Naugle, D., & Doherty, K. (2007). Greater Sage-Grouse population response to energy development and habitat loss. *Journal of Wildlife Management*, 71:2644–2654.

Webb, C., Boarman, W., & Rotenberry, J. (2004). *Common Raven Juvenile Survival in a Human-Augmented Landscape.* Condor, 106:517-528.

Whitehurst, W., & Marlowe, C. (2013). *Forb Nutrient Density for Sage-grouse Broods in Mountain Big Sagebrush Communities.* Montana: Rangelands.35:18-25.

Williams, B., Szaro, R., & Shapiro, C. (2009). *Adaptive Management: The U.S. Department of the Interior Technical Guide.* Washington, DC: Department of the Interior, Adaptive Management Working Group.

Wisdom, M., & Chambers, J. (2009). *A Landscape Approach for Ecologically Based Management of Great Basin Shrublands.* Restoration Ecology.17:740-749.

Wolfe, M. (1980). *Feral Horse Demography: A Preliminary Report.* Journal of Range Management, 33(5):354-360.

Wolfe, M., Ellis, L., & MacMullin, R. (1989). *Reproductive Rates of Feral Horses and Burros.* Journal of Wildlife Management, 53(4):916-919.

Wyman, S., Bailey, D., Borman, M., Cote, S., Eisner, J., Elmore, W., . . . Winward, A. (2006). *Riparian Area Management: Grazing Management Processes and Strategies for Riparian-Wetland Areas.* Denver, CO: BLM, Bureau of Land Management, National Science and Technology Center.

Zou, L., Miller, S., & Schmidtmann, E. (2006). Mosquito Larval Habitat Mapping Using Remote Sensing and GIS: Implications of Coalbed Methane Development and West Nile Virus. *Journal of Medical Entomology* , 43:1034-1041.

APPENDICES

Appendix A: Site Specific Consultation Based Design Features 144
Appendix B: Development Process and Justification for Habitat Objectives for Greater Sage-Grouse in Nevada 174
Appendix C: Inter-Tribal Council of Nevada Resolution 178
Appendix D: Cooperation of State and Federal Agencies for Depredation Permits for Common Raven 182
Appendix E: Process to Prioritize Integrated Predator Management Projects 185
Appendix F: Template for a Cooperative Monitoring Agreement 189
Appendix G: Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and their Habitats, excerpt page 25-29 196

Appendix A:

Site Specific Consultation Based Design Features

Site Specific Consultation Based Design Features

Site Specific Consultation Based Design Features (here after Design Features) are used to minimize impacts to sage-grouse and its habitat due to disturbances on a project by project and site by site basis. Design Features in the State of Nevada's plan apply to all newly proposed projects and modifications to existing projects. Existing projects within SGMA are not currently subject to Design Features; however all Design Features listed below, according to program area, are required to be considered as part of the SETT Consultation process. The State of Nevada recognizes that all Design Features may not be practical, feasible, or appropriate in all instances considering site conditions and project specifications, nor is this list completely exhaustive. Therefore, the SETT in coordination with the project proponent, will consider all of the listed Design Features on a site-specific basis taking into consideration the best available science references for guidance in planning and implementation. If certain Design Features are determined to not be practical, feasible, or appropriate for the specific project site, the SETT will document the reasons the Design Features were not selected. The SETT may also consider additional Design Features that may minimize impacts to sage-grouse and its habitat that are not specifically listed here and document the reasons for selecting the additional Design Features.

Roads

These Design Features apply to all new roads, whether a component of a mining/ energy project or for any other purpose.

• Do not construct new roads where roads already in existence, could be used or upgraded to meet the needs of the project or operation.

• Design roads to an appropriate standard, no higher than necessary, to accommodate their intended purpose and level of use.

• Locate roads outside of key sage-grouse seasonal habitat, such as leks and late brood rearing habitat areas. New roads that are located within 3 miles of a lek should have seasonal restrictions from March 1 to May 15 from 1 hour before sunrise to 9 a.m.

• Coordinate road construction and use among ROW or SUA holders.

• Avoid constructing roads within riparian areas and ephemeral drainages (note that such construction may require permitting under section 401 and 404 of the Clean Water Act).

• Construct road crossings at right angles to ephemeral drainages and stream crossings.

• Work with local governments to enforce speed limits and design roads to be driven at speeds appropriate to minimize vehicle/wildlife collisions.

• Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of remote access technology, such as telemetry and remote well control if applicable (e.g., Supervisory Control and Data Acquisition).

• Restrict vehicle traffic to authorized users on newly constructed routes by employing traffic control devices such as signage, gates, fencing etc.

• Dust abatement on roads and pads will be based on road use, road condition, season, and other pertinent considerations.

• Close and rehabilitate duplicate roads by restoring original landform and establishing desired vegetation, in cooperation with landholders and where appropriate authority exists to do so.

Mineral Resources

Fluid Minerals

Operations

• Cluster disturbances associated with operations and facilities as close as possible, unless site specific conditions indicate that disturbances to sagebrush habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.

• Minimize site disturbance though site analysis and facility planning.

• Use directional and horizontal drilling to reduce surface disturbance.

• Place infrastructure in already disturbed locations where the habitat has not been restored.

• Apply a phased development approach with concurrent reclamation through a coordination process among relevant parties.

• Place liquid gathering facilities outside of Core Management Areas. Have no tanks at well locations within Core Management Areas to minimize truck traffic, and perching and nesting sites for ravens and raptors.

• Pipelines should be under or immediately adjacent to the road.

• Reduce motor vehicle travel during field operations through development and implementation of remote monitoring and control systems plans.

To reduce predator perching, limit the construction of vertical facilities and fences to the minimum number and amount needed.

• Site or minimize linear ROWs or SUAs to reduce disturbance to sage-grouse habitats.

•Co-locate new utility developments (power lines, pipelines, etc.) and transportation routes with existing utility or transportation corridors where adequate spacing separation can be achieved in order to preserve grid reliability and ongoing maintenance capability.

• Bury distribution power lines of up to 35kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

• Power lines, flow lines, and small pipelines should be co-located under or immediately adjacent to existing roads.

• Permanent structures, which create movement (e.g., pump jack) should be designed or sited to minimize impacts to sage-grouse.

• Preclude sage-grouse access to pits and tanks through use of practical techniques (e.g. covers, netting, birdballs, location, etc.).

• Equip tanks and other above-ground facilities with structures or devices that discourage nesting or perching of raptors, corvids, and other predators.

• Control the spread and effects of non-native, invasive plant species Nevada Department of Agriculture listed noxious weeds (NAC 555.010, classes A through C, inclusive) and undesirable non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007) (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance). All projects within SGMA should have a noxious weed management plan in place prior to construction and operations.

• Use only closed-loop systems for drilling operations and no reserve pits.

• Reduce the potential for creating excessive or unintended mosquito habitat and associated risk of West Nile Virus impacts to sage-grouse. This can be implemented

through minimizing pit and pond construction and, where necessary, size of pits and ponds (Doherty 2007).

• Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues and West Nile virus has been identified as a concern in the project area, use the following steps for reservoir design to limit favorable mosquito habitat (Dohery 2007):

– Overbuild size of ponds for muddy and non-vegetated shorelines.

– Build steep shorelines to decrease vegetation and increase wave actions. Ponds with steep shorelines will be equipped with NDOW approved wildlife escape ramps.

– Avoid flooding terrestrial vegetation in flat terrain or low lying areas.

– Construct dams or impoundments that restrict down slope seepage or overflow.

– Line the channel where discharge water flows into the pond with crushed rock.

– Construct spillway with steep sides and line it with crushed rock.

– Treat waters with larvicides to reduce mosquito production where water occurs on the surface if necessary.

• Limit noise to less than 10 decibels above ambient measures one hour before sunrise until 9:00 a.m. within 3 miles of a lek during active lek season, March 1 to May 15 (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

• Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

• Fit new transmission towers with anti-perch devices (Lammers and Collopy 2007).

• Design and construct fences consistent with NRCS fence standards and specifications Code 382 and, where appropriate, use fence markers (Sage Grouse Initiative 2013).

• Locate new compressor stations outside priority habitats. Otherwise design them to reduce noise that may be directed towards priority habitat.

• Implement site keeping practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of sage-grouse (Bui et al 2010).

• Locate man camps outside of priority habitats.

Reclamation

• Include objectives for ensuring habitat rehabilitation to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plans such that goals and objectives are to protect and improve sage-grouse habitat needs.

•Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

• Maximize the area of interim and concurrent reclamation on long-term access roads and well pads, including reshaping, topsoiling and revegetating cut-and-fill slopes. In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

•Restore disturbed areas at final reclamation to the near pre-disturbance landforms and the desired plant community.

• Irrigate interim reclamation if necessary for establishing seedlings more quickly and if water rights are available.

• Utilize mulching techniques to expedite reclamation and to protect soils.

• Ensure that all authorized ground disturbing projects have vegetation reclamation standards suitable for the site type prior to construction and ensure that reclamation to appropriate sage-grouse standards are budgeted for in the reclamation bond.

Locatable Minerals

For consistency, sage-grouse Design Features for locatable minerals shall be considered in association with state and federal permitting requirements including bonding, if applicable.

Operations

• Cluster disturbances associated with operations and facilities as close as possible unless site specific conditions indicate that disturbances to sagebrush habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.

• Minimize site disturbance though site analysis and facility planning.

• Place infrastructure in already disturbed locations where the habitat has not been restored.

• Apply a phased development approach with concurrent reclamation through a coordination process among relevant parties.

• Reduce motor vehicle travel during field operations through development and implementation of remote monitoring and control systems plans.

• To reduce predator perching, limit the construction of vertical facilities and fences to the minimum number and amount needed.

• Site or minimize linear ROWs or SUAs to reduce disturbance to sage-grouse habitats.

• Co-locate new utility developments (power lines, pipelines, etc.) and transportation routes with existing utility or transportation corridors where adequate separation can be achieved in order to preserve grid reliability and ongoing maintenance.

• Bury distributive power lines of up to 35 kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

• Preclude sage-grouse access to pits and tanks through use of practical techniques (e.g. covers, netting, birdballs, location, etc.).

• Equip tanks and other above ground facilities with structures or devices that discourage nesting or perching of raptors, corvids, and other predators.

• Control the spread and effects of Nevada Department of Agriculture listed noxious weeds (NAC 555.010, classes A through C, inclusive) and undesirable non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007). All projects within SGMA should have a noxious weed management plan in place prior to construction and operations.

• Reduce the potential for creating excessive or unintended mosquito habitat and associated risk of West Nile Virus impacts to sage-grouse. This can be implemented through minimizing drill and process pit and pond construction and, where necessary, size of drill and process pits and ponds (Doherty 2007).

• Reduce habitat for mosquitoes that vector West Nile virus. If West Nile virus has been identified as a concern in the project area, limit favorable mosquito habitat.

• Limit noise to less than 10 decibels above ambient measures one hour before sunrise until 9:00 a.m. within 3 miles of a lek of a lek during active lek season, March 1 through May 15 (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

• Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

• Fit new transmission towers with anti-perch devices (Lammers and Collopy 2007).

• Design and construct fences consistent with NRCS fence standards and specifications Code 382 and, where appropriate, use fence markers (Sage Grouse Initiative 2013).

• Implement site keeping practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of sage-grouse (Bui et al 2010).

• Locate man camps outside of priority sage-grouse habitats.

Reclamation

• Include objectives for ensuring habitat rehabilitation to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plans such that goals and objective are to protect and improve sage-grouse habitat needs.

•Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

• Maximize the area of interim and concurrent reclamation on infrastructure related disturbances through reshaping/regrading, topsoiling and revegetating cut and fill slopes. In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

• Ensure that all authorized ground disturbing projects have vegetation reclamation standards suitable for the site type prior to construction and ensure that reclamation to appropriate sage-grouse standards are budgeted for in the reclamation bond.

• Irrigate interim reclamation as necessary during dry periods when valid water rights exist.

• Utilize mulching techniques to expedite reclamation.

Salable and Non-Energy Minerals

Operations

• Cluster disturbances associated with operations and facilities as close as possible unless site specific conditions indicate that disturbances to sagebrush habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.

• Minimize site disturbance though site analysis and facility planning.

• Place infrastructure in already disturbed locations where the habitat has not been restored.

• Apply a phased development approach with concurrent reclamation through a coordination process among relevant parties.

• Reduce motor vehicle travel during field operations through development and implementation of remote monitoring and control systems plans.

• To reduce predator perching, limit the construction of vertical facilities and fences to the minimum number and amount needed.

• Site or minimize linear ROWs or SUAs to reduce disturbance to sage-grouse habitats.

• Co-locate new utility developments (power lines, pipelines, etc.) and transportation routes with existing utility or transportation corridors where adequate separation can be achieved in order to preserve grid reliability and ongoing maintenance.

• Bury distributive power lines of up to 35 kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

• Preclude sage-grouse access to pits and tanks through use of practical techniques (e.g. covers, netting, birdballs, location, etc.).

• Equip tanks and other above ground facilities with structures or devices that discourage nesting or perching of raptors, corvids, and other predators.

• Control the spread and effects of Nevada Department of Agriculture listed noxious weeds (NAC 555.010, classes A through C, inclusive) and undesirable non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007).. All projects within SGMA should have a noxious weed management plan in place prior to construction and operations.

• Reduce the potential for creating excessive or unintended mosquito habitat and associated risk of West Nile Virus impacts to sage-grouse. This can be implemented through minimizing pit and pond construction and, where necessary, size of pits and ponds Where West Nile virus has been identified as a concern, restrict pond and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).

• Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues and West Nile virus has been identified as a concern in the project area, use the steps described under "Fluid Minerals" for reservoir design to limit favorable mosquito habitat (Dohery 2007).

• Limit noise to less than 10 decibels above ambient measures one hour before sunrise until 9:00 a.m. within 3 miles of a lek during active lek season, March 1 through May 15 (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

• Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

• Fit new transmission towers with anti-perch devices (Lammers and Collopy 2007).

• Design and construct fences consistent with NRCS fence standards and specifications Code 382 and, where appropriate, use fence markers (Sage Grouse Initiative 2013)around sumps.

• Implement site keeping practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of sage-grouse (Bui et al 2010).

• Locate man camps outside of priority sage-grouse habitats.

Reclamation

• Include objectives for ensuring habitat rehabilitation to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plans such that goals and objective are to protect and improve sage-grouse habitat needs.

•Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and

habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

• Reclamation In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

• Maximize the area of interim and concurrent reclamation on infrastructure related disturbances through reshaping/regrading, topsoiling and revegetating cut and fill slopes. In coordination with appropriate agencies, consider development of fuel breaks in reclamation design.

• Ensure that all authorized ground disturbing projects have vegetation reclamation standards suitable for the site type prior to construction and ensure that reclamation to appropriate sage-grouse standards are budgeted for in the reclamation bond.

• Restore disturbed areas at final reclamation to near pre-disturbance landform and the desired plant community.

• Irrigate interim reclamation as necessary during dry periods when valid water rights exist.

• Utilize mulching techniques to expedite reclamation.

Fuels and Fire Management and Post-Fire Rehabilitation

• Fire and fuels operations should focus on protecting and enhancing occupied sage-grouse habitats. This includes taking into account the feasibility and cost of future rehabilitation efforts during Wildland Fire Decision Support Tree planning and general fire operations in all occupied sage-grouse habitats

Fuels Management

• Design fuels treatment objective to protect existing sagebrush ecosystems, modify fire behavior, restore ecological function, and create landscape patterns which most benefit sage-grouse habitat.

• Incorporate resilience and resistance and other best available science concepts into fuels treatment planning activities

• Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas used locally.

•Fuels treatment project design in sagebrush and pinyon-juniper encroached sagebrush habitats must be based on the best available science. At a minimum, project proponents will consider best available science including: use of site appropriate state and transition models; ecological site characteristics; and, the evaluation of resilience to disturbance and resistance to invasive annual grasses.

• Ensure the proposed prescription burning plans meet the need of the resource via a comprehensive review by proponents, fire managers, wildlife biologists and resource managers, at a minimum.

• Use prescriptive fire use on project sites where state and transition models, ecological site descriptions and existing high site resilience/resistance are used as principle components of the prescription planning process. The desired outcome of all prescription fire use in appropriate sagebrush habitat is to minimize undesirable long-term effects on vegetation or soils (e.g., minimize mortality of desirable perennial herbaceous species and reduce risk of annual grass invasion).

• Ensure proposed sagebrush treatments are planned with full interdisciplinary input pursuant to NEPA and coordination with NDOW and SETT, and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.

• Ensure that treatments are configured in a manner that promotes use by sage-grouse.

• Incorporate roads and natural fuel breaks into fuel break design

• Utilize supervised livestock grazing as a tool to reduce fuels and control non-native species. Targeted grazing needs to be conducted within the framework of the sage-grouse habitat objectives (Table 4-1).

• Power-wash all vehicles and equipment involved in fuels management activities prior to entering the area to minimize the introduction of undesirable or invasive plant species.

• Design vegetation treatments in areas of high fire frequency, which facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat. Additionally, develop maps for sage-grouse habitat, which spatially display existing fuels treatments that can be used to assist suppression activities.

• For implementing specific sage-grouse habitat rehabilitation projects in annual grasslands, first give priority to sites which are adjacent to or surrounded by Core Management Areas or that reestablish continuity between priority habitats. Annual grasslands are a second priority for rehabilitation when the sites are not adjacent to Core Management Areas, but within two miles of Core Management Areas. The third priority for annual grassland habitat restoration projects are sites beyond two miles of Core Management Areas. The intent is to focus restoration outward from existing, intact habitat. Within these criteria, projects should be prioritized based on probability of success based on current condition, ecological site and state-and-transition modeling if available.

• As funding and logistics permit, rehabilitate annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs with the goal of

establishing a functional ecological site based on state-and-transition modeling and ecological site descriptions..

• Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions

• Based on ecological site descriptions, remove encroaching pinyon and juniper trees from areas within at least 3 kilometers (1.86 miles) of occupied sage-grouse leks (Connelly et al. 2000) and from other limiting habitats at least 850 meters (e.g., nesting, wintering and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit (Connelly et al 2000, Casazza et al. 2011).

• Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.

• Reduce the risk of vehicle- or human-caused wildfires and the spread of invasive species by installing and maintaining fuel breaks or planting perennial vegetation (e.g., green-strips) paralleling road rights-of-way. Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, targeted grazing, etc.) to aid in controlling wildfire, should wildfire occur near SGMA or important restoration areas (such as where investments in restoration have already been made).

• All fuels management projects should include short and long term monitoring to ensure success and provide for adaptive management. Multiple revegetation entries may be required to ensure success.

Fire Management

• Compile state and local government/District/Forest level information into state-wide sage-grouse tool boxes. Tool boxes will contain maps, listing of state and local resource advisors, contact information, local guidance, and other relevant information for each

state and local government/District/Forest, which will be aggregated into a state-wide document. Update the toolbox annually or continually.

• Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.

• Assign a state or local resource advisor with sage-grouse expertise, or who has access to sage-grouse expertise, to all extended attack fires in or near sage-grouse habitat. 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. Involve state wildlife agency expertise in fire operations through:

– instructing resource advisors during preseason trainings;

– qualification as resource advisors;

– coordination with resource advisors during fire incidents;

– contributing to incident planning with information such as habitat features or other key data useful in fire decision making.

• On critical fire weather days, pre-position additional local, state, and federal fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.

• Encourage local resources (volunteer fire departments and country equipment) to respond to initial attack efforts and further encourage these agencies to obtain required ICS training to be able to run incidents for longer periods when needed during critical fire periods.

• During periods of multiple fires, ensure line officers, in consultation with state and local resource advisors are involved in setting priorities.

• To the extent possible, locate wildfire suppression facilities (i.e., 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, 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, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATV) prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.

• Minimize burnout operations in key sage-grouse habitat areas by constructing direct fire line whenever safe and practical to do so.

• Utilize retardant, mechanized equipment, and other available resources 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.

• Adequately document fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

• Coordinate and utilize local fire suppression resources to the maximum extent possible.

• Eliminate “burning out” islands and fingers of unburned sage-grouse habitat, unless lives and property are at risk.

Post-Fire Rehabilitation

• Emphasis should be on fall revegetation to ensure greatest likelihood of success.

- All post-fire rehabilitation projects should include short- and long-term monitoring to ensure success and provide for adaptive management. Multiple revegetation entries may be required to ensure success. Emphasize the use of native plant species in post-fire rehabilitation, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions. Selected species maintain site ecological function based on pre-burn conditions and anticipated threat of invasive and noxious weed establishment. Use ecological site descriptions and state-and-transition models if available.

- Reseed all burned areas requiring rehabilitation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

- Power-wash all vehicles and equipment prior to entering sage-grouse habitat rehabilitation/restoration areas to minimize noxious weed spread. Minimize unnecessary cross-country vehicle travel during rehabilitation/restoration operations in sage-grouse habitat.

- Consider Integrated Pest Management (IPM) practices to ensure greater initial control of invasive and noxious plant species.

- Sage-grouse seasonal habitat requirements must be considered when selecting revegetation materials in all burned potential and current sage-grouse habitat.

- Prioritize shrub island plantings in large burn areas which may lack sufficient shrub seed sources, in order to ensure the reestablishment of the shrub component.

Vegetation Management

• Avoid sagebrush removal in sage-grouse breeding or wintering habitats.

• Maintain all remaining large intact sagebrush patches, particularly at low elevations, through active management, in order to increase resistance and resilience to reduce the risk of being lost to wildfire.

• Limit habitat treatments in winter ranges to actions that maintain or expand current or needed levels of sagebrush available in winter.

Lands and Realty

Leases and Permits

• Permits and leases must include stipulations to minimize impacts to sage-grouse and sage-grouse habitat based upon the specific activity and ensure no net loss of sage-grouse habitat.

Right-of-Ways (ROWs)

• Work with existing rights-of-way holders to encourage installation of perch guards on all poles where existing utility poles are located within 5 km (3.2 miles) of known leks (Coates et al. 2013).

• Use existing utility corridors and consolidate rights-of-way to reduce habitat loss, degradation, and fragmentation. Install new power lines within existing utility corridors.

• Where sage-grouse conservation opportunities exist, BLM field offices and Forests should work in cooperation with rights-of-way holders to conduct maintenance and operation activities, authorized under an approved ROW grant, to avoid and minimize effect on sage-grouse habitat.

• When renewing or amending ROWs, assess the impacts of ongoing use of the ROW to sage-grouse habitat and incorporate stipulations, which minimize such impacts to the extent allowed by law.

• Conduct pre-application meetings with the BLM or Forest Service and SETT for all new ROW proposals consistent with the ROW regulations (43 CFR 2804.10) and consistent with current renewable energy ROW policy guidance (WO-IM-2011-061, issued February, 2011). Assess the impact of the proposed ROW on sage-grouse and its habitat, and implement the following: Ensure that reasonable alternatives for siting the ROW outside of sage-grouse habitat or within a BLM designated utility corridor are considered and analyzed in the NEPA document; and identify technically feasible best management practices, conditions, (e.g., siting, burying power lines) that may be implemented in order to eliminate or minimize impacts.

• Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.

• Authorize ROWs for wind energy development projects by applying appropriate Design Features as specified in the BLM Wind Energy Development EIS (BLM 2005), land use restrictions, stipulations, and mitigation measures.

• Bury distribution power lines of up to 35kV where ground disturbance can be minimized. Where technology and economic factors allow, bury higher kV power lines.

• Where existing leases or rights-of-way (ROWs) have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features, without interfering with valid pre-existing rights, and restoring the habitat.

• Within designated ROW corridors encumbered by existing ROW authorizations: new ROWs should be co-located to the extent practical and feasible with the entire footprint

of the proposed project adjacent to or within the existing disturbance associated with the authorized ROWs taking into account operational requirements and safety.

• Subject to valid, existing rights, where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes sage-grouse impacts. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the minimum standard necessary.

• Upon project completion, roads used for commercial access on public lands would be reclaimed, unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.

• Construct new power lines outside of sage-grouse habitat wherever possible. If power lines cannot be sited outside of sage-grouse habitat, site power lines in the least suitable habitat possible or bury power lines, where technology and economic factors allow.

• Remove power lines that traverse important sage-grouse habitats when facilities being serviced are no longer in use or when projects are completed.

• Install anti-perching and anti-nesting measures on new tall structures, such as power lines, commensurate with the design of the structures.

Travel and Transportation

• Work with local government to enforce speed limits and design roads to be driven at speeds appropriate to minimize vehicle/wildlife collisions.

• Conduct rehabilitation of roads, primitive roads, and trails not designated in travel management plans where such plans exist and have been approved for implementation.

This also includes primitive route/roads that were not designated in wilderness study areas and within lands managed for wilderness characteristics that have been selected for protection, with due consideration given to any historical significance of existing trails.

• When reseeding roads, primitive roads, and trails, use appropriate seed mixes and consider the use of transplanted sagebrush in order to meet sage-grouse habitat restoration objectives (Table 4-1). Where invasive annual grasses are present, herbicides may be used to enhance the effectiveness of any seeding and to also establish islands of desirable species for dispersion.

• Use existing roads, or realignments to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then any new roads would be constructed to the minimum standard necessary to support the intended use.

• Work with local governments to minimize upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on sage-grouse habitat, is necessary for motorist safety, or eliminates the need to construct a new road, while providing for the intended use.

• Manage on-road travel and OHV use in key grouse areas to avoid disturbance during critical times such as winter and nesting periods.

• Consider road removal, realignment, or seasonal closures where appropriate to avoid degradation of habitat and /or to avoid disturbance during critical periods of the sage-grouse life cycle

Recreation

• Special recreation permits must have stipulations to minimize impacts to sage-grouse and sage-grouse habitat based upon the specific activity and ensures no net unmitigated loss of sage-grouse habitat.

• Issue special recreation permits with appropriate distance and timing restrictions to minimize impacts to seasonal sage-grouse habitat.

• Develop trail mapping, and educational campaigns to reduce recreational impacts on sage-grouse, including effects of cross country travel.

• Where feasible, locate recreation trails strategically to create or augment fuel breaks in the margins of sage-grouse habitats and landscapes and not create roads or trails where they cause net negative direct and indirect impacts.

• Take measures to minimize or reduce activities and to avoid an ambient noise level increase >10 dB at the edge of leks during the lekking season generally, March 1 through May 15 from one hour before sunrise until 9:00 a.m. (Patricelli et al. 2010, Blickley et al. 2012, Patricelli et al. 2013).

Energy Development and Infrastructure

• Adopt standards outlined in *Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and Their Habitats,* April 2010, pgs. 25-29 (Appendix G).

Wild Horses and Burros

• When conducting NEPA analysis for wild horse and burro management activities, water developments or other rangeland improvements for wild horses in sage-grouse habitat, address the direct and indirect effects to sage-grouse populations and habitat. Implement any water developments or rangeland improvements using the criteria for

wild horses and burros year around use and consistent with necessary rights and right of ways in sage-grouse habitats. Incorporate the NRCS water development standards and additional criteria listed below, including Codes 614, 574, 533, 642, and 516.

Livestock Grazing and Range Management

• Where applicable and as part of a ranch management plan, use the Natural Resource Conservation Service (NRCS) Conservation Practice Standards and Specification listed below[11]. In addition, use the recommendations additions to the standards developed by NRCS and NDOW as part of NRCS' Sage-grouse Initiative and further expanded by the state of Nevada in this document:

- Code 645: Upland Wildlife Habitat Management
- Code 528: Prescribed Grazing
    - Emphasize rest periods or seasonal deferment when appropriate as part of the grazing management plan and restoration.
- Code 614: Water Facilities
    - Avoid placement where existing sagebrush cover will be reduced near a lek, in nesting habitat, or winter habitat whenever possible. NDOW recommends structures be at least 1 mile from a lek.
- Code 574: Spring Development
    - Springs may be developed as long as valid water claims or rights exist and development shows a net benefit to overall habitat management within a SGMA.
- Code 533: Pumping Plant

[11] These USDA; NRCS Conservation Practice Codes as well as others can be found at: http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/references/?cid=nrcs143_026849

    - NDOW recommends the structure should not be placed within 3 miles of a lek to avoid disturbance to nesting sage-grouse.
- Code 642: Water Well
    - Well placement should encourage dispersion of livestock and provide for a neutral or no net negative impact to habitat within a SGMA. Further water developments will decrease concentrated livestock and wildlife use and further protect sagebrush habitats.
- Code 516: Livestock Pipeline
    - Pipelines shall be replaced as needed to provide for better dispersion of livestock.
    - Pipelines shall be replaced along existing pipelines, roadways, or fences.
    - Replacement and maintenance of pipelines shall use the least invasive techniques and extensive work requiring heavy equipment shall be done in a manner consistent with season of use by the sage-grouse (i.e. replacing improvements in sage-grouse winter habitat during the summer and replacing improvements in breeding and nesting habitat during the fall)
    - Replacement of improvements shall be allowed in order to not jeopardize existing and valid claims and rights.
- Code 410: Grade Stabilization Structure
    - If possible, avoid the installation of these structures during the late summer brood rearing period. NDOW recommends structure placement in mid-September through late November.
- Code 382: Fence
    - If possible, fencing should not be constructed near a lek and should be avoided in winter habitats near ridges. To make a fence more visible, use white tipped metal fence posts, securing flagging or reflectors to the

top fence wires, or slide sections of PVC pipe over the top wire (Stevenson and Reece 2012).

• Relocate or modify existing water developments (including locating troughs to further disperse livestock) that are having a net negative impact on sage-grouse habitats. Any changes to existing water developments must be conducted in accordance with State Water Law and in close consultation with the water right owner in order to avoid a "taking" of private property water rights.

• All troughs should be outfitted with the appropriate type and number of wildlife escape ramps.

• All field and district offices should apply BLM IM 2013-094 or similar methodology until superseded related to drought management planning.

Surface Disturbing Activities – General

• During the period specified, based upon site-specific conditions manage discretionary surface disturbing activities and uses to prevent disturbance to sage-grouse during life cycle periods. Seasonal protection is identified for the following:

-Seasonal protection within three (3) miles of active sage-grouse leks from March 1 through June 15 during lekking hours of 1-hour before sunrise until 9:00 a.m.

-Seasonal protection of sage-grouse suitable wintering areas from November 1 through March 31;

-Seasonal protection of sage-grouse suitable brood-rearing habitat from May 15 to August 15.

• Implement appropriate time-of-day or time-of year restrictions for future construction or maintenance activities in known sage-grouse habitat

• Reseed all areas requiring reclamation with a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the invasion of noxious weeds or other exotic invasive species. Long-term monitoring is required to determine success.

• Minimize the footprint of disturbances to avoid or minimize the potential for invasive plant infestations. When possible, do not remove native vegetation. Monitor, report, and treat all disturbance sites that become occupied by invasive plants, primarily cheatgrass, and all state listed noxious weeds. Pre- and post-disturbance activities must include prevention strategies prior to entering sites. Treatments, restoration, and monitoring are required for a minimum of three years or until the site is deemed noxious and invasive weed free following the disturbance. Reporting should be sent to the Nevada Department of Agriculture via the EDDMapS link on their website.

• Maximize the area of interim reclamation on long-term surface disturbing activities to including reshaping, topsoiling and revegetating areas no longer being disturbed within the overall project foot print.

Miscellaneous

• In Wilderness and Wilderness Study Areas (WSA), the state of Nevada will work with the federal land management agencies to investigate the use of mechanized equipment in those areas in conformance with the Wilderness Act, Federal Land Policy and Management Act, and National Forest Management Act. The State will also support congressional efforts to investigate and responsibly use additional techniques (including mechanized) to protect or restore areas that exhibit unique or emergency

circumstances (fire, P/J expansion, invasive weeds infestations, excessive fuels, etc.) in order to protect the area from long term resource damage..

• Work with federal, state, and local governments and project proponents to minimize anthropogenic subsidies for predators, including ravens.

Appendix B:

Development Process and Justification for Habitat Objectives

for Greater Sage-Grouse in Nevada

Greater Sage-Grouse Proposed Habitat Objectives

Questions and Answers

1. How were the Proposed Habitat Objectives for GRSG developed?

   The proposed habitat objectives are a synthesis of existing data across the state of Nevada and portions of the Bi-State in California. The U.S. Geological Survey was primarily responsible for much of the synthesis and in translating often complex habitat relationships and GRSG responses into the proposed habitat objectives which could be summarized and applied on the ground. A team consisting of representatives from the U.S. Fish and Wildlife Service, BLM, Nevada Department of Wildlife, and U.S. Forest Service reviewed the Connelly et al. 2000 guidelines and also reviewed a bibliography of Nevada-based research made available by the U.S. Geological Survey. The team then went through each Connelly et al. 2000 guideline and reviewed it with respect to localized data. The Connelly et al. 2000 guidelines remained as a default unless refined by new information.

2. Why are the Proposed Habitat Objectives for GRSG different from Connelly et al. 2000 guidelines?

   The Connelly et al. 2000 guidelines were a strong synthesis of research until that time. The guidelines themselves suggest that studies which define GRSG habitat on a more region-specific basis should be used where supported by research. These proposed habitat objectives respond to more localized data than the Connelly et al. 2000 guidelines, which relied heavily on data from the eastern half of the range of GRSG where a perennial grass component is more dominant, and where large-scale ecological changes such as invasive grasses and conifer encroachment are largely absent. The proposed habitat objectives reflect those differences.

3. What are the differences between the Proposed Habitat Objectives for GRSG and Connelly et al. 2000 guidelines?

While numerous differences exist, they are driven primarily by three elements: 1) the reduced role of perennial grasses for nest concealment as revealed by many nesting habitat studies throughout Nevada; 2) the increased habitat fragmentation and degradation as a result of invasive grasses and conifer encroachment; and 3) the elevated importance of late-summer brood-rearing habitats in the lower precipitation zones of Nevada. The proposed habitat objectives also reflect recent research into more complex aspects of habitat juxtaposition, such as the interspersion of meadow habitat with adjacent sagebrush cover, and the attempt to quantify other scale-dependent relationships such as the degree of conifer encroachment.

4. Are the Proposed Habitat Objectives for GRSG supported by science?

   The proposed habitat objectives are supported by numerous studies throughout Nevada from the Bi-State area in southwestern Nevada and California through the Elko District into northeastern Nevada. Much of the synthesis of research which resulted in these proposed habitat objectives for GRSG was conducted by the U.S. Geological Survey.

5. Are the Proposed Habitat Objectives for GRSG consistent with the BLM National Technical Team report (NTT)?

   The NTT report suggests the use of local and state seasonal GRSG habitat objectives when they are available and references the habitat recommendations from Connelly et al. 2000 if they are not.

6. What is the rationale for eliminating the residual cover standard (7 in/18cm) from GRSG nesting habitat?

   Localized data indicate that sagebrush canopy cover was the primary indicator of nesting success within Nevada. Research indicates that the primary deterrent to successful nesting was predation, specifically by common ravens, an aerial predator. Thus, the research demonstrated that overhead concealment was the primary

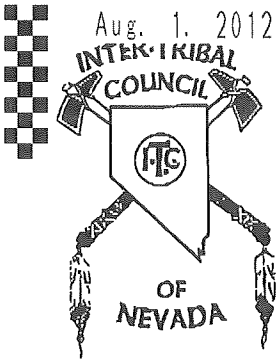
indicator of nesting success and that the lateral concealment component of perennial grasses drove nesting success only when sagebrush canopy was deficient.

7. What is the difference between tall trees and powerlines?

These differ in degree of impact. Generally, powerlines are larger and have much greater visibility. They contribute to fragmentation and provide potential predators with larger scale, more pervasive access to habitats.

Appendix C:

Inter-Tribal Council of Nevada Resolution



INTER-TRIBAL COUNCIL OF NEVADA, INC.

660 GREENBRAE DR., SUITE 265 • SPARKS, NV 89431
P.O. BOX 7440 • RENO, NV 89510
PHONE (775) 355-0600 • FAX (775) 355-0648

BATTLE MOUNTAIN BAND COUNCIL
CARSON COLONY COMMUNITY COUNCIL
DRESSERVILLE COMMUNITY COUNCIL
DUCK VALLEY SHOSHONE-PAIUTE BUSINESS COUNCIL
DUCKWATER SHOSHONE TRIBAL COUNCIL
ELKO BAND COUNCIL
ELY SHOSHONE COUNCIL
FALLON BUSINESS COUNCIL
FT. McDERMITT PAIUTE-SHOSHONE TRIBES
GOSHUTE BAND COUNCIL
LAS VEGAS PAIUTE TRIBAL COUNCIL
LOVELOCK TRIBAL COUNCIL
MOAPA BUSINESS COUNCIL
PYRAMID LAKE TRIBAL COUNCIL
RENO/SPARKS TRIBAL COUNCIL
SOUTH FORK BAND COUNCIL
STEWART COMMUNITY COUNCIL
SUMMIT LAKE PAIUTE COUNCIL
TE-MOAK TRIBAL COUNCIL
TIMBISHA SHOSHONE TRIBE
WALKER RIVER PAIUTE TRIBAL COUNCIL
WASHOE TRIBAL COUNCIL
WELLS BAND COUNCIL
WINNEMUCCA COLONY COUNCIL
WOODFORDS COMMUNITY COUNCIL
YERINGTON PAIUTE TRIBAL COUNCIL
YOMBA TRIBAL COUNCIL

RESOLUTION NO. 12-ITCN-06

RESOLUTION
OF
INTER-TRIBAL COUNCIL OF NEVADA, INC.

SAGE GROUSE MANAGEMENT AREA ON TRIBAL LANDS

WHEREAS, The Inter-Tribal Council of Nevada, Inc., is organized and operates in accordance with its Constitution and By-Laws, amended in November 1974; and

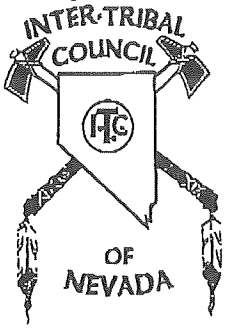
WHEREAS, the purposes of Inter-Tribal Council of Nevada, Inc. (ITCN), are stated in its Constitution, Preamble; and

WHEREAS, the Executive Board, a body comprised of the twenty-seven (27) representatives of the federally recognized member tribes in the State of Nevada and whose Charter is ratified by these same tribes; and

WHEREAS, the Inter-Tribal Council of Nevada has a continuing interest in the health, education and well-being of their Indian people; and

WHEREAS, the Inter-Tribal Council of Nevada respects the sovereign to sovereign relationship between the Tribes and the State of Nevada and the federal government; and

WHEREAS, a Memorandum of Agreement may be sought on behalf of each individual Tribe to further develop the efforts needed for the management, monitoring, and surveying for sage grouse.



INTER-TRIBAL COUNCIL OF NEVADA, INC.

680 GREENBRAE DR., SUITE 265 • SPARKS, NV 89431
P.O. BOX 7440 • RENO, NV 89510
PHONE (775) 355-0600 • FAX (775) 355-0648

BATTLE MOUNTAIN BAND COUNCIL
CARSON COLONY COMMUNITY COUNCIL
DRESSERVILLE COMMUNITY COUNCIL
DUCK VALLEY SHOSHONE-PAIUTE BUSINESS COUNCIL
DUCKWATER SHOSHONE TRIBAL COUNCIL
ELKO BAND COUNCIL
ELY SHOSHONE COUNCIL
FALLON BUSINESS COUNCIL
FT. McDERMITT PAIUTE-SHOSHONE TRIBES
GOSHUTE BAND COUNCIL
LAS VEGAS PAIUTE TRIBAL COUNCIL
LOVELOCK TRIBAL COUNCIL
MOAPA BUSINESS COUNCIL
PYRAMID LAKE TRIBAL COUNCIL
RENO/SPARKS TRIBAL COUNCIL
SOUTH FORK BAND COUNCIL
STEWART COMMUNITY COUNCIL
SUMMIT LAKE PAIUTE COUNCIL
TE-MOAK TRIBAL COUNCIL
TIMBISHA SHOSHONE TRIBE
WALKER RIVER PAIUTE TRIBAL COUNCIL
WASHOE TRIBAL COUNCIL
WELLS BAND COUNCIL
WINNEMUCCA COLONY COUNCIL
WOODFORDS COMMUNITY COUNCIL
YERINGTON PAIUTE TRIBAL COUNCIL
YOMBA TRIBAL COUNCIL

WHEREAS, the sage grouse (*Centrocercus urophasianus*) is a valued native avian species with declining populations that have been severely impacted by habitat degradation, by declining big sage populations, by invasive plants, by increased predation, by mining interest, by recreational use, and by livestock grazing; and

WHEREAS, the ITCN recognizes the need for tribes to protect and conserve, to the greatest extent possible, the existing wildlife habitat of sage grouse within and/or adjacent to the boundaries of all tribal lands within Nevada; and

WHEREAS, the cooperative efforts will involve survey and monitoring activities, conservation planning, and protecting key habitat areas to assist with all sage grouse life stages which include brooding, migration and lek habitat; and

WHEREAS, the sage grouse is recognized by Nevada tribes traditional song and dance, language, and stories/legends and there is presence of Traditional Ecological Knowledge (TEK) regarding sage grouse and their habitat be protected for tribes' value and conservation efforts; and

WHEREAS, the ITCN acknowledges the valiant effort to protect existing sage grouse populations through the development of a Sage Grouse Conservation Plan for the State of Nevada; and

INTER-TRIBAL COUNCIL OF NEVADA, INC.

680 GREENBRAE DR., SUITE 265 • SPARKS, NV 89431
P.O. BOX 7440 • RENO, NV 89510
PHONE (775) 355-0600 • FAX (775) 355-0648

BATTLE MOUNTAIN BAND COUNCIL
CARSON COLONY COMMUNITY COUNCIL
DRESSERVILLE COMMUNITY COUNCIL
DUCK VALLEY SHOSHONE-PAIUTE BUSINESS COUNCIL
DUCKWATER SHOSHONE TRIBAL COUNCIL
ELKO BAND COUNCIL
ELY SHOSHONE COUNCIL
FALLON BUSINESS COUNCIL
FT. McDERMITT PAIUTE-SHOSHONE TRIBES
GOSHUTE BAND COUNCIL
LAS VEGAS PAIUTE TRIBAL COUNCIL
LOVELOCK TRIBAL COUNCIL
MOAPA BUSINESS COUNCIL
PYRAMID LAKE TRIBAL COUNCIL
RENO/SPARKS TRIBAL COUNCIL
SOUTH FORK BAND COUNCIL
STEWART COMMUNITY COUNCIL
SUMMIT LAKE PAIUTE COUNCIL
TE-MOAK TRIBAL COUNCIL
TIMBISHA SHOSHONE TRIBE
WALKER RIVER PAIUTE TRIBAL COUNCIL
WASHOE TRIBAL COUNCIL
WELLS BAND COUNCIL
WINNEMUCCA COLONY COUNCIL
WOODFORDS COMMUNITY COUNCIL
YERINGTON PAIUTE TRIBAL COUNCIL
YOMBA TRIBAL COUNCIL

WHEREAS, the ITCN Executive Board endorses the attachment 1 of approved language that would be updated into the final State of Nevada Sage Grouse Conservation Plan.

NOW THEREFORE BE IT RESOLVED that the Executive Board, on behalf of their membership, hereby supports the statewide Sage Grouse Conservation Plan effort by including any applicable Nevada tribal lands within Sage Grouse Management Areas through a Memorandum of Agreement for direct involvement for the purposes of monitoring, surveying, developing recommended conservation measures, funding, and protecting the sage grouse and its sagebrush habitat.

CERTIFICATION

The foregoing resolution was adopted by poll vote of the Inter-Tribal Council of Nevada's Executive Board, completed on the 25th day of July, 2012, by a

Vote of __12__ FOR, __0__AGAINST, and__0__ ABSTENTIONS.

Daryl Crawford, ITCN Executive Director
for
Bryan Cassadore, Secretary
ITCN Executive Board

Appendix D:

Cooperation of State and Federal Agencies for Depredation Permits for Common Raven

Cooperation of State and Federal Agencies for Depredation Permits for Common Raven

The USFWS can authorize depredation permits for the 'take' of common ravens, which are protected under the Migratory Bird Treaty Act. Currently in the State of Nevada, there are permits that authorize the 'take' of approximately 5,000 ravens annually, which constitutes five percent of the estimated 100,000 resident ravens (2003 estimate, Wildlife Services) in Nevada. NDOW is authorized to take 2,500 ravens; USDA-APHIS-Wildlife Services (WS) is authorized to take 1,500, and other private sources around 1,000. NDOW's permit is specifically authorized for the protection of sage-grouse and other game species. WS' permit is authorized for the protection of livestock. Other permits are authorized for the protection of property, public health and welfare (power companies, landfills, etc.). The most recent population estimate for Nevada is 190,000 ravens (2013 estimate, WS). This may potentially lead to an increase in permit allocations in the future if they can be justified

WS is a federal agency that works cooperatively with the Nevada Department of Agriculture's Division of Animal Industry. Its primary objective is to protect livestock and farming interests from damage caused by predators or other nuisance species. WS is authorized to perform their duties on federal land and may enter into agreements with state, tribal, county, or private landowners to conduct their business. Predator control is a major component of their duties.

Specific to ravens, WS certified applicators are the only ones authorized by the EPA to either apply or directly supervise those applying the avicide DRC-1339 to execute the federal depredation permit authorized by the USFWS for the taking of migratory birds.

Currently, WS and NDOW are working jointly to reduce raven densities with the aim to enhance sage-grouse recruitment rates, which can be affected by raven predation of sage-grouse eggs and chicks. NDOW designates priority areas for treatment and WS treats hard-boiled chicken eggs with DRC-1339 and places them within the priority

areas. Monitoring and data collection is done by both agencies as well as other partners to inform future implementation of the program and determine the efficacy of the protocols used.

Appendix E:

Process to Prioritize Integrated Predator Management Projects

Process to Prioritize Integrated Predator Management Projects

The following frame work will be used to prioritize where Objective 1.1, 1.2, and 1.3 are implemented across the state.

Step 1: State level mapping for ravens and sage-grouse. This should be an ongoing process updated every few years.

a. Contract with USGS to conduct landscape level modeling to estimate location of high raven occupancy (following methods for Raven Selection Probability Function (RSPF) as described in Coates et al., In Review).
   If funding is not available to conduct modeling, regional biologists would submit areas of concern for evaluation.

b. Conduct modeling of sage-grouse nesting habitat

c. Intersect areas of raven concern with areas of sage-grouse nesting habitat. Select 5-15 sites to be evaluated at the site level. Until map of nesting habitat for sage-grouse in Nevada is available, the Core Management Area should be used.

Step 2: Site level analysis. This step should be conducted annually.

a. Conduct raven surveys at 5-15 sites identified during Step 1 following a selected raven survey protocol to determine raven densities.
b. Evaluate sage-grouse demographic data, as available, to determine if nest success is a limiting factor. Areas identified for potential raven removal should be prioritized for sage-grouse demographic data collection as feasible.
c. Use information from the above two steps to identify 2-5 project sites for Integrated Predator Management around the State. Sites that have identified nest success as limiting to the populations due to raven predation should be prioritized for treatment. Sites that have greater than 0.46 ravens per km^2 should be prioritized for treatment (Coates et al., In Review). Exact number of

project locations should be determined by number of raven take permits available, funding for projects, and personnel to carry out work.

Once Prioritized Integrated Predator Management Project locations are identified, the following steps should be completed.

1. Develop Integrated Predator Management Program for each project location.
    a. Develop anthropogenic subsidies control plan for project location following recommendations in Predation Goal 1 Objective 1.
    b. Develop habitat integrity improvement plan for project location recommendations in Predation Goal 1 Objective 2.
    c. Develop predator control plan for project location following recommendations in Predation Goal 1 Objective 3.
        i. Develop treatment regime for project area
            1. Determine/set parameters of predator control area (where damage is occurring)
            2. Determine/set parameters of predator control project timing (when resource is vulnerable)
            3. Establish species to be targeted and methods/techniques which are acceptable
            4. Determine what constitutes a “corrected” situation (when does project end, e.g. stop lethal control once raven density is below density thresholds or a lack of population response to actions is determined)
        ii. Establish predator monitoring regimes
            1. Pre-treatment monitoring of predator numbers (frequency, number & type).
            2. Treatment monitoring of predator numbers (frequency, number & type).

3. Post-treatment monitoring of predator numbers (frequency, number & type).

iii. Establish sage-grouse monitoring regimes

1. Monitor sage-grouse population trends/demographic rates to determine effectiveness of predator control practices.

Appendix F:

Template Cooperative Monitoring Agreement

COOPERATIVE MONITORING AGREEMENT

1. Introduction

The Joint Cooperative Monitoring Agreement is instituted under the authority of the Memorandum of Understanding between the U.S. Department of the Interior, Bureau of Land Management (BLM) and the Public Lands Council dated January 30, 2004.

The BLM and _____[*cooperator*] enter into this agreement with the intent to strengthen their partnership in monitoring of the _____ Allotment. Resource objectives will be a central feature of this agreement because they will become the target and guide regarding what and how to monitor, and for what reasons. Resource objectives will be measurable and attainable statements of the desired resource attributes.

The BLM and _____[*cooperator*] expect the monitoring plan to evolve over time. New data will provide input on how to better interpret and apply the monitoring results. This will enable the parties to optimize the application of cooperative techniques throughout the monitoring partnership. The parties will work together to determine how the monitoring results will be used to refine and redirect the strategies and tactics for both the monitoring and management plans.

2. Existing Management Objectives

The _____ Allotment was evaluated through a Rangeland Health Evaluation and Assessment document in _____[*year*]. Allotment-specific

objectives were brought forward through the Final Multiple Use Decision (FMUD) for each key management area for upland areas, riparian zones, wildlife habitat, and wild horse and burro management. These objectives were established to be in conformance with the current Land Use Plan (LUP) and the Standards for Rangeland Health. Objectives under the LUP, Rangeland Program Summary, and Allotment Evaluation are attached. Also attached are the _____ Resource Advisory Council Standards and Guidelines (RAC S&Gs).

3. Existing Monitoring Data/Information and Additional Data Needs to Address Established Resource Objectives

a. Established Monitoring Methodologies

Short-term	**Long-term**
Actual Use Information	Trend (Frequency study)
Use Pattern Mapping	Production/Composition/Ecological Status
Key Species Utilization at long-term upland monitoring sites	Cover
Riparian Utilization	Weed Inventory
	Water Quality
	Climate data
	Wild Horse & Burro Census
	Riparian Proper Functioning Condition (PFC) Assessment

b. Additional Studies Needed

Short-term	Long-term
None	Upland Soil Site Stability
	Photo Trend Monitoring
	Riparian Multiple Indicator Monitoring (MIM)

4. Future Monitoring Attributes and Protocols

a. Key Management Areas, Critical Area, or Designated Management Areas have been selected for the _____ Allotment utilizing BLM protocols. The site(s) will be reconfirmed jointly. If a site is not reconfirmed as an appropriate monitoring site, consideration must be given to the historical data associated with the site and a determination should be made whether or not to continue monitoring this site to retain trend information.

b. Monitoring by the BLM and the cooperator will be consistent with BLM protocol and technical references. Short and long-term monitoring studies will allow for measurement(s) towards specific objective(s).

c. Any updates to technical references/BLM protocol will be incorporated for use under this cooperative monitoring agreement in the future. If additional monitoring studies become available that will supplement studies already occurring for measuring an objective, this cooperative monitoring agreement will be updated.

5. Frequency and Timing of Monitoring (cooperator/agency specific for each cooperative monitoring agreement and cooperator interest)

a. Short-term monitoring will be collected on an annual or semi-annual basis, unless otherwise stipulated. Long-term monitoring will be measured at 3-10 year intervals unless otherwise stipulated or if observations indicate a more rapid than expected rate of change. Observers will be consistent in the plant phenology or time of year in which data are collected. If new sites are established, data collection will follow BLM protocol, BLM technical references, and this Cooperative Agreement.

b. The following monitoring studies will be conducted as appropriate in order to measure progress towards meeting the objectives and for determining if the RAC S&Gs are being met.

Short-term monitoring (Upland triggers or indicators):

Study	**Responsible Party**	**Collection Period**
Actual Use	Cooperator	Annually
Trigger Monitoring	Cooperator	Annually
Key Area Utilization	BLM	Semi-annually
Landscape Appearance (Ranchers' Monitoring Guide)	Cooperator	Annually
Use Pattern Mapping	BLM	As grazing management changes, funding, and priorities dictate
Climate	BLM and Cooperator	Annually

Long-term monitoring (Upland objectives):

Study	Responsible Party	Collection Period
Frequency	BLM	Every 5-10 years
Photo Trend	Cooperator	Annually
Production/Composition	BLM	Every 5-10 years
Line Intercept	BLM	Every 5-10 years
Line-Point Intercept	BLM	Every 5-10 years

Short-term monitoring (Riparian triggers or indicators):

Study	Responsible Party	Collection Period
Utilization/Stubble Height	BLM	Every 3-5 years
Stream Bank Alteration	BLM	Every 3-5 years

Long-term monitoring (Riparian objectives):

Study	Responsible Party	Collection Period
PFC (assessment)	BLM	Every 5-10 years
Multiple Indicator Monitoring	BLM	Every 5-10 years

c. Each party will contact the other party prior to collecting monitoring data on the _____ Allotment in order to further promote a cooperative and collaborative working environment.

d. If a cooperator is interested, they may request to collect additional monitoring studies from those assigned above after adequate training and verification by the BLM.

e. Parties are encouraged to conduct monitoring efforts together, where possible.

6. Data Analysis

a. The BLM and the Permittee will meet to discuss the monitoring data collected. Each party will be provided copies of the monitoring data collected each given year for the associated monitoring file.

b. The BLM and the Cooperator will meet periodically to discuss the monitoring data collected.

c. The BLM and the Cooperator will review data analysis jointly and discuss any future changes that may be needed in order to address resource concerns.

7. Agreement Implementation

a. Collection of monitoring data specified in this cooperative agreement will occur at appropriate times immediately upon signature of this agreement. Data share between the parties will occur by the end of each calendar year.

Cooperator _____ Date_____

BLM Authorized Officer_____ Date_____

Appendix G:

Nevada Energy and Infrastructure Development Standards to Conserve Greater Sage-grouse Populations and their Habitats, excerpt page 25-29

VII. Standards to Avoid or Minimize Impacts to Sage-grouse (All Energy Developments)

It is important to note here that some recommendations differ for non-migratory and migratory populations of sage-grouse. For the purposes of this document, non-migratory populations of sage-grouse are those where the majority of individuals do not make long distance movements between or among seasonal ranges (individuals travel <10 km one way between seasonal ranges). Migratory populations are those in which a preponderance of individual grouse move ≥10 km one way between seasonal ranges (derived from Connelly et al. 2000).

A. Site Selection

1. The NGSCT considers Category 1 habitats (leks and nesting habitat) irreplaceable and Category 2 habitats (quality winter and brood rearing habitats) critical to the long term persistence of sage-grouse populations. Energy or transmission development should be avoided within Category 1 and 2 sage-grouse habitats.
2. Energy development is strongly discouraged from occurring in Category 3 habitats; however, if unavoidable, projects in these habitats should be situated to minimize impact through placement in the least suitable portion of habitat.
3. Renewable energy developers are encouraged to pursue project development activities within Category 4 and 5 habitats within the range of sage-grouse in Nevada.
4. Project proponents should focus on previously disturbed sites in high potential wind resource areas. These areas could be described as those with prior disturbances including, but not limited to, previously burned areas, dense pinyon and juniper woodlands, areas converted to agriculture and areas within existing linear rights of way (transmission corridors).
5. If habitat categories have not been identified for a certain area, energy facilities and transmission lines should not be sited within 3 miles of the nearest active lek location for non-migratory populations[3].
   a. To the greatest extent possible, energy developers should work closely with NDOW and pertinent federal agency biologists to determine important nesting, brood rearing and winter habitats and avoid those areas.
6. Where populations of sage-grouse are considered migratory, energy facilities and transmission lines should not be sited within 3 miles of the nearest active lek location and should not be sited within the associated nesting habitat for that particular population.
   a. Consideration should also be given to movement corridors between breeding, nesting, brood-rearing or winter habitat. These movement corridors may not be well defined unless significant radio marking investigations have been conducted for a particular population. It is recommended that these investigations take place where project proponents are proposing developments in likely movement corridors for sage-grouse.
7. No development should occur within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats.

[3] Holloran (2005) found that natural gas development within 3 – 5 km (approximately 2 - 3 miles) of active sage-grouse leks led to dramatic declines in breeding populations. Walker et al. (2007) also found that coal-bed natural gas development within 0.8 km and 3.2 km had strong negative effects on sage-grouse and detected effects as far as 6.4 km. Johnson et al. (In Press) found that few leks were located within 5 km (≈3 miles) of developed land and trends in male attendance were lower for those leks with more developed land within 5 km or 18 km.

B. Pre-Development Planning and Survey Requirements (All Energy Related Developments)

Each proposed energy facility requires some level of detailed individual evaluation. Unique habitat conditions can and do exist due to local variations in wildlife populations and movement patterns, habitats, area topography, facility design, and weather (Alberta Fish and Wildlife Division 2005). The level of pre-project planning and the need for certain surveys or monitoring depends on the seasonal habitat that the project is located in and the importance of the particular habitat. It is the intent of the NGSCT to complete mapping of habitat categorizations in 2010. The following are standards recommended by the NGSCT for pre-project planning and surveys:

1. Identify the cover type of habitat and habitat category of proposed development by using R-value classifications, current seasonal habitat delineations and previous telemetry information. These habitat types and categories should be determined on a site specific basis through consultation with NDOW.
2. A remote assessment (utilizing GIS applications) of present habitat condition should be conducted. This assessment should include vegetative classification, seasonal habitat layers, aerial photos, fire polygons and other man-made structures on the landscape including transmission lines, roads or other anthropogenic features.
3. If the project happens to occur in Category 1 or 2 habitats, a comprehensive monitoring plan should be developed and approved by NDOW that addresses demographics and seasonal movement patterns. The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee provides sound recommendations in their Interim Guidelines for Evaluating the Impacts of Energy Development (Appendix A).
4. In Category 3 or 4 habitats, field investigations should be conducted by the applicant to determine the actual condition of the habitat and the approximate extent of use by sage-grouse through consultation with NDOW. The potential for habitat improvement should be identified and a restoration or habitat enhancement plan should be developed.
5. If a project is located in Category 5 habitats, surveys (radio-marking of individuals in adjacent sage-grouse populations or stratified random pellet counts) should be considered to determine if sage-grouse move through the area between seasonal habitat patches. If movement across the area is detected, then recommendations should be made to preserve movement patterns by grouse.

C. Project Development (All Energy Related Developments)

Through this guidance document, we hope to eliminate more direct impacts to sage-grouse populations through avoidance of Category 1 through 3 habitats. However, unless Greater Sage-grouse habitats are afforded increased protection from federal land management agencies such as the BLM, it is likely that some form of renewable energy development will occur within these types of habitats. The NSGCT recognizes that there are projects in the advanced stages of permitting or development which have obtained final or near-final siting approvals from federal, state and/or private entities, and that the siting and/or mitigation commitments for such projects may not be consistent with some of this document's recommendations. Where this is the case, and where the project has worked with federal and state agencies on matters relevant to wildlife prior to the release of this document, the NSGCT respects agreements that have

already been made with regard to siting and mitigation measures. We hope that project proponents in these situations can use the recommended guidance contained in this document to minimize the effects of development where possible. However, if sage-grouse are listed as a threatened or endangered species by the U.S. Fish and Wildlife Service in the future, then projects on federal lands would be subject to section 7 consultation. Prior agreements may be subject to further review.

It is important to note here that some recommendations differ for non-migratory and migratory populations of sage-grouse. For the purposes of this document, non-migratory populations of sage-grouse are those where the majority of individuals do not make long distance movements between or among seasonal ranges (individuals travel <10 km one way between seasonal ranges). Migratory populations are those in which a preponderance of individual grouse move ≥10 km one way between seasonal ranges (derived from Connelly et al. 2000). If a project were approved in Category 1 through 3 habitats, the following represents guidelines suggested by the NGSCT:

1. Where sage-grouse populations are non-migratory energy facilities should not be constructed within 3 miles of the nearest active lek site (see Chapter 1, Section C).
2. Where populations of sage-grouse are considered migratory, energy facilities should not be constructed within 3 miles of the nearest active lek location and should not be sited within the associated nesting habitat for that particular population.
3. If construction within 3 miles of an active sage-grouse lek is absolutely unavoidable, conduct construction activities from 15 July to 30 November to avoid disturbing sage-grouse during the breeding, nesting, early brood rearing and winter periods.
    a. If pumping stations are placed within 3 miles of an active lek, consideration should be given, and attempts made to place these features in an area where noise would least impact the actual lek using topography to help mask noise.
4. Avoid practices that remove sagebrush cover in these habitat categories as they may be the most important areas to sage-grouse using these habitats.
5. No development or infrastructure features should be placed within 0.6 miles (1 km) of identified late brood rearing habitats, especially meadow complexes and springs. These features can provide a competitive advantage for avian predators; therefore increasing sage-grouse mortality during a period when birds may be susceptible.
6. A comprehensive monitoring plan approved by the Nevada Department of Wildlife will be required to monitor sage-grouse demographics, vital rates and movement patterns before, during and after the construction phase within Category 1 – 3 habitats. The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee provide sound recommendations in their Interim Guidelines for Evaluating the Impacts of Energy Development (Appendix D).
7. Within Category 1-3 sage-grouse habitats, a company representative should be on site to oversee compliance during construction and provide environmental training to on-site personnel. This individual is responsible for overseeing compliance with all protective measures and coordination in accordance with the permitting authority and resource agencies should have the authority to issue a “stop work order” if deemed necessary.
8. Human Activity (Daily Operations/Maintenance)
    a. Vehicle trips should be limited to those times that would least impact nesting or wintering grouse:

i. Vehicle trips should not occur on a regular basis within 3 miles of an active lek or in identified nesting habitats from 01 March through 15 May.
   1) If vehicle trips are required during the lekking period, vehicles should only be operated from 10:00 a.m. to 5:00 p.m. daily.
ii. Public access to construction areas should be limited if construction activities are occurring from 01 March through 15 May.

D. Associated Infrastructure (Transmission Lines, Road, Substations, Fences, etc.)

The infrastructure associated with utility scale energy developments can potentially be as detrimental as the facility itself. Roads, transmission lines, substations, fences and vehicle traffic can all eliminate or create disturbance within sage-grouse habitats. Even though a wind generation facility or geothermal power plant may not be constructed in optimal sage-grouse habitats, it is likely that roads and/or transmission lines associated with the facility will be. The following guidelines apply to associated infrastructure:

1. Transmission lines should not be sited within 3 miles of the nearest active lek location or in nesting habitat that occurs outside lek buffers.
   a. In instances where transmission line placement is within 3 miles of the nearest active lek location and cannot be avoided, apply standards 5-9 in this section.
      i. Attempt to place the line in the least suitable habitat within a 3 mile radius of the nearest active lek.
      ii. Consider placing the transmission line to the west of the nearest active lek so that avian predators are at a disadvantage (i.e., looking into the sun) in the early morning hours.
2. Roads and below ground infrastructure (i.e. buried power lines, pipelines) should not be sited within 0.6 miles (1 km) of the nearest lek site. These features are a concern because their construction directly removes potential nesting habitat and act as vectors for invasive plant species establishment (e.g., cheatgrass).
3. To the greatest extent practical, transmission lines should be placed near existing highway corridors at “minimum safe distances” designated by the BLM or project proponent to reduce direct and indirect effects to sage-grouse.
4. In all instances where structures are to be placed in sage-grouse habitat, especially nesting habitat, preliminary surveys should be conducted to identify sage-grouse nesting areas and all attempts should be made to avoid these areas.
5. Structures should be constructed with the least amount of perching or nesting substrate possible by avoiding such things as external ladders and platforms.
6. Use tubular tower designs with pointed tops rather than lattice designs.
   a. This should be applied as a standard design within the range of sage-grouse in Nevada regardless of habitat categorization.
7. In addition to tubular towers, conventional perch and nesting deterrents should be utilized in adherence to the Migratory Bird Treaty Act. Perching and nest deterrents include:
   a. devices installed on support towers;
   b. actual physical maintenance through hazing; and/or
   c. physical removal of nest structures.
8. Avoid removing sagebrush cover whenever feasible, especially in identified winter habitats.
9. Avoid use of guy wires whenever possible.

a. In some circumstances, use of guy wires may facilitate tower design features which minimize perching and nest building (e.g. guyed V tubular tower). The overall benefit to sage-grouse of these designs is likely to compensate for any direct affect to sage-grouse from guy wire strikes; however, guy wires should be marked with devices (e.g. spiral vibration damper, FireFly™ bird flight diverter) to increase the visibility of the wires to avian species, thus minimizing strikes.

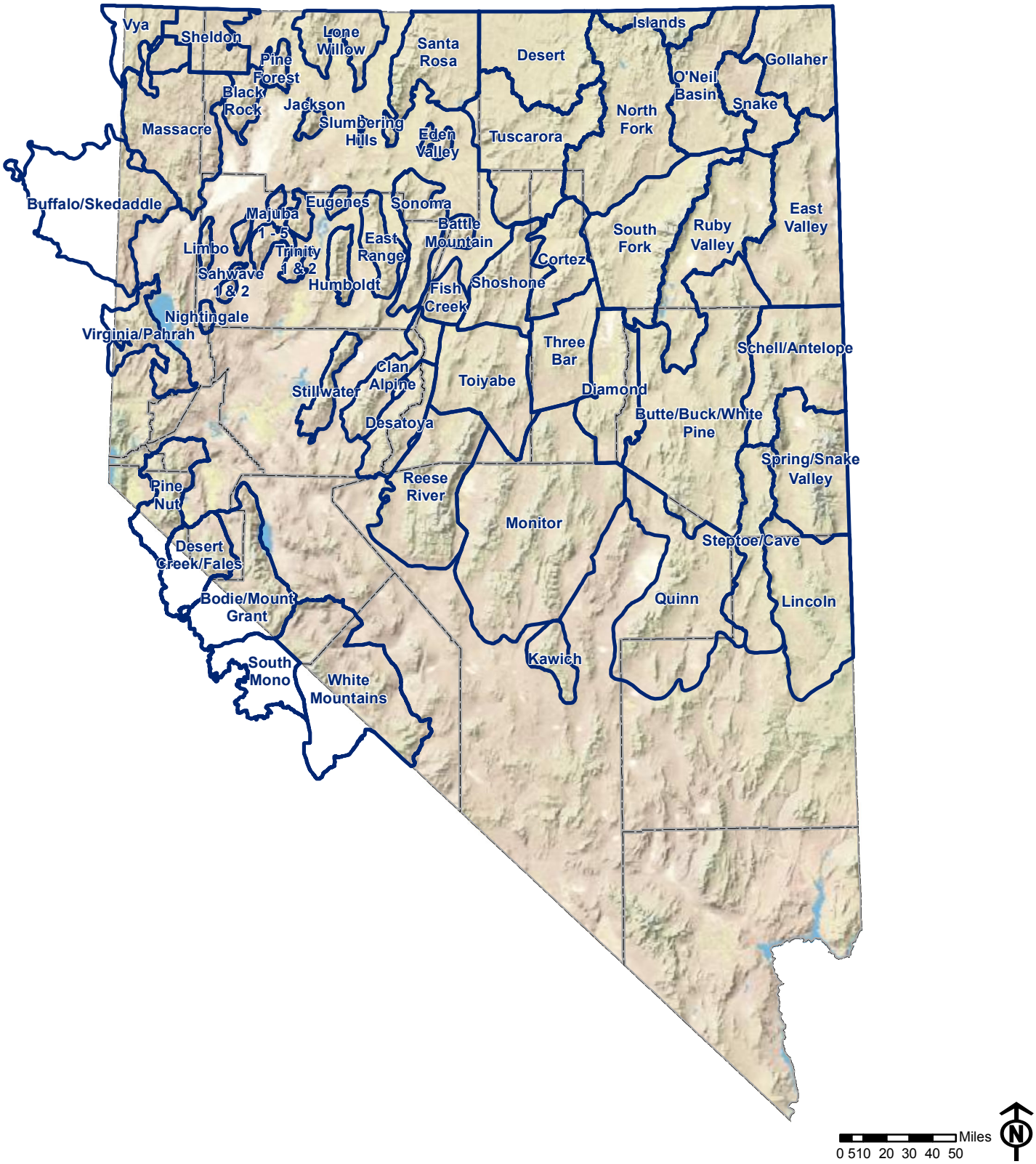
10. To reduce the impact of new fences on sage-grouse, new fence proposals (including those for emergency stabilization and rehabilitation) should be carefully evaluated for sage-grouse collision risk (BLM IM 2010-022).
    a. In the process of prioritizing areas for flagging or marking fences, state wildlife agency personnel shall be consulted (BLM IM 2010-022).

E. Post Project Development

1. Monitoring
    a. Within Category 1 through 3 sage-grouse habitats, a comprehensive monitoring plan will be required that addresses demographics, vital rates and seasonal movement patterns. The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee provide sound recommendations in their Interim Guidelines for Evaluating the Impacts of Energy Development (Appendix D).
    b. Information gained from monitoring can be used to help develop future mitigation measures.
2. Noxious Weed Prevention
    a. Roads and the footprint of wind turbine pads, geothermal energy plants, and transmission lines should be monitored at least annually for any noxious weeds and, if found, treated with appropriate techniques.
3. Noise Reduction
    a. Noise levels from geothermal facilities, oil and gas pumping stations or gas pipeline compressor stations should not exceed 55 decibels (dBa) at leks. Several noise muffling techniques and equipment are available.
        i. Noise mufflers should be installed at gas compressor stations;
        ii. Noise barriers should be installed around oil and gas pumping stations;
        iii. Temporary noise shields should be constructed around portions of the drilling rigs and used on standard construction equipment.
4. Decommissioning
    a. Any roads that were built, primarily for construction only, should be decommissioned post construction to deter dispersed vehicle use within sagebrush habitats and the creation of new roads.
        i. Decommissioned roadways should be restored, to the greatest extent practicable, to the pre-existing vegetative condition.
    b. Developers should restore pathways of buried transmission lines or pathways to a desired vegetative condition.

FIGURES

Figure 1: Sage-grouse Population Management Units 203
Figure 2: Sage-grouse Management Area 204
Figure 3: Habitat Suitability Classes 205
Figure 4: Management Categories 206
Figure 5: Habitat Suitability Index 207
Figure 6: Fire History 1910-2013 208
Figure 7: Probability of Cheatgrass Occurance 209
Figure 8: Single Leaf Pinyon Pine and Utah Juniper Ranges in NV 210
Figure 9: HMAs and HTBTss in Nevada 211
Figure 10: BLM and USFS Grasing Allotments in Nevada 212
Figure 11: Utility Corridors for Co-location in Nevada 213



Greater Sage-Grouse Population Management Units

September 19, 2014

Projection: UTM Zone 11 North, NAD83

No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of the data for individual use or aggregate use with other data.

V:\ActiveProjects\Game\Niell_Lara\NV_SG_PMUs_09192014.mxd

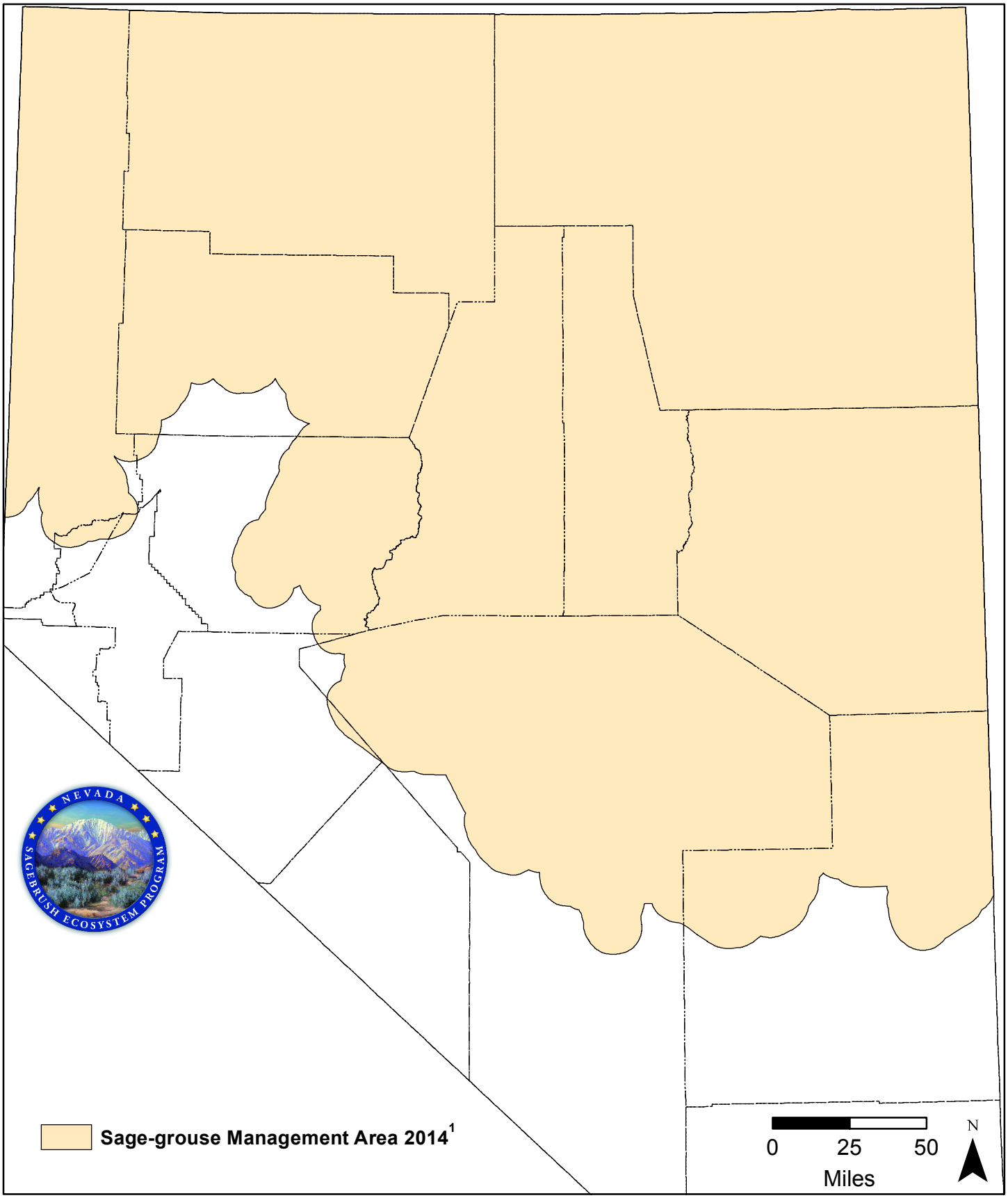


Figure 2. Sage-grouse Management Area (SGMA)

1. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

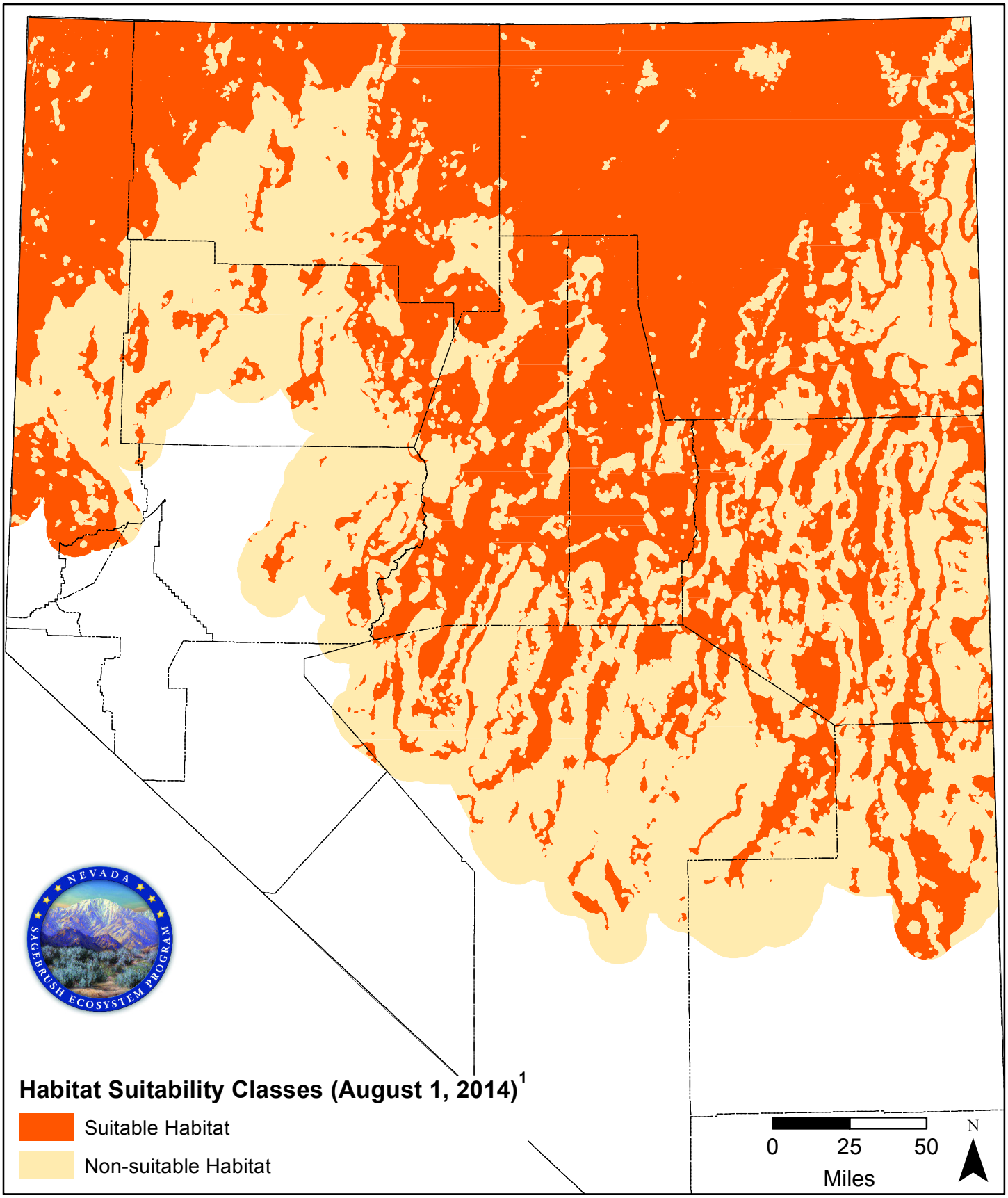


Figure 3. Habitat Suitability Classes

1. Coates et al. 2014

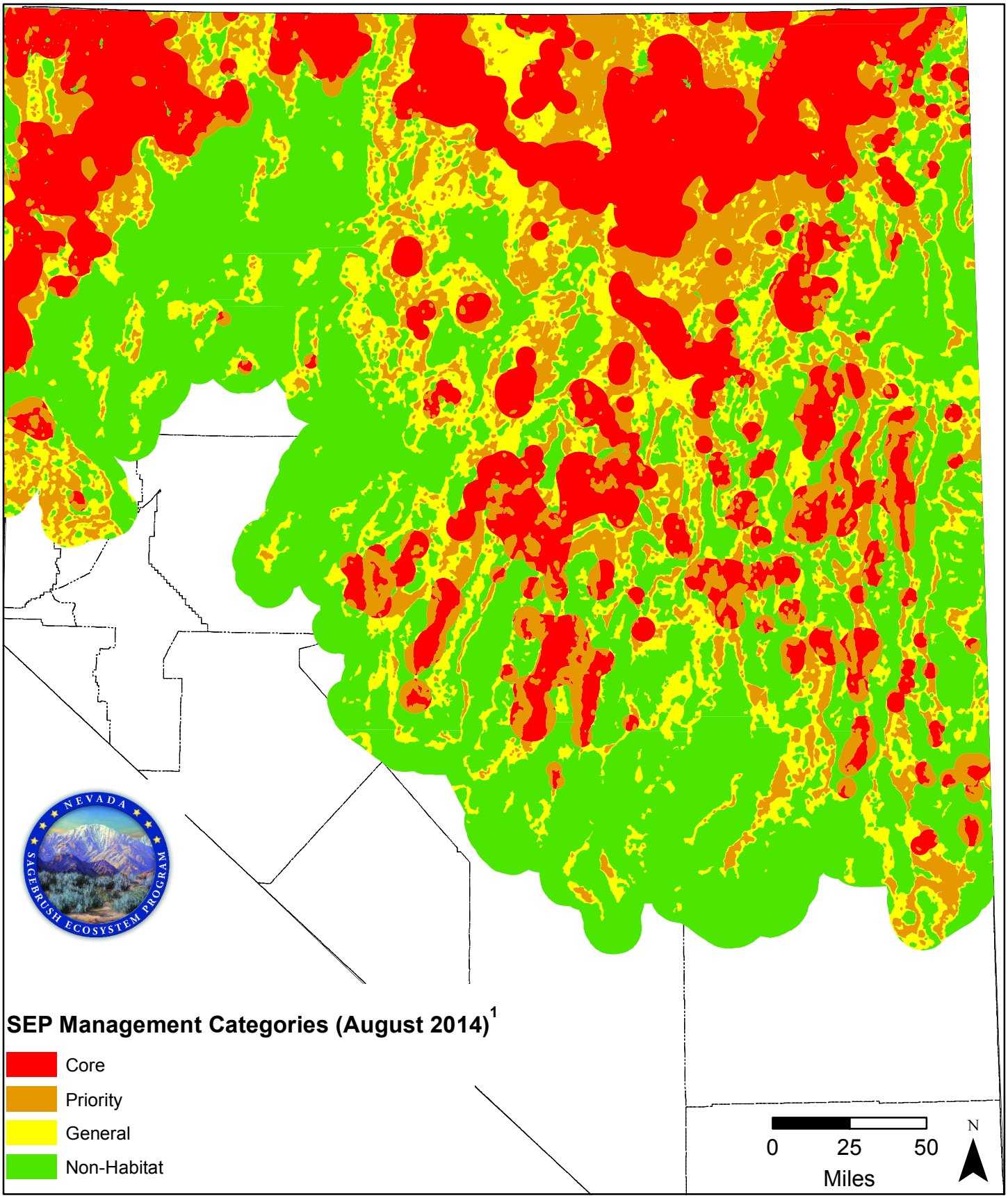


Figure 4. Management Category Map

1. Coates et al. 2014

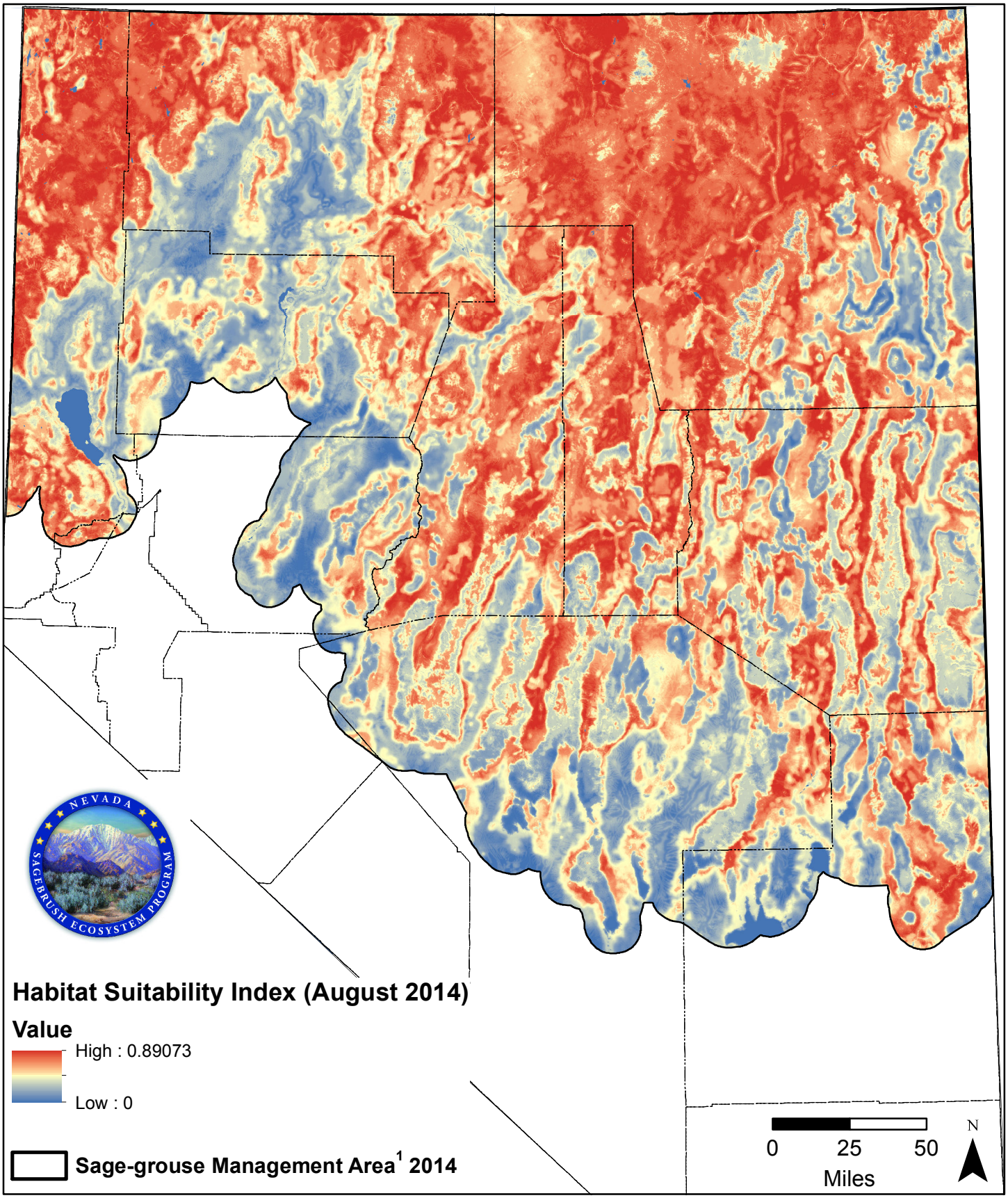


Figure 5. Habitat Suitability Index

1. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

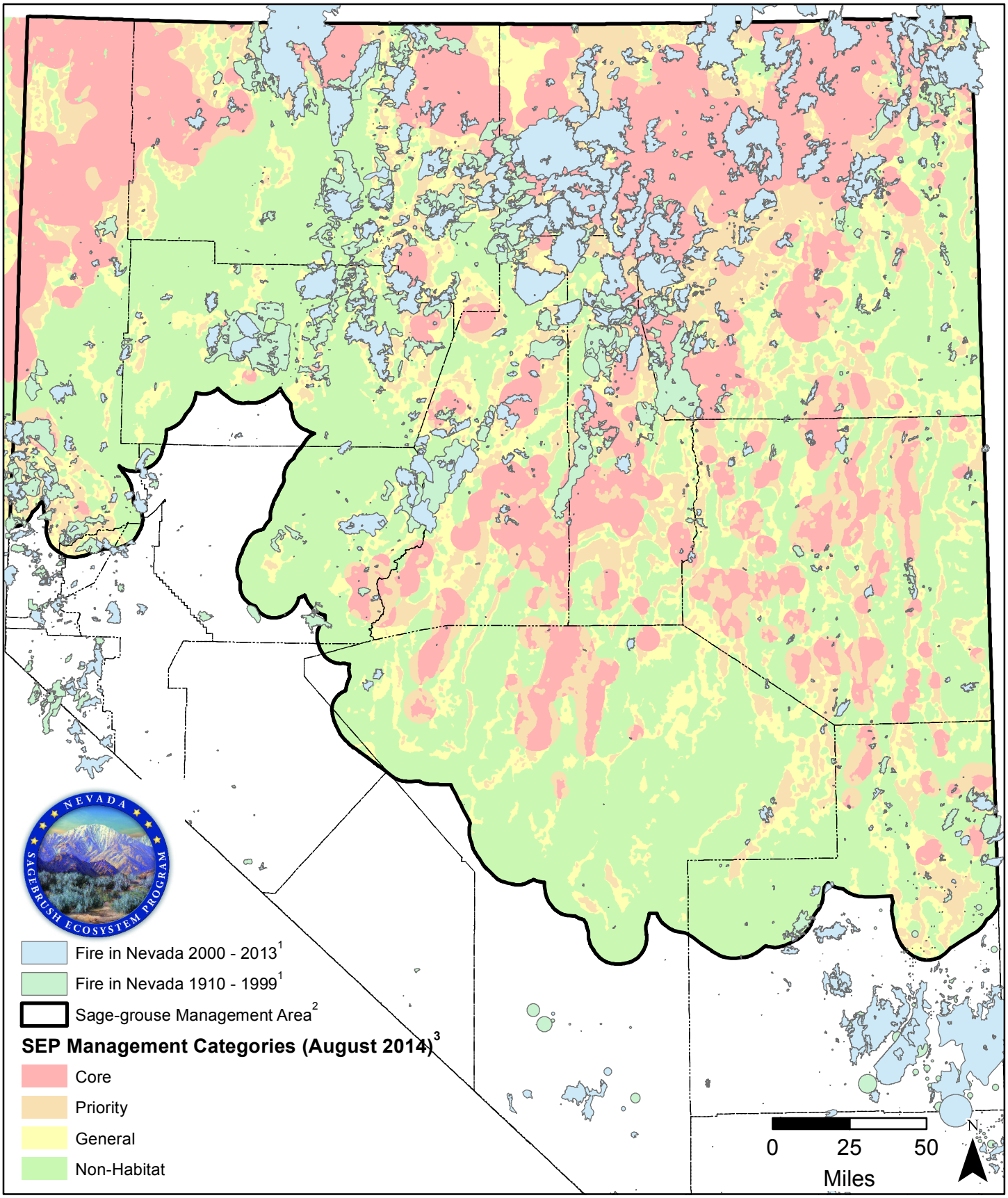


Figure 6. NV Fire History (1910 - 2013)

1. http://www.blm.gov/nv/st/en/prog/more_programs/geographic_sciences/gis/geospatial_data.html Accessed August, 2014
2. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.
3. Coates et al. 2014

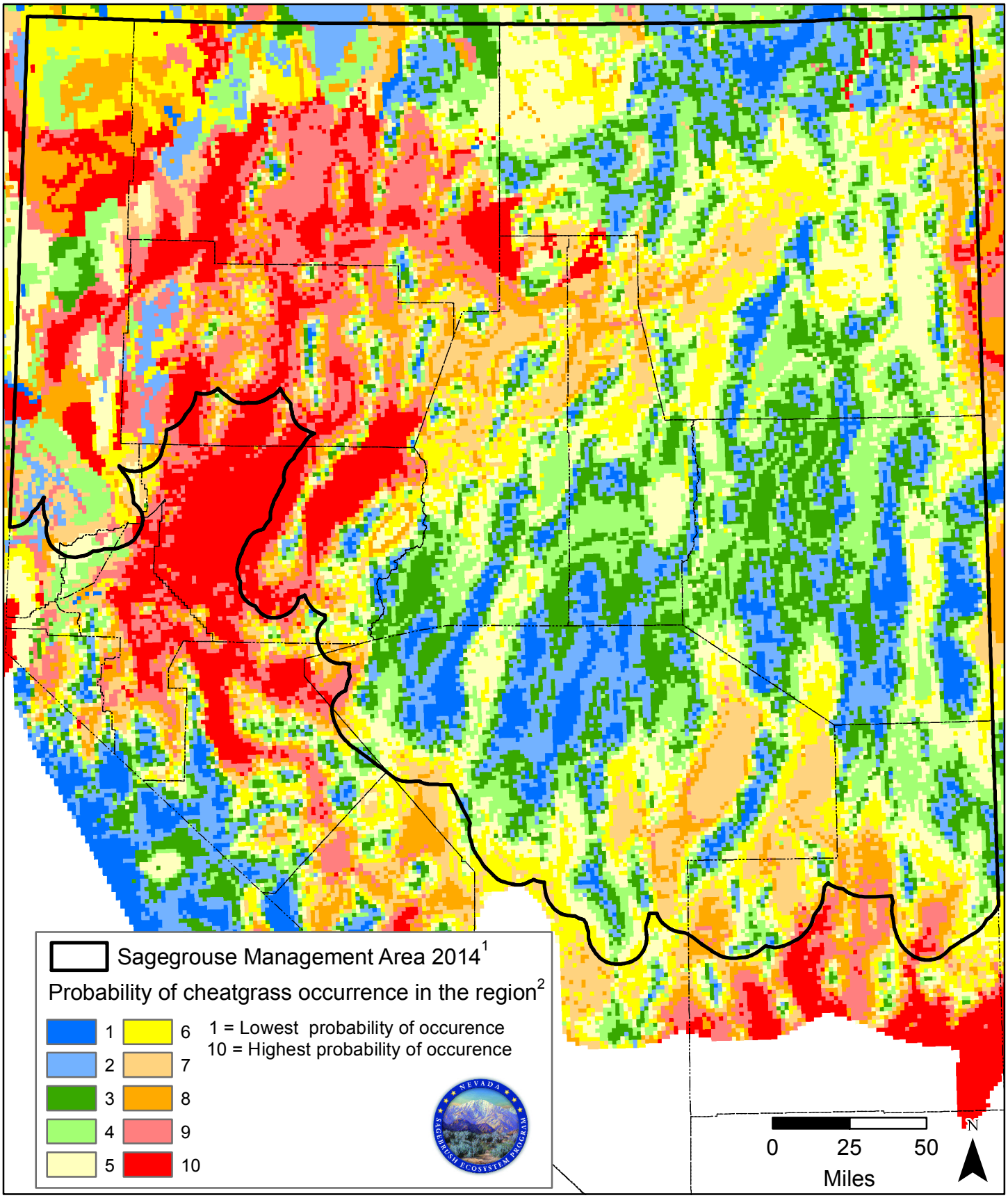


Figure 7. Probability of Cheatgrass Occurance

1. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

2. http://sagemap.wr.usgs.gov/ftp/sab/cheat_dec.zip Accessed September 2014

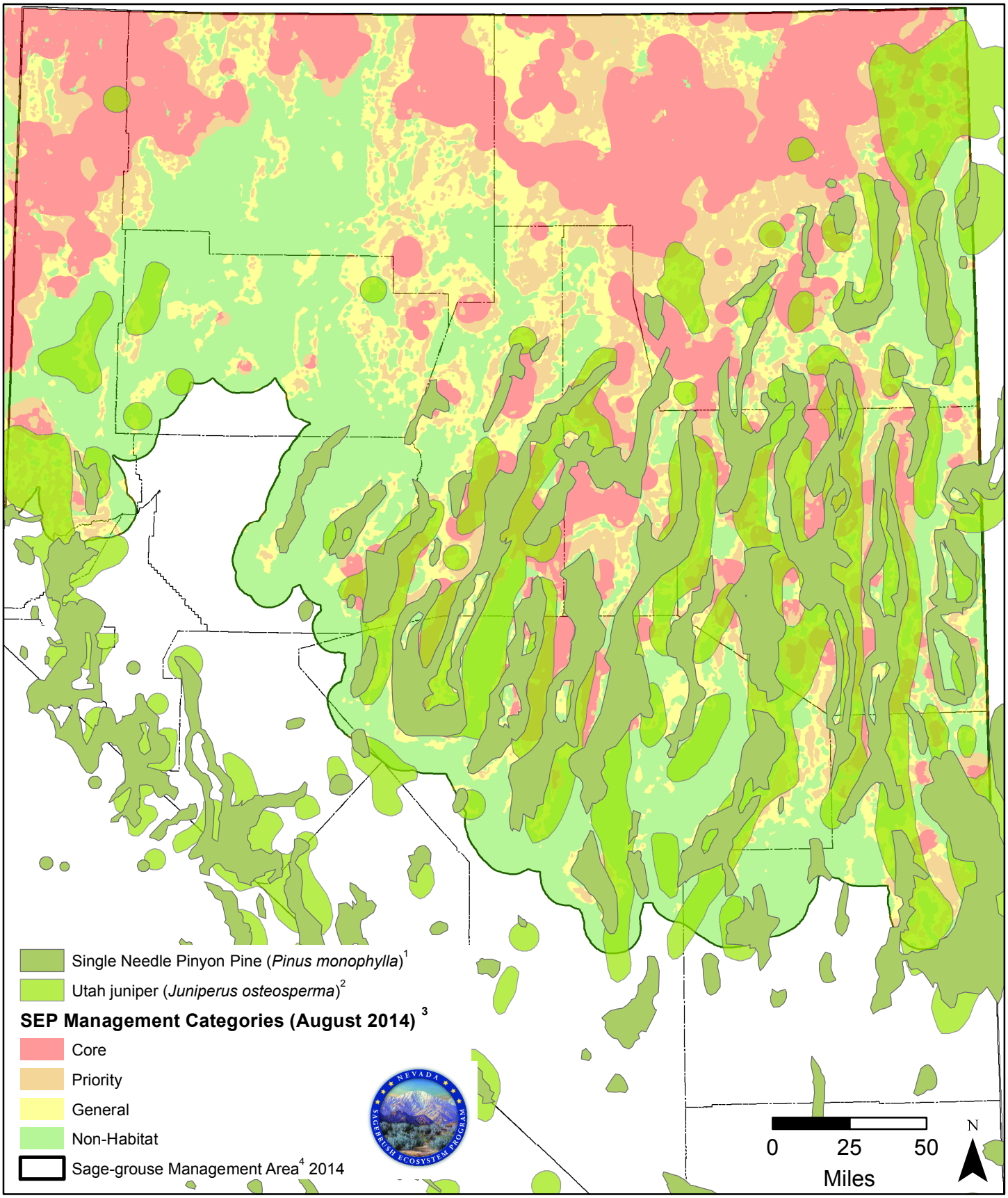


Figure 8. Single Leaf Pinyon Pine and Utah Juniper Ranges in NV

1. Data Basin: http://app.databasin.org/app/pages/datasetPage.jsp?id=ba674e845007441685a725d8fa962eb3
2. Atlas of the United States Trees by Elbert L. Little Jr.
3. Coates et al. 2014
4. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

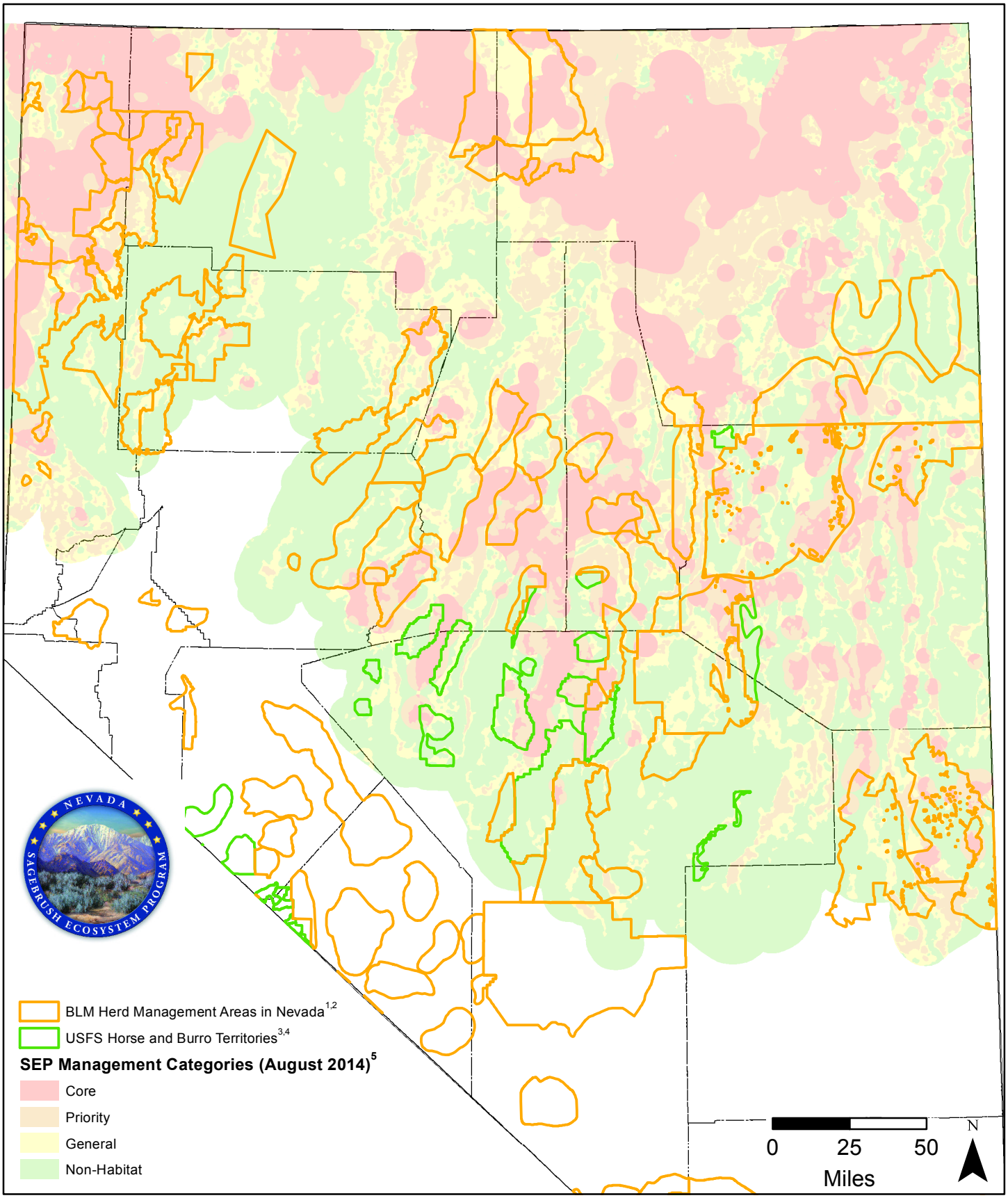


Figure 9. HMAs and WHBTs in Nevada

1. http://www.blm.gov/ca/gis/index.html Accessed August 13, 2014
2. http://www.blm.gov/nv/st/en/prog/more_programs/geographic_sciences/gis/geospatial_data.html Accessed August 13, 2014
3. http://www.fs.usda.gov/detail/r5/landmanagement/gis/?cid=STELPRDB5327833 Accessed August 13, 2014
4. http://www.fs.usda.gov/main/htnf/landmanagement/gis Accessed February 18, 2014
5. Coates et al. 2014

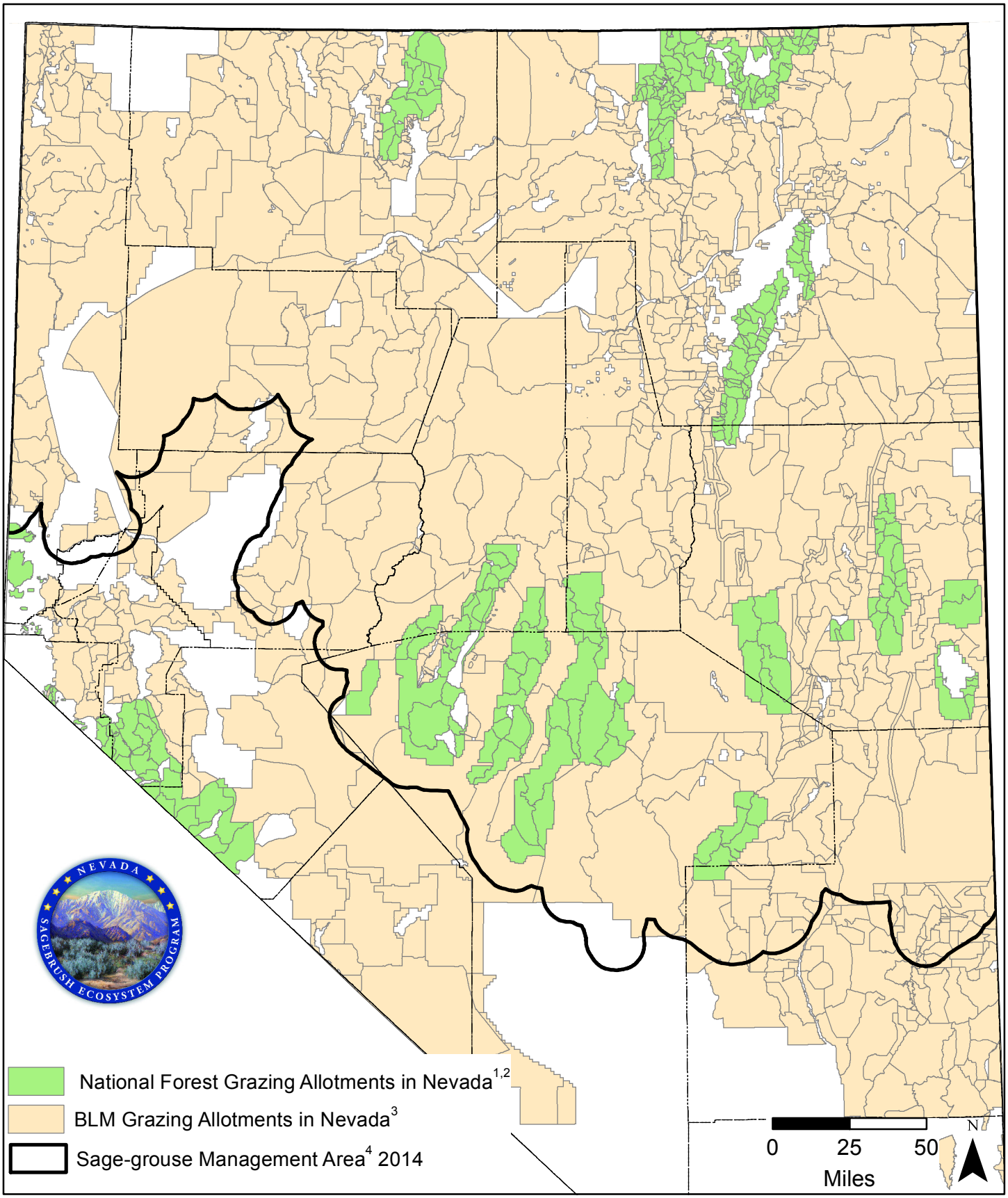


Figure 10. BLM and FS Grazing Allotments in Nevada

1. http://www.fs.usda.gov/main/htnf/landmanagement/gis Accessed August 12, 2014
2. http://www.fs.usda.gov/detail/r5/landmanagement/gis/?cid=STELPRDB5327833 Accessed August 13, 2014
3. http://www.geocommunicator.gov/shapefilesall/GA/BLM_Grazing_allotments.zip Accessed August 12, 2014
4. The express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

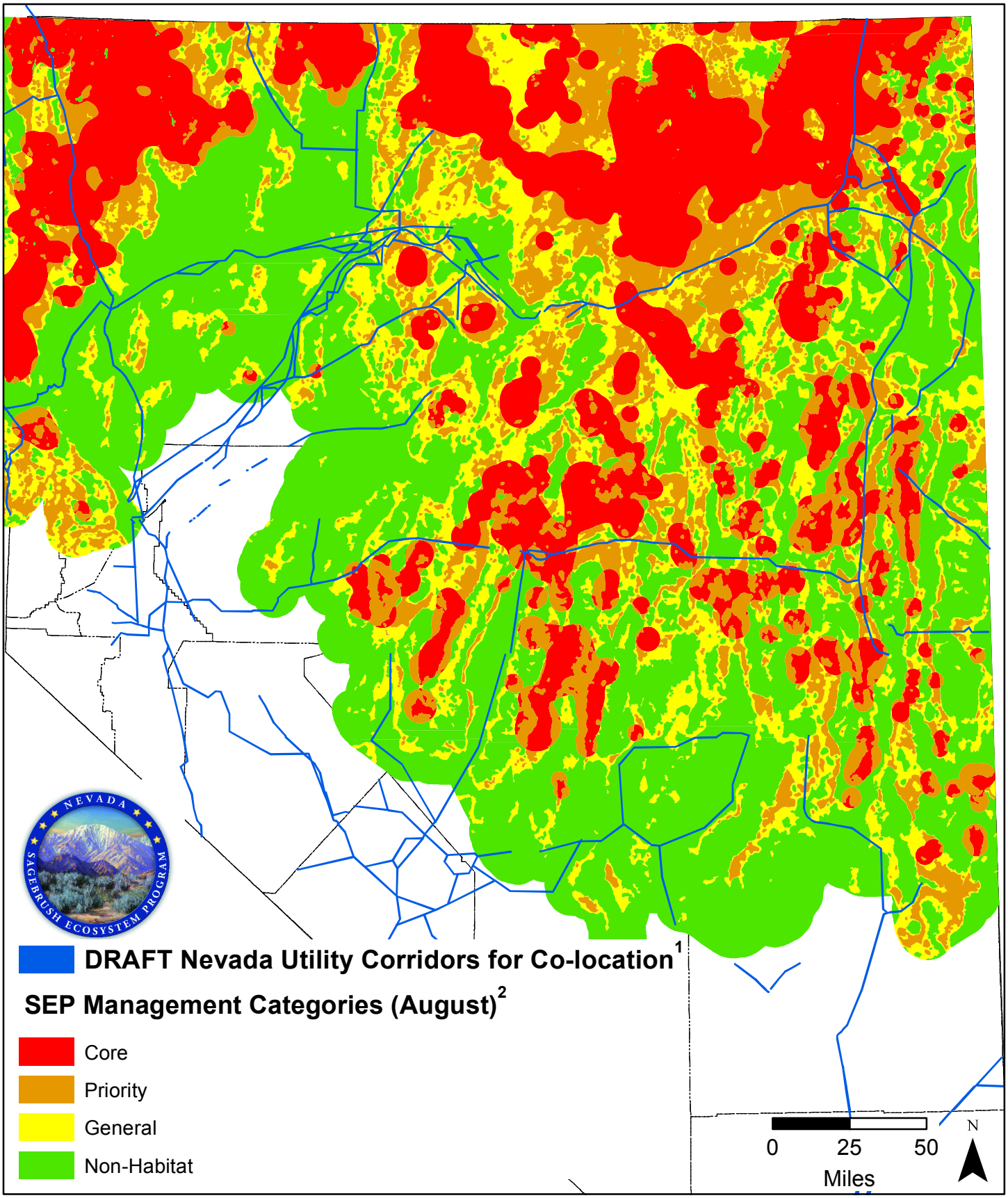


Figure 11. Utility Corridors for Co-location in Nevada

1. Utility Cooridor Co-location is still draft. Contact BLM Nevada State Office: Leisa Wesch lwesch@blm.gov
2. Coates et al. 2014

Appendix P

Fluid Minerals

Reasonably Foreseeable Development Scenario

APPENDIX P
FLUID MINERALS REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

This appendix contains reasonably foreseeable development (RFD) scenarios for both geothermal and oil and gas.

GEOTHERMAL REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

This RFD scenario serves as a basis for analyzing environmental impacts resulting from future leasing and development of federal geothermal resources within the decision area over the next 20 years. A variety of factors (e.g., economic, social, and political) are beyond the control of the BLM and Forest Service and will influence the demand for geothermal resources. Therefore, the RFD scenario is a best professional estimate of what may occur if public and National Forest System lands are leased. It is not intended to be a "maximum-development" scenario; however, it is biased towards the higher end of expected development and shows where the potential development might occur. If future development eventually exceeds RFD predictions, the BLM and Forest Service will assess the impacts on the resources under the context of the analysis provided in the Programmatic EIS (BLM 2008) or specific land use plans and determine if additional analysis is warranted.

Alternative A

Currently, there are 17 licensed geothermal power plants on federal lands in Nevada with a capacity of 480 MW. This averages out to be 28.8 MW capacity per plant. There are currently 81 producing wells from these 17 plants, which average out to be 5.9 MW capacity per well.

Based on these average figures and current market trends for geothermal energy in Nevada, it is reasonable to assume that over the next 20 years, an additional 336 MW capacity could be added, meaning that total production capacity could reach 816 MW. The addition of 336 MW may translate into 12

new power plants (336 MW ÷ 28.8 MW per power plant = 12 power plants) supported by 56 wells (332 MW ÷ 5.9 MW per well = 56 new wells).

Successful drilling of production wells can be estimated at 60 percent (Shevenell 2012), and thus 94 wells would be drilled (56 successful production wells (60 percent * 94 wells = 56 successful production wells). The unsuccessful wells drilled would be converted into injection wells or plugged and abandoned.

A typical geothermal well pad is approximately 4 acres in size, plus associated access roads, thus accounting for approximately 4 to 7 acres of ground disturbance per well. An average geothermal power plant (28 MW) might typically have 5 production wells and 4 injections wells, 6 miles of access roads (25 feet wide) and pipelines, and a facility footprint of 25 acres, totaling 71 acres of ground disturbance. See **Table P-1**.

Table P-1
Area of Disturbance: Wells, Access Roads, Power Plant, and Ancillary Facilities

Disturbance Type	Temporary Disturbance (approx.)	Permanent Disturbance (approx.)
Production & Injection Wells	36 acres	23 acres
Power Plant & Substation	10 acres	10 acres
Switching Station	7 acres	7 acres
Access Roads & Pipelines	18 acres	18 acres
TOTAL:	**71 acres**	**58 acres**

Source: BLM and Forest Service GIS 2015

Location of Development

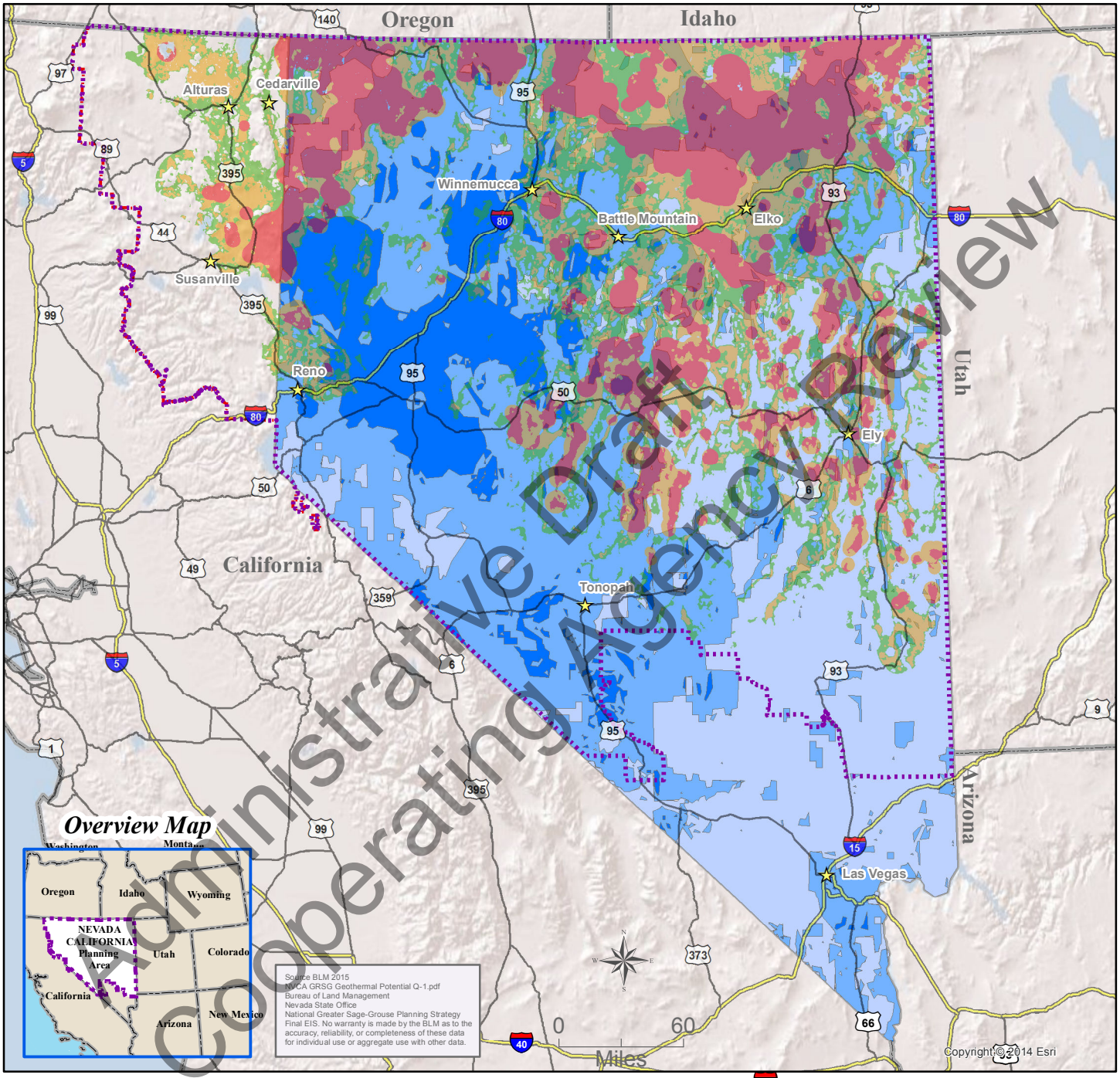
Development would be distributed across the planning area shown by **Figure P-1** with the highest potential being in the western portions of the planning area. **Figure P-1** and a report for Nevada prepared by the Nevada Bureau of Mines and Geology (2015) is used in this analysis.

Table P-2 displays acreages of moderate and high geothermal potential in the planning area. The low geothermal potential area is not considered, because everything but the moderate and high potential areas in the whole planning area has low potential. That makes it difficult to compare alternatives, and it is most likely that moderate and high geothermal potential areas will be leased, explored, and developed, especially the high geothermal potential areas. These acreages are used in the RFDs.

Disturbance from Geothermal Development

This RFD for geothermal resource use involves four sequential phases: (1) exploration, (2) drilling, (3) utilization, and (4) reclamation and abandonment. The success or failure of each phase affects the implementation of subsequent phases, and, therefore, subsequent environmental impacts. The general

Nevada and Northeastern California Greater Sage-Grouse
Geothermal Potential within the Planning Area



Administrative Draft
Cooperating Agency Review

Legend

All Land Status

Potential

- High
- Low
- Moderate
- Priority Habitat Management Area (PHMA)
- General Habitat Management Area (GHMA)
- Other Habitat Management Area (OHMA)

- Planning Area
- City/Town
- Interstate
- US Route
- States

Table P-2
Acreages of Moderate and High Geothermal Potential in the Planning Area

Geothermal Potential	Acres
High	8,226,100
Moderate	33,096,000
Total	**41,322,100**

Source: BLM and Forest Service GIS 2015

assumptions outlined in the following four phases serve to establish RFD scenarios for analyzing future environmental impacts that may result from development following BLM issuance of leases for geothermal resources within the identified area of geothermal potential. It should be noted that the RFD scenario permits a general evaluation of the types of impacts that may occur but cannot accurately predict the magnitude and extent of these impacts. This is due in part to the uncertainty about the timing, location, distribution of the geothermal resources, and the likely types of development.

Table P-3 provides the estimated acreages of land disturbance for each phase in geothermal development for a typical power plant. The actual area of disturbance varies greatly depending upon site conditions and the type and size of power plant being constructed; therefore, a range is provided. Acreages are not provided for the reclamation and abandonment phase, since this phase involves the return of previously disturbed lands to their existing conditions.

The total potential amount of area disturbed under the utilization phase includes development activities. Much of the land would be reclaimed after the initial exploration, drilling, and construction; therefore, the actual amount of land occupied during operation would be less. A typical development generally requires several leases or the use of private or other adjacent lands.

Alternative B

Under Alternative B, 8,236,400 acres in PHMA would be closed to new geothermal leasing. Existing leases in PHMA would be managed in accordance with the stipulations on their lease. Therefore, no new geothermal leasing, exploration, and development would occur on unleased lands in PHMA; however, GHMA would remain available for leasing under standard stipulations.

Although it is uncertain which future geothermal exploration and development projects would be located within these lands; it is reasonable to assume that development would occur in areas with at least moderate geothermal potential. There are 5,261,300 acres of moderate and high geothermal potential in PHMA, which is 12.7 percent of the total area of moderate and high geothermal potential of 41,322,000 acres. Therefore, geothermal leasing, exploration, and development could be reduced by 12.7 percent (see **Table P-4**).

Table P-3
Typical Disturbances by Phase of Geothermal Resource Development

Development Phase	Disturbance Estimate per Plant
Exploration	*2 – 7 acres*
Geophysical	30 square feet[1]
Seismic surveys	negligible
Road/access construction	1- 6 acres
Temperature gradient wells	1 acre[2]
Drilling Operations and Utilization	*51 – 350 acres*
Drilling and well field development	5 – 50 acres[3]
Road improvement/construction	4 – 32 acres[4]
Power plant construction	15 – 25 acres[5]
Installing well field equipment, including pipelines	5 – 20[6]
Installing transmission lines	24 – 240[7]
TOTAL	**53 – 367 acres**

Source: BLM 2008
[1] Calculated assuming 10 soil gas samples, at a disturbance of less than three square feet each.
[2] Calculated assuming area of disturbance of 0.05 to 0.25 acre per well and six wells. Estimate is a representative average disturbance of all well sites. Some wells may require a small footprint (e.g., 30x30 feet), while others may require larger rigs and pads (e.g., 150x150 feet).
[3] Size of the well pad varies greatly based on the site-specific conditions. Based on a literature review, well pads range from 0.7 acres up to 5 acres (GeothermEx 2007; Forest Service 2005). Generally a 30MW to 50 MW power plant requires about five to 10 well pads to support 10 to 25 production wells and five to 10 injection wells. Multiple wells may be located on a single well pad.
[4] One-half mile to nine miles; assumes about ¼ mile of road per well. Estimates 30-foot wide surface disturbance for a 18-20 foot road surface, including cut and fill slopes and ditches.
[5] 30 MW plant disturbs approximately 15 acres; 50 MW plant disturbs approximately 25 acres.
[6] Pipelines between well pad to plant assumed to be ¼ or less; for a total of 1½ to seven miles of pipeline in length, with a 25-foot-wide corridor
[7] Five to 50 miles long, 40-foot-wide corridor

Table P-4
Alternatives B through F and Proposed Plan Compared to Alternative A with 41,322,100 acres of Moderate and High Geothermal Potential in Planning Area

Alt.	Moderate and High Geothermal Potential in:			Expected Reduction in Geothermal Leasing, Exploration, and Development (%)	Description of Alternative
	SFA	PHMA	GHMA		
B	N/A	5,261,300	N/A	12.7	PHMA closed to geothermal leasing. Existing leases could be explored.
C	N/A	8,707,300	N/A	21.1	All GRSG habitat considered PHMA and closed to geothermal leasing.

Table P-4
Alternatives B through F and Proposed Plan Compared to Alternative A with 41,322,100 acres of Moderate and High Geothermal Potential in Planning Area

Alt.	Moderate and High Geothermal Potential in:			Expected Reduction in Geothermal Leasing, Exploration, and Development (%)	Description of Alternative
	SFA	PHMA	GHMA		
D	N/A	5,524,000	3,183,200	13.4 - 21.1	PHMA: NSO without WEMs & GHMA: NSO with exceptions.
E	N/A	5,261,300	3,446,000	0 - 21.1	PHMA & GHMA open to geothermal leasing, exploration, and development, but require avoidance, minimization, and mitigation of impacts to GRSG habitat.
F	N/A	5,261,300	3,446,000	21.1	PHMA & GHMA closed to new geothermal leasing. Existing leases could be explored. Impacts and RFD projections would be similar or the same as those described under Alternative C.
Proposed Plan	1,076,300	5,413,000	3,324,600	15.7 - 23.7	PHMA considered SFA: NSO no WEMs. PHMA: NSO with 3 conditions. GHMA: open with TL and CSU stipulations & avoidance, minimization, and application of compensatory mitigation of impacts to GRSG habitat.

Source: BLM and Forest Service GIS 2015

Alternative C

Under Alternative C, all 16,526,600 acres in GRSG habitat would be closed to new geothermal leasing, exploration, and development. Existing leases would be managed in accordance with the lease stipulations on their lease. Therefore, no new geothermal leasing, exploration, and development would occur on unleased lands, and only existing leases could be explored for development.

Although it is uncertain which future geothermal exploration and development projects would be located within these lands, it is reasonable to assume that development would occur in areas with at least moderate geothermal potential.

There are 8,707,300 acres of moderate and high geothermal potential in PHMA, which is 21.1 percent of the total area of moderate and high geothermal potential of 41,322,000 acres. Therefore, geothermal leasing, exploration, and development could be reduced by 21.1 percent (see **Table P-4)**.

Alternative D

Under Alternative D, 8,151,600 acres in PHMA would be managed as NSO without any waivers, exceptions, or modifications. In addition, 6,490,700 acres in GHMA would be managed as NSO but would allow exceptions. Existing leases would be under the lease stipulations on the existing lease.

It is difficult to predict the leasing activity in areas with NSO stipulations. In the case of PHMA, this alternative proposes NSO stipulations without any waivers, exceptions, or modifications. Unless there are adjacent lands that are not subject to these restrictions, it would be impossible to explore and develop with current technology. In the case of GHMA with NSO with exceptions, it is still unlikely to be leased because industry would have to lease the land first without knowing if an exception would be granted. This would create a level of uncertainty. Unless there are adjacent lands that are not subject to these restrictions, then it would be unlikely to be leased.

Although it is uncertain which future geothermal exploration and development projects would be located within these lands, it is reasonable to assume that development would occur in areas with at least moderate geothermal potential. There are 5,524,000 acres of moderate and high geothermal potential in PHMA, which is 13.4 percent of the total area of moderate and high geothermal potential. Additionally, there are 3,183,200 acres of moderate and high geothermal potential in GHMA, which is 7.7 percent of the total area of moderate and high geothermal potential. It is likely that no geothermal leasing, exploration, and development would occur in PHMA, and little to none would occur in GHMA, Therefore, geothermal leasing, exploration, and development would be reduced by at least the moderate and high geothermal potential in PHMA and, at most, the additional moderate and high geothermal potential in GHMA. Therefore, geothermal leasing, exploration, and development could be reduced by at least 13.4 percent and possibly as much as 21.1 percent (see **Table P-4**).

Alternative E

Under Alternative E, 8,236,400 acres of PHMA and 6,405,900 acres of GHMA would be open to geothermal leasing, exploration, and development but would require avoidance, minimization, and mitigation of impacts on GRSG habitat. The impacts under this alternative would be similar to those under Alternative A. However, the additional time and costs associated with the "avoid, minimize, and mitigate" management may discourage leasing and development from occurring.

It is difficult to predict leasing activity in areas with requirements of "avoidance, minimization, and mitigation" of impacts on GRSG habitat. If industry is comfortable with such requirements, then geothermal leasing, exploration, and development would be reduced by zero percent. However, if industry is not comfortable with such requirements, then geothermal leasing, exploration, and development could be reduced by 5,261,300 acres of moderate and high geothermal potential in PHMA and 3,446,000 acres of moderate and high geothermal potential in GHMA for a total of 8,707,300, which is 21.1 percent of the total area of moderate and high geothermal potential. Therefore, geothermal leasing, exploration, and development could be reduced from zero to 21.1 percent (see **Table P-4**).

Alternative F

Under Alternative F, 8,236,400 acres in PHMA and 6,405,900 acres in GHMA would be closed to new geothermal leasing, exploration, and development. Only existing leases could be explored. Impacts and RFD projections would be similar or the same as those described under Alternative C. Existing closures would remain in place on 1,436,900 acres in PHMA and 547,400 acres in GHMA.

There are 5,261,300 acres of moderate and high geothermal potential in PHMA and 3,446,000 acres of moderate and high geothermal potential in GHMA for a total of 8,707,300 acres, which is 21.1 percent of the total area of moderate and high geothermal potential. Therefore, geothermal leasing, exploration, and development could be reduced by 21.1 percent (see **Table P-4**).

Proposed Plan

Under the Proposed Plan, 9,255,400 acres of land in PHMA would be subject to NSO restrictions with only two exceptions. Included in this acreage is 2,797,400 acres of PHMA that is considered SFA and would be managed as NSO without any waivers, exceptions, or modifications. Another 6,037,800 acres of GHMA would be open to leasing, exploration, and development but would be subject to moderate constraints, such as TL and CSU stipulations, and would require avoidance, minimization, and application of compensatory mitigation of impacts on GRSG habitat. There are also 1,984,300 acres that are closed to leasing in WSAs and wilderness areas within PHMA and GHMA.

It is difficult to predict the leasing activity in areas with NSO stipulations. In the case of SFA, this alternative proposes NSO stipulations without any waivers, exceptions, or modifications. Unless there are adjacent lands that are not subject to these restrictions, it would be impossible to explore and develop with current technology. In the case of PHMA with only one exception, it is still unlikely to be leased because industry would have to lease the land first without knowing if an exception would be granted. This would create a level of uncertainty. Unless there are adjacent lands that are not subject to these restrictions, then it would be unlikely to be leased.

Although it is uncertain which future geothermal exploration and development projects would be located within these lands, it is reasonable to assume that development would occur in areas with at least moderate geothermal potential. There are 1,076,300 acres of moderate and high geothermal potential in SFA, which is 2.6 percent of the total area of moderate and high geothermal potential. Additionally, there are 5,413,000 acres of moderate and high geothermal potential in the remaining PHMA, which is 13.1 percent of the total area of moderate and high geothermal potential. It is likely that no geothermal leasing, exploration, and development would occur in SFA and the remaining PHMA. Therefore, geothermal leasing, exploration, and development would be reduced by at least the moderate and high geothermal potential in SFA and in the remaining PHMA, which is 15.7 percent of the total area of moderate and high geothermal potential.

It is difficult to predict leasing activity in areas with requirements of "avoidance, minimization, and application of compensatory mitigation" of impacts on GRSG habitat, as is the case with GHMA for this alternative. If industry is comfortable with such requirements, then geothermal leasing, exploration, and development would be reduced by zero percent in GHMA. However, if industry is not comfortable with such requirements, then geothermal leasing, exploration, and development could be reduced by 3,324,600 acres of moderate and high geothermal potential in GHMA, which is 8 percent of the total area of moderate and high geothermal potential.

Overall, geothermal leasing, exploration, and development could be reduced by at least 15.7 percent and possibly as much as 23.7 percent (see **Table P-4**).

OIL AND GAS REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

This RFD scenario serves as a basis for analyzing environmental impacts resulting from future leasing and development of federal oil and gas resources within the decision area over the next 20 years. A variety of factors (e.g., economic, social, and political) are beyond the control of the BLM and Forest Service and will influence the demand for oil and gas resources. Therefore, the RFD scenario is a best professional estimate of what may occur if public lands are leased. It is not intended to be a "maximum-development" scenario; however, it is biased towards the higher end of expected development and shows where the potential development might occur. If future development eventually exceeds RFD predictions, then the BLM and Forest Service will assess the impacts on the resources under the context of the analysis provided in this EIS or specific LUPs and determine if additional analysis is warranted.

The decision area produces approximately 367,000 barrels of oil per year. Based on production data within the planning area, production wells produce on average 14 barrels per day per well. The success rate for drilling production wells can be estimated at 20 percent within the decision area. However, production within Elko-Noble project areas is estimated to be as high as 55

percent because of new completion technologies. If a total of 100 wells were to be drilled in the decision area, including 60 wells projected for the Elko-Noble project, up to 41 could be successful production wells, as shown in Table P-5.

Table P-5
Oil and Gas Wells (Exploration & Production) Projections for the Decision Area (DA) and Elko-Noble Area (Elko)

Alternative	Oil Wells Expected to be Drilled					Oil Wells Expected to be Producing				
	On Existing Leases		On New Leases		Total	On Existing Leases		On New Leases		Total
	DA	Elko	DA	Elko		DA	Elko	DA	Elko	
A	15	60	25	0	100	3	33	5	0	41
B	12	40	20	0	72	2	22	4	0	28
C	10	20	18	0	48	2	11	3	0	16
D	11	24	19	0	54	2	13	4	0	19
E	13	51	21	0	85	2	28	4	0	34
F	10	20	18	0	48	2	11	3	0	16
PP	14	45	19	0	78	3	9	4	0	16

Source: BLM and Forest Service GIS 2015

LOCATION OF DEVELOPMENT

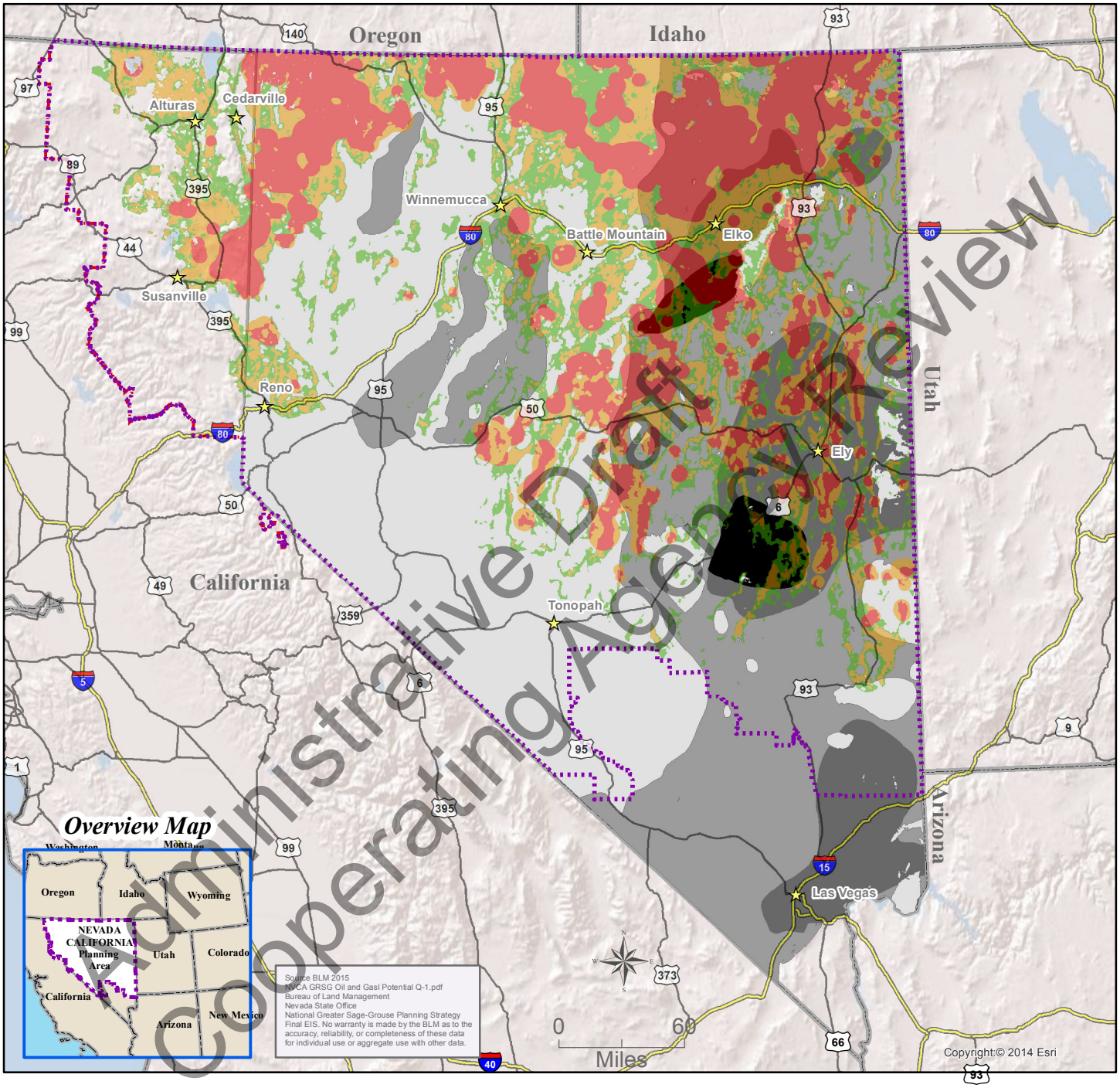
Development would be distributed across the area shown by **Figure P-2**. The majority of the resources are located within the eastern portion of the decision area with high potential areas occurring within the Battle Mountain, Elko, and Ely BLM districts around Railroad and Pine Valleys.

Typical Phases in Oil and Gas Development

This RFD for oil and gas resource use involves four sequential phases: (1) exploration, (2) drilling, (3) utilization, and (4) reclamation and abandonment. The success or failure of each phase affects the implementation of subsequent phases, and, therefore, subsequent environmental impacts. The general assumptions outlined in the following four phases serve to establish RFD scenarios for analyzing future environmental impacts that may result from development following BLM issuance of leases for oil and gas resources within the identified area of oil and gas potential. It should be noted that the RFD scenario permits a general evaluation of the types of impacts that may occur but cannot accurately predict the magnitude and extent of these impacts. This is due in part to the uncertainty about the timing, location, distribution of the oil and gas resources, and the likely types of development.

Table P-6 provides the estimated acreages of land disturbance for each phase in oil and gas development for an oil and gas field. The actual area of disturbance varies greatly depending upon site conditions and the type and size of field being constructed; therefore, a range is provided. Acreages are not provided for the reclamation and abandonment phase since this phase involves the return of previously disturbed lands to their existing conditions.

Nevada and Northeastern California Greater Sage-Grouse
Oil and Gas Potential within the Planning Area



All Land Status

- High Potential
- Low Potential
- Moderate Potential
- Very Low Potential
- Priority Habitat Management Area (PHMA)
- General Habitat Management Area (GHMA)
- Other Habitat Management Area (OHMA)

Legend

- Planning Area
- City/Town
- Interstate
- US Route
- States

Table P-6
Disturbance from Reasonably Foreseeable Development

Activity	Disturbance (acres)	Reclamation (acres)	Total Disturbance at the End of the RFD Period (acres)
Seismic Surveys	606	606	0
Roads	480	384	96
Drilling	160	128	32
Total	1246	1118	128

Source: BLM and Forest Service 2015

The total potential amount of area disturbed under the utilization phase includes development activities. Much of the land would be reclaimed after the initial exploration, drilling, and construction; therefore, the actual amount of land occupied during operation, would be less than the figure outlined in the development section. A typical development generally requires several leases or the use of private or other adjacent lands. The details of each phase of development are described below.

ASSUMPTIONS FOR REASONABLY FORESEEABLE DEVELOPMENT SCENARIO – OIL AND GAS WITHIN THE DECISION AREA

Alternative A

Assumptions for Exploration

1. Exploration and development will occur over 20 years.
2. There would be approximately 25 miles of seismic line at a width of 10 feet surveyed per year for an anticipated overall total of 606 acres of disturbance over the life of the RFD. Each year, 100 percent of the disturbance would be reclaimed. Other geophysical surveys would be completed; however, the surveys would be minimal, with little to no surface disturbance.
3. The majority of the decision area is considered to be a high risk (wild cat) exploration region. This means that there is low to moderate potential for oil and gas discoveries.
4. Approximately 450 wells have been drilled within the decision area to date, and 71 of those wells are producing. This is a success rate of approximately 16 percent. On average two wells per year are drilled, which amounts to 40 wells over the life of the RFD (this does not include the following RFD for the Noble project in the Elko District). It is projected that the success rate would increase to 20 percent because of new completion technologies. Approximately 8 out of the 40 wells drilled would be potentially viable for production.

5. An estimated 32 wells would be reclaimed over the 20-year timespan.
6. The majority of successful wells drilled are located in the high potential regions within the eastern portion of the planning area. From this we can assume the continued success of these locations.
7. The average size for a well pad is 4 acres. Forty new wells over the next 20 years would then amount to 160 acres of disturbance for new wells drilled. Since it is projected that 8 wells would be producing, the amount remaining unreclaimed would be 32 acres.
8. The average access road would be 20 feet wide and 5 miles long (average width accounting for turnouts) the total disturbance due to road construction would then be approximately:
    - 5 miles by 5,280 feet/mile by 20 feet = 528,000 square feet.
    - 528,000 feet by 1 acre/43560 feet = approximately 12 acres per successful well.
    - 12 acres by 8 (successful wells) = 96 acres remaining un-reclaimed over the course of 20 years. Over the 20 year period, the total amount of disturbed area due to access roads is expected to be no more than 480 acres, with 384 acres being reclaimed.

Based on the above assumptions, disturbance from geophysical surveys are estimated at 606 acres, access roads are estimated at 480 acres, and well pads are estimated at 160 acres for a total surface disturbance of approximately 1,246 acres. The surface disturbance from oil and gas exploration well pads and access roads combined is estimated to be 640 acres, of which 512 acres for roads and well pads of unsuccessful wells would be reclaimed within the 20-year period, leaving a total of approximately 128 acres of surface disturbance.

Assumptions for Production

We have estimated that over the next 20 years 8 new producing wells will be discovered.

The following assumptions are based on estimated mineral potential, ground conditions within the decision area, road availability, and existing development for the decision area.

1. There would be 40 wells drilled within the RFD; 32 of those wells would be reclaimed, leaving a total of 8 successful production wells totaling 32 acres of disturbance due to well pads.
2. A tank battery would be placed on the existing drill pad of the producing well, and no additional surface disturbance would be required.

3. The access roads to the unsuccessful wells total 384 acres. This acreage would be reclaimed.
4. Based on the above assumption, the total surface disturbance from the 8 production well pads is estimated at 32 acres, and the surface disturbance from the construction of roads is estimated to be approximately 96 acres. Surface disturbance from oil and gas production over the 20-year period could total a maximum of approximately 128 acres after reclamation.

The above assumptions for both exploration and production are summarized below in **Table P-7**, Reasonably Foreseeable Disturbance from Exploration and Production.

Table P-7
Reasonably Foreseeable Disturbance from Exploration and Production

Activity	Disturbance (acres)	Reclamation (acres)	Total Disturbance at the end of the RFD period (acres)
Seismic Surveys	606	606	0
Roads	480	384	96
Well Pads	160	128	32
Total	1246	1118	128

Source: BLM and Forest Service 2015

Assumptions for Reasonably Foreseeable Development Scenario (Noble – Elko Areas Only)

1. Exploration and development will occur over 20 years.
2. The majority of the decision area is considered to be a high risk (wildcat) exploration region. This means that there is low to moderate potential for oil and gas discoveries.
3. Extensive seismic surveys have been completed within this portion of the planning area; therefore, additional seismic survey disturbance would be minimal.
4. Although no wells have been drilled within this portion of the decision area, it is anticipated that Noble would drill 60 wells within the decision area and that 33 of those wells would be productive. This is a success rate of approximately 55 percent.
5. Multi-well directional and horizontal pads would be implemented; therefore, four wells would be drilled on each pad. The average size of a well pad is four acres. This would result in a total of 15 pads being required to drill a total of 60 wells, amounting to 60 acres of disturbance.
6. Wells within this portion of the decision area would be drilled using new completion technologies. These technologies could include hydraulic fracturing and horizontal drilling.

7. The majority of successful wells drilled are located in the moderate potential regions within the northeastern portion (Elko District) of the decision area.
8. The average access road would be 20 feet wide and 5 miles long (average width accounting for turnouts). The total disturbance due to road construction would then be:
    - 5 miles by 5,280 feet/mile by 20 feet by 1 acre/43,560 square feet = approximately 12 acres.
    - 12 acres by 0.75 well pads per year = approximately 9 acres/year. Over the course of 20 years, this amounts to an expected maximum of approximately 180 acres.

The above assumptions for Noble – Elko are summarized below in **Table P-8**, Disturbance from Reasonably Foreseeable Development in Noble – Elko.

Table P-8
Disturbance from Reasonably Foreseeable Development in Noble – Elko

Activity	Disturbance (acres)
Roads	180
Well Pads	60
Total	240

Source: BLM and Forest Service GIS 2015

Alternative B

Under Alternative B, 8,236,000 acres in PHMA (plus acreage already closed within WAs and WSAs under Alternative A) would be closed to new oil and gas leasing, exploration, and development. Of the 8,236,000 acres, there are approximately 6,591,100 acres with low, moderate, and high oil and gas potential in PHMA that would be closed to leasing, exploration, and development. Approximately 41 percent of PHMA habitat (15,343,900 acres) would be closed under Alternative B. Existing leases in PHMA would be subject to the existing lease stipulations. Out of the total 6.9 million acres of GHMA, 3.5 million acres with low, moderate, and high oil and gas potential would remain open to existing and new oil and gas leasing and development.

Although it is uncertain which future oil and gas exploration and development projects would be located within these lands, it is reasonable to conclude that oil and gas exploration and development could be reduced by 35 to 50 percent in the northern area and southwest area in the Elko District. Instead of drilling 60 wells, as projected in the RFD for Elko, closures in PHMA could decrease the well count to less than 40 wells. Development in the rest of the planning area could be decreased by as much as 20 percent under Alternative B. This could result in the reduction of drilled wells, as projected in the RFD, from 40 wells to 32 wells (see **Table P-9**).

Table P-9
Reasonably Foreseeable Disturbance from Oil & Gas Exploration within the Decision Area (DA) and Elko-Noble

	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F		Proposed Plan	
RFD Areas	**Elko**	**DA**	**Elko**	**DA**	**Elko**	**DA**	**Elko**	**DA**	**Elko**	**DA**	**Elko**	**DA**	**Elko**	**DA**
# of new wells	60	40	40	32	20	28	24	30	51	34	20	28	45	33
Seismic Surveys (acres)	-	606	-	485	-	436	-	455	-	515	-	436	-	497
Roads (acres)	180	480	120	384	60	346	72	360	153	408	59	346	135	394
Well Pads (acres)	60	160	48	128	20	115	24	120	51	136	20	115	45	131
Total Acres:	**240**	**1,246**	**168**	**997**	**80**	**897**	**96**	**935**	**204**	**1,059**	**79**	**897**	**180**	**1,022**

(DA = Decision Area minus Elko-Noble Areas)
Source: BLM and Forest Service GIS 2015

Alternative C

Under Alternative C, all 16,526,600 acres in GRGS habitat would be closed to new oil and gas leasing, exploration, and development, affecting almost 13.5 million acres of lands with low, moderate, and high oil and gas potential. Existing leases would be managed as NSO with exceptions.

Alternative D

Under Alternative D, 8,236,400 acres in PHMA would be managed as NSO without any exceptions, modifications, or waivers. In addition, 6,405,900 acres in GHMA would also be managed as NSO but would allow exceptions. Existing closures would remain in place on 1,436,900 acres in PHMA and 547,400 acres in GHMA. The maximum lateral extent of oil wells with current drilling technologies is typically between 3,000 and 4,000 feet but can be as much as 10,000 feet lateral extent. However, the cost of the project is determined by several factors, such as the length and size of the installed product, the lithology, and the ongoing operation. If the expected lithology is bedrock, or other hard-to-drill conditions, horizontal/directional drilling may be cost prohibitive for an operator; therefore, as much as 75 percent of oil and gas resources within the NSO interior within PHMA may not be accessible.

It is estimated that oil and gas exploration and development in the Elko District could be reduced by 55 to 65 percent by applying the NSO restriction to GRSG habitat and by 25 percent throughout the rest of the planning area. Applying an NSO restriction to leasing, exploration, and development within PHMA and GHMA lands could decrease the projected well counts in the RFD from 60 in the Elko District to 24 wells, and from 40 wells to 30 wells for the rest of the planning area.

Alternative E

Under Alternative E, 8,236,400 acres of PHMA and 6,405,900 acres of GHMA would be open to oil and gas leasing, exploration, and development but would require avoidance, minimization, and mitigation of impacts on GRSG habitat. The impacts under this alternative would be similar to those under Alternative A. However, the additional time and costs associated with the "avoid, minimize, and mitigate" management may discourage leasing and development from occurring. Existing closures would remain in place on 1,436,900 acres in PHMA and 547,400 acres in GHMA.

Areas with the most GRSG habitat would be the most affected, especially Elko and the areas with moderate to high potential. Therefore, it is estimated that oil and gas drilling and exploration could be reduced by more than 10 to 20 percent under this alternative. This could decrease the projected well counts in the RFD from 60 in the Elko District to 51 wells, and from 40 wells to 34 wells for the rest of the planning area (See Table P-9).

Alternative F

Under Alternative F, 8,236,400 acres in PHMA and 6,405,900 acres in GHMA would be closed to new oil and gas leasing, exploration, and development. Only existing leases could be explored. This would remove over 10 million acres of land with oil and gas potential from leasing, exploration, and development. Impacts and RFD projections would be similar or the same as those described under Alternative C (See **Table P-9**).

Proposed Plan

Under the Proposed Plan, approximately 7,498,700 acres of land in PHMA would be subject to NSO restrictions with only two exceptions. An additional 2,797,400 acres of PHMA is considered SFA and would be managed as NSO with no exceptions. Another 6,516,800 acres of GHMA would be open to leasing, exploration, and development but would be subject to moderate constraints, such as TL and CSU stipulations, and would require avoidance, minimization, and mitigation of impacts to GRSG habitat. However, the additional time and costs associated with the "avoid, minimize, and application of compensatory mitigation" management may discourage leasing and development from occurring.

Areas managed as NSO would only be accessible by directional drilling, and the maximum lateral extent of oil wells with current drilling technologies is typically between 3,000 and 4,000 feet but can be as much as 10,000 feet lateral extent. However, the cost of the project is determined by several factors, such as the length and size of the installed product, the lithology, and the ongoing operation. If the expected lithology is bedrock, or other hard-to-drill conditions, horizontal directional drilling may be cost prohibitive.

Areas with the most PHMA habitat would be the most affected, especially Elko and the areas with moderate to high potential. Therefore, it is estimated that oil and gas exploration and development in the Elko District could be reduced by 20 to 30 percent by applying the NSO restriction to PHMA habitat and by 18 percent throughout the rest of the planning area. Applying an NSO restriction to leasing, exploration and development would decrease the projected well counts in the RFD from 60 in the Elko District to 45 wells, and from 40 wells to 33 wells for the rest of the planning area (see **Table P-9**).

Appendix Q

Forest Service Biological Evaluation and Wildlife Specialists Report

APPENDIX Q
FOREST SERVICE BIOLOGICAL EVALUATION AND WILDLIFE SPECIALISTS REPORT

This page intentionally left blank

U.S. Forest Service Biological Evaluation and Wildlife Specialists Report

for the

Greater Sage-Grouse Conservation Effort to Amend the Forest Plans in Nevada for the Humboldt and Toiyabe National Forest Plans

May 15, 2015

Prepared by:

Katherine Malengo, Wildlife Biologist
kmalengo@fs.fed.us

Kimberly O'Connor, Botanist
kimberlyoconnor@fs.fed.us

Kat Carsey, Botanist
kscarsey@fs.fed.us

Chris Colt, Wildlife Biologist
ccolt@fs.fed.us

Table of Contents

I. INTRODUCTION 10
II. PROJECT HISTORY 10
III. PURPOSE AND NEED 11
IV. DESCRIPTION OF THE ALTERNATIVES 12
Alternative A: 12
Management Common to All Alternatives 12
Alternative B: 13
Alternative C: 14
Alternative D: 14
Alternative E: 16
Alternative F: 16
Proposed Plan: 17
V. PLANNING AREA/ANALYSIS AREA 18
VI. BIOLOGICAL EVALUATION 14
A. Forest Service Sensitive Species 15
B. Species Information and Effects Analysis (*Direct, Indirect and Cumulative*) 36
1. Greater Sage-Grouse (*Centrocercus urophasianus*) 36
Evaluating Viability 36
Life History 37
Habitat and Population Condition 38
Threats 41
Alternative A - No Action 41
Vegetation and Soils Management 41
Livestock Grazing 43
Fire and Fuels 44
Energy and Locatable Minerals Development 47
Land Uses and Realty Management 48
Travel, Transportation and Recreation Management 49
Determination 50
Alternative B 50
Vegetation and Soils Management 50
Livestock Grazing 51
Fire and Fuels 52

Wild Horse and Burro Management 53
Energy and Locatable Minerals Development 53
Land Uses and Realty Management 54
Travel, Transportation and Recreation Management 55
Determination 56
Alternative C 56
Vegetation and Soils 56
Livestock Grazing 57
Fire and Fuels 57
Wild Horse and Burro Management 58
Energy and Locatable Minerals Development 58
Land Uses and Realty Management 59
Travel, Transportation and Recreation Management 60
Determination 60
Alternative D 60
Vegetation and Soils Management 60
Livestock Grazing 61
Fire and Fuels 62
Wild Horse and Burro Management 63
Energy and Locatable Minerals Development 64
Land Uses and Realty Management 65
Travel, Transportation and Recreation Management 66
Determination 67
Alternative E 67
Vegetation and Soils 67
Livestock Grazing 68
Fire and Fuels 69
Wild Horse and Burro Management 70
Energy and Locatable Minerals Development 70
Land Uses and Realty Management 71
Travel, Transportation and Recreation Management 72
Determination 73
Alternative F 73
Vegetation and Soils 73

Livestock Grazing 74
Fire and Fuels 74
Wild Horse and Burro Management 75
Energy and Locatable Minerals Development 75
Land Uses and Realty Management 76
Travel, Transportation and Recreation Management 76
Determination 77
Proposed Plan 77
Vegetation and Soils Management 77
Livestock Grazing 78
Fire and Fuels 80
Wild Horse and Burro Management 80
Energy and Locatable Minerals Development 81
Land Uses and Realty Management 83
Travel, Transportation and Recreation Management 85
Determination 85
2. Sagebrush-Associated Species 86
Bighorn sheep (Ovis Canadensis) 86
Pygmy Rabbit (Brachylagus idahoensis) 87
Columbia spotted bat (Euderma maculatum) 88
Townsend's big eared bat (Corynorhinus townsendii) 88
Alternative A - No Action 89
Vegetation and Soils 89
Livestock Grazing 90
Fire and Fuels 91
Wild Horse and Burro Management 92
Energy and Locatable Minerals Development 94
Land Uses and Realty Management 94
Travel, Transportation and Recreation Management 95
Determination 96
Alternative B 96
Vegetation and Soils 96
Livestock Grazing 97
Fire and Fuels 98

Wild Horse and Burro Management 99
Energy and Locatable Minerals Development 100
Land Uses and Realty Management 101
Travel, Transportation and Recreation Management 102
Determination 102
Alternative C 103
Vegetation and Soils 103
Livestock Grazing 103
Fire and Fuels 104
Wild Horse and Burro Management 104
Energy and Locatable Minerals Development 105
Land Uses and Realty Management 106
Travel, Transportation and Recreation Management 106
Determination 107
Alternative D 107
Vegetation and Soils 107
Livestock Grazing 108
Fire and Fuels 109
Wild Horse and Burro Management 110
Energy and Locatable Minerals Development 111
Land Uses and Realty Management 112
Travel, Transportation and Recreation Management 113
Determination 114
Alternative E 114
Vegetation and Soils 114
Livestock Grazing 115
Fire and Fuels 116
Wild Horse and Burro Management 116
Energy and Locatable Minerals Development 117
Land Uses and Realty Management 118
Travel, Transportation and Recreation Management 119
Determination 119
Alternative F 120
Vegetation and Soils 120

Livestock Grazing 120
Fire and Fuels 121
Wild Horse and Burro Management 121
Energy and Locatable Minerals Development 122
Land Uses and Realty Management 123
Travel, Transportation and Recreation Management 123
Determination 124
Proposed Plan 124
Vegetation and Soils 124
Livestock Grazing 125
Fire and Fuels 126
Wild Horse and Burro Management 127
Energy and Locatable Minerals Development 127
Land Uses and Realty Management 128
Travel, Transportation and Recreation Management 129
Determination 130
3. Sensitive Plants 130
Antennaria arcuata (Meadow pussytoes) 130
Asclepias eastwoodiana (Eastwood milkweed) 131
Astragalus lentiginosus var. *latus* (Broad-pod freckled milkvetch) 131
Astragalus robbinsii var. *occidentalis* (Lamoille Canyon milkvetch) 132
Astragalus toquimanus (Toquima milkvetch) 132
Astragalus uncialis (Currant milkvetch) 132
Boechera falcatoria (Grouse Creek rockcress) 133
Botrychium ascendens (Upswept moonwort) 133
Botrychium crenulatum (Dainty moonwort) 134
Botrychium lineare (Slender moonwort) 135
Botrychium tunux (Moosewort) 135
Epilobium nevadense (Nevada willowherb) 136
Eriogonum douglasii var. *elkoense* (Sunflower Flat buckwheat) 136
Eriogonum esmeraldense var. *toiyabense* (Toiyabe buckwheat) 137
Eriogonum lewisii (Lewis's buckwheat) 137
Jamesia tetrapetala (Basin jamesia) 138
Lathyrus grimesii (Grimes lathyrus) 138

Lewisia maguirei (Maguire lewisia) 139
Penstemon concinnus (Elegant penstemon) 139
Penstemon moriahensis (Mt. Moriah penstemon) 139
Penstemon pudicus (Bashful penstemon) 140
Phacelia inconspicua (Inconspicuous phacelia) 140
Phacelia minutissima (Small-flower phacelia) 141
Polyctenium williamsiae (Williams combleaf) 141
Potentilla johnstonii (Sagebrush cinquefoil) 142
Sphaeralcea caespitosa var. *williamsiae* (Railroad Valley globemallow) 142
Townsendia jonesii var. *tumulosa* (Charleston ground daisy) 143
Trifolium andinum var. *podocephalum* (Currant Summit clover) 143
Trifolium leibergii (Leiberg's clover) 143
Trifolium macilentum var. *rollinsii* (Rollins clover) 144
Alternative A - No Action 144
Vegetation and Soils 144
Livestock Grazing 145
Fire and Fuels 147
Wild Horse and Burro Management 148
Energy and Locatable Minerals Development 150
Land Uses and Realty Management 151
Travel, Transportation and Recreation Management 152
Determination 154
Alternative B 154
Vegetation and Soils 154
Livestock Grazing 155
Fire and Fuels 156
Wild Horse and Burro Management 157
Energy and Locatable Minerals Development 158
Land Uses and Realty Management 159
Travel, Transportation and Recreation Management 160
Determination 161
Alternative C 161
Vegetation and Soils 161
Livestock Grazing 162

Fire and Fuels 163
Wild Horse and Burro Management 164
Energy and Locatable Minerals Development 165
Land Uses and Realty Management 166
Travel, Transportation and Recreation Management 167
Determination 167
Alternative D 168
Vegetation and Soils 168
Livestock Grazing 169
Fire and Fuels 170
Wild Horse and Burro Management 171
Energy and Locatable Minerals Development 172
Land Uses and Realty Management 173
Travel, Transportation and Recreation Management 174
Determination 175
Alternative E 176
Vegetation and Soils 176
Livestock Grazing 177
Fire and Fuels 178
Wild Horse and Burro Management 179
Energy and Locatable Minerals Development 179
Land Uses and Realty Management 180
Travel, Transportation and Recreation Management 181
Determination 181
Alternative F 182
Vegetation and Soils 182
Livestock Grazing 183
Fire and Fuels 184
Wild Horse and Burro Management 185
Energy and Locatable Minerals Development 186
Land Uses and Realty Management 187
Travel, Transportation and Recreation Management 187
Determination 188
Proposed Plan 188

Vegetation and Soils 188
Livestock Grazing 190
Fire and Fuels 191
Wild Horse and Burro Management 192
Energy and Locatable Minerals Development 193
Land Uses and Realty Management 194
Travel, Transportation and Recreation Management 195
Determination 196
C. Literature Cited 197
VII. MANAGEMENT INDICATOR SPECIES REPORT 201
A. Introduction 201
B. Species Information and Effects Analysis (Direct, Indirect and Cumulative) 207
C. Literature Cited 245

I. INTRODUCTION

The purpose of this report is to identify the likely effects of the Greater Sage-Grouse (GRSG) Land Use Plan Amendment (LUPA) for the Humboldt-Toiyabe National Forest on USDA Forest Service Region 4 sensitive species and Management Indicator Species (MIS) occurring on Humboldt and Toiyabe National Forests in Nevada. The analysis is framed around two primary sections:

1. Biological Evaluation (BE) for Region 4 species designated by the Regional Forester as "Sensitive Species", including greater sage-grouse; and
2. Management Indicator Species (MIS)

The BE has been prepared following the standards set forth in Forest Service Manual 2672.4. It is in compliance with 36 CFR 219.19 and 36 CFR 241.1.

The Forest Service Manual defines MIS as "…plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (USDA Forest Service 1991).

MIS are chosen based on five criteria (36 CFR 219.19 (a)(1)) that include endangered and threatened plant and animal species identified on State and Federal lists; species commonly hunted, fished, or trapped; non-game species of special interest; species with special habitat needs that may be influenced significantly by planned management programs; additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

Species listed as threatened or endangered by the USFWS are addressed in a separate biological assessment.

II. PROJECT HISTORY

Greater Sage-Grouse have emerged as a significant conservation concern over the last 10 years. The species is currently a candidate species for listing under the Endangered Species Act inferring that listing is "warranted, but precluded due to higher priorities" because of two primary factors: (1) the large-scale loss and fragmentation of habitats across the species range; and (2) a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to sage-grouse habitat are summarized in the listing decision. The two dominant threats are related to infrastructure associated with energy development in the eastern portion of the species range, and the conversion of sagebrush communities to annual grasslands associated resulting in large uncharacteristic wildfires in the western portion of the species range (U.S. Fish and Wildlife Service 2010).

The Bureau of Land Management (BLM) manages approximately half of the Greater Sage-Grouse habitats, whereas the Forest Service (FS) manages approximately 8 percent of species habitat, with most of that occurring on national forests in the Intermountain Region. The Forest

Service manages approximately 9 million acres of sage-brush habitats, of which about 7.5 million acres occurring in the Intermountain Region. Most habitats on FS administered lands contribute to summer brood-rearing habitats, although some forests and grasslands do contribute important breeding, nesting and winter habitat.

In 2011 and 2012, the United States Fish and Wildlife Service (USFWS) submitted letters to the BLM and FS recommending that the agencies amend land use plans to provide adequate regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 national forests viewed as "high priority" to ensure appropriate regulatory mechanisms. Following scoping and discussion the FS added an additional 10 forest plans that would be considered for amendment. The FS is participating in several joint Environmental Impact Statements (EISs) with the BLM to develop Records of Decision that will be used as a basis for amending land use plans, including forest plans.

Because most occupied GRSG habitat remaining on federal lands is managed by the BLM, that agency is leading the effort to amend or revise land use plans, with the Forest Service as a cooperating agency. The purpose is to provide direction in land management plans that conserve and protect sage-grouse habitat and to provide assurances to the U.S. Fish and Wildlife Service that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for seven sage-grouse planning subregions: 1) eastern Montana and portions of North and South Dakota, 2) Idaho and southwest Montana, 3) Oregon, 4) Wyoming, 5) northwest Colorado, 6) Utah, and 7) Nevada and northern California. The FS is participating in six of these EISs (excluding Eastern Montana/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision."

III. PURPOSE AND NEED

This LUPA is needed to respond to the USFWS's March 2010 "warranted, but precluded" ESA listing petition decision. Inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The USFWS identified the principal regulatory mechanisms for the BLM and the Forest Service as conservation measures embedded in LUPs. Changes in management of GRSG habitats are necessary to avoid the continued decline of populations across the species' range. These LUPAs focus on areas affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision.

The major threats identified within BLM-administered and National Forest System lands in the Nevada and Northeastern California Sub-region include the following (the major threats were identified by the BLM interdisciplinary team in coordination with the USFWS):

- Wildfire–loss of large areas of GRSG habitat due to wildfire
- Invasive Species–conversion of GRSG habitat to cheatgrass- dominated plant communities
- Conifer Invasion–encroachment of pinyon and/or juniper into GRSG habitat
- Infrastructure–fragmentation of GRSG habitat due to human development activities such as right-of-way and renewable energy development
- Grazing-loss of habitat components due to improper livestock grazing

- Hard Rock Mining–fragmentation of GRSG habitat due to mineral exploration and development
- Fluid Mineral Development-fragmentation of GRSG habitat due to mineral exploration and development
- Human Uses-fragmentation of GRSG habitat and/or modification of GRSG behavior due to human presence and activities
- Climate Change-fragmentation of GRSG habitat due to climate stress

The purpose of the LUPA is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat.

Because the BLM and Forest Service administer a large portion of GRSG habitat within the affected states, changes in BLM and Forest Service management of GRSG habitats are anticipated to have a considerable beneficial impact on present and future GRSG populations and could potentially eliminate the need to list the species as threatened or endangered under the ESA.

IV. DESCRIPTION OF THE ALTERNATIVES

See Chapter 2 of the FEIS for complete alternative descriptions.

Alternative A:

Alternative A meets the CEQ requirement that a No Action Alternative be considered. This alternative continues current management direction and prevailing conditions derived from the existing field/district office and forest planning documents. Goals and objectives for resources and resource uses are based on the most recent LUP decisions, along with associated amendments, activity- and implementation-level plans, and other management decision documents. Laws, regulations, and BLM and Forest Service policies that supersede LUP decisions would apply. The No Action Alternative highlights those decisions that can be shown to have a direct effect or link to conserving or restoring GRSG habitat or sagebrush vegetation communities that support GRSG throughout its life cycle. Because there are few management decisions that are common to all 13 LUPs, a summary of the general management per threat is discussed.

Goals and objectives for BLM-administered and National Forest System lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM and Forest Service would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

Management Common to All Alternatives

Allowable uses and management actions from existing LUPs that remain valid are not subject to modification based on management actions identified in the selected alternative. The effects of

the allowable uses and management action are included in the cumulative effects analysis. Other decisions are common only to the action alternatives (Alternatives B, C, D, E, F, and the Proposed Plan). Common management actions include:

- In cooperation with other conservation partners and tribes, conserve, enhance, and restore the sagebrush ecosystem on which GRSG populations depend to maintain or increase their abundance and distribution.
- Manage GRSG as a BLM sensitive species; and as a Forest Service Sensitive and Management Indicator Species (MIS).
- Comply with state and federal laws, regulations, policies, and standards, including the multiple use mandates of FLPMA and NFMA.
- Implement actions originating from laws, regulations, and policies and conform to day-to-day management, monitoring, and administrative functions not specifically addressed.
- Recognize valid existing rights, including any leases, claims, or other use authorizations established, before a new or modified authorization, change in land designation, or new or modified regulation is approved; existing fluid mineral leases are managed through COAs applied at the time the BLM and Forest Service approve an Application for Permit to Drill (APD).
- Collaborate with adjacent landowners, federal, state and local agencies, tribes, communities, other agencies, and other individuals and organizations, as needed, to implement decisions and monitoring to achieve GRSG habitat objectives.
- Apply RDFs (Appendix J of the FEIS) and other site-specific mitigation measures to all resource uses in GRSG habitat to promote rapid reclamation, maximize resource protection, and minimize soil erosion.
- Incorporate the Regional Mitigation Strategy, as outlined in Appendix E of the FEIS.
- Implement management action within wilderness, wilderness study areas, national historic trails and wild and scenic rivers or other special designated areas to be consistent with policies and procedures that have been established to maintain the current physical setting and characteristics of these units.
- Where more restrictive land use allocations or decisions are made in existing RMPs, those more restrictive land use allocations or decisions will remain in effect and will not be amended by this LUPA.

Alternative B:

Greater Sage-Grouse conservation measures in *A Report on National Greater Sage-Grouse Conservation Measures* [Sage-grouse National Technical Team (NTT) Report 2011] were used to form BLM and Forest Service management direction under Alternative B. Management actions by the BLM and Forest Service in concert with other federal, state, and local agencies, tribes, and private land owners play a critical role in the future trends of GRSG populations. To ensure BLM and Forest Service management actions are effective and based on the best available science, the BLM's National Policy Team created a National Technical Team in August 2011. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms, through land use plans, to conserve and restore Greater Sage-Grouse and its habitat on BLM-administered and National Forest System lands on a range-wide basis over the long term. Conservation measures in the report are applied to GRSG PHMA and to a lesser extent to GHMA. PHMA and GHMA are based on mapping of Preliminary

Priority Habitat (PPH) and Preliminary General Habitat (PGH) as described in Chapter 1 of the FEIS. Alternative B includes all mapped PPH and PGH within PHMA and GHMA, with no adjustments. PHMAs have the highest conservation value to maintaining or increasing GRSG populations. See Chapter 2 of the FEIS for additional information.

The Best Management Practices (BMPs) proposed in the NTT report are included as Required Design Features (RDFs) as part of Alternative B and are listed in Appendix J of the FEIS, Required Design Features, of the FEIS. The RDFs mirror the NTT BMPs with one exception: the locatable mineral BMPs are carried forward as BMPs because the General Mining Act of 1872 prevents the agencies from imposing use restrictions on mining claims.

Management actions from the NTT Report concerning coal are not applicable to the Nevada and Northeastern California Sub-region since there are no reasonably developable coal resources within the planning area. Accordingly, the portion of the NTT Report that addresses coal leasing will not be carried forward as part of Alternative B.

Alternative C:

During scoping, individuals and conservation groups submitted management direction recommendations for protection and conservation of Greater Sage-Grouse and its habitat. The recommendations, in conjunction with resource allocation opportunities and internal sub-regional BLM and Forest Service input, were reviewed to develop BLM and Forest Service management direction for Greater Sage-Grouse under Alternative C. Conservation measures in Alternative C are applied to PHMA and focus on the complete removal of livestock grazing from the landscape to alleviate threats to GRSG. PHMA include both PPH and PGH. Refer to Chapter 2 of the FEIS for additional information.

Alternative D:

Alternative D was the BLM and Forest Service, Nevada and Northeastern California Sub-region's preferred alternative in the Draft LUPA/EIS, which emphasizes balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative, which designates and applies management to PHMA and GHMA, seeks to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses.

The alternative adjusts the delineation of PHMA and GHMA to reflect existing land uses, use authorizations, land allocations, and habitat considerations. Areas of PPH next to large-scale mining or EIS level mine expansions, or within developed utility/transportation corridors would be managed as PHMA. PGH in designated wilderness or within wilderness study areas would be managed as PHMA. Mapped PPH in the isolated and highly fragmented Northwest Interior population would be managed as GHMA.

PGH in an area of high potential for ensuring genetic connectivity across the I-80/checkerboard land ownership corridor would be managed as PHMA. The alternative provides for up to 10 percent adjustment in PHMA and GHMA to adapt to changing conditions such as climate

change, wildfire, and population dynamics (e.g., genetic and seasonal range connectivity), which may change due to habitat conditions or new information.

This alternative seeks to provide for no unmitigated loss to GRSG within and outside PHMA/GHMA, in areas where GRSG use has been observed or suspected, areas and habitats that may be necessary to maintain the viability of GRSG populations, or where the activity would affect GRSG or its habitat in PHMA or GHMA occupied GRSG habitat, as described below.

Continued losses of GRSG habitat through natural events such as wildfire are expected to continue. Therefore, it is incumbent on the BLM and Forest Service to minimize loss of habitat or habitat functionality arising from discretionary agency actions or authorizations.

The concept of "no unmitigated loss" includes a suite of actions that can be taken to off-set or restore direct and indirect disturbances on Greater Sage-Grouse habitat. This includes conducting restoration or other appropriate actions (e.g., fence marking to reduce collision risk, and avian predator diverters) in advance of or concurrent with human activities that disrupt GRSG behavior, remove habitat or degrade habitat quality, and/or functionality.

These actions include:

- Siting activities in landscapes that do not provide habitat currently and are not likely to be restorable to habitat
- Rejecting use applications or nominations that cannot be adequately mitigated and where the agencies have discretion to do so
- Applying RDFs and mitigation measures at a level that will offset immediate and long-term effects of the disturbance

Mitigation of anthropogenic uses would be accomplished by specific measures (actions, RDFs & BMPs) and the Nevada Conservation Credit System that include:

- On-site measures to minimize disturbance footprints and taking actions to restore the disturbed areas concurrently (such as revegetation and weed treatments while burying power lines or pipelines)
- Off-site mitigation agreements developed cooperatively with state wildlife agencies, conservation agencies and the Sagebrush Ecosystem Technical Team (SETT) for BLM-administered and National Forest System lands in Nevada
- Prescribed mitigation process to offset the immediate and long-term effects of the disturbance
- Conducting restoration in advance of disturbance
- Coordination with the state(s) on required GRSG habitat restoration

Mitigation of natural disturbances would include:

- Taking actions to prevent or reduce human-caused wildfire ignitions
- Conducting treatments (e.g., creating fuel breaks) to prevent and reduce the spread of wildfires and to augment fire suppression tactics

- Conducting restoration treatments in areas burned by wildfire (including post-fire uses, such as grazing management)
- Conducting treatments to control the spread and dominance of cheatgrass
- Applying habitat restoration or enhancement treatments, such as seeding/planting of perennial grasses, forbs, and shrubs to improve habitat conditions

Alternative E:

Alternative E is based on the State of Nevada's Conservation Plan for Greater Sage-Grouse in Nevada (State of Nevada Alternative, Management Actions for the Conservation of the GRSG in the Nevada and Northeastern California Sub-region [State of Nevada 2012]; Appendix P of the FEIS, State of Nevada Alternative) and would apply to all BLM- and Forest Service-administered lands in Nevada. The State of California did not submit a proposal for a complete alternative and as such, Alternative E would only apply to BLM and Forest Service-administered lands in Nevada. The goals, objectives, and actions under Alternative E reflect concurrent state-level planning efforts for the protection of Greater Sage-Grouse and its habitat. State-level planning efforts focus on all lands within the state, regardless of ownership. The actions are applied to federal lands if the federal agencies have the authority to implement them.

The Nevada State Plan identifies one Sage-Grouse Management Area (SGMA) located within the state. The Sage-Grouse Management Area map defines the overall area where the state would like resources to be managed to maintain and expand GRSG populations (Chapter 2 of the FEIS). The SGMA includes Core, Priority, General and Non-habitat Management Areas. The State of Nevada SGMA map is based on a data-driven approach that uses existing GRSG telemetry locations and mapping products as multiple environmental factors to model the probability of GRSG occurrence throughout the state of Nevada. This process resulted in resource selection functions that were used to create a habitat suitability index and predict the relative importance of all areas, even those where data are lacking. These methods have been accepted in peer-reviewed scientific literature and have been shown to be valuable for identifying areas meaningful to GRSG populations.

Key elements of this alternative are:

- Achieving "no net unmitigated loss" of GRSG habitat by implementation of a strategy to avoid, minimize, and mitigate impacts on GRSG
- Establishing the Conservation Credit System
- Establishing the Sagebrush Ecosystem Technical Team

Alternative F:

Alternative F is based on recommendations submitted by individuals and conservation groups for the protection and conservation of Greater Sage-Grouse and its habitat. Alternative F includes goals and objectives that:

- Increase GRSG populations to a level where they are viable and secure from local extirpation events and, eventually, to a level that allows for an annual harvest surplus.
- Restore and maintain sagebrush steppe to its ecological potential in PPH, PGH

- Establish a system of sagebrush reserves to anchor recovery efforts by protecting the highest quality habitats.
- Rest 25 percent of PHMA and GHMA from livestock grazing each year and reduce AUMs by 25 percent.
- Reduce the established AMLs for wild horses and burros in herd management areas (HMAs) and wild horse and burro territories (WHBTs) within PHMA and GHMA by 25 percent.

Management Actions provide for the protection of GRSG habitat. Alternative F differs from Alternative C on issues relating to grazing, wild horse and burro management, lands and realty, and minerals. Management actions for the conservation of GRSG habitat under Alternative F apply to GRSG PHMA and GHMA, which are mapped as in Alternative B. See Chapter 2 of the FEIS for additional information.

Proposed Plan:

BLM management under the Proposed Plan would balance the multiple uses of the public lands with GRSG habitat conservation, as well as the conservation of other natural and cultural resource values. Within PHMA and GHMA, the Proposed Plan would provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. The Proposed Plan would also apply guidelines to certain activities within PHMA, GHMA, and OHMA.

Although the Proposed Plan resembles the agencies' preferred alternative (Alternative D) from the Draft LUPA/EIS, it includes distinct management strategies from within the range of alternatives in the Draft LUPA/EIS. Importantly, the Proposed Plan clarifies the management approach of avoid, minimize, and mitigate described in the Draft LUPA/EIS, by incorporating screening criteria and development conditions for new anthropogenic disturbances. The screening criteria and development conditions would apply to the following types of resource use decisions: proposed lands and realty; fluid, salable, and non-energy leaseable minerals; travel and transportation; and recreation actions in PHMA and GHMA. Following the screening criteria, the first priority would be to avoid any anthropogenic disturbance in PHMA or GHMA. However, if the activity could not be avoided, the screening criteria would provide a series of secondary priorities, including application of development conditions designed to minimize and mitigate impacts on GRSG and its habitat.

The Proposed Plan also incorporates sagebrush ecosystem resistance and resilience concepts from the Fire and Invasives Assessment Tool (FIAT) (Appendix F of the FEIS, Fire and Invasives Assessment Tool) to prioritize landscape-level habitat restoration, fire operations, and post-fire recovery projects. The Proposed Plan would provide the planning-level framework for more detailed implementation-level FIAT assessments that address the threat of fire, invasive annual grasses, and conifer encroachment in GRSG habitat throughout the planning area and Great Basin region.

The Proposed Plan would also include the following management decisions for Sagebrush Focal Areas (SFAs): 1) recommendation to withdraw the areas from locatable mineral development; 2) no surface occupancy (NSO) for fluid minerals; and 3) prioritization for conservation actions, particularly for grazing permits/leases.

Mitigation, monitoring, and adaptive management are fundamental elements of the Proposed Plan. For mitigation, the BLM would coordinate with the Nevada Sagebrush Ecosystem Technical Team (SETT) for application of the "avoid, minimize, mitigate" process (Appendix G of the FEIS) and Nevada Conservation Credit System (Appendix L of the FEIS) to ensure anthropogenic activities result in a net conservation gain for GRSG habitat. The Proposed Plan also includes a process for monitoring and adapting to changing conditions on the landscape. Using monitoring data for population and sagebrush canopy cover, the adaptive management strategy would apply more restrictive management in biological significant units (BSUs) where there is a consistent downward trend. The cause of the downward trend (e.g., anthropogenic disturbance, fire, disease, etc.) will be identified through monitoring data.

Disturbance in PHMA under the Proposed Plan would also be limited to 3 percent, subject to valid existing rights. The disturbance cap would apply to all anthropogenic disturbances and be measured at the biologically significant unit level and project scales. In the event disturbance exceeds 3 percent, new authorizations would be denied in California and would be subject to the disturbance management protocol in Nevada. Wildfire, although not calculated as disturbance, would reduce the overall amount of sagebrush habitat thereby changing the sagebrush habitat to disturbance ratio within a biologically significant unit.

Guidelines and other site-specific mitigation measures would be applied to all resource uses to promote rapid reclamation and maximize resource protection in PHMA, GHMA, and OHMA.

The Forest Service Proposed Plan is similar to the BLM Proposed Plan except for the following differences in Forest Service management:

- Forest Service units would be required to amend their plans to apply grazing-use Guidelines to nesting and brood rearing habitat during nesting and brood rearing seasonal dates.
- Required Design Features have been incorporated into the Proposed Plan Amendment as planning-level Guidelines, which will be implemented during site-specific project analysis.
- The Forest Service Proposed Plan Amendment is drafted using terminology and guidelines consistent with agency direction for development of forest plans in compliance with the National Forest Management Act.

V. PLANNING AREA/ANALYSIS AREA

The planning area is the geographic area within which the BLM and Forest Service will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction (Figure 1). For this LUPA/EIS, the planning area is the entire Nevada and Northeast California sub-region. While the planning area consists of all lands regardless of ownership, decisions resulting from the LUPA would apply only to BLM-administered and National Forest System lands in mapped GRSG habitats, including surface and split-estate lands with BLM subsurface mineral rights, and would be limited to land use planning decisions specific to the conservation of GRSG and its habitat.

GRSG habitat on BLM-administered and National Forest System lands in the decision area consists of Priority Habitat Management Areas (PHMAs) and General Habitat Management Areas (GHMA). PHMA and GHMA are defined as follows:

- PHMA: BLM and Forest Service lands identified to be managed as having the highest value to maintaining sustainable sage-grouse populations. The PHMAs are derived from and generally follow the PPH boundaries (Chapter 3 of the FEIS) but may be modified in extent based on the objectives of each alternative. Likewise, management strategies applied to the PHMAs may vary by alternative.
- GHMA: BLM and Forest Service lands identified requiring special management to sustain sage-grouse populations, but that are not as important as PHMAs. The GHMAs are derived from and generally follow the PGH boundaries (Chapter 3 of the FEIS) but may be modified in extent based on the objectives of each alternative. Likewise, management strategies applied to the GHMAs may vary by alternative.
- OHMA: BLM and Forest Service lands identified as unmapped habitat in the Draft LUPA/EIS that are within the planning area and contain seasonal or connectivity habitat areas. OHMAs are only applicable to Alternatives D, E, and the Proposed Plan.

This LUPA/EIS also identifies specific GRSG "stronghold" areas described in a FWS memorandum to the BLM/Forest Service titled "Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes." These areas, which the LUPA/EIS refers to as Sagebrush Focal Areas (SFAs), contain the highest densities of GRSG and other criteria important for the persistence of the species. Under the Proposed Plan, the BLM and Forest Service would manage all lands within SFAs as PHMA.

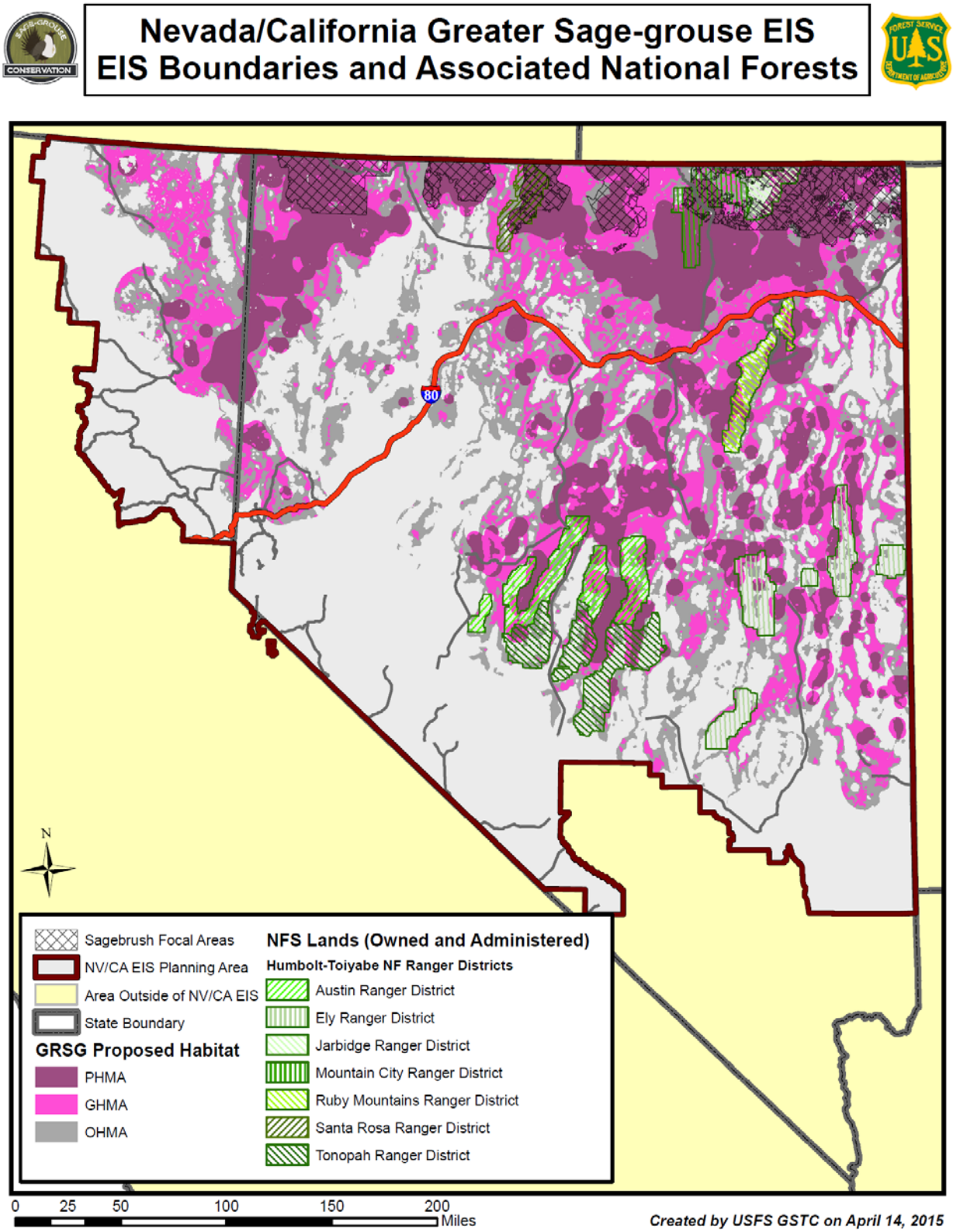


Figure 1. Nevada and northeastern California EIS analysis area showing National Forest-administered lands

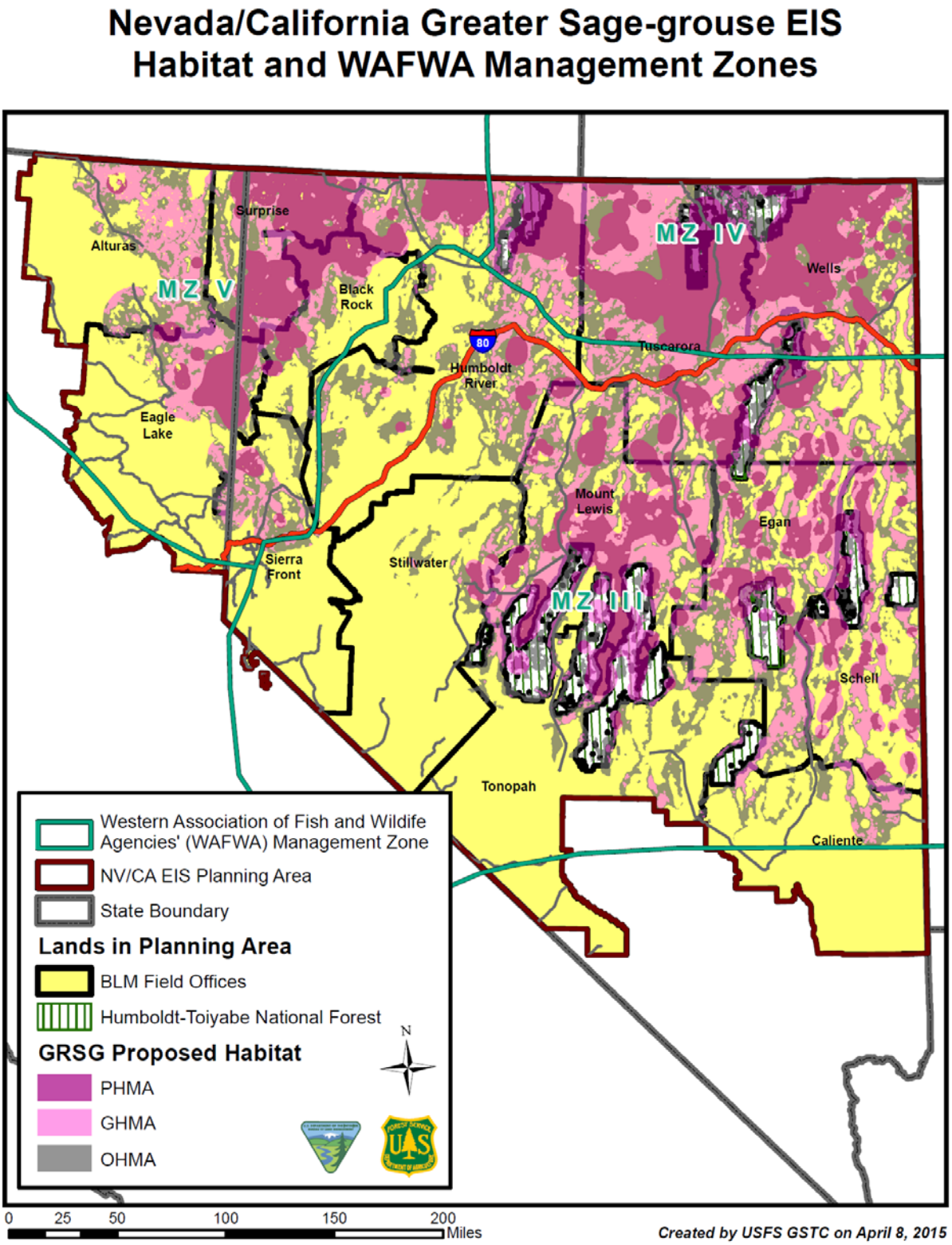


Figure 2. Nevada and northeastern California analysis showing PPH, PGH and Western Association of Fish and Wildlife Agencies (WAFWA) MZs (Stiver et al. 2006).

VI. BIOLOGICAL EVALUATION

This biological evaluation addresses Region 4 sensitive species that meet the following criteria:

1) Species that are known to occur on any of the National Forest System lands listed above based on confirmed sightings.

2) Species that may occur on any of the National Forest System lands listed above based on reliable unconfirmed sightings.

3) Species that may occur on any of the National Forest System lands listed above based on the presence of potential habitat.

Forest Service Policy **-** The USDA Forest Service has developed policy regarding the designation of plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following three criteria:

1) The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend.

2) The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline.

3) The species' population or habitat is stable but limited.

Forest Service Objectives- Under FSM 2672.41, the objectives for completing biological evaluations for proposed Forest Service programs or activities are:

1) To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or contribute to animal species or trends toward Federal listing of any species listed as sensitive by USDA Forest Service Region 4, which includes the Humboldt-Toiyabe.

2) To comply with the requirements of the Endangered Species Act, actions of Federal agencies should not jeopardize or adversely modify critical habitat of federally listed species.

3) To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process, and to enhance opportunities for mitigation.

FSM 2670.22 #2 includes the following objective for sensitive species: “Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System Lands.” FSM 2600, Section 2671.44 (Supplement 2600-94-2) provides direction on the review of actions and programs authorized, funded or implemented by the Forest Service relative to the requirements

of the Endangered Species Act. Species considered in the BE portion of this analysis are all Regional Forester's designated sensitive species.

A. Forest Service Sensitive Species

The sensitive species list is composed of plants, birds, mammals, amphibians, fish, and invertebrates. We conducted a review for Region 4 sensitive species occurring within the Humboldt and Toiyabe National Forests that may overlap with the range of the GRSG or be affected by activities associated with the Planning EIS and subsequent Region 4 Plan Amendments for the Greater Sage-Grouse. Existing occurrence information, as well as known or potential habitat, was obtained from Humboldt and Toiyabe National Forests, Nevada Department of Wildlife (NDOW), Great Basin Bird Observatory (GBBO), Nevada Bat Working Group, Nevada Natural Heritage Program (NNHP), and NatureServe (2013, 2015).

Table 1 lists Forest Service sensitive species known or suspected to exist on the aforementioned national forests. Threatened, endangered, proposed and candidate species are addressed separately in the biological assessment prepared for this project. All of the species in table 1 were considered in this analysis and compared to the five criteria listed below. The five criteria were used to identify species that would experience "no impact" from the implementation of the action alternatives and could therefore be eliminated from detailed analysis. These numerical categories below are referred to in table 1:

1. Analysis area is outside species' range.
2. Potential habitat for the species does not exist within greater sage-grouse habitat (sagebrush-steppe) or is outside the elevation range of the greater sage-grouse.
3. The type or intensity of the activity in the proposed action is expected to have no impact/effect on these species or their habitat.
4. Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic or opportunistic visitors to the habitat(s) impacted by the proposal, but no affiliation or dependence upon these habitat(s) has been shown.
5. The associated conservation design or mitigations eliminate any potential for impact to the species.

Species in table 1 likely to occur within or near the analysis area, or with potential habitat in or near the analysis area, that may be affected (negatively or positively, directly, indirectly and/or cumulatively) by implementation of an action alternative were carried forward into table 2, and a more detailed analysis of the project effects was subsequently conducted.

Table 1. USDA Forest Service Region 4 sensitive species occurring or potentially occurring on the Humboldt-Toiyabe National Forest that may be influenced by an action alternative and will be further analyzed in this document.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
USFS REGION 4 SENSITIVE SPECIES				
MAMMALS				
Bighorn sheep (includes Rocky Mountain bighorn sheep, California bighorn sheep and desert bighorn sheep) *Ovis Canadensis (includes O. c. canadensis, O. c., californiana, and O. c. nelson)*	All subspecies rely on steep, high elevation habitats for spring and summer, including lambing. In winter, they move to lower elevations. Species also uses open areas of desert scrub, grasslands, shrub-steppe, cliffs, canyons, alpine, tundra, and barren landscapes. Migrates through Greater sage-grouse habitat.	Y	Not excluded	No impact
Pygmy rabbit *Brachylagus idahoensis*	Typically found in dense stands of big sagebrush growing in deep loose soils (4,500 to 7,450 feet) in desert, shrubland, chaparral, sagebrush communities	Y	Not excluded	See detailed analysis below
Spotted bat *Euderma maculatum*	Found in various habitats from low elevation desert scrub to high-elevation coniferous forest habitats, including pinyon-juniper, sagebrush or riparian habitats. Closely associated with rocky cliffs.	Y	Not excluded	See detailed analysis below
North American wolverine *Gulo gulo (luscus)*	Remote habitats within subalpine and montane forests	N	2	No impact
Townsend's western big-eared bat *Corynorhinus townsendii townsendii*	Current Nevada records indicate this species is distributed between 210 – 3,500 m (mean = 1,720 m +/- 421 m) primarily in pinyon-juniper-mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally in urban habitats.	Y	Not excluded	See detailed analysis below
Sierra Nevada red fox *Vulpes vulpes necator*	Restricted to Sierra Nevada.	N	1	No impact
BIRDS				
Bald eagle *Haliaeetus leucocephalus*	Found in coniferous forest and intermountain rivers and streams; nest in large trees near water, such as rivers, lakes, and coast shorelines, where they prey upon fish and waterfowl.	Y	4	No Impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Greater Sage-Grouse *Centrocercus urophasianus*	Habitats used in Nevada include sagebrush, montane shrubland, wet meadow; agriculture, springs; montane riparian, aspen; and Great Basin Lowland Riparian with sagebrush species (esp. Wyoming big sagebrush, mountain big sagebrush, and low sagebrush), flowering forbs, agricultural crops (particularly alfalfa), variety of montane shrubs, aspen, alder, willow	Y	Not excluded	See detailed analysis below
Peregrine falcon *Falco peregrinus anatum*	At present, peregrine falcons in Nevada are concentrated around the Lake Mead NRA, where they nest on earthen and rock cliffs surrounding the reservoir. Their current range is likely related to limited recovery rather than habitat availability. They are occasionally found in other areas further north.	Y	4	No Impact
Mountain quail *Oreortyx pictus*	Not closely tied to any single habitat type, but instead tied to dense montane shrub and forb cover. Steep landscapes with intact coniferous forests, deciduous woodlands, and montane shrublands that exist in proximity to a stream represent ideal conditions. Patchy distribution. Overlaps with Greater sage-grouse in montane shrubland, but utilizes steeper terrain and different cover type (dense, tall shrubs vs. sagebrush) than GRSG.	Y	2, 3	No Impact
Flammulated owl *Otus flammeolus*	Hardwood and mixed forests, and hardwood and mixed woodlands; dense oak and oak-pine woodlands, from 6,000 to 10,000 feet. Typically nest in a variety of older conifer or aspen stands.	N	2	No Impact
White-headed woodpecker *Picoides albolarvatus*	Restricted to the Carson Range of western Nevada, which is the eastern edge of their range.	N	2	No impact
Three-toed woodpecker *Picoides tridactylus*	Mature stands with bark beetles, disease, and heart rot and recent stand-replacing burns with abundant wood-boring insects	N	2	No impact
Great gray owl *Strix nebulosa*	Mature forests that provide suitable nesting sites and foraging areas (seedling forests, meadows, and open riparian habitats adjacent to meadows), and large-diameter trees or snags	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
California Spotted Owl *Strix occidentalis occidentalis*	Primarily on the east side of the Sierra Crest, plus a few in the Carson Range. They are associated with large contiguous tracts of old-growth or late-seral coniferous forest.	N	1	No impact
Northern goshawk *Accipiter gentilis*	Typically inhabit late seral or old growth forests that have closed canopies (greater than 40 percent) and a relatively open understory. Goshawks are primarily nest in aspen (Populus tremuloides), but in Nevada, they sometimes nest in conifers. Goshawks use a wide variety of habitats for foraging.	N	2	No impact
Yellow-billed cuckoo *Coccyzus americanus*	Large blocks of riparian habitat with a dense understory of foliage. Their range is south of the range of the Greater sage-grouse.	N	2	No impact
REPTILES AND AMPHIBIANS				
Columbia spotted frog *Rana luteiventris*	Highly aquatic; within vicinity of relatively cold, perennial water (streams, rivers, springs and small lakes) of both woods and meadows	Y	3[1]	No impact
Yosemite toad *Bufo canorus*	Occurs only in high Sierra Nevada, CA, wet mountain meadows and borders of forests from the vicinity of Grass Lake (Eldorado County) to south of Kaiser Pass and Evolution Lake (Fresno County), at elevations 1,460-3,630 meters (mostly above 2,740 meters)	N	1	No impact
Sierra Nevada yellow-legged frog *Rana sierrae*	East of the Sierra Nevada crest, R. sierrae occurs in the Glass Mountains just south of Mono Lake (Mono County) and along the east slope of the Sierra Nevada south to the type locality at Matlock Lake (Inyo County). Rana sierrae is now extirpated from NVand from large portions of the historical range in the Sierra Nevada of CA.	N	1	No impact
FISH				

[1] Subsequent review of the alternatives indicates that this species will experience no effects to its primary habitat or populations. None of the alternatives is expected to impact any of the identified limiting factor s for this species or its life requirements. Based on these factors, the Columbia spotted frog will not be analyzed in additional detail.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Bonneville cutthroat trout *Oncorhynchus clarkii utah*	Bonneville Basin in relatively cool, well-oxygenated water with clean, well-sorted gravels and minimal fine sediments.	Y	3[2]	No impact
INSECTS				
Spring Mountains acastus checkerspot *Chlosyne acastus robusta*	Arid, relatively open areas within pinyon-juniper woodlands and conifer woodlands in patches of yellow rabbitbtrush, the species' larval host plant, intermixed with big sagebrush, mountain mahogany, sulfur-flower buckwheat, and/or rubber rabbitbrush. 5,970-8,730 ft. Endemic to Spring Mountains.	N	1	No impact
Spring Mountains dark blue *Euphilotes ancilla purpura*	Relatively open pinyon-juniper where scattered patches of sulfur-flower buckwheat, the species' larval host plant, occur in association with blackbrush at lower elevations and big sagebrush and mountain mahogany at higher elevations. 5,900-8,200 ft. Endemic to Spring Mountains.	N	1	No impact
Morand's checkerspot *Euphydryas anicia morandi*	Meadows, avalanche chutes and revegetated burned areas composed of bristlecone pine, mixed conifer, and pinyon-juniper vegetation. 6,690-11,290 ft. Endemic to Spring Mountains.	N	1	No impact
Mt. Charleston Blue Butterfly *Plebejus* (=*Icaricia*) *shasta charlestonensis*	Open habitats on flat or moderately sloped ridges, hilltops, or meadows surrounded by bristlecone pine, white fir, or ponderosa pine forest. Endemic to Spring Mountains.	N	1	No impact
PLANTS				
Angelica scabrida Charleston angelica	Moist calcareous-based substrates in montane coniferous forest communities and near springs on moist gravelly soils of washes, ephemeral streams, gullies, montane slopes and avalanche chutes. 4,040-9,350 ft. Endemic to Spring Mountains.	N	1, 2	No impact

[2] Subsequent review of the alternatives indicates that this species will experience no effects to its primary habitat or populations. None of the alternatives is expected to impact any of the identified limiting factor s for this species or its life requirements. Based on these factors, the Bonneville cutthroat trout will not be analyzed in additional detail.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Antennaria arcuata Meadow pussytoes	Seasonally moist areas in alkaline meadows, seeps, & springs, surrounded by silver sagebrush & grassland associations between 6,200 and 6,500 ft. Elko County NV. Also in ID and WY.	Y	Not excluded	See detailed analysis below
Antennaria soliceps Charleston pussytoes	Open carbonate scree, talus, gravel, and crevices in the subalpine conifer, lower alpine, and upper montane conifer zones. 8,660-11,650 ft. Endemic to Spring Mountains.	N	1, 2	No impact
Arenaria kingii ssp. *rosea* Rosy King's Sandwort	Wooded slopes and ridges and associated with pinyon-juniper, montane coniferous forest, and lower subalpine coniferous zones. 6,560-9,550 ft. Endemic to Spring Mountains.	N	1	No impact
Asclepias eastwoodiana Eastwood milkweed	Mixed desert shrub, sagebrush, and pinyon-juniper in open areas frequently in small washes or other moisture-accumulating microsites. 3,000-7,080 ft. Nevada endemic documented from Esmeralda, Lander, Lincoln, and Nye Counties.	Y	Not excluded	See detailed analysis below
Astragalus aequalis Clokey milkvetch	Pinyon-juniper, mountain mahogany, ponderosa pine on basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops. 5,970-8,400 ft. Endemic to Spring Mountains	N	1	No impact
Astragalus johannis-howellii Long Valley milkvetch	Sagebrush on sandy rhyolitic soils on flats and gentle slopes, usually in swales of former or present hot springs. 6,700-8,400 ft. NV distribution limited to Mineral County. Also in CA.	N	1	No impact
Astragalus lentiginosus var. *latus* Broad-pod freckled milkvetch	Pinyon-juniper on gravelly or sandy calcareous soils, generally on moderate to steep slopes. 5,700 to 9,900 ft. NV endemic documented from Elko and White Pine Counties.	Y	Not excluded	See detailed analysis below
Astragalus oophorus var. *clokeyanus* Lee Canyon milkvetch	Pinyon-juniper and mixed conifer communities on moist to dry soils, in openings of forests, shrublands, and woodlands. 5,400-8,990 ft. Endemic to Spring Mountains.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Astragalus oophorus var. *lavinii* Lavin's Egg milkvetch	Pinyon-juniper and sagebrush on relatively barren slopes, knolls, badlands, or outcrops, derived from volcanic ash or carbonate, usually on northeast to southeast aspects. 5,700 -7,467 ft. In NV known only from Douglas, Lyon and Mineral Counties.	N	1	No impact
Astragalus remotus Spring Mountain milkvetch	Low elevation juniper, creosote, scrub oak, serviceberry on rocky, gravelly, and/or sandy calcareous soils in washes and drainages or on hillsides or rocky ledges. 3,400-7,050 ft. Documented from Spring Mountains in Clark County NV and Belted Range and Pahute Mesa in southern Nye County.	N	1	No impact
Astragalus robbinsii var. *occidentalis* Lamoille Canyon milkvetch	Willow, aspen or shrubby cinquefoil communities in moist to seasonally dry sandy loam soils in seeps, riparian strips, stream banks, and high-elevation meadow margins. 6,050-10,000 ft. Endemic to Ruby and east Humboldt Mountains in Elko County.	Y	Not excluded	See detailed analysis below
Astragalus toquimanus Toquima milkvetch	Pinyon-juniper, sagebrush typically on gravelly hillsides with gentle slopes in basic or calcareous soils. 6,480-7,520 ft. NV endemic documented from Nye County.	Y	Not excluded	See detailed analysis below
Astragalus uncialis Currant milkvetch	Desert shrub and sagebrush on knolls, gullied foothills, stony washes, saline flats, gently sloping hillsides, and alluvial fans in calcareous sandy-clay or gravelly alkaline soils. 4,800-6,050 ft. In NV documented from Nye County. Also in UT.	Y	Not excluded	See detailed analysis below
Boechera (=*Arabis*) *bodiensis* Bodie Hills rockcress	Pinyon-juniper, mountain sagebrush, subalpine, alpine on dry, open, rocky, high or north-facing slopes or exposed summits of granitic or rhyolitic material. 6,720-9,970 ft. In NV known only from western Mineral County.	N	1	No impact
Boechera (=*Arabis*) *falcatoria* Grouse Creek rockcress	Exposed gravelly wind-swept passes with low sagebrush in mountain mahogany, sagebrush, and pinyon-juniper associations. 6,600-9,000 ft. In NV, restricted to Ruby Mountains. Also documented from UT.	Y	Not excluded	See detailed analysis below
Boechera (=*Arabis*) *nevadensis* Spring Mountains rockcress	Ledges and talus of limestone cliffs. 9,842-11,159 ft. Endemic to Spring Mountains.	N	1, 2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Boechera (=*Arabis*) *ophira* Ophir rockcress	Mountain sagebrush, subalpine conifer, and alpine zones in loamy soil pockets on exposed talus or scree or in rocky areas on south- to west-facing ridge lines and upper slopes. 9,960 to 10,520 ft. Endemic to Toiyabe Range in Lander and Nye Counties.	Y	2	No impact
Boechera (=*Arabis*) *rectissima* var. *simulans* Washoe tall rockcress	Jeffrey Pine-Sierra Nevada White fir forests on dry, deep, sandy, granitic or andesitic soils on mostly gentle slopes of all aspects, in full or filtered sunlight of thinly littered openings. 6,035-7,335 ft. Endemic to northern Carson Range.	N	1, 2	No impact
Boechera (=*Arabis*) *rigidissima* var. *demota* Galena Creek rockcress	Fir, pine, and aspen communities on sandy to rocky soils or outcrops derived from granitic or volcanic materials often in drainage ways, near meadow edges or other moisture accumulating microsites. 7,020-10,020 ft. Endemic to northern Carson Range.	N	1, 2	No impact
Boechera (=*Arabis*) *tiehmii* Tiehm rockcress	Alpine boulder and rock fields, soil pockets within talus slopes, and slopes of decomposed granite. Over 9,000 ft. In NV known only from Mt. Rose area in northern Carson Range.	N	1, 2	No impact
Botrychium ascendens Upswept moonwort	Riparian areas, seeps, and springs primarily in open habitats, such as alpine meadows, avalanche meadows, and grassy roadsides. 8,136-11,646. in NV. In NV documented from Spring Mountains on HT. Also occurs at Cooney Lake on Bridgeport RD in CA. Distribution includes AK, CA, MN, MT, OR, WY, Alberta, British Columbia, Newfoundland, Ontario, Quebec, and Yukon Territory.	Y	Not excluded	See detailed analysis below
Botrychium crenulatum Dainty moonwort	Riparian areas, seeps, and springs in very moist sites with saturated soil and dense herbaceous vegetation. 8,136 to 11,154 in NV. In NV documented from Jarbidge and Ruby Mountains RDs and SMNRA on HT. Also in AZ, CA, ID MT, OR, UT, WA, WY, British Columbia, and Alberta.	Y	Not excluded	See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Botrychium lineare Slender moonwort	Riparian areas, seeps, and springs in a variety of areas ranging from limestone cliffs and gravelly beaches to wet meadows and forest understory. 8,497-9,776 ft. in NV. In NV, documented from Spring Mountains. Also occurs in AK, CA, CO, SD, MT, UT, WA, WY, Yukon Territory, and historically in New Brunswick and Quebec.	Y	Not excluded	See detailed analysis below
Botrychium tunux Moosewort	Riparian areas, seeps, and springs in disjunct areas, including low elevation coastal beaches and dunes in Alaska, well-drained rocky meadows in California, and sparsely vegetated alpine scree slopes in Montana, Wyoming and Colorado. 9,186-9,842 ft. in NV. On HT documented from Spring Mountains and Bridgeport Ranger District.	Y	Not excluded	See detailed analysis below
Carex tiogana Tioga pass sedge	Alpine on terraces next to lakes, meadows, and other mesic sites. 10,100-10,900 ft. Endemic to Sierra Nevada in CA.	N	1, 2	No impact
Cusickiella quadricostata Bodie Hills draba	Great Basin scrub, including low sagebrush, grasslands, pinyon-juniper, mountain mahogany, on clay or rocky soils on flats and rolling hills. 6,000-8,500 ft. NV distribution limited to western Douglas, Lyon & Mineral Counties	N	1	No impact
Cymopterus goodrichii Goodrich biscuitroot	Upper subalpine and lower alpine on moderate to steep scree and talus slopes of dark angular slate or limestone. 7,300-11,100 ft. NV endemic documented from Lander, Nye, and Pershing Counties.	Y	2	No impact
Draba arida Arid draba	Subalpine conifer and lower alpine in rock crevices, scree, snow-bank areas, rocky soils, loam, or forest litter on gentle to steep slopes of all aspects. Often with limber pine. 7,350-11,100 ft. NV endemic documented from Lander and Nye Counties.	Y	2	No impact
Draba asterophora var. *asterophora* Star draba	Subalpine conifer zone on granite rock crevices, talus, scree, rocky decomposed granite, or volcanic soils on steep slopes, mostly on north to east aspects. 8,000-10,200 ft. Endemic to Sierra Nevada.	N	1, 2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Draba brachystylis Wasatch Draba	Montane coniferous forest and bristlecone pine communities in moist to damp rocky pockets and soils on drainage banks, steep drainage areas, and avalanche chutes where snowdrifts remain until late winter. 7,874-9,022 ft. in NV. In NV, restricted to Spring Mountains. Also in UT.	N	1, 2	No impact
Draba jaegeri Jaeger draba	Subalpine conifer, lower alpine, and occasionally upper montane conifer zones, most often in the understory of bristlecone pine forest on dry carbonate scree, talus, crevices, and coarse rocky soils on ridges and steep north-facing slopes. 8,370-11,650 ft. Endemic to Spring Mountains.	N	1, 2	No impact
Draba oreibata var. *serpentina* Serpentine draba	Lower alpine and upper subalpine conifer in dry quartizite cliff crevices, and on ledges, talus, and rocky slopes. 10,000-11,926 ft. NV endemic documented from Lander and White Pine Counties.	Y	2	No impact
Draba paucifructa Charleston draba	Alpine and bristlecone pine communities in moist places, on rock ledges, along avalanche chutes, and in seeps. 8,700-11,300 ft. Endemic to Spring Mountains.	N	1, 2	No impact
Draba pennellii Pennell draba	Pinyon-juniper, subalpine, and alpine on crevices and ledges of carbonate or quartzite cliffs, outcrop faces, and ridges in the zones. 6,200 to 11,800 ft. Endemic to White Pine County.	Y	3[3]	No impact
Epilobium nevadense Nevada willowherb	Pinyon pine and ponderosa pine communities on limestone talus slopes and rock outcrops. 6,000-8,930 ft. in NV. Documented from Clark, Eureka, and Lincoln Counties NV. Also in UT.	Y	Not excluded	No impact
Ericameria compacta (=*Haplopappus compactus*) Spring Mountain goldenweed	Ponderosa pine, limber pine and bristlecone pine in sheltered areas on sparsely timbered slopes. 2,850-11,350 ft. Endemic to Spring and Sheep Mountains.	N	1, 2	No impact

[3] Although Pennell draba occurs within sagebrush and pinyon-juniper vegetation, it occurs in crevices and ledges of carbonate or quartzite cliffs, outcrop faces, and ridges occurs on near vertical limestone cliffs and in talus at base of cliffs, which do not constitute greater sage-grouse habitat.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Erigeron cavernensis Snake Mountain erigeron	Montane conifer and subalpine conifer zones on limestone cliffs, outcrops, crevices, and rubble often in limber pine and bristlecone pine communities. 6,890 to 11,155 ft. NV endemic documented from White Pine County.	Y	2	No impact
Eriogonum douglasii var. *elkoense* Sunflower Flat buckwheat	Mixed grassland and sagebrush communities on sandy to gravelly flats and slopes. 6,200 to 6,900 ft. Narrow endemic to Sunflower Flat area in northwestern Elko County.	Y	Not excluded	See detailed analysis below
Eriogonum esmeraldense var. *toiyabense* Toiyabe buckwheat	Pinyon-juniper, mountain sagebrush, mountain mahogany, and subalpine conifer on steep, loose slopes derived from rhyolitic or andesiteic volcanic materials, frequently on white ash deposits. 6,900 -10,500 ft. NV endemic documented from Eureka, Lander, and Nye Counties.	Y	Not excluded	See detailed analysis below
Eriogonum heermannii var. *clokeyi* Clokey buckwheat	Creosote-bursage, shadcale, and blackbrush on carbonate outcrops, talus, scree, and gravelly washes and banks. 4,000-6,000 ft. Documented only from Spring & Sheep Mtns in Clark County & DOE lands in southern Nye County.	N	1, 2	No impact
Eriogonum lewisii Lewis's buckwheat	Mountain or low sagebrush on dry, exposed, shallow, relatively barren, undisturbed, rocky soils on convex ridge-line knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects. Clay hills at lower elevations. 6,470-9,720 ft. NV endemic documented from Elko and Eureka Counties.	Y	Not excluded	See detailed analysis below
Eriogonum robustum Altered andesite buckwheat	Restricted to andesitic soils on barren ridges, knolls and steep slopes. 4,410-7,325 ft. NV narrow endemic documented from Storey County and southwestern Washoe County.	N	1	No impact
Glossopetalon clokeyi Clokey greasebush	Pinyon-juniper, sagebrush, ponderosa pine, white fir, limber pine, and bristlecone pine communities on vertical and near-vertical limestone cliff faces and ledges. 6,594-9678 ft. Endemic to Spring Mountains.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Glossopetalon pungens var. *glabra* (=*G.pungens*) Smooth dwarf greasebrush	Pinyon-juniper, sagebrush, and montane conifer on vertical crevices of limestone cliff faces and rocky slopes or outcrops. 6,000-7,800 ft. Distribution limited to Clark Mtns CA and Spring & Sheep Mtns NV.	N	1	No impact
Ivesia aperta var. *aperta* Sierra Valley ivesia	Yellow pine, mountain sagebrush, and mountain mahogany zones on vernally saturated sites, such as meadow flats and borders and ephemeral channels. NV populations are restricted to shallow, slow draining soils of volcanic origin. 6,460-7,300 ft. in NV. Documented from Carson and Virginia Ranges and Peavine Mtn NV. Also in CA.	N	1	No impact
Ivesia aperta var. *canina* Dog Valley ivesia	Yellow pine forest on vernally saturated sites, including meadow flats, borders of gently sloping openings, and ephemeral channels on soils with sandy loam and slightly acidic surface layer. 5,249-6,561 ft. Endemic to Dog Valley, CA.	N	1, 2	No impact
Ivesia cryptocaulis Charleston ivesia	Subalpine bristlecone pine and alpine on moist to dry carbonate scree, talus, outcrops, and gravelly soils on steep slopes, ridges, and alpine flats. 10,890-11,915 ft. Endemic to Spring Mountains.	N	1, 2	No impact
Ivesia jaegeri Jaeger ivesia	Pinyon pine, ponderosa pine, bristlecone pine, mountain mahogany communities on limestone and sandstone cliffs and crevices. 5,200-11,060 ft. in NV. NV distribution limited to Spring Mountains. Also in CA.	N	1, 2	No impact
Ivesia sericoleuca Plumas ivesia	Sagebrush scrub, yellow pine forest, freshwater wetlands, and wetland-riparian communities associated with seasonally wet meadows, meadow ecotones, terraces and toeslopes on primarily volcanic soils. 4,297-7,217 ft. Endemic to California.	N	1	No impact
Ivesia webberi Webber ivesia	Low sagebrush in full sun on gentle slopes (<15%) in sparsely vegetated areas. 4,000-5,950 ft. NV distribution limited to Peavine Mtn, Carson Range and Pine Nut Mtns.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Jamesia tetrapetala Basin jamesia	Pinyon-juniper to subalpine in cracks and crevices of limestone outcrops and talus at cliff bases. 6,560-10,800 ft. Lincoln, Nye, and White Pine Counties NV. Also in UT.	Y	Not excluded	See detailed analysis below
Lathyrus grimesii Grimes lathyrus	Sagebrush, mountain shrub on dry, open, shallow, silty clay soils usually overlain by a thin scree of reddish to yellowish brown gravel, stone, and clay that form relatively barren patches on mostly steep slopes of all aspects with a sparse to moderately dense vegetation association. 6,000-8,300 ft. Endemic to Elko County, NV.	Y	Not excluded	See detailed analysis below
Lesquerella hitchcockii var. *hitchcockii* (=*Physaria hitchcockii* var. *hitchcockii*) Hitchcock bladderpod	Pinyon-juniper to the subalpine conifer zones on dry, gravelly, carbonate soils, scree, talus, and outcrops on knolls, flats, and slopes. 7,000-11,710 ft. Documented in NV from Spring and Sheep Mountains. May also include occurrences on Table Cliff Plateau UT.	N	1, 2	No impact
Lewisia maguirei Maguire lewisia	Pinyon-juniper on dry, sparsely vegetated carbonate scree or shallow gravelly-clay soils on steep slopes and ridgelines. 7,360 to 8,280 ft. Endemic to Grant-Quinn Range in Nye County NV.	Y	Not excluded	See detailed analysis below
Meesia triquetra Three-ranked hump-moss	Upper montane coniferous forest and subalpine coniferous forest in bogs, fens, meadows, and seeps. 4,250-9,700 ft. Distribution limited to Sierra Nevada bioregion.	N	1, 2	No impact
Orthotrichum shevockii Shevock rockmoss	Joshua tree woodland, pinyon-juniper woodland, and Jeffrey pine forest on underhangs or in crevices of granitic rock in filtered light. 3,600-5,250 ft. Endemic to Eastern to Central Sierra Nevada and Western edge of Nevada in the Carson Range.	N	1	No impact
Orthotrichum spjutii Spjut's brittle-moss	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, upper montane coniferous forest in shaded areas near stream beds and in canyons on deciduous trees and rarely on shaded rocks. 6,890-8,500 ft. Endemic to CA.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Penstemon arenarius Dune penstemon	Desert shrub on deep, loose sandy soils of valley bottoms, aeolian deposits, and dune skirts, often in alkaline areas, sometimes on road banks and other recovering disturbances. 3,920-5,960 ft. NV endemic documented from Churchill, Mineral, and Nye Counties.	N	2	No impact
Penstemon concinnus Elegant penstemon	Pinyon-juniper woodlands in gravelly, alluvial soils. 5,925 to 7,700 ft. Lincoln and White Pine Counties NV. Also in UT.	Y	Not excluded	See detailed analysis below
Penstemon leiophyllus var. *keckii* Charleston beardtongue	Limber pine, bristlecone pine, and aspen in unvegetated gravelly areas or open meadows at or near timberline. 2,980-11,480 ft. Endemic to Spring Mountains.	N	1	No impact
Penstemon moriahensis Mt. Moriah penstemon	Subalpine, mountain mahogany, ponderosa pine, and upper pinyon-juniper on open, gravelly and/or silty carbonate soils in drainages, on gentle slopes, and on road banks or other recovering disturbances with enhanced runoff. 7,100 to 10,800 ft. NV endemic documented from White Pine County.	Y	Not excluded	See detailed analysis below
Penstemon pudicus Bashful penstemon	Mountain sagebrush, mountain mahogany, and pinyon juniper in crevices, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, steep protected slopes, and drainage bottoms. 7,500-9,000 ft. NV endemic documented from Nye County.	Y	Not excluded	See detailed analysis below
Penstemon rhizomatosus Rhizome beardtongue	Subalpine conifer in crevices of cliffs and outcrops, or silty loam soil pockets in talus or scree of carbonate rocks on steep slopes. 10,000-11,250 ft. Narrow endemic within White Pine County.	Y	2	No impact
Penstemon rubicundus Wassuk beardtongue	Desert scrub, sagebrush, pinyon-juniper on open, rocky to gravelly soils on perched tufa shores, steep decomposed granite slopes, rocky drainage bottoms, and recovering disturbances with enhanced runoff. 4,200-6,850 ft. NV endemic with distribution limited to Douglas, Mineral and Esmeralda Counties.	N	1	No impact
Penstemon thompsoniae ssp. *jaegeri* Jaeger beardtongue	Pinyon-juniper to the subalpine conifer zones on gravelly limestone banks, hillsides, knolls, or slopes, in drainages, and under conifers. 5,577-11,060 ft. Endemic to Spring and Sheep Mountains.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Phacelia inconspicua Inconspicuous phacelia	Mountain big sagebrush in small clearings on deep, undisturbed soils with high organic content on steep concave north to northeast facing slopes where moisture and snow accumulate. 5,000-8,280 ft. in NV. In NV known only from northern Humboldt Range, Pershing County. Also in ID.	Y	Not excluded	See detailed analysis below
Phacelia minutissima Small-flower phacelia	Riparian areas in vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, at perimeters of corn lily, mule-ears, and/or aspen, and on ephemeral stream banks. 6,240-8,900 ft. in NV. Elko and Eureka Counties NV. Also in ID and WA.	Y	Not excluded	See detailed analysis below.
Phacelia monoensis Mono phacelia	Pinyon-juniper, low sagebrush, and mountain sagebrush on alkaline, barren or sparsely vegetated shrink-swell clays. 6,000-9,000 ft. NV distribution limited to Esmeralda, Lyon and Mineral Counties.	N	1	No impact
Whitebark pine *Pinus albicaulis*	Subalpine on dry, rocky sites, ledges, and cliff faces often with white pine, limber pine, lodgepole pine, subalpine fir. 6,800-10,750 in NV.	Y	2	No impact
Plagiobothrys glomeratus Altered andesite popcorn flower	Sagebrush, pinyon-juniper, and montane conifer zones. Restricted to altered andesite soils. 4,860-6,650 ft. Western NV endemic documented from Storey and southwestern Washoe Counties.	N	1	No impact
Poa abbreviata ssp. *marshii* Marsh's bluegrass	Alpine in soil pocks in scree, talus, boulder, rock fields, and loose quartzite. 11,600-12,600 ft. Documented from White Pine County NV. Also in CA and ID.	Y	2	No impact
Polemonium chartaceum White Mountain skypilot	Alpine boulder and rock fields and subalpine coniferous forest on rocky, serpentine, granitic, or volcanic soils. 5,900-13,700 ft. In NV documented only from White Mountains.	N	1, 2	No impact
Polyctenium williamsiae Williams combleaf	Pinyon-juniper and sagebrush on relatively barren sandy to sandy-clay or mud margins and bottoms of non-alkaline seasonal lakes perched over volcanic bedrock. 5,670-8,930 ft. Doucumented from Douglas, Lyon, Mineral, Nye, and Washoe Counties NV. Also in CA and OR.	Y	Not excluded	See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Potentilla johnstonii Sagebrush cinquefoil	Pinyon-juniper and sagebrush. 7,600 ft. Endemic to Quinn Canyon Range in Nye County.	Y	Not excluded	See detailed analysis below
Primula capillaris Ruby Mountain primrose	Subalpine meadow openings in the subalpine conifer zone on moist, seasonally saturated, slowly creeping, dark brown loam or sandy loam soils derived from glacial till, generally on steep north to northeast aspects. 8,500-10,000 ft. Endemic to the Ruby Mountains.	N	2	No impact
Primula cusickiana var. *nevadensis* (=*P. nevadensis*) Nevada primrose	Subalpine conifer and lower alpine zones in limestone rock outcrops, crevices, talus, scree, and gravelly soils or soil pockets often on north to east aspects or in lee ward snow-accumulation areas sometimes in litter of bristlecone pine, meadows, or riparian areas. 10,200-11,590 ft. NV endemic documented from Nye and White Pine Counties.	Y	2	No impact
Senecio pattersonensis Mono ragwort	Alpine on talus slopes and gravelly ridges at and above timberline and in alpine fell-fields. 9,500-12,200 ft. Endemic to CA.	N	1, 2	No impact
Silene clokeyi Clokey silene	Dry to moist carbonate scree, talus, and loose rocky soils on ridges, flats, and steep slopes. 9,940-11,580 ft. Endemic to Spring Mountains.	N	1, 2	No impact
Silene nachlingerae Nachlinger silene	Subalpine conifer on rocky limestone knolls and ridges or at the bases of steep slopes or cliffs. 7,160-11,250 ft. NV endemic documented from Elko, Nye, and White Pine Counties NV.	Y	2	No impact
Sphaeralcea caespitosa var. *williamsiae* Railroad Valley globemallow	Desert shrub and sagebrush restricted to sevy dolomite calcareous soil. 4,770 to 5,310. Nye County NV. Also in UT.	Y	Not excluded	See detailed analysis below
Sphaeromeria compacta Low sphaeromeria	Lower alpine and upper subalpine conifer zones along ridges and slopes on carbonate scree, talus, outcrops, and rocky fellfields. 9,680-11,810 ft. Endemic to Spring Mountains.	N	1, 2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Streptanthus oliganthus Masonic Mountain jewelflower	Pinyon-juniper, sagebrush-grass, and Jeffery pine zones on rocky slopes or talus, on flat areas, in ravines, and in canyon bottoms in sandy or gravelly soil of decayed granite or decomposing volcanic rock. 6,400-10,000 ft. NV distribution limited to Esmeralda, Lyon and Mineral Counties. Also in CA.	N	1	No impact
Synthyris ranunculina Charleston kittentails	Bristlecone pine and limber pine along moist cliff bands bordering avalanche chutes and drainages. 8,760-12,073 ft. Endemic to Spring Mountains.	N	1, 2	No impact
Tonestus (=*Haplopappus*) *alpinus* Alpine goldenweed	Mountain mahogany, subalpine conifer, and lower alpine in crevices, rubble, and adjacent rocky soils of rock outcrops, often on northerly or protected aspects. 8,900-11,810 ft. NV endemic documented from Lander and Nye Counties.	Y	2	No impact
Townsendia jonesii var. *tumulosa* Charleston ground daisy	From upper shadscale/mixed shrub to lower subalpine conifer zones on ridges, slopes, saddles, and washes in open places away from shrubs. 5,200-11,060 ft. Documented from Spring and Sheep Mountains in Clark County and Sunnyside in Nye County.	Y	Not excluded	See detailed analysis below
Trifolium andinum var. *podocephalum* Currant Summit clover	Pinyon-juniper zone in crevices of volcanic or limestone rock. 6,900-7,400 ft. Endemic to White Pine and Egan Ranges in Lincoln and Nye Counties.	Y	Not excluded	See detailed analysis below
Trifolium leibergii Leiberg's clover	Sagebrush to pinyon-juniper mainly on dry, shallow, relatively barren gravel soils of crumbling volcanic outcrops, bare shale crests, talus slopes, and reddish ash flow tuft. 6,560 to 7,800 ft. in NV. In NV documented from Elko County. Also in OR.	Y	Not excluded	See detailed analysis below
Trifolium macilentum var. *rollinsii* Rollins clover	Mountain sagebrush, subalpine conifer, and lower alpine on dry to moist gravelly soils in concave, leeward, or otherwise moisture-accumulating areas on steep to moderate slopes. 8,800 to 10,580 ft. Endemic to Toiyabe Range, NV.	Y	Not excluded	See detailed analysis below
Viola charlestonensis Charleston violet	Pinyon pine, Utah juniper, ponderosa pine and aspen on limestone hills, slopes, and dry washes. 6,500-9,800 ft. In NV known only from Spring Mountains. Also in AZ & UT.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Viola lithion Lithion violet	Subalpine to alpine zone in seasonally wet crevices and along narrow ledges of steep carbonate or quartzite outcrops in shaded northeast-facing avalanche chutes and cirque headwalls. 7,840-10,480 ft. in NV. Elko, Nye and White Pine Counties NV. Also in UT.	N	2	No impact

Table 2. Species analyzed in detail because they may be affected by one of the action alternatives.

Species	Habitat affinity	Species Group
Mammals		
Bighorn sheep *Ovis canadensis*	GRA, SHR, S	Sagebrush-associated species
Pygmy rabbit *Brachylagus idahoensis*	S	Sagebrush-associated species
Columbia spotted bat *Euderma maculatum*	PJ, RIP, S	Sagebrush-associated species
Townsend's western big-eared bat *Corynorhinus townsendii*	GRA, PP, RIP, S	Sagebrush-associated species
Birds		
Greater Sage-Grouse *Centrocercus urophasianus*	GRA,MS, PJ, PP, SHR, S	Sagebrush-associated species
Plants		
Antennaria arcuate Meadow pussytoes	M & SP in S & GRA	Plants
Asclepias eastwoodiana Eastwood milkweed	DS, S, PJ	Plants
Astragalus lentiginosus var. *latus* Broad-pod freckled milkvetch	PJ	Plants
Astragalus robbinsii var. *occidentalis* Lamoille Canyon milkvetch	RIP, M	Plants
Astragalus toquimanus Toquima milkvetch	PJ, S	Plants
Astragalus uncialis Currant milkvetch	DS, S	Plants
Boechera falcatoria Grouse Creek rockcress	S, MM	Plants

Species	Habitat affinity	Species Group
Botrychium ascendens Upswept moonwort	RIP, SP,M	Plants
Botrychium crenulatum Dainty moonwort	RIP, SP	Plants
Botrychium lineare Slender moonwort	RIP, SP, M	Plants
Botrychium tunux Moosewort	RIP, SP, M	Plants
Epilobium nevadense Nevada willowherb	PP, PN	Plants
Eriogonum douglasii var. *elkoense* Sunflower flat buckwheat	GRA, S	Plants
Eriogonum esmeraldense var. *toiyabense* Toiyabe buckwheat	PJ, S, MM, C	Plants
Eriogonum lewisii Lewis's buckwheat	S	Plants
Jamesia tetrapetala Basin jamesia	PJ & SA	Plants
Lathyrus grimesii Grimes lathyrus	S, MS	Plants
Lewisia maguirei Maguire lewisia	PJ	Plants
Penstemon concinnus Elegant penstemon	PJ	Plants
Penstemon moriahensis Mt. Moriah penstemon	SA, MM, PP, PJ	Plants
Penstemon pudicus Bashful penstemon	S, MM, PJ	Plants

Species	Habitat affinity	Species Group
Phacelia inconspicua Inconspicuous phacelia	S	Plants
Phacelia minutissima Small-flower phacelia	RIP	Plants
Polyctenium williamsiae Williams combleaf	PJ, S	Plants
Potentilla johnstonii Sagebrush cinquefoil	PJ, S	Plants
Sphaeralcea caespitosa var. *williamsiae* Railroad Valley globemallow	DS, S	Plants
Townsendia jonesii var. *tumulosa* Charleston ground daisy	SHR, C	Plants
Trifolium andinum var. *podocephalum* Currant Summit clover	PJ	Plants
Trifolium leibergii Leiberg's clover	S, PJ	Plants
Trifolium macilentum var. *rollinsii* Rollins clover	S, C, A	Plants
Key: ***A = Alpine; C = Coniferous forest; DS = Desert shrub; GRA = Grassland; M = Meadows (wet or dry), fens; MM = Mountain mahogany; MS = Mountain shrub; PJ = Pinyon-Juniper; PN = Pinyon pine; PP = Ponderosa pine; RIP = Riparian; SHR = Shrubland; S = Sagebrush; SA = Subalpine; SP = Seeps, springs, swales***		

B. Species Information and Effects Analysis (*Direct, Indirect and Cumulative*)

1. Greater Sage-Grouse (*Centrocercus urophasianus*)

Evaluating Viability

Forest Service policy based on the National Forest Management Act (NFMA) and associated regulations motivate careful consideration of the conservation status of sensitive species. In this section we briefly outline the legal foundation and the policy which establishes our approach to evaluating the contribution of habitat on NFS land to the overall viability of the GRSG, and how that evaluation differs among NFS units depending on the inherent capability and suitability of the environment.

The statutory underpinning for evaluating viability of species expressed in 16 U.S.C. §1604(g)(3)(B) requires the Secretary to promulgate regulations that shall include, but not be limited to:

> (3) specifying guidelines for land management plans developed to achieve the goals of the Program which –
>
> (B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, …

The Department published planning regulations in 1982, under which the land management plans associated with the current amendment for GRSG were written. The 1982 regulations included the viability provision at 36 CFR 219.19:

> Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

All Forest Plans being considered for amendment to address GRSG conservation and recovery were developed under the 1982 planning regulations. This Biological Evaluation considers management guidance for GRSG, outside of the bistate population area, on NFS lands in Nevada, and assesses the outcomes of seven alternatives for amendment of the Humbold-Toiyabe (H-T) National Forest land management plans. The NFS units on the H-T differ substantially in the inherent distribution and quality of GRSG habitat. The seven NFS districts comprising the Forest occur at an elevation and in ecological settings such that they support certain life history needs, but not others. As a result, GRSG use National Forest System lands

for only a portion of the year (e.g. for summer brood-rearing habitat). Differences among NFS units result largely from the environmental setting, and therefore the inherent capability of the environment to support particular sage brush ecosystems varies.

As outlined in the FEIS and referenced in this Biological Evaluation, the capability of NFS lands to support self-sustaining populations of GRSG is limited. The NFS lands contain relatively small areas of GRSG habitat as compared to habitats occurring off-Forest, and often the habitat on NFS land only contributes to particular life cycle requisites.

Consequently, the assessment of whether habitat on NFS land is sufficient to maintain viable populations of GRSG must consider the contribution of habitat on NFS land to GRSG persistence generally, recognizing the inherent limitations on the ability to meet needs for all GRSG life stages from habitat located exclusively on NFS land. As recognized in the NFMA, the ability of the Forest Service to provide for diversity of animal communities is limited by "the suitability and capability of the specific land area. . . " 16 U.S.C. & 1604(g)(3)(B). Accordingly, this BE considers the contribution of NFS units to GRSG viability as follows:

- Forest plans provide for management of the environment to provide habitat to meet species' requirements associated with the particular seasons and life history stages supported on National Forest System (NFS) lands;
- Because GRSG spend only a portion of the year on NFS lands in response to the inherent capability and suitability of the lands (e.g. breeding habitat occurs off NFS), there are threats and stressors to species' which occur off of NFS land, and therefore over which the Forest Service has no jurisdiction or control;
- Managing habitats on NFS land to contribute to the support of persistent populations on NFS land is not the same as ensuring species viability over its entire range;
- The scale of analysis to assess the contribution of habitat on NFS land to GRSG viability is the planning unit, which is generally considered a national forest.

The seven alternatives represent various scenarios for multiple resource management on NFS land with differing outcomes for GRSG. For each alternative, we end our discussion in this Biological Evaluation with a determination regarding the likelihood that the scenario provides conditions to support the ***persistence*** of GRSG on the NFS units ***to meet the associated life cycle requisites*** that land is suitable for and capable of providing, based on the combined outcomes of regulatory restrictions and restoration of habitat.

Life History

Sage-grouse depend on a variety of semiarid shrub-grassland (shrub steppe) habitats throughout their life cycle, and are considered obligate users of sagebrush (e.g., *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush), *A. t.* ssp. *vaseyana* (mountain big sagebrush), and *A. t. tridentata* (basin big sagebrush)) (Patterson 1952; Braun et al. 1976; Connelly et al. 2000; Connelly et al. 2004; Miller et al. 2011). Sage-grouse also use other sagebrush species (which can be locally important) such as *A. arbuscula* (low sagebrush), *A. nova* (black sagebrush), *A.*

frigida (fringed sagebrush), and *A. cana* (silver sagebrush) (Schroeder et al. 1999; Connelly et al. 2004). Sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b). Sage-grouse exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas) (Connelly et al. 2004; Connelly et al. 2011a). Adult sage-grouse rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder et al. 1999). [Life history section was copied from the USFWS FINAL Conservation Objectives Team (COT) report (USFWS 2013)]

Based on GIS analysis of the EIS planning area, the following table describes the number of acres of GRSG PHMA and GHMA on the Humboldt-Toiyabe National Forest and the percentage of the Forest considered occupied habitat.

FOREST NAME	Forest Acres	PHMA	GHMA	Total Occupied	% of Forest
Humboldt-Toiyabe	4,653,437	880,055	913,199	1,793,254	39%

Habitat conditions and population information were largely taken from the COT report (USFWS 2013).

Habitat and Population Condition

The COT report (USFWS 2013) describes sage-grouse populations throughout the species range and references 30 and 100 year persistence probabilities modeled for these populations in Garton et al. (2011). The COT also identifies Priority Areas for Conservation (PACs) associated with these populations, and describes the threats potentially affecting them. PACs are considered habitats important to the persistence of sage-grouse populations. Sage-grouse populations and PACs are placed in the context of Management Zones (MZs) (Stiver et al. 2006). Management zones were identified that reflect ecological and biological issues and similarities, not political boundaries They tend to respond comparably to habitat perturbations and are subject to similar management challenges. There are seven management zones, three of which include portions of Nevada (Management Zones III, IV and V). The Humbold-Toiyabe does not manage sage-grouse habitats in MZ V.

Northern Nevada is included in MZ IV (Snake River Plains) while the remainder of the Forest in in MZ III (Southern Great Basin). The Humboldt-Toiyabe (H-T) National Forests are unique in that there are 7 ranger districts that contain sage-grouse habitat that are spread over a large area of the central and southern portion of the Great Basin in Nevada. The northern two districts fall within MZ IV, while the remainder (central and southern portions of the Forest, contribute to MZ III. The ranger districts that comprise the H-T are found within three sage-grouse populations: Northern Great Basin (MZ IV), Southern Great Basin (MZ III) and Quinn Canyon, a small, isolated population also in MZ III.

The Northern Great Basin population consists of habitats in Nevada, Idaho, Oregon and Utah. Northern Nevada sagebrush habitats are a significant contributor to this population (USFWS 2013). Habitats supporting this population are among the least fragmented and largest sagebrush dominated landscapes remaining within the extant range of the species (Knick and Hanser 2011). The Mountain City, Jarbidge and Santa Rosa Ranger Districts contribute to habitats to PAC for this population. Population analyses (USFWS cites Garton et al. 2011) indicate that sage-grouse will fluctuate around a carrying capacity that will decline from an estimated 6,770 males in 2007 to 1787 males in 2037 if current trends continue. This currently large and extensive population has a 2.5 percent chance of declining below 200 males within the next 30 years and a 99.7 percent chance of declining below 200 males within 100 years (by 2107) (Garton et al. 2011).

The Nevada portion of the Southern Great Basin population contains the largest number of sage-grouse in this population delineation (USFWS 2013). Suitable habitats for this population are somewhat uncharacteristic of sage-grouse, are differentiated from those in the Northern Great Basin because areas used are disjunct, but connected. This is due to the "basin and range" topography that is characteristic of this region. Lower elevation valley bottoms often are dominated by playas and salt desert shrub vegetation, but transition quickly into sagebrush dominated benches, which often comprises the breeding and winter habitat. Moving up in elevation, pinyon-juniper woodlands dominate the mid-elevation and gives way to little sagebrush, mountain big sagebrush and mountain shrub communities used by sage-grouse as nesting and brood rearing habitat in the higher elevations (> 2,200 m). There are a total of 880,055 acres of PHMA and 913,199 acres of GHMA on the H-T. USFWS (2013) cites Garton et al. (2011) estimating that the Nevada portion of the Southern Great Basin population declined by 19 percent from the period 1965-69 through 2000-2007 and that average rates of population change were <1.0 for three of the eight analysis periods from 1965-2007. In addition, Garton et al. (2011) determined that this population has a two percent chance of declining below 200 males within the next 30 years and a 78 percent chance of declining below 200 males within 100 years (by 2107).

The Quinn Canyon population, located in southeastern Nevada is small and isolated near the aforementioned Southern Great Basin population. Data was insufficent to conduct population trends or persistence analyses (USFWS 2013 cites Garton et al. (2011)). Two to three leks have been identified in this area, but there is very little information associated with these sites and most of this information is anecdotal. Habitat within this area has been compromised by pinyon-juniper encroachment. Very little sagebrush exists within the geographic area of this population. Overall this is a high risk population.

Garton et al. (2015) published a follow-up report building on the range-wide analysis of Garton et al. (2011). The 2011 book chapter in Knick and Connelley (eds.) 2011 evaluated changes in GRSG populations from roughly 1965 to 2007 examining population trajectories at multiple spatial scales. The more recent manuscript employed the same analytical methods but extends the field survey data to include 2008 through 2013. Garton et al (2015) provides reconstructed

estimates for population trajectories across the species' range using for the array of populations examined in 2011.

From 2007 to 2013, data suggests that minimum counts for breeding males range-wide fell from 109,990 to 48,641, a decline of 56%. Using population persistence models consistent with those from Garton et al. (2011), Garton et al. (2015) examines future scenarios for males range-wide (excluding Colorado) and for individual populations at multiple spatial scales. For example, a minimum number of males counted at leks for the entire range-wide distribution, excluding Colorado, were 40,505 birds in 2013 and projected to decline to 19,517 males in 30 years (2030), and 8,154 males in 100 years (2107) based on the scenario examined.

As outlined in past review, many factors potentially contribute to projected declines (Stiver et al. 2006, Sage-grouse National Technical Team 2011, and U.S. Fish and Wildlife Service 2013; e.g. drought, climate change, disease, invasive plants, wildfire, habitat destruction). Garton et al (2015) suggests that environmental conditions and management actions through 2013 have not reversed the pattern of population declines observed in most populations since the 1970's or 1980's. Alternative A (continue current management), as outlined in this FEIS, most closely reflects the scenario examined in Garton et al (2011) and Garton et al (2015). As noted earlier, the Determinations in this biological evaluation reflect an evaluation of conditions for GRSG and the consequences of management for future populations of GRSG under each of the analyzed alternatives for NFS lands based on requirements for providing environmental conditions to assure the persistence of GRSG habitats within the capability of the unit to support these habitats when GRSG use them. The evaluation for each alternative carefully considers the context provided by the Garton et al (2011) and Garton et al (2015) analysis for those population using NFS lands.

The effects analysis on Greater Sage-Grouse for the EIS relies heavily on a metric derived from buffering lek locations (Doherty et al. 2011) as a proxy to spatially delineate nesting habitat, and provides a quantitative measure of the percentage of the population potentially impacted within the planning area (see EIS Ch. 4 Greater Sage-Grouse section). Using this methodology, management decisions on the H-T have the potential to impact 23% of the GRSG population within the planning area based on a weighted model of leks on or within 4 miles of Forest Service lands.

This population metric is correlated to nesting habitat and is derived by assigning the contribution of individual leks to Greater Sage-Grouse populations at the population/ subpopulation scale (see FEIS Section 3.2.1 and Section 4.3.1) and at the sub-region scale. The metric provides for inferences toward population effects from each resource allocation expressed as a percentage of population at the two scales. The analysis conducted in the EIS employing this population metric was done on BLM and FS lands. When looking only at FS lands, the percentage of the population potentially impacted under each alternative is consistent with the EIS analysis, however, it is smaller than for the BLM since there is less habitat on FS lands.

Threats

Threats to sage-grouse on and adjacent to the Humboldt-Toiyabe NF include, but are not limited to loss of habitat, primarily from fire and invasive species, wind and solar energy development, grazing, and recreation. In some areas, habitat loss leads to isolation and therefore fragmentation effects. In addition some of the historic habitat available to sage-grouse within these populations has transitioned to pinyon-juniper woodlands. Miller and Tausch (2001) estimated that the area of pinyon-juniper woodlands has increased approximately 10-fold throughout the western United States since the late 1800s. Additionally, Wisdom et al. (2005) determined that 35 percent of the sagebrush area in the eastern Great Basin is at high risk to future displacement by pinyon-juniper woodlands and that mountain big sagebrush appeared to be most at risk, which could have meaningful impacts to sage-grouse brood rearing habitats within the upper elevations of mountain ranges within this region. In addition to this threat, much of the Great Basin is also susceptible to sagebrush displacement by cheatgrass. The sagebrush community most at risk from conversion to cheat grass dominated systems in this region is Wyoming basin big sagebrush (Wisdom et al. 2005) located predominately within the lower elevation benches of mountain ranges. In some areas, this condition has already been realized and the risk for conversion of sagebrush habitats is moderate to high. Conversion of systems to annual grasses threatens both breeding and winter habitats for sage-grouse. For example, in a study conducted within this region (in Eureka County, NV), Blomberg et al. (2012) determined that sage-grouse leks that were not impacted by exotic grasslands experienced recruitment levels that were six times greater than those impacted by exotic grasslands. Additionally, Blomberg et al (2012) found that drought is a major contributor to reduced recruitment and low population growth within the Southern Great Basin. Other threats such as mining and infrastructure have the potential to affect this sage-grouse population due to loss of habitat and disturbance from mine expansions, as well as new mines and the infrastructure associated with them. Existing mining claims are ubiquitous throughout the Southern Great Basin PAC.

Alternative A - No Action

Vegetation and Soils Management

Direct and Indirect Effects

In parts of the sub-region, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species. Invasive plants such as cheatgrass and other non-native annuals alter plant community dynamics, structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. These invasive species compete with native grasses and forbs that are important components of Greater Sage-Grouse (GRSG) habitat. Invasive species cause direct degradation of sagebrush habitats resulting in effects on local GRSG populations by affecting forage, cover quality and composition, increased wildfire frequency and intensity (see Fire and Fuels discussion below). Resulting elimination of sagebrush will lead to loss of habitat for GRSG. As discussed below in

Fire and Fuels, the encroachment of pinyon and juniper from higher elevations into sagebrush habitats has a negative impact on GRSG habitat. Expansion of conifer woodlands threatens GRSG populations through displacement of shrubs, grasses and forbs, by trees. Juniper expansion is associated with increased bare ground and the potential for erosion, as well as an increase in perch sites for raptors increasing the potential for raptor predation on grouse.

To reduce the likelihood of invasive plant spread and to reduce the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are used. Implementation of the above policies and plans would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads. Mechanical and manual treatments would also increase noise, vehicular traffic and human presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition, reduction in predator perches, decrease in fire spread and intensity and a potential increase in water availability.

Cumulative Effects

The baseline date for the FEIS cumulative impacts analysis for Greater Sage-Grouse is 2015. The temporal scope of this analysis is a 20-year planning horizon; land use planning documents are generally evaluated on a 5-year cycle. The spatial boundary for cumulative effects analysis for Greater Sage-Grouse includes Western Association of Fish and Wildlife Agencies (WAFWA) MZs III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin) which comprise Greater Sage-Grouse habitat in the state of Nevada.

Under Alternative A within MZs III, IV and V (as outlined in Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue at current levels. These actions, although potentially beneficial, are likely insufficient to stem their negative impacts on GRSG and GRSG habitat. Habitat loss would likely continue at a rate that exceeds restoration. There would be local beneficial impacts, including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative A, would have some beneficial local effects for for Greater Sage-Grouse, however when combined with the past, present and reasonably foreseeable future landscape changes would not substantially reduce long-term impacts to Greater Sage-Grouse. Direction in the current Forest Plans for the Humbodt and Toiyabe units were done in the 1980s. Forest plan direction had some management guidance for sage-grouse habitats, but these plans largely predated the extensive landscape changes resulting from invasive species, wildfire and conifer

expansion. Hence, current plan direction may be insufficient in halting landscape changes due to invasive species, uncharacteristic wildfires and pinyon-juniper expansion.

Livestock Grazing

Direct and Indirect Effects

Livestock grazing can affect soils, vegetation, water and nutrient availability by consuming or altering vegetation, redistributing nutrients and plant seeds, trampling soils and vegetation, and disrupting microbial composition (Connelly et al. 2004, ch.7). At unsustainable levels of grazing, negative impacts to GRSG can include loss of herbaceous vegetation cover, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including GRSG. Properly managed grazing, however, may protect GRSG habitat by reducing fuel loads and therefore reducing the probability of sagebrush loss through fire. Structural range improvements such as fences represent potential movement barriers (especially woven-wire fences), predator perches or travel corridors, and are a potential cause of direct mortality to GRSG.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve conditions that are conducive to sage-grouse brood rearing habitat. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to protect GRSG, these approaches would protect and enhance GRSG habitat by reducing the likelihood of surface disturbance in sensitive areas and ensuring brood rearing habitat is available to GRSG.

Cumulative Effects

Although livestock grazing occurs throughout all MZs in the FEIS, it is considered a “lesser threat” with respect to “relative cumulative actions” (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not include wild horse and burro territories [IV (95 percent of BLM land/0 percent Forest Service), and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative A, within MZs III , IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III and IV from the management actions under Alternative A, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Fire and Fuels

Direct and Indirect Effects

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in many cases, re-burns before sagebrush has a chance to re-establish. Fire is a primary threat to GRSG populations where exotic annual grasses, primarily cheatgrass, increase in cover following fire resulting in the loss of sagebrush cover. Depending on the frequency of fire, soil conditions, and availability of seed sources, sagebrush steppe is often converted to annual grasslands. Without sagebrush cover and a diversity of grasses and forbs, annual grasslands will not support GRSG populations. As GRSG habitats are lost and populations become less connected, they become increasingly susceptible to stochastic events, and local extirpations. In extreme cases genetic isolation could occur that can have negative demographic consequences (Jamieson and Allendorf 2012).

Another factor affecting fire in some sagebrush sites is the encroachment of pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above resulting in low probability of sagebrush recovery.

The cheatgrass fire cycle causes GRSG habitat loss and degradation. Currently, due to the extent of the threat, there are no management actions that can effectively alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the Lands and Realty Management, Energy and Locatable Minerals Development and Travel, Transportation and Recreation sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat.

Under Alternative A, wildfires would likely continue to increase in size and frequency in Greater Sage-Grouse habitats and those habitats would subsequently continue to be degraded or lost. Small and heavily disturbed populations occurring in areas dominated by invasive annual grass understory would be particularly susceptible to these impacts. Additionally, there may be some direct and indirect effects to individual Greater Sage-Grouse from direct morality or disturbance due to fire suppression or fuels treatment activities. Increased human activity and noise associated with wildland fire suppression or fuels treatments in areas occupied by sage-grouse can disrupt nesting, breeding, or foraging behavior. Important habitats can be removed or degraded because of the use of heavy equipment or hand tools. Other potential impacts may include injuring or killing eggs/chicks, or causing changes in species movement patterns due to areas devoid of vegetation.

Cumulative Effects

As outlined in Chapter 5 of the FEIS, current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in MZs III, IV, and V (Chapter 5 of the FEIS). As discussed in the vegetation and soils management section, the current plan direction may be insufficient in halting the extensive landscape changes resulting from invasive species and uncharacteristic wildfires.

Wild Horse and Burro Management

Direct and Indirect Effects

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Equid grazing results in a reduction of shrub cover and more fragmented shrub canopies, which can negatively affect GRSG habitat (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming equids have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011). Effects of wild equids on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, pg 18).

Fences associated with wild horse and burro management represent potential movement barriers, predator perches or predator travel corridors, and are a potential cause of direct mortality to GRSG. In addition to the impacts of fencing on GRSG, The Wild and Free-Roaming Horses and Burros Act of 1971 requires that water must also be available yearlong in horse management areas. This often leads to riparian areas receiving yearlong use by horses or riparian areas being

modified with additional fencing and troughs in order to accommodate yearlong horse use. The range improvements associated with the water developments result in increased potential perch sites, less water available in the riparian area, and possibly have negative effects to riparian habitat depending on how facilities are constructed. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive success and meadows received the highest use in proportion to their availability. At levels higher than Appropriate Management Level (AML), impacts can lead to loss of vegetation cover, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including Greater Sage-Grouse. Mesic areas with an array of forbs and with vegetation cover are particularly important for grouse brood rearing.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for AML. Initially, AML is established in LUPs at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules (operations to capture animals), and budget. Gathers are also conducted in emergency situations when the health of the population is at risk for lack of forage or water. Direction for prioritizing horse gathers and maintaining AML is not based on GRSG habitat needs, although this is implicit in the Congressional directive to maintain a thriving natural ecological balance. Under Alternative A, there are no GRSG goals, objectives, or management actions specifically identified within the management framework for the Wild Horse and Burro program.

Cumulative Effects

As outlined in Chapter 5 of the FEIS, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZ IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service), and V (91 percent of BLM land/0 percent Forest Service) (Chapter 5 of the FEIS). Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of wild horse and burro management on these lands, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions”. and only for Management Zone V (see Chapter 5 of the FEIS).

Under Alternative A, within MZ III, wild horse and burro territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to

Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative A, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Minerals development within the sub-region consists of locatable mineral resources at various scales. Mining is primarily for gold, silver, and copper and is largely absent from the basalt-capped areas of northwestern Nevada. Leasable minerals include mineral material sales such as sand and gravel for road maintenance, and limited additional commodities such as potash. Oil and gas is in limited production occurring only in the far southeastern sub-region. Oil and gas leasing occurs over a much larger footprint in western Nevada and additional production is projected as new technologies expand recovery potential. Development of locatable and leasable mineral resources typically requires significant infrastructure and human activity for construction, operation, and maintenance.

Within the sub-region, most public lands are open to oil and gas leasing, saleable mineral material development, and solar development, although specific closures of areas to leasing such as Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat exist throughout the sub-region. Lands within the sub-region are generally open to mineral location. There are specific locatable mineral withdrawals for particular rights of way, designated wilderness areas, areas of critical environmental concern and other administrative needs, none specific to protecting Greater Sage-Grouse habitat. All locatable mineral activities are managed under the regulations at 43 CFR 3800 through approval of a Plan of Operations. Mitigation of effects to GRSG and its habitat are identified through the NEPA process approving plans of operation. Goals and objectives for locatable minerals are to provide opportunities to develop the resource while preventing undue or unnecessary degradation of public lands. Within the sub-region, most areas of public land would remain open for wind development.

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on GRSG and their habitat including habitat loss, degradation, and fragmentation by roads, pipelines and power lines, higher levels of noise, increased presence of roads/humans, and a larger number of anthropogenic structures in an otherwise open landscape that could result in abandonment of leks, decreased attendance at the leks that do persist, lower nest initiation, poor nest success, decreased yearling

survival, and avoidance of energy infrastructure and ancillary facilities in important wintering habitat. Please also refer to the Land Uses and Realty Management section below.

Cumulative Effects

As outlined in Chapter 5 of the FEIS energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat from energy and locatable minerals development in MZs III, IV or V (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Although land tenure adjustments or withdrawals made in GRSG habitat could reduce the habitat available to sustain GRSG populations, unless provisions were made to ensure that GRSG conservation remained a priority under the new land management regime, land tenure adjustments would likely include retention of areas with GRSG, and would thus retain occupied habitats under BLM or FS management. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat.

Existing land use plans direction would apply under Alternative A. There would be no changes to the current National Forest System infrastructure including power lines, wind turbines, solar panels, communications towers, fences, or roads. Although mitigation is typically developed under the NEPA process and most right of way and surface developments are subject to limited operation periods or other stipulations in local GRSG conservation strategies, permitted right-of-ways (ROWs) or special use authorities (SUAs) would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of GRSG habitat or result in barriers to migration corridors or seasonal habitats.

Construction, maintenance, and use of infrastructure and ancillary facilities would continue to lead to higher short-term concentrations of human noise and disturbance that could cause disruption of nesting activities, abandonment of young or temporary displacement; these could also facilitate establishment and spread of cheatgrass and other invasive weeds (see discussion on Vegetation and Soils) and an increase in edge habitat. Existing and new power lines, wind turbines, solar panels, communications towers, fences, and vehicles traveling on associated roads would continue to pose a collision hazard to GRSG or to provide potential perching and/or nesting habitat for avian predators that could result in declines in lek attendance or nest success. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on the GRSG and its habitat.

Cumulative Effects

As outlined in Chapter 5 of the FEIS current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to GRSG in MZs III, IV and V (Chapter 5 of the FEIS).

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within GRSG habitat and disturbance on GRSG. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption of nesting activities, abandonment of young and temporary displacement. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. Although the majority of cross country travel for big game retrieval would occur outside of the GRSG lekking and breeding season limiting the potential for OHV-related disturbance impacts to GRSG, OHV use in these areas would still have the potential to fragment and introduce weeds into GRSG habitat. This alternative has the highest potential to impact GRSG due to the lack of

restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

Cumulative Effects

As outlined in Chapter 5 of the FEIS recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Determination

Under the current management direction, existing conservation measures limit some, but not all the majority of impacts to GRSG and GRSG habitat. Therefore, Alternative A of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement will likely result in a loss of viability or in a trend toward federal listing to the population or species for the GRSG in the plan area.

Alternative B

Vegetation and Soils Management

Direct and Indirect Effects

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, GRSG vegetation management conservation measures included in Alternative B would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants in PHMA, in order to benefit GRSG habitats. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing and new range improvements in PHMA. Alternative B incorporates fewer invasive plant management measures in GHMA compared to PHMA. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts from invasive plants and pinyon-juniper encroachment on GRSG habitat described under Alternative A although the effects of the treatments would be the same.

Cumulative Effects

As outlined in Chapter 5 of the FEIS, under Alternative B, within MZs III, IV and V, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Livestock Grazing

Direct and Indirect Effects

Alternative B would implement a number of beneficial management actions in PHMA to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows. Together these efforts would reduce the impacts from grazing on GRSG described under Alternative A.

Cumulative Effects

As outlined in Chapter 5 of the FEIS, although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative B, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternatives B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Fire and Fuels

Direct and Indirect Effects

Under Alternative B, suppression would be prioritized in PHMA to protect mature sagebrush habitat. Suppression would be prioritized in GHMA only where fires threaten PHMA. Alternative B does not include any other specific management for wildland fire management in GHMA. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments in PHMA would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments in PHMA would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A though, in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A.

Cumulative Effects

Management actions under Alternative B with regard to fire would increase protection of Greater Sage-Grouse habitat, primarily within PHMA, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V (Chapter 5 of the FEIS), current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PHMA. Therefore, the direct and indirect effects of fire to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PHMA habitat and emergency environmental issues. Wild Horse Territory (WHT) Plans would incorporate GRSG habitat objectives in PHMA. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PHMA would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they "conserve, enhance, or restore GRSG habitat through improved grazing management". Design features could include treating invasive species associated with range improvements. Additional range improvements in PHMA would specifically address the needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS).

Under Alternative B, within MZs III, IV and V (Chapter 5 of the FEIS), wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III, IV or V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under this Alternative, PHMA would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid

mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PHMA. A 3% disturbance cap to activities in PHMA would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PHMA. These measures would reduce the impacts of energy development on GRSG and GRSG PHMA described under Alternative A.

Alternative B does not include specific management for fluid, saleable, locatable, and nonenergy leasable minerals in GHMA or wind energy or solar energy development in PHMA or GHMA. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See Land Uses and Realty Management) would apply to energy development and would limit the extent of all types of energy development in PHMA.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PHMA, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to Greater Sage-Grouse in MZs III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Land Uses and Realty Management

Direct and Indirect Effects

Under this alternative, all PHMA would be managed as exclusion areas and GHMA would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PHMA and GHMA. It would also include the following within PHMA: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on

anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PHMA.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit GRSG by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PHMA by power lines, communication towers and roads. GRSG and GRSG habitat outside PHMA would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PHMA rather than just reducing it within PHMA, the extent of impacts on GRSG and GRSG habitat outside PHMA could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These conservation measures make this alternative more protective than Alternative A, although the general effects would be the same.

Cumulative Effects

Management actions associated with lands and realty under Alternatives B would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in MZs III, IV and V under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under Alternative B, motorized travel in PHMA would be limited to designated roads, primitive roads, and trails at a minimum. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PHMA and there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would reduce loss, fragmentation and disturbance to GRSG leks and nesting habitat by limiting motorized travel to designated routes, minimizing human use and road construction or upgrades and reducing automotive collisions with individual birds.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PHMA, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in MZs III, IV and V under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Determination

Under Alternative B, proposed conservation measures would limit many, but not all impacts to GRSG and GRSG habitat. Therefore, Alternative B of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the GRSG in the plan area.

Alternative C

Vegetation and Soils

Direct and Indirect Effects

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce impacts from invasive plants described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would make Alternative C more protective of GRSG and GRSG habitat than Alternatives A or B.

Cumulative Effects

Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of

invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Livestock Grazing

Direct and Indirect Effects

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat (PHMA and GHMA) reducing both the negative and positive grazing-related impacts on GRSG and GRSG habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat treatments that benefit GRSG would be allowed. Retirement of grazing would be allowed and fast tracked.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing to Greater Sage-Grouse in MZs III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Fire and Fuels

Direct and Indirect Effects

Alternative C is similar to Alternative B except that it is more protective of GRSG and GRSG habitat because prioritization of suppression would apply to GHMA in addition to PHMA (i.e., All Occupied Habitat), it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

Cumulative Effects

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during "active restoration" processes related to livestock grazing, horses and burros would be expected to range over a larger area than in Alternative A and would necessitate the need for increased gather schedules. The increase in access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could over time reduce food and cover for GRSG and change water holding capacities of riparian brood rearing sites compared to Alternative A, although needs of GRSG would be fully considered as part of the AML establishment process.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Energy and Locatable Minerals Development

Direct and Indirect Effects

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see Land Uses and Realty Management below). Like Alternative B, the conservation measures proposed under

Alternative C would reduce the impacts of energy and locatable minerals development on GRSG described under Alternative A, but to a larger degree than any of the other alternatives.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Alternative C would have the most protective measures for GRSG. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on GRSG described under Alternatives A and B in a wider area than Alternative B.

Unlike Alternative B, which would permit wind energy siting in PHMA provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on GRSG as discussed under Alternative A more so than Alternative B.

Cumulative Effects

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty

management to Greater Sage-Grouse in MZs III, IV and V under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of GRSG habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in MZs III, IV and V under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Determination

Under Alternative C, proposed conservation measures would limit many, but not all impacts to GRSG and GRSG habitat. Therefore, Alternative C of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the GRSG in the plan area.

Alternative D

Vegetation and Soils Management

Direct and Indirect Effects

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and

removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush component.

Alternative D would be more protective of GRSG habitat than Alternative B because it contains several conservation measures specifically targeted to invasive species infestations and pinyon-juniper encroachment and it would apply them over a larger area (within priority and general habitat) than Alternative B (only PHMA).

Cumulative Effects

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Livestock Grazing

Direct and Indirect Effects

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when

beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PHMA as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce the negative impacts from grazing on GRSG described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

Fire and Fuels

Direct and Indirect Effects

Unlike Alternative B, in which suppression would be prioritized in PHMA, but only in GHMA where fires threaten PHMA, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRSG habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PHMA. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to

be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRSG or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PHMA under Alternative B, would make Alternative D more protective of GRSG and GRSG habitat, in the long term, than Alternative B.

Cumulative Effects

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PHMA under Alternative B. Otherwise Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on GRSG described under Alternative A over a larger area than Alternative B.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS).

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on Greater Sage-Grouse.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see Land Uses and Realty Management), whereas Alternative B would manage PHMA as a new ROW exclusion area and GHMA as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on GRSG associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of PHMA than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PHMA to new fluid

mineral leasing. On the other hand, it would be more protective of GHMA than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PHMA under Alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within MZs III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PHMA and GHMA without waiver, exception, or modification. NSO restrictions would apply to GHMA with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in MZs III, IV and V from the added management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development, and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-deterring devices during ROW renewal process. These conservation measures make this alternative more

protective than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

Cumulative Effects

Management actions associated with land uses and realty under Alternative D would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in MZs III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PHMA to include GHMA. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce loss, fragmentation and disturbance to GRSG leks and nesting habitat by minimizing human use and road construction or upgrades and reducing automotive collisions with individual birds.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase protection of Greater Sage-Grouse habitat within PHMA and GHMA, thereby benefitting Greater Sage-Grouse rather

than removing or fragmenting habitat. Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in MZs III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

Determination

Under Alternative D, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG habitat. Therefore, Alternative D of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the GRSG in the plan area.

Alternative E

All management actions under Alternative E would correspond to areas identified on the Sage-Grouse Management Areas (SGMAs) Map contained in the "2012 Strategic Plan for the Conservation of Greater Sage-Grouse in Nevada" (2012 Plan) produced by Nevada stakeholders at the request of the governor. The SGMAs include four categories - Occupied Habitat, Suitable Habitat, Potential Habitat, and Non Habitat areas - as defined in the 2012 Plan. The Nevada Sagebrush Ecosystem Council would further refine the habitat categories within the SGMAs and determine where the best possible habitat exists based on recommendations from the Nevada Sagebrush Ecosystem Technical Team. All management Actions would be implemented through a coordinated effort among local, state and federal agencies, unless an agency is specifically noted. Alternative E would not provide fixed exclusion or avoidance areas, but would seek to achieve conservation through a goal of "no net loss" in the Occupied, Suitable and Potential Habitat categories for activities that could be controlled, such as a planned disturbance or development. Management under Alternative E would be subject to an avoid, minimize, and mitigate approach, which would provide a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PHMA and GHMA designations.

Vegetation and Soils

Direct and Indirect Effects

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to

Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment efforts for GRSG habitat compared to Alternative A and addresses it more specifically than Alternatives B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseeding of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species.

Cumulative Effects

Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative E, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Livestock Grazing

Direct and Indirect Effects

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in

order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would provide less protection to GRSG and their habitats. There are fewer conservation measures associated with this alternative including no management actions associated with direct impacts on GRSG or lek or nesting habitat (refer to Alternative A). Riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur under this alternative.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), there would be fewer restrictions on livestock grazing than under Alternative A, including no management actions associated with direct impacts on GRSG or leks or nesting habitat. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in conjunction with the past, present and reasonably foreseeable future actions, could result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Fire and Fuels

Direct and Indirect Effects

Alternative E would utilize a unique approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the State of Nevada Sage-Grouse Management Areas. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and

preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners.

Cumulative Effects

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land Use Plans and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to Greater Sage-Grouse are expected to be similar.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative E, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

Energy and Locatable Minerals Development

Direct and Indirect Effects

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been

stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Measures to deter raptor perching and raven nesting on elevated structures would be applied to energy development projects. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. As previously stated, Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PHMA and GHMA designations. Under Alternative E, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out, but the amount is not quantifiable. Therefore, the general impacts of energy and locatable minerals development on GRSG discussed under Alternative A would have the potential to increase under Alternative E.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty

percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to GRSG and sagebrush habitats. Therefore, Alternative E would not be as protective of GRSG as any of the other alternatives.

Cumulative Effects

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for Greater Sage-Grouse habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS).

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to Greater Sage-Grouse under Alternative E are expected to be similar to those of Alternative A.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions,

may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Determination

Under Alternative E, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG habitat. Therefore, Alternative E of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the GRSG in the plan area.

Alternative F

Vegetation and Soils

Direct and Indirect Effects

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PHMA and GHMA as opposed to only PHMA under Alternative B). Together, these measures would reduce impacts from invasive plants and pinyon-juniper encroachment on GRSG habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

Cumulative Effects

Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Livestock Grazing

Direct and Indirect Effects

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking.. Together these efforts would reduce the impacts from grazing on GRSG described under Alternative A.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Fire and Fuels

Direct and Indirect Effects

Fire and fuels management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The impacts on GRSG would be the same.

Cumulative Effects

The cumulative effect of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or

remove and fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PHMA, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on GRSG under Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of GRSG and GRSG habitat than Alternative B.

Cumulative Effects

Refer to Alternative B. Cumulative effects would be the same.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F siting of wind energy development would be prevented in PHMA; PHMA would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PHMA. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in GHMA. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PHMA: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on GRSG and GRSG habitat, as described under Alternative A, more so than Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PHMA more thoroughly than alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative F would increase

protection of Greater Sage-Grouse habitat, primarily within PHMA, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternatives F, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Land Uses and Realty Management

Direct and Indirect Effects

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects would be the same.

Cumulative Effects

Management actions associated with land uses and realty under Alternative F would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in MZs III, IV and V under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PHMA, only recreational SUAs that are neutral or beneficial to GRSG would be permitted, there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PHMA to include GHMA, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road

construction would be prohibited within 4 miles of active sage-grouse leks. Although the general recreational effects of Alternative F would be the same as those for Alternatives A and B, Alternative F would be more protective of GRSG and GRSG habitat, particularly with respect to reducing disturbance to GRSG and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of Greater Sage-Grouse habitat within PHMA and, in some instances, GHMA and PHMA, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in MZs III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts to Greater Sage-Grouse.

Determination

Under Alternative F, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG habitat. Therefore, Alternative F of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the GRSG in the plan area.

Proposed Plan

Vegetation and Soils Management

Direct and Indirect Effects

Impacts under the Proposed Plan would be less than under Alternative A. All vegetation and soils management activities under the Proposed Plan would be prioritized in PHMA and GHMA with an emphasis in improving and/or restoring GRSG seasonal habitat objectives. Under the Proposed Plan, the most limiting seasonal habitat to an individual lek or population would be identified and would be given priority for vegetation treatments. Treatments would use native seed and establish appropriate sagebrush species/subspecies. The GRSG Wildfire and Annual Invasive Annual Grasses Assessment and Concepts of Resistance and Resilience (Appendix F of the FEIS) would be used to identify GRSG habitats and management strategies to reduce the threats to GRSG resulting from changes in invasive annual grasses, wildfires, and conifer

expansion. These concepts would reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem as well as reduce the rate of conifer encroachment in order to reduce GRSG habitat fragmentation and maintain or re-establish habitat connectivity over the long-term and at broad spatial scales.

Vegetation treatments would not be grazed by commercial livestock for two growing seasons or until vegetation or GRSG habitat objectives are met. Management actions under the Proposed Plan would increase the amount and quality of GRSG habitat within PHMA and GHMA compared with Alternative A for all GRSG seasonal requirements, including breeding, nesting, brood-rearing and wintering.

Cumulative Effects

As described further in Chapter 5 of the FEIS, under the Proposed Plan, within MZs III, IV and V, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on improving and restoring existing sagebrush habitat under the Proposed Plan would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts to Greater Sage-Grouse.

Livestock Grazing

Direct and Indirect Effects

Management under the Proposed Plan would retain the same number of acres available and the same number of acres unavailable for livestock grazing in PHMA and GHMA as under Alternative A. However, the Proposed Plan would impose additional restrictions on specific livestock activities in upland and riparian habitats used by GRSG affording more protection to GRSG and its habitat than under Alternative A, resulting in improvements in habitat condition for GRSG,. Under the Proposed Plan, upland and riparian habitats would be managed according to the GRSG habitat objectives with restrictions on activities such as salting locations, fences and construction of range facilities. These activities would be sited one (1) mile from GRSG brood-rearing seasonal habitats within PHMA and GHMA. Grazing periods would be more restrictive, concentrated at times when GRSG habitats would benefit more from grazing instead of being grazed every year during critical growth periods. This would occur through rest, deferment of use, and greater limits on utilization. This in turn would provide long-term benefits to both upland and riparian habitats by providing a greater diversity and volume of GRSG seasonal habitats and results would be expected to be seen faster due to a decrease in livestock grazing use

compared with Alternative A. Higher quality GRSG seasonal habitats would be expected to improve overall GRSG production due to increased habitat quality in GRSG brood-rearing habitats as well as a reduction in predation of GRSG by increasing the capability of vegetation to act as hiding cover. Direct impacts on breeding and/or nesting GRSG would also be reduced due to the use of various herd management actions (e.g., seasonal timing restrictions) applied during the GRSG breeding and nesting season.

Management under the Proposed Plan may require a reduction in AUMs in pastures where short-term utilization limits are not met. The reduction in AUMs would be applied the following year and could include utilization and seasonal timing limits in allotments and pastures not meeting Land Health Standards. These management actions would speed recovery of negatively impacted GRSG habitats as compared with Alternative A.

Removal of livestock ponds outside of perennial waterways and requiring salting facilities to be moved farther away from riparian areas, springs and meadows would reduce long-term negative impacts on riparian brood-rearing habitats by reducing long-term grazing use during critical vegetation growth periods as well as reduce short-term impacts from hoof packing and shearing, which change water flow patterns and increase soil compaction on sensitive riparian soils. Requiring that no more than 50 percent of water can be removed from a riparian area would also reduce the possibility of degrading riparian habitats due to rangeland related facilities, especially during extended drought periods.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would maintain current available acres for grazing and wild horse and burro territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush and riparian habitat under the Proposed Plan would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts to Greater Sage-Grouse.

Fire and Fuels

Direct and Indirect Effects

Under the Proposed Plan, impacts on GRSG and its habitat are expected to be less than under Alternative A due to increased coordination and collaboration with federal, tribal, state and local governments, as well as associations sanctioned through either California and/or Nevada states that meet fire standards for effective and efficient wildfire responses. Pre-suppression activities and other conservation actions, along with suppression efforts, will identify and prioritize GRSG habitats that are vulnerable to wildfire events and prescribe actions important to their protection.

Fuels management treatments and post-fire rehabilitation projects in PHMA would focus on maximizing benefits on GRSG habitats using the resistance and resilience concepts identified in Appendix F of the FEIS. These concepts would reduce impacts from invasive annual grasses and altered fire regimes on the sagebrush ecosystem as well as reduce the rate of conifer encroachment in order to reduce GRSG habitat fragmentation and maintain or re-establish habitat connectivity over the long-term and at a landscape scale. Fuel breaks would also be implemented to better contain wildfires, and during firefighting operations, sagebrush habitat would be protected to the extent possible, as a valuable resource.

In the Nevada and Northeastern California Sub-region, fire contributes significantly to the declining modeled GRSG trends in seven of the nine populations/subpopulations. The management actions under the Proposed Plan would provide GRSG and its habitat the greatest protection from wildland fire and GRSG habitat improvements compared with all alternatives.

Cumulative Effects

Management actions under the Proposed Plan, with respect to fire and fuels management, would increase protection of sagebrush habitat, within PHMA, GHMA, and SFAs, thereby benefitting GRSG rather than removing or fragmenting habitat. Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), current wildfire suppression operations would continue, however, additional emphasis on protecting existing GRSG habitat during suppression activities and pre-suppression planning and staging for maximum protection of GRSG habitat would be included. Fuels treatment activities would focus on protecting GRSG habitat, including PHMA, GHMA, and SFAs. Therefore, the direct and indirect effects of fire to GRSG in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for GRSG, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to GRSG.

Wild Horse and Burro Management

Direct and Indirect Effects

Under the Proposed Plan, upland and riparian habitats within HMAs and WHBTs would be managed according to the habitat needs of GRSG. This would require in some instances that AMLs be re-evaluated and possibly reduced where wild horses and burros are found to be negatively impacting GRSG habitats. In PHMA and GHMA, AMLs would be maintained at

their lower levels. As with livestock grazing, these reductions would be expected to provide long-term benefits to GRSG and its habitat by increasing the overall quality of riparian and upland habitats through increased diversity and availability of vegetation as well as reducing potential direct impacts on GRSG from wild horse and burros, compared with Alternative A

Similar to livestock grazing, providing new water sites to increase dispersal of wild horses and burros would have both positive and negative effects to GRSG and its habitat. While the dispersal of wild horses and burros would decrease localized negative impacts on GRSG and its habitat, it would also spread those effects to other GRSG seasonal habitats not currently being impacted, thereby reducing the quality of those sites. Under the proposed action the relative cost/benefit of new water developments will be evaluated based on the relative value of local habitats influenced by the action.

Cumulative Effects

Please refer to the Proposed Plan cumulative effects section for livestock grazing.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Management under the Proposed Plan would allow leasing on all lands with federal fluid mineral estate. Existing and future fluid mineral leases in PHMA and GHMA would be managed through the application of lease stipulations, COAs, and guidelines to conserve and maintain the quality and distribution of GRSG habitat. The guidelines would minimize or eliminate disturbance to GRSG and its habitat from surface disturbance, noise impacts, West Nile virus, and habitat fragmentation. Guidelines would also ensure the appropriate reclamation of disturbed GRSG habitats is implemented.

Under the Proposed Plan, within PHMA and GHMA on leases not yet developed, proposed surface disturbances must achieve a net conservation gain of PHMA and GHMA. This requirement would ensure that GRSG habitats within or outside of PHMA and/or GHMA are restored to meet GRSG habitat objectives and may provide for the creation of additional GRSG habitats. A 3 percent disturbance cap would also be applied in PHMA. Seasonal restrictions would be applied to exploratory drilling in PHMA and GHMA minimizing and/or eliminating direct impacts on GRSG individuals and populations. Within PHMA, a full reclamation bond would be required specific to the site. New compressor stations would be located outside PHMA and GHMA and designed to reduce noise that may be directed towards PHMA and GHMA which would minimize or eliminate noise impacts on GRSG populations within all seasonal habitats. Application of lease stipulations, COAs, and guidelines would provide an increased level of protection to all areas of PHMA and GHMA within modeled GRSG nesting habitat associated with leks. In addition, the 3 percent disturbance cap would provide additional protection to GRSG habitat and within PHMA.

Under the Proposed Plan, NSO stipulations would be applied to unleased federal fluid mineral estates in PHMA and SFAs. A lease exception would be considered in PHMA if the lease site is determined to be in non-suitable GRSG habitat, the area is not used by GRSG, and the lease

would not have direct, indirect, or cumulative effects on GRSG or its habitat. A 3 percent disturbance cap would also be applied within PHMA. In GHMA, under the Proposed Plan, new leases within unleased federal fluid mineral estate must include appropriate controlled surface use and timing limitation stipulations to protect sage-grouse and their habitat.

In PHMA, GHMA, and SFAs, geophysical exploration and similar type of exploratory operations that are consistent with GRSG habitat vegetation objectives (see tables 1a and 1b of the Chapter 2 of the FEIS), achieve a net conservation gain, and include appropriate seasonal restrictions would be allowed. These requirements would minimize or eliminate disturbance to GRSG and its habitat from surface disturbance, noise impacts, West Nile virus, and habitat fragmentation.

The Proposed Plan is similar to Alternatives D and E but includes additional guidelines and development conditions. Some of these guidelines would apply a buffer around active leks and require seasonal timing and noise restrictions. Management under the Proposed Plan would decrease direct and indirect impacts to GRSG and its habitat by eliminating noise impacts to GRSG during the breeding season which has the potential to increase attendance at leks and a potential to decrease predation. In addition, the application of a buffer around active leks would protect approximately 70-80 percent of the nesting GRSG associated with the lek depending upon the size of the buffer.

Evaluation and adjustment of GRSG habitat boundaries would be required under the Proposed Plan based on continuing inventory and monitoring results. This provision would ensure that disturbances in PHMA/GHMA are sited in the least suitable GRSG habitats and guide the application of on- and off-site mitigation efforts in areas that would provide the most benefit to GRSG and its habitat. Fragmentation threats to GRSG habitat would be reduced; increasing connectivity of GRSG populations through a focused mitigation strategy.

Management under the Proposed Plan would close PHMA and GHMA to new material disposal. On existing mineral disposal the management goal would be to conserve and maintain the quality and distribution of GRSG habitat to achieve a net conservation gain in PHMA and GHMA or provide for the enhancement of those habitats. This would be achieved through on-site and off-site mitigation under the Nevada Conservation Credit system. Evaluation and adjustment of GRSG habitat and management boundaries would be required under the Proposed Plan based on continuing inventory and monitoring results. This provision would ensure that disturbances in PHMA/GHMA are sited in the least suitable GRSG habitats and guide the application of on- and off-site mitigation efforts in areas that would provide the most benefit to GRSG and its habitat. Fragmentation threats to GRSG habitat would be reduced; increasing connectivity of GRSG populations through a focused mitigation strategy.

The Proposed Plan would apply guidelines to OHMA and include a 3 percent disturbance cap in PHMA which would decrease direct and indirect impacts to GRSG and its habitat as compared with Alternative A.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common

across MZs III and IV in Nevada and occurs at a variety of scales. Under the Proposed Plan, within MZs III, IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting GRSG and GRSG habitat would be included. The Proposed Plan includes management actions and guidelines, including buffers around leks and seasonal timing and noise restrictions. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in MZs III, IV and V from the added management actions under the Proposed Plan, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts to Greater Sage-Grouse (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Under the Proposed Plan, PHMA and GHMA would be designated as major ROW SUA avoidance areas; PHMA would be designated as minor ROW SUA avoidance areas and GHMA as minor ROW SUA open areas. A disturbance cap of 3 percent would also be applied to all PHMA. The Proposed Plan would have less impact on GRSG and its habitat than Alternative A.

Under the Proposed Plan, all PHMA and GHMA would be managed to minimize the effects of current and future land use authorizations, both through direct and indirect means. Except within designated corridors, no new anthropogenic effects would be allowed within a three (3) mile buffer of active leks and nesting habitats. Noise restrictions and seasonal timing restrictions on development would also be required. Areas where development would be permitted would be outside of GRSG habitats or if not possible then the least suitable habitats would be selected. guidelines and mitigation would apply too. Evaluation and adjustment of GRSG habitat would be required under the Proposed Plan based on continuing inventory and monitoring results. This provision would ensure that disturbances in PHMA/GHMA are sited in the least suitable GRSG habitats and guide the application of on- and off-site mitigation efforts in areas that would provide the most benefit to GRSG and its habitat. Fragmentation and predation threats to GRSG habitat would be reduced as well as noise disturbance.

New power and communication lines would be buried when feasible and the priority for both power and fluid lines would be to locate them within existing ROW corridors. Additionally, power lines within three (3) miles of an active lek would be required to be retrofitted with nesting and perch deterrents to minimize predation on GRSG in areas where predation is identified as being a limiting factor to GRSG populations.

The management actions under the Proposed Plan would provide various benefits to GRSG and its habitat. Direct benefits to GRSG and its habitat would be expected by reducing the real and perceived threat of aerial predators (Note that ‘perceived threat’ by sage-grouse can result in reduced use of otherwise quality habitat because birds perceive the potential for predation). This would be realized by adding perch and nesting deterrents and reducing the number of developments within proximity of leks and other seasonal habitats where GRSG are most susceptible to aerial predators. Burying power and communication lines also serves to reduce future and perceived threats to GRSG by reducing new potential nesting and perching platforms. Co-locating power and communication lines or siting in non-habitats would decrease direct

disturbance to GRSG habitat. Noise and seasonal restrictions would reduce disturbance to GRSG during the breeding season. As with other wildlife species, and based on sage-grouse research, a reduction in disturbance from noise would be expected to improve reproductive success.

Reducing the number of developments permitted within buffered distances of seasonal GRSG habitats and applying a 3 percent disturbance cap in PHMA also reduces direct loss of GRSG habitat. Focusing development outside of seasonal GRSG habitats would equate to fewer long-term impacts on GRSG and its habitat by keeping habitat available for longer periods of time without the need to wait for rehabilitation or reclamation efforts to restore sagebrush habitat. These undisturbed habitats remain available for nesting and other seasonal life history requirements of GRSG without reducing available GRSG habitat due to rehabilitation or reclamation efforts that are slow to rehabilitate or fail altogether.

Under the Proposed Plan, PHMA and GHMA would be managed as ROW exclusion areas for utility-scale commercial wind energy facilities (i.e., facilities that generate 20 megawatts or more). PHMA would be managed as wind energy exclusion areas and GHMA as avoidance areas. This represents fewer acres open to wind energy development than under Alternative A. Less impacts on GRSG and all of its seasonal habitats would be afforded under the Proposed Plan than under Alternative A.

Under the Proposed Plan, PHMA and GHMA would be managed as ROW exclusion areas for utility-scale commercial solar energy facilities (i.e., facilities that generate 20 megawatts or more). This represents fewer acres open to solar energy development than under Alternative A. Less impacts on GRSG and all of its seasonal habitats would be afforded under the Proposed Plan than under Alternative A.

Under the Proposed Plan, PHMA would be subject to NSO restrictions with only one exception. Sagebrush focal areas would be managed as NSO without any waivers, exceptions, or modifications. General habitat management areas would be open to leasing, exploration, and development, but would be subject to moderate constraints, such as TL and CSU stipulations, and would require avoidance, minimization, and mitigation of impacts to GRSG habitat.

Cumulative Effects

Management actions associated with land uses and realty under the Proposed Plan would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in MZs III, IV and V under the Proposed Plan, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts to Greater Sage-Grouse.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative D, the Proposed Plan would limit motorized travel to designated routes, limit opportunities for new road construction, and prohibit construction of new recreation facilities, unless the development results in a net conservation gain to greater sage-grouse. Unlike Alternative D, the Proposed Plan would extend these measures beyond PHMA and GHMA to include SFAs. Whereas, Alternative D would only permit recreational SUAs that are neutral or beneficial to sage-grouse, the Proposed Plan would include terms and conditions that protect and/or restore greater sage-grouse habitat within the permit in new recreation special use authorizations. Under the Proposed Plan, seasonal time restrictions could also be applied to roads near leks. Although the general impacts of travel, transportation, and recreation management under the Proposed Plan would be the same as Alternative A, the Proposed Plan would provide fewer impacts on GRSG and its habitat than under Alternative A. The Proposed Plan, like Alternative D, would protect individual GRSG from vehicle and human noise, increased stress, vulnerability to predation, and decrease the potential of habitat fragmentation caused by roads. However, the Proposed Plan includes slightly more habitat than Alternative D.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under the Proposed Plan would increase protection of Greater Sage-Grouse habitat within PHMA and GHMA, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in MZs III, IV and V under the Proposed Plan, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

Determination

Under the Proposed Plan, conservation measures would limit many, but not all impacts to GRSG and GRSG habitat. Therefore, the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement Proposed Plan may impact

individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the GRSG in the plan area.

2. Sagebrush-Associated Species

Greater Sage-Grouse as an Umbrella Species

GRSG populations require large landscapes and specific habitat conditions at broad scales to meet their seasonal life requisite requirements. Rowland et al. (2006) and Hanser and Knick (2010) provide evidence that GRSG habitats at broad scales have substantial overlap with habitats of other species similarly associated with sagebrush and sagebrush-steppe communities.

The plan amendment is specially designed to provide protections for GRSG and their habitats. Although individual species have specific habitat requirements at finer scales that differentiate their use of habitats, habitat protections for GRSG will benefit other species similarly dependent on these habitats. The structure of this biological evaluation reviews the efficacy for conservation and management actions for GRSG, and then evaluates the adequacy of these protections for other sensitive species, including those associated with sagebrush habitats

Bighorn sheep, pygmy rabbit, Columbia spotted bat and Townsend's big-eared bat have been grouped as Sagebrush-associated Species (SAS) for this analysis due to the similar habitats they occupy and the programmatic nature and broad scale of this analysis. Though each of the species may not be completely dependent upon sagebrush for every life history stage, they are all strongly associated with sagebrush habitats. The landscape scale effects of the proposed conservation measures for each program area within each alternative will be analyzed generally and collectively for this group of species.

Bighorn sheep (Ovis Canadensis)

Distribution

The analysis area is outside of the range of the desert bighorn sheep, but within the range of the California and Rocky Mountain bighorn sheep. California bighorn sheep in Nevada are located primarily in the northwestern part of the state, mainly in Washoe and Humboldt counties, as well as in portions of western Elko, northern Lander, and Eureka counties. The state contained an estimated 2,100 animals as of 2012 (NDOW 2013). Although there are occasional sightings of individual juvenile male California bighorn sheep on the Jarbridge and Mountain City Ranger Districts of the Humboldt-Toiyabe National Forest, viable populations are restricted to the Santa Rosa Mountain Ranger District in the Northern Mountains Ecounit where they overlap the range of the Greater sage-grouse. Within Nevada, Rocky Mountain bighorn sheep occur within the Badlands, and on Forest Service and other lands in the East Humboldt Range, and Ruby Mountains (Ruby Mountains ecounit) of Elko County, and in the northern portion of the Snake Range (Eastern Mountains ecounit), White Pine County (NDOW 2013). The 2012 Rocky Mountain bighorn sheep population estimate for Nevada was 260 (NDOW 2013).

Habitat Association and Threats

Bighorn sheep occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons. Escape terrain (cliffs, talus slopes, etc.) is an important feature. Dense forests and chaparral that restrict vision are avoided. Bighorn sheep diets are diverse and variable. They are primarily grazers of grass and forbs, but diet can also include significant amounts of shrubs. Their diet changes seasonally. Populations other than those in low deserts typically migrate between an alpine or montane summer range and a lower elevation winter range (NDOW 2012a).

The primary threats for bighorn sheep is disease transmission from domestic livestock (permitted and private land inholdings) and predation by mountain lions (NDOW 2012a). Competition from livestock, wildhorses and burros, and other large ungulates for water at spring sources, predation by mountain lion, energy development, such as oil, gas, and wind development, off-highway vehicle activity could disrupt bighorn sheep use of some habitat.

Pygmy Rabbit (Brachylagus idahoensis)

Distribution

In Nevada, the pygmy rabbit ranges primarily in the central and northern part of the state, corresponding to sagebrush distribution (NDOW 2012b). There are records of pygmy rabbit on Santa Rosa and Mountain City Ranger Districts of the Humboldt-Toiyabe National Forest, along with the lower elevations of the Ruby Mountains and East Humboldt Mountains. Currently, the Santa Rosa District contains the largest population on the Forest. Extensive pygmy rabbit surveys on the Jarbidge Ranger District in 2009 found no suitable habitat due to the preponderance of volcanic, rocky soils.

Habitat Associations and Threats

Typically found in dense stands of big sagebrush growing in deep loose soils (4,500 to 7,450 feet) in desert, shrubland, chaparral, sagebrush communities. Burrows measure three inches in diameter and may have three or more entrances. Big sagebrush is the primary food source; however, grasses and forbs are eaten in mid- to late-summer.

The primary cause for population declines is due to the loss, alteration, and fragmentation of sagebrush-steppe habitat because of factors such as increased fire frequency, extent, and severity, encroachment of habitat by invasive plant species, and vegetation treatments that remove sagebrush (NatureServe 2013). Fragmentation of sagebrush communities also poses a threat to populations of pygmy rabbits because dispersal potential is limited (NatureServe 2013).

Columbia spotted bat (Euderma maculatum)

Distribution

This species is known to occur from central Mexico, north to southern British Columbia, and east to Texas, Known from only twelve localities in Nevada, but distribution is scattered throughout Nevada. Distribution is patchy and linked to availability of cliff roosting habitat. Currently, the Humboldt-Toiyabe National Forest has no sighting information for Columbia spotted bats within the Northeastern Zone (Santa Rosa, Jarbridge, Mountain City, and Ruby Mountain Ranger Districts).

Habitat Associations and Threats (Bradley et al. 2006)

Found in various habitats from low elevation desert scrub to high-elevation coniferous forest habitats, including pinyon-juniper, sagebrush or riparian habitats. Closely associated with rocky cliffs. Current Nevada records indicate this species is distributed between 540 – 2,130 m (mean = 1,447m +/- 569m). Hibernates but periodically arouses to actively forage and drink in the winter. Characteristics of winter hibernacula in Nevada are completely unkown and poorly understood throughout the species range. Day roosts primarily in crevices in cliff faces. Diet includes a variety of insects but primarily consists of moths. In desert settings, foraging occurs in canyons, in the open, or over riparian vegetation.

The spotted bat is sensitive to human disturbance during roosting. Conservation and management issues include recreational climbing, water impoundments, grazing/meadow management, and mining and quarry operations.

Townsend's big eared bat (Corynorhinus townsendii)

Distribution

Found throughout the state of Nevada from low desert to high mountain habitats. Distribution is strongly correlated with the availability of caves and abandoned mines (Bradley et al. 2006). Townsend's big-eared bats have been observed across the Northeast Zone (Santa Rosa, Jarbridge, Mountain City, and Ruby Mountain Ranger Districts) of the Humboldt-Toiyabe National Forest.

Habitat Associations and Threats

Townsend's big-eared bat is highly associated with caves and mines and found primarily in rural settings from deserts to lower, mid- to high-elevation mixed coniferous-deciduous forest. Current Nevada records indicate this species is distributed between 210 – 3,500 m (mean = 1,720 m +/- 421 m) primarily in pinyon-juniper-mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally in urban habitats (Bradley et al. 2006).

Telemetry studies in northern Nevada have revealed over 95% of foraging activity to be concentrated in open forest habitats of pinyon, juniper, mahogany, white fir, aspen and cottonwood (Bradley et al. 2006).

Primary threats consist of disturbance and destruction of roost sites. Other threats and conservation issues include recreational caving, closure of mines for reclamation, renewed mining, repeated surveys during hibernation and maternity seasons, water impoundments, loss of building roosts and bridge replacement.

Alternative A - No Action

Vegetation and Soils

Direct and Indirect Effects

As previously discussed for GRSG, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species in parts of the sub-region. Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Cheatgrass competes with native grasses and forbs in sagebrush habitat. Invasive species cause direct degradation of sagebrush habitats including cover quality and composition, increased wildfire frequency and intensity (see Fire and Fuels discussion below) and are a particular threat to SAS species such as pygmy rabbit. As discussed below in Fire and Fuels, the encroachment of pinyon and juniper from higher elevations into sagebrush habitats can have a negative impact on sagebrush habitat. Although expansion of conifer woodlands threatens SAS species, such as pygmy rabbit, because they do not provide suitable habitat and trees displace shrubs, grasses and forbs, increase bare ground and the potential for erosion, and increase perch sites for raptors and raptor predation threats, pinyon and juniper woodland can provide structure for SAS species, such as bats, for nesting and roosting.

To reduce the likelihood of invasive weed spread and the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are utilized. Implementation of the above policies and plans would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads and remove habitat that could be utilized by SAS species such as bats. Although Townsend's big-eared bats tend to be associated with mines and caves, and Columbia spotted bats with crevices in cliff faces, much remains unknown about the roosting and hibernating habits of these species and conifer removal could eliminate a portion of this type of habitat or injure or kill individual bats that may be utilizing individual trees for these purposes. Mechanical and manual treatments would also increase noise, vehicular traffic and human

presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition and reduction in predator perches benefitting SAS species such as the pygmy rabbit. In addition, there would be a decrease in fire spread and intensity and a potential increase in water availability.

Cumulative Effects

Temporal and spatial boundaries used in the cumulative effects analysis for SAS are the same as those for Greater Sage-Grouse. The baseline date for the cumulative impacts analysis is 2012. The temporal scope of this analysis is a 20-year planning horizon; land use planning documents are generally evaluated on a 5-year cycle. The spatial boundary for cumulative effects analysis for SAS includes Western Association of Fish and Wildlife Agencies (WAFWA) MZs III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin), which is large enough to encompass larger-ranging species, such as bighorn sheep.

Under Alternative A, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would generally continue to be outweighed by the long-term beneficial impacts, including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. Therefore, the direct and indirect effects of vegetation and soils management to SAS in MZs III, IV and V from the management actions under Alternative A, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

Livestock Grazing

Direct and Indirect Effects

Depending upon site-specific management, beneficial or adverse impacts of grazing on SAS or their habitat would continue. Grazing practices can benefit SAS by reducing fuel load, protecting intact sagebrush habitat and increasing habitat extent and continuity. However, grazing at inappropriate intensity, season, or location may alter or degrade sagebrush ecosystems, or reduce cover and structure that could reduce the suitability of reproductive or foraging habitat. Grazing can degrade meadow/wetland/spring/stream habitat crucial riparian-dependent SAS such as bats. In addition, it can negatively impact SAS species, such as pygmy rabbits, through competition for forbs, soil compaction affecting burrows, disturbance of reproductive, foraging, or other critical behaviors, or temporary displacement, particularly during movement or trailing operations. Structural range improvements such as fences represent potential movement barriers or predator perches.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve standards. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to protect SAS, these approaches would protect and enhance SAS habitat by reducing the likelihood of the types of impacts described above.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative A, within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under Alternative A, which would be largely neutral for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

Fire and Fuels

Direct and Indirect Effects

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in some cases, re-burns before sagebrush has a chance to re-establish. Without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be converted to annual grasslands. Another factor affecting fire in some sagebrush sites is the encroachment of

pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above. The cheatgrass fire cycle causes sagebrush habitat loss and degradation on an annual basis. Currently, due to the extent of the threat, there are no management actions that can effectively alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the Lands and Realty Management, Energy and Locatable Minerals Development and Travel, Transportation and Recreation sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in sagebrush habitat and that habitat would subsequently continue to be degraded or lost. Additionally, there could be some direct and indirect effects to individuals of SAS, particularly bats that may be roosting in pinyon or juniper, from direct morality or disturbance due to fire suppression or fuels treatment activities. Increased human activity and noise associated with wildland fire suppression or fuels treatments can disrupt nesting, breeding, or foraging behavior. Sagebrush habitat can be removed or degraded because of the use of heavy equipment or hand tools.

Cumulative Effects

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats, as well as, the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in MZs III, IV and V.

Wild Horse and Burro Management

Direct and Indirect Effects

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Equid grazing results in a reduction of shrub cover and more fragmented shrub canopies (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming equids have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011). Effects of wild equids on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011,

pg 18). The Wild and Free-Roaming Horses and Burros Act of 1971 requires that water must also be available yearlong in horse management areas. This often leads to riparian areas receiving yearlong use by horses or riparian areas being modified with additional fencing and troughs in order to accommodate yearlong horse use. Fences associated with wild horse and burro management represent potential movement barriers or predator perches for SAS species. Range improvements have the potential to increase perch sites, reduce water availability, and possibly negatively impact riparian habitat which could negatively impact pygmy rabbits or bats. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive success and meadows received the highest use in proportion to their availability. At levels higher than Appropriate Management Level (AML), impacts can lead to loss of vegetative cover, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife. In addition, wild horses and burros can compete with bighorn sheep for water at spring sources.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for AML. Initially, AML is established in LUPs at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules, and budget. Gathers are also conducted in emergency situations when the health of the population is at risk for lack of forage or water.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of wild horse and burro management on these lands, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS).

Under Alternative A, within MZ III, wild horse and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to SAS in MZs III, IV and V from the management

actions under Alternative A, which would be largely neutral for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on SAS and their habitat including habitat loss, degradation, and fragmentation by roads, pipelines and power lines , disturbance of reproductive, foraging, or other critical behaviors, or displacement from increased levels of noise, presence of roads/humans and anthropogenic structures in an otherwise open landscape. Turbines associated with wind energy development would pose a greater collision hazard to bat species than under alternatives that would limit wind energy development.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat from energy and locatable minerals development in MZs III, IV or V (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat. Existing land use

plans direction would apply under Alternative A. There would be no changes to the current National Forest System infrastructure including power lines, wind turbines, communications towers, fences, or roads. Permitted ROWs would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of sagebrush habitat or result in barriers to migration corridors or seasonal habitats. Construction and maintenance of infrastructure would continue to lead to higher short-term concentrations of human noise and disturbance that could cause disruption of reproductive, foraging, or other behaviors, abandonment of young, or temporary displacement of individuals. These activities could also lead to new infestations of noxious or invasive weeds and an increase in edge habitat. Existing and new power lines, wind turbines, communications towers, fences, and vehicles traveling on associated roads would continue to pose a collision hazard to SAS or to provide potential perching and/or nesting habitat for avian predators. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on SAS and their habitat.

Cumulative Effects

Current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to SAS in MZs III, IV and V (Chapter 5 of the FEIS).

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions.

Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within sagebrush habitat and disturbance on SAS. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption of breeding activities, abandonment of young, and temporary displacement. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or

seasonal habitats. Although the majority of cross country travel for big game retrieval would occur outside of the breeding season for SAS limiting the potential for OHV-related disturbance impacts to SAS, OHV use in these areas would still have the potential to fragment and introduce weeds into sagebrush habitat. This alternative has the highest potential to impact SAS due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Determination

Under the current condition, existing conservation measures limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, Alternative A of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, and Townsend's big-eared bat in the plan area.

Alternative B

Vegetation and Soils

Direct and Indirect Effects

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, vegetation management conservation measures would benefit weed control efforts by prioritizing restoration efforts, including reducing invasive plants and, in turn, benefit SAS species, such as pygmy rabbit, negatively impacted by invasive species. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing range improvements. Alternative B incorporates fewer invasive plant management

measures in GHMA compared to PHMA. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts to SAS from invasive plants described under Alternative A although the effects of the treatments would be the same.

Cumulative Effects

Under Alternative B, within MZs III, IV and V, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and, potentially, increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Livestock Grazing

Direct and Indirect Effects

Alternative B would implement a number of beneficial management actions in PHMA to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sagebrush habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows, which would benefit sagebrush-associated bat species in particular. Together these efforts would reduce the negative grazing-related impacts on SAS described under Alternative A.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not

contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative B, within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to SAS habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under Alternatives B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

Fire and Fuels

Direct and Indirect Effects

Under Alternative B, suppression would be prioritized in PHMA to protect mature sagebrush habitat. Suppression would be prioritized in GHMA only where fires threaten PHMA. Suppression-related juniper encroachment discussed under Alternative A could increase in some areas under Alternative B, eliminating habitat for SAS, such as the pygmy rabbit, and eventually resulting in heavy fuel loadings that could contribute to larger-scale wildfire events that have a particularly negative effect on the pygmy rabbit. However, suppression could benefit SAS, such as bats, by protecting juniper and pinyon that may be used as roosts or hibernacula.

Alternative B does not include any other specific management for wildland fire management in GHMA. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. These measures would benefit SAS species negatively impacted by invasive species, such as pygmy rabbit, by eliminating competition with or exclusion of forage species. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A although the general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

Cumulative Effects

Management actions under Alternative B, with respect to fire and fuels, would increase protection of sagebrush habitat, primarily within PHMA, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V, current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging

for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PHMA. Therefore, the direct and indirect effects of fire to SAS in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PHMA habitat and emergency environmental issues. Wild Horse Territory Plans would incorporate GRSG habitat objectives in PHMA. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PHMA would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they "conserve, enhance, or restore GRSG habitat through improved grazing management". Design features could include treating invasive species associated with range improvements. Additional range improvements in PHMA would specifically address the needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs which would also likely benefit sagebrush-associated species by reducing the types of wild horse and burro management-related impacts discussed under Alternative A.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS).

Under Alternative B, within MZs III, IV and V, wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV or V from the management actions under Alternative B,

which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under this Alternative, PHMA would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PHMA. A 3% disturbance cap to activities in PHMA would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PHMA. These measures would reduce the impacts of energy development described under Alternative A on SAS within PHMA.

Alternative B does not include specific management for fluid, saleable, locatable, and nonenergy leasable minerals in GHMA or wind energy or solar energy development in PHMA or GHMA. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See Land Uses and Realty Management) would apply to energy development and would limit the extent of all types of energy development in PHMA. These measures would reduce the impacts of energy development on SAS described under Alternative A, although turbines associated with wind energy development would pose a greater collision hazard to bat species than under alternatives that would limit wind energy development through avoidance or exclusion.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PHMA, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to SAS in MZs III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

Land Uses and Realty Management

Direct and Indirect Effects

Under this alternative, all PHMA would be managed as exclusion areas and GHMA would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PHMA and GHMA. It would also include the following within PHMA: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PHMA.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit SAS by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PHMA by power lines, communication towers and roads. SAS and SAS habitat outside PHMA would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PHMA rather than just reducing it within PHMA, the extent of impacts on SAS and SAS habitat outside PHMA could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These conservation measures make this alternative more protective of SAS than Alternative A, although the general effects would be the same.

Cumulative Effects

Management actions associated with lands and realty under Alternatives B would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in MZs III, IV and V under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under Alternative B, motorized travel in PHMA would be limited to designated roads, primitive roads, and trails. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PHMA and there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would likely reduce loss and fragmentation of SAS habitat and disturbance to SAS in PHMA by minimizing human use and road construction or upgrades, and reduce the potential for automotive collisions with individuals of SAS species within PHMA. However, if these measures ended up concentrating recreational use and additional roads outside PHMA rather than just reducing it within PHMA, the extent of impacts on SAS outside PHMA could increase under Alternative B relative to Alternative A.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of sagebrush habitat, primarily within PHMA, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in MZs III, IV and V under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

Determination

Under Alternative B, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, Alternative B of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, or Townsend's big-eared bat in the plan area.

Alternative C

Vegetation and Soils

Direct and Indirect Effects

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce the impacts of invasive plants on SAS described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would generally make Alternative C more protective of SAS and SAS habitat than Alternatives A or B.

Cumulative Effects

Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and sagebrush habitat would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in MZs III, IV and V from the management actions under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

Livestock Grazing

Direct and Indirect Effects

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat reducing both the negative and positive grazing-related impacts on SAS and SAS habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat treatments that benefit GRSG would be allowed; most habitat treatments would be expected to benefit SAS as well. Retirement of grazing would be allowed and fast tracked. Alternative C could negatively impact SAS species by eliminating artificial water developments that some of

these species have come to rely upon once grazing is eliminated, but it could improve riparian conditions. It would eliminate the potential for disease transmission from domestic livestock to bighorn sheep or the potential for competition between livestock and bighorn sheep at spring sources within all occupied habitat.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing to SAS in MZs III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Fire and Fuels

Direct and Indirect Effects

Alternative C is similar to Alternative B except that it is more protective of SAS and SAS habitat because prioritization of suppression would apply to All Occupied Habitat, it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. Some of the negative impacts of fire suppression on conifer encroachment and fire suppression and fuels treatments on SAS discussed under Alternative A would be offset by the prioritization of restoration treatments described below for invasive plants. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

Cumulative Effects

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during "active restoration" processes related to livestock grazing, horses and burros would be expected to range over a larger area than in Alternative A and would necessitate the need for increased gather schedules. The increase in

access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could reduce food and cover for SAS, degrade riparian habitat important to bat species or increase the potential for competition between wild horses and burros and bighorn sheep at spring sources.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Energy and Locatable Minerals Development

Direct and Indirect Effects

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see Land Uses and Realty Management below). Like Alternative B, the conservation measures proposed under Alternative C would reduce the impacts of energy and locatable minerals development on SAS described under Alternative A, but to a larger degree than any of the other alternatives.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting SAS. Under Alternative C, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to SAS Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

Land Uses and Realty Management

Direct and Indirect Effects

Alternative C would have the most protective GRSG conservation measures with respect to SAS and infrastructure. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on SAS described under Alternatives A and B in a wider area than Alternative B. Unlike Alternative B, which would permit wind energy siting in PHMA provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on SAS discussed under Alternative A more so than Alternative B. Like alternative B, Alternative C would aim to remove, bury, or modify existing power lines but would apply to all occupied GRSG habitat, having the potential to disturb more SAS and habitat in the short term but, perhaps, having a greater likelihood of reducing the potential for collisions with aerial species in the long term. This alternative would be expected to have the least negative impacts and most positive impacts to wildlife species whose ranges overlap with all occupied GRSG habitat.

Cumulative Effects

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in MZs III, IV and V under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of SAS habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in MZs III, IV and V under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Determination

Under Alternative C, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, Alternative C of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, or Townsend’s big-eared bat in the plan area.

Alternative D

Vegetation and Soils

Direct and Indirect Effects

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that

maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush component. More so than Alternatives A, B or C, Alternative D has the potential to negatively impact bat species, through roost/hibernacula removal or injury or death, from more targeted pinyon and juniper removal. Although species negatively impacted by conifer encroachment, such as pygmy rabbit, would likely benefit more so than under Alternatives A, B or C. Use of domestic sheep for targeted grazing has the potential to negatively impact bighorn sheep through disease transmission. Short-term disturbance-related impacts to SAS from treatments would be the same under Alternative D as under Alternative A as would the general long-term benefits.

Cumulative Effects

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

Livestock Grazing

Direct and Indirect Effects

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PHMA as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce potential for negative impacts from grazing on SAS described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat. Alternative D

would benefit riparian-dependent SAS, such as Columbia spotted bat, by improving riparian conditions.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

Fire and Fuels

Direct and Indirect Effects

Unlike Alternative B, in which suppression would be prioritized in PHMA, but only in GHMA where fires threaten PHMA, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRSG habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PHMA. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRSG or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although

in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PHMA under Alternative B, would make Alternative D more protective of SAS and sagebrush habitat, in the long term, than Alternative B.

Cumulative Effects

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PHMA under Alternative B. Otherwise Alternative D is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on SAS described under Alternative A over a larger area than Alternative B.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS).

Under Alternative D, within MZs III, IV and V, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under Alternative D,

which would be largely beneficial SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on SAS or their habitat.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Guidelines would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see Land Uses and Realty Management), whereas Alternative B would manage PHMA as a new ROW exclusion area and GHMA as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on SAS associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of PHMA than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PHMA to new fluid mineral leasing. On the other hand, it would be more protective of GHMA than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PHMA under Alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within MZs III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PHMA and GHMA without waiver, exception, or modification. NSO restrictions would apply to GHMA with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to SAS in MZs III, IV and V from the added management actions under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-deterring devices during ROW renewal process. These conservation measures make this alternative more protective of SAS than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective to SAS with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

Cumulative Effects

Management actions associated with land uses and realty under Alternative D would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in Zones III, IV and V under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PHMA to include GHMA. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce habitat loss or fragmentation and disturbance to SAS species by minimizing human use and road construction or upgrades and reduce automotive collisions with individuals of SAS. It could also limit access to caves or rock outcrops, thereby benefitting SAS bat species.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase protection of sagebrush habitat within PHMA and GHMA, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in MZs III,

IV and V under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

Determination

Under Alternative D, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, Alternative D of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, or Townsend's big-eared bat in the plan area.

Alternative E

Vegetation and Soils

Direct and Indirect Effects

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment management for sagebrush habitat compared to Alternative A, B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseeding of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species. The effects under Alternative E would be similar to those under Alternative D.

Cumulative Effects

Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in MZs III, IV and V from the management actions under Alternative E, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Livestock Grazing

Direct and Indirect Effects

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats which could benefit SAS as well. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would provide less protection to SAS and their habitats. In general, there are fewer conservation measures associated with this alternative. Impacts to riparian structure that could negatively impact sagebrush-associated bat species would be expected to be greater due to more areas being available for livestock use. Bighorn sheep could be subject to increased competition at spring sources and, depending upon the type of livestock authorized, disease transmission. Fewer overall sagebrush-specific habitat enhancement or maintenance actions would occur under this alternative.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not

contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), there would be fewer restrictions on livestock grazing than under Alternative A. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in conjunction with the past, present and reasonably foreseeable future actions, could result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Fire and Fuels

Direct and Indirect Effects

Alternative E would utilize a unique approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the SGMAs. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners. While the general short-term impacts fire and fuels conservation measures on SAS would be the same as those described under Alternative A, the long-term beneficial effects of the measures on SAS would be similar to those of Alternative B.

Cumulative Effects

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (refer to Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land Use Plans and Resource

Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to SAS are expected to be similar to that of Alternative A.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to SAS in MZs III, IV and V from the management actions under Alternative E, which would be largely neutral for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

Energy and Locatable Minerals Development

Direct and Indirect Effects

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Measures to deter raptor perching and raven nesting on elevated structures would be applied to energy development projects. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. In addition, Alternative E would aggressively engage in reclamation efforts as projects are completed. Renewed mining could disturb or destroy existing Townsend's big-eared bat roosts while prioritization of reclamation of previously defunct mines could negatively impact Townsend's big eared bats by trapping individuals or eliminating roost habitat if reclamation is improperly implemented. As previously stated, Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PHMA and GHMA designations. Under Alternative E, there

would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to sagebrush habitat would not be ruled out. Therefore, the general impacts of energy and locatable minerals development on SAS discussed under Alternative A would have the potential to increase under Alternative E.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to SAS and sagebrush habitats. Therefore, Alternative E would not be as protective of SAS habitat as any of the other alternatives.

Cumulative Effects

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and

Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for sagebrush habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS).

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to SAS under Alternative E are expected to be similar to those of Alternative A.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Determination

Under Alternative E, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, Alternative E of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, or Townsend's big-eared bat in the plan area.

Alternative F

Vegetation and Soils

Direct and Indirect Effects

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PHMA and GHMA as opposed to only PHMA under Alternative B). Together, these measures would result in a net benefit to sagebrush habitat by reducing impacts from invasive plants and pinyon-juniper encroachment on sagebrush habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

Cumulative Effects

Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to SAS. Therefore, the direct and indirect effects of vegetation and soils management to SAS in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Livestock Grazing

Direct and Indirect Effects

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs

for West Nile Virus, and fence removal, modification or marking. Together these efforts would reduce the impacts from grazing on SAS described under Alternative A to a larger degree than Alternative B and expand the beneficial impacts discussed under Alternative B over a larger area.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to SAS. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Fire and Fuels

Direct and Indirect Effects

Fire and fuels management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The impacts on SAS would be the same.

Cumulative Effects

The cumulative of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PHMA, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on SAS under

Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of SAS and SAS habitat than Alternative B.

Cumulative Effects

Refer to Alternative B. Cumulative effects would be the same.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F siting of wind energy development would be prevented in PHMA; PHMA would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PHMA. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in GHMA. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PHMA: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on SAS and SAS habitat, as described under Alternative A, more so than Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PHMA more thoroughly than Alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PHMA, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternatives B, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to SAS in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

Land Uses and Realty Management

Direct and Indirect Effects

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects on SAS and their habitat would be the same.

Cumulative Effects

Management actions associated with land uses and realty under Alternative F would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in MZs III, IV and V under Alternative F, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PHMA, only recreational SUAs that are neutral or beneficial to GRSG would be permitted, there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PHMA to include GHMA, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road construction would be prohibited within 4 miles of active sage-grouse leks. Therefore, the general travel, transportation and recreation effects of Alternative F on SAS would be the same as those for Alternatives A and B, although Alternative F would be more protective, particularly with respect to reducing disturbance to SAS and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of sagebrush habitat within PHMA and, in some instances, GHMA and PHMA, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in MZs III, IV and V under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

Determination

Under Alternative F, proposed conservation measures would limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, Alternative F of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, or Townsend’s big-eared bat in the plan area.

Proposed Plan

Vegetation and Soils

Direct and Indirect Effects

The Proposed Plan would emphasize improving and/or restoring GRSG habitat based on GRSG seasonal habitat objectives. The most limiting seasonal habitat to an individual lek or population would be identified and would be given priority for vegetation treatments. Treatments would use native seed and establish appropriate sagebrush species/subspecies. Management strategies that reduce the threats to GRSG resulting from changes in invasive annual grasses, wildfires, and conifer expansion would be used in GRSG habitats. Similar to Alternative D, these strategies would reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem as well as reduce the rate of conifer encroachment in order to reduce GRSG habitat fragmentation and maintain or re-establish habitat connectivity over the long-term and at a landscape scale. Unlike alternative D, targeted grazing is not identified as a treatment method for vegetation management.

Like Alternative D, the Proposed Plan has the potential to negatively impact bats through roost/hibernacula removal or injury or death from more targeted pinyon and juniper removal than under Alternatives A, B or C, Alternative D. Like Alternative D, species negatively impacted by

conifer encroachment, such as pygmy rabbit, would likely benefit more so than under Alternatives A, B or C. Short-term disturbance-related impacts to SAS from vegetation treatments would be the same under Alternative D as under Alternative A, as would the general long-term benefits.

Cumulative Effects

Proposed Plan additional emphasis on protecting existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management on SAS in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

Livestock Grazing

Direct and Indirect Effects

Similar to Alternative D, the Proposed Plan would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management in PHMA and GHMA. In priority and general habitat management areas and sagebrush focal areas, livestock grazing is managed to provide for adequate nesting, breeding, and winter vegetation cover, construction of water developments, unless beneficial to greater sage-grouse habitat consistent with State approved water rights, is prohibited, grazing guidelines for seasonal (breeding and nesting, brood rearing and summer, and winter/fall) habitats should be applied, and closure of grazing allotments or portions of them should be considered where removal of livestock grazing would enhance the ability to achieve desired habitat conditions. In addition, construction of fences and new permanent livestock facilities (windmills, water tanks, corrals) would be discouraged within 1.2 miles from the perimeter of occupied leks and improved management of riparian areas and wet meadows that contribute to GRSG brood rearing and summer habitat would be emphasized. Like Alternative D, the measures would reduce potential for negative impacts from grazing on SAS described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat. The Proposed Plan would benefit riparian-dependent SAS, such as Columbia spotted bat, by improving riparian conditions.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not

contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing GRSG sagebrush habitat under the Proposed Plan would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

Fire and Fuels

Direct and Indirect Effects

The Proposed plan is similar to Alternative D. But, while Alternative D would prioritize suppression in PHMA and GHMA, the Proposed Plan would emphasize suppression along with pre-suppression activities and other conservation actions in PHMA, GHMA, as well as SFAs. Pre-suppression activities and other conservation actions, along with suppression efforts, would identify and prioritize GRSG habitats that are vulnerable to wildfire events and prescribe actions important to their protection. Under the Proposed Plan, several other conservation measures proposed under Alternative D would be extended beyond PHMA and GHMA to SFAs. They include: designing fuels treatments to restore, enhance, or maintain greater sage-grouse habitat; limiting prescribed fire use to only when clearly beneficial to GRSG or its habitat. In addition, the Proposed Plan includes measures to protect GRSG and sagebrush habitat during fire suppression activities in PHMA, GHMA, and SFAs. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments to SAS would be similar to those of Alternative A. Extending conservation measures beyond PHMA and GHMA to include SFAs under the Proposed Plan, would make the Proposed Plan more protective of SAS and sagebrush habitat, in the long term, than Alternative D.

Cumulative Effects

Management actions under the Proposed Plan, with respect to fire and fuels management, would increase protection of sagebrush habitat, within PHMA, GHMA, and SFAs, thereby benefitting SAS rather than removing or fragmenting habitat. Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, including PHMA, GHMA, and SFAs. Therefore, the direct and indirect effects of fire to SAS in MZs III, IV and V from the management actions under the Proposed Plan, which would

be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

Wild Horse and Burro Management

Direct and Indirect Effects

The Proposed Plan is similar to management proposed in Alternative D: wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing PHMA or GHMA; adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; and gathers would be prioritized in PHMA and GHMA when wild horse and burro populations exceed the upper limit of the established AML. In addition, under the Proposed Plan, wild horse and burro population levels in PHMA and GHMA would be managed at the lower limit of established AML ranges. The Proposed Plan would be expected to reduce the impacts of wild horses and burros on SAS described under Alternative A similarly to Alternative D.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS).

Under the Proposed Plan, within MZs III, IV and V, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under the Proposed Plan would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on SAS or their habitat.

Energy and Locatable Minerals Development

Direct and Indirect Effects

The Proposed Plan is similar to Alternative D. The main difference is that the Proposed Plan includes SFAs that would be recommended for withdrawal from locatable mineral development and require no surface occupancy for fluid minerals. In addition, GHMA would be open to fluid

mineral and geothermal development, with moderate constraints, as opposed to NSO under Alternative D, and under the Proposed Plan, some of types of minerals development, including saleable and non-energy, would be open in GHMA as opposed to closed under Alternative D.

The guidelines proposed under the Proposed Plan would, overall, reduce the general impacts on SAS associated with energy and locatable minerals development discussed under Alternative A. SAS within SFAs would receive a more protective benefit under the Proposed Plan. However, the benefit to those within GHMA might be slightly less under the Proposed Plan than under Alternative D.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under the Proposed Plan, within MZs III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting sagebrush would be included. The Proposed Plan adds NSO restrictions to SFAs and PHMA. Management under the Proposed Plan would add the application of guidelines and mitigation to areas open to mineral development. Therefore, the direct and indirect effects of energy and locatable minerals development to SAS in MZs III, IV and V from the added management actions under the Proposed Plan, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

The Proposed Plan is similar to Alternative D, but could be slightly less protective of sagebrush habitat and SAS because under the Proposed Plan new wind energy utility-scale and/or commercial development would be prohibited in SFAs and PHMA and avoided in GHMA, as opposed to excluded in PHMA and GHMA under Alternative D, and under the Proposed Plan, GHMA would be open to minor ROWs as opposed to avoidance areas under Alternative D.

Guidelines protecting GRSG and sagebrush habitat make this alternative more protective of SAS than Alternative A, although the general effects of land uses and realty management on SAS would be the same as under Alternative A.

Cumulative Effects

Management actions associated with land uses and realty under Alternative the Proposed Plan would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative the Proposed Plan, within MZs III, IV and V (Chapter 5

of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in Zones III, IV and V under the Proposed Plan, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative D, the Proposed Plan would limit motorized travel to designated routes, limit opportunities for new road construction, and prohibit construction of new recreation facilities, unless the development results in a net conservation gain to greater sage-grouse. Unlike Alternative D, the Proposed Plan would extend these measures beyond PHMA and GHMA to include SFAs. Whereas, Alternative D would only permit recreational SUAs that are neutral or beneficial to sage-grouse, the Proposed Plan would include terms and conditions that protect and/or restore greater sage-grouse habitat within the permit in new recreation special use authorizations. Although the general impacts of travel, transportation, and recreation management on SAS under the Proposed Plan would be the same as Alternative A, the Proposed Plan is more restrictive than Alternative A and includes slightly more habitat than Alternative D. Therefore, the Proposed Plan has the potential to reduce habitat loss or fragmentation and disturbance to SAS species by minimizing human use and road construction or upgrades and reduce automotive collisions with individuals of SAS more so than Alternative D. It could also limit access to caves or rock outcrops, thereby benefitting SAS bat species.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under the Proposed Plan would increase protection of sagebrush habitat within PHMA, GHMA, and SFAs thereby benefitting SAS rather than removing or fragmenting habitat. Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in MZs III, IV and V under the Proposed Plan, which would be largely

beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

Determination

Under the Proposed Plan, conservation measures would limit some, but not all impacts to GRSG and GRSG sagebrush habitat. Therefore, the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement Proposed Plan may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species for the bighorn sheep, pygmy rabbit, Columbia spotted bat, or Townsend's big-eared bat in the plan area.

3. Sensitive Plants

Forest sensitive plants have been grouped for this analysis due to the similar types of impacts they could experience and the programmatic nature and landscape scale of this analysis. The landscape scale effects of the proposed conservation measures for each program area within each alternative will be analyzed generally and collectively for this group of species. For each species, the NatureServe Ranking is provided in the Status section to provide additional context for the global and state rarity of the species. For a thorough discussion of NatureServe rankings, please refer to the NatureServe web site (NatureServe 2015).

Antennaria arcuata (Meadow pussytoes)

Status

Meadow pussytoes is considered globally imperiled (G2) and critically imperiled (S1) in Nevada. Meadow pussytoes was considered for federal listing under the Endangered Species Act from 1975 to 1996, but based on the absence of significant downward trends and survey work completed in Wyoming, where most populations are known, Meadow pussytoes was not recommended for listing.

Distribution

Meadow pussytoes occurs primarily in Wyoming, with small numbers of disjunct occurrences in Nevada and Idaho. In Nevada, documented occurrences are restricted to Elko County.

Habitat Associations/Natural History and Threats

Meadow pussytoes is a stoloniferous, short-lived perennial forb in the sunflower family. The species typically flowers in July and August. Meadow pussytoes occurs in sagebrush and grassland associations within seasonally dry portions of moist alkaline meadows, seeps, and springs at elevations of 6,200-6,500 ft. (Morefield 2001). Data from Wyoming occurrences indicate that meadow pussytoes occurs on soils that are neutral to basic with high concentrations of calcium, magnesium, sodium, and organic content and low concentrations of selenium (Heidel

2013). Threats to meadow pussytoes include overgrazing by livestock in late summer, alteration of hydrology, road construction and maintenance, competition with invasive non-native plants, and mineral exploration and development.

Asclepias eastwoodiana (Eastwood milkweed)

Status

Eastwood milkweed is considered imperiled globally and in Nevada.

Distribution

Eastwood milkweed is endemic to Nevada, where it occurs in Esmeralda, Lander, Lincoln, and Nye Counties.

Habitat Associations/Natural History and Threats

Eastwood milkweed is a low-growing perennial forb that typically flowers in May and June. The species occurs within mixed desert shrub, sagebrush, and pinyon-juniper woodlands in open areas, frequently in small washes or other moisture-accumulating microsites (Morefield 2001). The approximate elevation range of Eastwood milkweed is 3,000-7,080 ft. Threats to Eastwood milkweed include trampling by livestock and habitat loss due to mining and road construction (Morefield 2001).

Astragalus lentiginosus var. *latus* (Broad-pod freckled milkvetch)

Status

Broad-pod freckled milkvetch is considered imperiled globally (T2) and in Nevada (S2).

Distribution

Broad-pod freckled milkvetch is a Nevada endemic found in Elko and White Pine Counties, Nevada.

Habitat Associations/Natural History and Threats

Broad-pod freckled milkvetch is a perennial forb in the pea family. The subspecies occurs within pinyon-juniper woodlands on gravelly or sandy calcareous soils, generally on moderate to steep slopes, at elevations of 5,700-9,900 ft. (Morefield 2001). Threats to Broad-pod freckled milkvetch include livestock grazing, recreation, road development and maintenance, mining, and invasive species.

Astragalus robbinsii var. *occidentalis* (Lamoille Canyon milkvetch)

Status

Lamoille Canyon milkvetch is considered imperiled to vulnerable globally (T2T3) and in Nevada (S2S3).

Distribution

Lamoille Canyon milkvetch is a Nevada endemic that occurs in Elko County in the Ruby and east Humboldt Mountains.

Habitat Associations/Natural History and Threats

Lamoille Canyon milkvetch is a perennial forb in the pea family that typically flowers from late June to August. The subspecies occurs in willow, aspen or shrubby cinquefoil communities in seeps, riparian strips, and high-elevation meadow margins on moist to seasonally dry sandy loam soils (Morefield 2001). The approximate elevation range of Lamoille Canyon milkvetch is 6,050-10,000 ft. Threats to Lamoille Canyon milkvetch include recreation use and development, livestock grazing, road construction and maintenance, and mineral exploration and development (Morefield 2001).

Astragalus toquimanus (Toquima milkvetch)

Status

Toquima milkvetch is considered imperiled globally (G2) and in Nevada (S2).

Distribution

Toquima milkvetch is a Nevada endemic documented from the Monitor and Toquima Ranges in Nye County.

Habitat Associations/Natural History and Threats

A member of the pea family, Toquima milkvetch is a perennial forb that typically flowers in May and June. The species occurs within pinyon-juniper and sagebrush vegetation, typically on gravelly hillsides with gentle slopes in areas of basic or calcareous soils, and is often found growing underneath sagebrush plants. The documented elevation range of Toquima milkvetch is 6,480-7,520 ft. (Morefield 2001). Threats to the species include livestock grazing, mining activity, and road construction and maintenance.

Astragalus uncialis (Currant milkvetch)

Status

Currant milkvetch is considered globally imperiled (G2) and critically imperiled in Nevada (S1).

Distribution

Currant milkvetch is documented from Millard County, Utah, and Nye County, Nevada.

Habitat Associations/Natural History and Threats

A member of the pea family, Currant milkvetch is a long-lived low perennial forb that grows in dense tufts and flowers from early May to mid-June. The species occurs in desert shrub and sagebrush vegetation on knolls, gullied foothills, stony washes, saline flats, gently sloping hillsides, and alluvial fans in calcareous sandy-clay or gravelly alkaline soils. Currant milkvetch is documented from an elevation range of approximately 4,800-6,050 ft. in Nevada (Morefield 2001). Threats to Currant milkvetch include livestock grazing, mining activity, and off road vehicle use.

Boechera falcatoria (Grouse Creek rockcress)

Status

Grouse Creek rockcress is considered critically imperiled to imperiled globally (G1G2) and critically imperiled in Nevada (S1).

Distribution

Grouse Creek rockcress occurs in Utah and Nevada. In Nevada, the species is apparently restricted to the southern Ruby Mountains.

Habitat Associations/Natural History and Threats

Grouse Creek rockcress is a perennial forb in the mustard family. The species occurs on exposed gravelly wind-swept passes with low sagebrush in mountain mahogany, sagebrush, and pinyon-juniper associations at elevations of 6,600-9,000 ft. Livestock grazing has been identified as a potential threat to this species.

Botrychium ascendens (Upswept moonwort)

Status

Upswept moonwort is considered globally vulnerable (G3) and critically imperiled in Nevada (S1).

Distribution

Upswept moonwort is widely distributed throughout the western United States and Canada but is locally rare across its range. The species is documented from Alaska, California, Minnesota, Montana, Nevada, Oregon, Wyoming, Alberta, British Columbia, Newfoundland, Ontario, Quebec, and Yukon Territory. On the Humboldt-Toiyabe NF, the species is documented from

the Spring Mountains National Recreation Area in Nevada and Cooney Lake on the Bridgeport RD in California.

Habitat Associations/Natural History and Threats

Upswept moonwort is a diminutive (6-10 cm.) perennial fern. Across its range, the species occurs in diverse habitats, including riparian areas, seeps, springs, alpine meadows, avalanche meadows, grassy roadsides, and shrublands. As with other moonworts, upswetp moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. In Nevada, upswept moonwort is documented at elevations of approximately 8,136-11,646. Although specific threats have not been identified for upswept moonwort in Nevada, populations are small and isolated, making them particularly vulnerable to stochastic natural phenomena.

Botrychium crenulatum (Dainty moonwort)

Status

Dainty moonwort is considered globally vulnerable (G3) and critically imperiled in Nevada (S1).

Distribution

Dainty moonwort is widely distributed throughout the western United States and Canada but is locally rare across its range. Dainty moonwort is documented from Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming, British Columbia, and Alberta. On the Humboldt-Toiyabe NF, dainty moonwort is documented from the Spring Mountains National Recreation Area, and the Jarbidge and Ruby Mountains RDs in Nevada and the Bridgeport RD in California.

Habitat Associations/Natural History and Threats

Dainty moonwort is a small (6-16 cm) perennial fern that occurs in diverse habitats, including stream bottoms, seeps, marsh edges, wet swales, alpine meadows, and grassy roadsides, often on soils of reprecipitated calcium. Dainty moonwort is the most hydrophyllic of the moonworts and typically grows in saturated soils. In Nevada, fronds of dainty moonwort emerge in the spring, typically become fertile in late spring, and die in the fall. As with other moonworts, dainty moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. In Nevada, dainty moonwort is documented at elevations of approximately 8,136-11,154 ft. Because populations of dainty moonwort are small and highly disjunct, they are particularly vulnerable to stochastic natural phenomena.

Botrychium lineare (Slender moonwort)

Status

Slender moonwort is considered globally imperiled (G2) and its status has not been assessed in Nevada (SNR).

Distribution

Slender moonwort is widely distributed throughout the western United States and Canada but is locally rare across its range. In the United States, the species is documented from Alaska, California, Colorado, South Dakota, Montana, Utah, Washington, and Wyoming, and in Canada it is documented from Yukon Territory and historically from New Brunswick and Quebec. In Nevada, slender moonwort is documented from the Spring Mountains National Recreation Area.

Habitat Associations/Natural History and Threats

Slender moonwort is a small (6-18cm) perennial fern that occupies highly varied habitats across its range, including moist to dry meadows, bogs, swamps, roadside ditches, dry fields, and forests in a variety of areas ranging from limestone cliffs and gravelly beaches to forest understory. Slender moonwort is among the least frequently encountered moonworts. As with other Botrychium species, slender moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. Most occurrences are montane at 4,900-9,800 ft., but the species occupies elevation from sea level to 10,000 ft. In Nevada, slender moonwort is documented from 8,497-9,776 ft. Threats to slender moonwort include road maintenance, non-native invasive species, and overgrazing by livestock. Because populations of slender moonwort are small and highly disjunct, they also are vulnerable to stochastic natural phenomena.

Botrychium tunux (Moosewort)

Status

Moosewort is considered vulnerable globally (G3) and critically imperiled in Nevada (S1).

Distribution

Moosewort is broadly distributed across the western United States and Canada but is locally rare in some states in which it occurs. Moosewort is documented from Alaska, California, Colorado, Idaho, Montana, New Mexico, Nevada, and Yukon Territory. On the Humboldt-Toiyabe NF, moosewort is documented from the Spring Mountains National Recreation Area in Nevada and the Bridgeport RD in California.

Habitat Associations/Natural History and Threats

Moosewort is a small (6-12 cm.) perennial fern. Across its range, the species occurs in diverse habitats, including low elevation coastal beaches and dunes in Alaska, well-drained rocky meadows in California, and sparsely vegetated alpine scree slopes in Montana, Wyoming and Colorado. In Nevada, the species is associated with seeps, and springs at 9,186-9,842 ft. On the Humboldt-Toiyabe NF, moosewort is documented from Spring Mountains in Nevada and the Bridgeport Ranger District in California. As with other moonworts, peculiar moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. Threats to moosewort include all-terrain vehicle use, grazing by wild horses, and debris avalanches. Small and highly disjunct populations of moosewort (such as those that occur on the Humboldt-Toiyabe NF) also are vulnerable to stochastic natural phenomena.

Epilobium nevadense (Nevada willowherb)

Status

Nevada willowherb is imperiled globally (G2) and in Nevada (S2).

Distribution

Nevada willowherb occurs in Nevada and Utah. In Nevada, the species is documented from Clark, Eureka, and Lincoln Counties.

Habitat Associations/Natural History and Threats

A member of the evening primrose family, Nevada willowherb is a perennial subshrub that typically flowers from July through August. The species occurs within pinyon pine and ponderosa pine communities on limestone talus slopes and rock outcrops at an elevation range of 6,000-8,930 ft. in NV (Morefield 2001). Threats to Nevada willowherb include road construction, mineral exploration and extraction, and recreation.

Eriogonum douglasii var. *elkoense* (Sunflower Flat buckwheat)

Status

Sunflower Flat buckwheat is considered critically imperiled globally (T1) and in Nevada (S1).

Distribution

Sunflower Flat buckwheat is known only from the Sunflower Flats area northeast of Wild Horse State Park in Elko County, Nevada

Habitat Associations/Natural History and Threats

Sunflower Flat buckwheat is a perennial forb that typically flowers between May and July. Sunflower Flat buckwheat occurs within mixed grassland and sagebrush communities on sandy to gravelly flats and slopes at elevations of 6,200-6900 ft. Identified threats to Sunflower Flat buckwheat include grazing and trampling by livestock and wildlife, competition from invasive weeds, road maintenance, fuel treatments, recreation, and mining activities.

Eriogonum esmeraldense var. *toiyabense* (Toiyabe buckwheat)

Status

Toiyabe buckwheat is considered imperiled globally (T2) and in Nevada (S2).

Distribution

Toiyabe buckwheat is endemic to Nevada. The variety is documented from the Toiyabe, Toquima, and Monitor ranges in Nye County, where it can be locally common, and from the Shoshone and Independent mountains in Lander and Elko Counties, respectively, where it is locally infrequent.

Habitat Associations/Natural History and Threats

Toiyabe buckwheat is an annual forb that typically flowers between June and September. Toiyabe buckwheat occurs in saltbush, sagebrush, and mountain mahogany communities, and in pinyon-juniper and montane conifer woodlands on sandy to gravelly flats and slopes at elevations of 6,900-10,500 ft. Primary threats have not been assessed for this species.

Eriogonum lewisii (Lewis's buckwheat)

Status

Lewis's buckwheat is considered imperiled to vulnerable globally (G2G3) and in Nevada (S2S3).

Distribution

Lewis's buckwheat is a Nevada endemic documented from north-central Elko County and northern Eureka County in the Bull Run, Independence, Tuscarora and Jarbidge Mountains.

Habitat Associations/Natural History and Threats

Lewis's buckwheat is a small, long-lived perennial that flowers from June to July and sets seed between early June and the end of August. The species occurs within low sagebrush (*Artemisia arbuscula*) and squirreltail (*Elymus elymoides*) vegetation on dry, exposed, shallow, soils on convex ridge-line knolls and crests on flat to moderately steep slopes of all aspects (Morefield 2001). The approximate elevation range of Lewis's buckwheat is 6,470-9,720 ft. Threats to

Lewis's buckwheat include mineral exploration and development, development and maintenance of roads and electronic sites, off-road vehicle travel, trampling by livestock, fire, and fire suppression activities (Morefield 2001).

Jamesia tetrapetala (Basin jamesia)

Status

Basin jamesia is considered imperiled globally (G2) and in Nevada (S2).

Distribution

Within Nevada, Basin jamesia is documented from Lincoln, Nye, and White Pine Counties, in the Highland, Snake, and Grant Ranges. The species also is documented from the House Range in Millard County, Utah.

Habitat Associations/Natural History and Threats

Basin jamesia is a perennial shrub in the hydrangea family. Although specific habitat information is not available for Nevada (Morefield 2001), in Utah the species occurs with chokecherry, mountain mahogany, jointfir (*Ephedra* spp.), and sagebrush in crevices in limestone cliffs at 6,560-10,800 ft. Threats to basin jamesia include mining.

Lathyrus grimesii (Grimes lathyrus)

Status

Grimes lathyrus is considered imperiled globally (G2) and in Nevada (S2).

Distribution

Grimes lathyrus is documented only from a small portion of the northern Independence Range and southern Bull Run Mountains of north-central Elko County, Nevada.

Habitat Associations/Natural History and Threats

Grimes lathyrus is a perennial forb in the pea family. The species occurs within sparse to moderate vegetation consisting of antelope bitterbrush (*Purshia tridentate*), rubber rabbitbrush (*Ericameria nauseosa*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), basin wildrye (*Leymus cinereus*), cheatgrass (*Bromus tectorum*), and occasionally leafy spurge (*Euphorbia esula*), and Leiberg's clover (*Trifolium leibergii*). Within this habitat, Grimes lathyrus occurs on mostly steep slopes of all aspects at 6,000-8,300 ft. elevation (Morefield 2001). Threats to *Grimes lathyrus* include livestock grazing, mineral exploration and development, slope destabilization and erosion caused by roads and other disturbances, road maintenance, concentrated trampling by livestock or feral horses, fire, competition with invasive non-native plants, and declines in insect pollinator populations (NatureServe 2015).

Lewisia maguirei (Maguire lewisia)

Status

Maguire lewisia is considered critically imperiled globally (G1) and in Nevada (S1).

Distribution

Maguire lewisia is a Nevada endemic whose distribution is apparently restricted to the Quinn Canyon and Grant Ranges in eastern Nye County, Nevada.

Habitat Associations/Natural History and Threats

Maguire lewisia is a perennial forb in the purslane family. The species occurs within the pinyon-juniper zone in association with desert frasera (*Frasera albomarginata*), Torrey's milkvetch (*Astragalus calycosus*), stemless four-nerve daisy (*Hymenoxys acaulis*), Nevada onion (*Allium nevadense*), and rock goldenrod (*Petradoria pumila*) on dry, sparsely vegetated carbonate scree or shallow gravelly-clay soils on steep slopes and ridgelines of all aspects at elevations of 7,360-8,280 ft. (Morefield 2001). Primary threats to Maguire lewisia include horticultural collection, mineral exploration and climate change (NatureServe 2015).

Penstemon concinnus (Elegant penstemon)

Status

Elegan penstemon is considered vulnerable globally (G3) and imperiled in Nevada (S2).

Distribution

Elegant penstemon is documented from Lincoln and White Pine Counties, Nevada, and from Beaver, Iron, and Millard Counties, Utah.

Habitat Associations/Natural History and Threats

Elegant penstemon is a perennial subshrub in the plantain family. The species occurs within pinyon-juniper woodlands on alluvial, calcareous, and igneous gravels between 5,925 and 7,700 ft. (Franklin 1999). Threats to elegant penstemon include livestock grazing, recreational activities, road maintenance, and mining.

Penstemon moriahensis (Mt. Moriah penstemon)

Status

Mt. Moriah penstemon is considered critically imperiled to imperiled globally (G1G2) and in Nevada (S1S).

Distribution

Mt. Moriah penstemon is endemic to White Pine County, Nevada. The species occurs mainly in the northern Snake Range near Mount Moriah, with one outlying site documented in the Kern Range and one in the White Pine Range.

Habitat Associations/Natural History and Threats

Mt. Moriah penstemon is a perennial forb in the plantain family. The species occurs in the subalpine conifer, subalpine sagebrush, mountain mahogany, and upper pinyon-juniper zones at elevations of 7,100-10,800 ft. on open, gravelly and/or silty carbonate soils in drainages, on gentle slopes, and on road banks or other recovering disturbances with enhanced runoff (Morefield 2001). Mining has been identified as a potential threat to Mt. Moriah penstemon.

Penstemon pudicus (Bashful penstemon)

Status

Bashful penstemon is considered critically imperiled globally (G1) and in Nevada (S1).

Distribution

Bashful penstemon is a Nevada endemic that is documented from the Kawich Range in Nye County, Nevada, where fewer than 1000 individuals are thought to occur (NatureServe 2015).

Habitat Associations/Natural History and Threats

Bashful penstemon is a perennial forb in the plantain family. The species occurs within the subalpine sagebrush, mountain mahogany, and upper pinyon-juniper zones at elevations of 7,500-9,000 ft. in crevices, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, steep protected slopes, and drainage bottoms, mostly on north and east aspects (Morefield 2001). Specific threats have not been identified for this species.

Phacelia inconspicua (Inconspicuous phacelia)

Status

Inconspicuous phacelia is considered imperiled globally (G2) and critically imperiled in Nevada (S1).

Distribution

Inconspicuous phacelia is documented from six sites in Idaho and one in the West Humboldt Mountains of Nevada (NatureServe 2015).

Habitat Associations/Natural History and Threats

Inconspicuous phacelia is an annual forb in the waterleaf family. The species occurs in small clearings within shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) on relatively deep, undisturbed, highly organic soils on concave slopes where snow drifts persist well into spring (Morefield 2001). Inconspicuous phacelia is documented from elevations of 5,000-8,280 ft. Threats to inconspicuous phacelia in Nevada include mineral exploration and development, fire suppression and catastrophic wildfire, competition from invasive weeds, and concentrated trampling by livestock and feral horses (Morefield 2001).

Phacelia minutissima (Small-flower phacelia)

Status

Least phacelia is an R4 sensitive species that is considered globally vulnerable (G3) and imperiled in Nevada (S2).

Distribution

Least phacelia is a regional endemic that is documented from Nevada, Idaho, Oregon, and Washington. Within Nevada, the species is documented from Elko and Eureka Counties.

Habitat Associations/Natural History and Threats

Least phacelia is an annual forb in the waterleaf family. Within Nevada, the species occurs in the following habitats: within sagebrush swales; along the high water lines of creek beds; around springs; at the perimeter of corn lily (*Veratrum californicum*), mule ears (*Wyethia amplexicaulis*) and/or aspen stands; and in vernally saturated summer drying mud banks in meadows (Morefield 2001). The elevation range of least phacelia is approximately 6,240-8,900 ft. Threats to least phacelia include mining activities, recreation, construction and maintenance of trails and roads, off road vehicle use, water development, competition from non-native species, herbicide application, and domestic livestock grazing.

Polyctenium williamsiae (Williams combleaf)

Status

Williams combleaf is considered imperiled globally (G2) and in Nevada (S2).

Distribution

Williams combleaf occurs in California, Oregon, and Nevada. Within Nevada, the species is documented from Douglas, Lyon, Mineral, Nye, and Washoe Counties.

Habitat Associations/Natural History and Threats

Williams combleaf is a perennial forb in the mustard family. In Nevada, the species is aquatic or wetland dependent and occurs in the sagebrush, pinyon-juniper, and mountain sagebrush zones on relatively barren sandy to sandy-clay or mud margins and bottoms of non-alkaline seasonal lakes perched over volcanic bedrock (Morefield 2001). Williams combleaf is documented from elevations of 5,670-8,930 ft. Threats to Williams combleaf include grazing by livestock, feral horses, and wildlife, water diversions and developments, and off-road vehicle use (NatureServe 2015).

Potentilla johnstonii (Sagebrush cinquefoil)

Status

Sagebrush cinquefoil is considered critically imperiled globally (G1) and in Nevada (S1)

Distribution

Sagebrush cinquefoil is documented from a single location near a frequently traveled National Forest road on Cherry Creek Summit in the Quinn Canyon Range in Nye County, Nevada (NatureServe 2015).

Habitat Associations/Natural History and Threats

Sagebrush cinquefoil is a perennial forb in the rose family. The species occurs in pinyon-juniper vegetation with a sagebrush understory at an elevation of 7,600 ft. Although documented threats have not been identified for this species, because plants in the known location occur along a road within a dispersed camping site, potential threats to sagebrush cinquefoil include the following: trampling and crushing from dispersed camping; competition from invasive species that may be transported to the area on vehicles, equipment, footwear, or clothing; and road maintenance.

Sphaeralcea caespitosa var. *williamsiae* (Railroad Valley globemallow)

Status

Railroad Valley globemallow is considered imperiled globally (G2T2) and in Nevada (S2).

Distribution

Railroad Valley globemallow is endemic to Nye County, Nevada.

Habitat Associations/Natural History and Threats

Railroad Valley globemallow is a perennial subshrub in the mallow family. The species occurs on shallow, gravelly soils of alluvial fans or valley fill and is documented from an elevation range of 4,770- 5,310 ft. (Holmgren et al. 2005). Threats to Railroad Valley globemallow

include changes in land use, industrial expansion, and mineral exploration and development or leasing.

Townsendia jonesii var. *tumulosa* (Charleston ground daisy)

Status

Charleston ground daisy is considered vulnerable globally (G4T3) and in Nevada (S3).

Distribution

Charleston ground daisy is a Nevada endemic that is documented from Clark and Nye Counties.

Habitat Associations/Natural History and Threats

Charleston ground daisy is a perennial forb in the sunflower family. The species occurs in the lower sagebrush and upper shadscale/mixed-shrub zones on knolls of calcareous silty deposits and in the montane conifer, pinyon-juniper, mountain mahogany, and lower subalpine conifer zones in open, sparsely vegetated calcareous areas (Morefield 2001). Charleston ground daisy is documented from an elevation range of 5,200-11,060 ft. Recreational use has been identified as a primary threat to the species.

Trifolium andinum var. *podocephalum* (Currant Summit clover)

Status

Currant Summit clover is considered imperiled globally (G3T1) and in Nevada (S1).

Distribution

Currant Summit clover is endemic to the White Pine and Egan Ranges in Lincoln and Nye Counties, Nevada.

Habitat Associations/Natural History and Threats

A member of the pea family, Currant Summit clover is a long-lived perennial forb that occurs in the pinyon-juniper zone on volcanic or carbonate rock at elevations of 6,900-7,400 ft. (Barneby 1989). An assessment of primary threats is not available for this species.

Trifolium leibergii (Leiberg's clover)

Status

Leiberg's clover is considered imperiled globally (G2) and in Nevada (S2).

Distribution

Leiberg's clover is documented from the Independence and Jarbidge Mountains in Elko County, Nevada, and from Oregon.

Habitat Associations/Natural History and Threats

Leiberg's clover is a perennial forb in the pea family. The species occurs in little sagebrush (Artemisia arbuscula) vegetation at elevations of 6,560-7,800 ft. on relatively barren gravel soils of crumbling volcanic outcrops, mainly on flat steep areas with northeast to southeast to southwest aspects (Morefield 2001). Threats to Leiberg's clover include off-highway vehicle use, cattle trampling and trailing through habitat, mineral exploration, and reduction or loss of native pollinators.

Trifolium macilentum var. *rollinsii* (Rollins clover)

Status

Rollins clover is considered vulnerable to imperiled globally (G2G3) and in Nevada (G2G3).

Distribution

Rollins clover is endemic to the Toiyabe Range in Nevada.

Habitat Associations/Natural History and Threats

Rollins clover is a perennial forb in the pea family. The species occurs in mountain sagebrush, subalpine conifer, and lower alpine vegetation on concave, leeward, or otherwise moisture-accumulating areas on steep to moderate slopes of all aspects at elevations of 8,800 to 10,580 ft. (Morefield 2001). An assessment of primary threats is not available for this species.

Alternative A - No Action

Vegetation and Soils

Direct and Indirect Effects

Invasive non-native plants have been identified as a significant threat to more than one-fourth of the plant species in table 2. Under Alternative A, land use and management would continue in compliance with existing land use plans, and the introduction, spread, and treatment of invasive non-native plants would be expected to follow current trends. New infestations would be expected to be highest along roads and in areas of heaviest use or ground disturbance (such as in campgrounds, energy development sites, and areas of concentrated recreation). Sensitive plants would continue to be impacted through direct competition with invasive species for water, light, and nutrients, and by alteration of fire frequency and severity. Invasive species treatments would reduce these impacts, but the scale of invasive species infestations in the analysis area and the difficulty effectively eradicating them are such that impacts on sensitive plants from invasive species infestations could not be completely avoided. Treatment of invasive species using herbicide could impact sensitive plant species that occur in treatment areas. Species most susceptible to herbicide impacts would be those that grow in disturbed areas, such as roadsides.

Currently, least phacelia is the only plant species in table 2 for which herbicide use has been identified as a primary threat.

Under Alternative A, conifer encroachment into sagebrush would be expected to follow existing trends. Conifer encroachment into sagebrush ecosystems is common and widespread in the Intermountain West. Sagebrush vegetation types susceptible to encroachment include Wyoming sagebrush, mountain big sagebrush, and black sagebrush. The encroachment of pinyon and juniper trees into sagebrush types located within their thermal zones is well documented. Douglas-fir trees are known to encroach into high elevation sagebrush types. Increasing tree cover in sagebrush communities reduces or eliminates sagebrush and reduces the herbaceous understory. Conifer encroachment into sagebrush and other shrub types that would be expected to continue under Alternative A would likely result in a loss of individuals or occurrences of sensitive plants found in the affected sagebrush types.

National Forests have implemented and continue to implement vegetation treatments that curtail conifer encroachment into vegetation communities, including sagebrush. Treatments include but are not limited to prescribed fire, lop-and-scatter, and mechanical methods (such as mastication). These actions often coincide with Forest Service land use plans that contain objectives to maintain, restore, and/or improve sagebrush and other valued plant communities. Under Alternative A, impacts on sensitive plant species from treatments that involved prescribed fire and impacts on sensitive plant species from other vegetation treatments that involve hand or mechanical methods would be as described below for Fire and Fuels.

Although energy development has not been specifically identified as a primary threat to the plant species in table 2, impacts could occur to any species that occurs within areas of conifer encroachment.

Cumulative Effects

Under Alternative A, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue within MZs III, IV and V (Chapter 5 of the FEIS), and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in MZs III, IV and V from the management actions under Alternative A when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

Under Alternative A, livestock grazing would continue under current management with no expected change in AUMs, season-of-use, or other terms, conditions, or directives delineated

within grazing permits or AMPs, although administrative actions may be implemented on a case-by-case basis to attain desired rangeland conditions. Desired rangeland conditions would be managed according to existing standards and guidelines designed to maintain healthy, sustainable rangeland resources and allow for the recovery of degraded rangelands.

Effects of grazing on sensitive plants include the following: trampling, which can result in direct mortality of individuals and loss of entire occurrences; herbivory, which can result in direct mortality or reduced vitality and reproduction of individuals; alteration of habitat through soil compaction, which can reduce water infiltration and change hydrology and may render areas less suitable or unsuitable for sensitive plants; and increased competition for light, nutrients and water through introduction or spread of non-native invasive species, which may reduce sensitive plant species abundance or result in the loss of occurrences.

The nature and extent of impacts of livestock grazing on individuals, populations, and habitat quality of sensitive plants depend on the palatability of the species, the grazing and trampling tolerance of the species, grazing intensity, timing of grazing, forage preferences of ungulates, soil conditions, and hydrology. Livestock grazing has been identified as a primary threat to more than half the sensitive plant species in table 2, including meadow pussytoes, Eastwood milkweed, broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Toquima milkvetch, Currant milkvetch, Grouse Creek rockcress, slender moonwort, moosewort, Sunflower Flat buckwheat, Lewis's buckwheat, Grimes lathyrus, elegant penstemon, inconspicuous phacelia, small-flower phacelia, Williams combleaf, and Leiberg's clover.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it only a "lesser threat" with respect to "relative cumulative actions" within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which could compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative A, livestock grazing would continue to be managed in MZs III, IV and V through existing grazing plans, and methods and guidelines from the existing plans would be followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse

and burro management on sensitive plants in MZs III, IV and V when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

Wildfire, prescribed burns, and fuels management would continue to follow current direction under Alternative A, which would impose fewer restrictions on these actions than the other alternatives. Prescribed burns and other fuels treatments involving vegetation thinning or removal (such as lop-and-scatter or mastication) could occur within a variety of vegetation types, including sagebrush. Associated impacts on plant species could include direct mortality to individuals as a result of fire or crushing by equipment or cut vegetation. Fire-adapted plant species and plant species that favor early successional habitats could benefit. However, species dependent on mature sagebrush could be negatively affected by fire and associated changes in vegetation. Additional impacts on sensitive plant species could result from the direct and indirect effects of fire suppression. The creation of fire lines could result in direct mortality to individual plants or negative impacts associated with alteration of their habitat through soil disturbance, alteration of hydrology, and promotion of the establishment or spread of invasive non-native species. The application of fire retardant can negatively impact some plant species by killing entire plants, burning shoots and leaves, and reducing germination rates (Bell et al. 2005). Fire retardant also can have fertilizing effects and promote the spread of invasive non-native species (Bell et al. 2005). Longer term impacts on plant species could occur from fire suppression. Fire suppression may initially result in higher rates of pinyon-juniper encroachment in some areas. In the initial stages of encroachment (Phase I), fuel loadings remain consistent with the sagebrush understory. As pinyon-juniper encroachment advances (Phases II and III) and the understory begins to thin, the depleted understory causes the stands to become resistant to wildfire and further alters fire return intervals. During years of high fire danger, the resulting heavy fuel loadings in these stands can contribute to larger-scale wildfire events and confound control efforts due to extreme fire behavior. Such high-severity fires can negatively impact native plant species by promoting the establishment of exotics (Hunter et al. 2006).

Although impacts from fire and fuels management could occur to any of the sensitive plants in table 2, those for which fire has been identified as a major potential threat include Lewis's buckwheat, Grimes lathyrus, inconspicuous phacelia, and Williams combleaf. Fuels management has been identified as a potential major threat to Sunflower Flat buckwheat.

Cumulative Effects

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as

they would be in Alternatives B, C, D, E F, and G. Under Alternative A, the direct and indirect effects in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change may increase loss and fragmentation of the existing sagebrush habitat from wildfire in MZs III, IV and V (Chapter 5 of the FEIS), which could contribute to negative cumulative impacts on sensitive plants.

Wild Horse and Burro Management

Direct and Indirect Effects

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Horse impacts are somewhat different than cattle impacts. Horses consume more forage and remove a greater proportion of the plants they consume than cattle or sheep, which hinders the recovery of vegetation (Menard et al. 2002). Grazing by wild horses and burros reduces shrub cover and creates more fragmented shrub canopies, which can negatively affect Greater Sage-Grouse habitat (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming wild horses and burros have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011), (COT 2013, pg 46). Effects of wild horses and burros on habitats may be more pronounced during periods of drought or vegetation stress (NTT 2011, pg 18).

Water must be available yearlong in horse management areas (The Wild and Free-Roaming Horses and Burros Act of 1971). As a result, riparian areas are often used year round by wild horses and burros and these areas are frequently modified with additional fencing and troughs in order to accommodate year round use. Such range improvements decrease the amount of water available within natural drainages and may negatively affect riparian habitat. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive success and meadows received the highest use in proportion to their availability.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for Appropriate Management Level (AML). Initially, AML is established in LUPs at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Loss of vegetation cover, decreased water quality, increased soil erosion, and reduced overall habitat quality can result when AMLs are exceeded. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules, and budget. Gathers also are conducted in emergency situations when the health of the population is at risk for lack of forage or water. Direction for prioritizing horse gathers and maintaining AML is not based on GRSG habitat

needs, although this is implicit in the Congressional directive to maintain a thriving natural ecological balance.

Alternative A does not include any GRSG goals, objectives, or management actions that specifically relate to the Wild Horse and Burro Program. Though the magnitude and spatial distribution of potential impacts of wild horse and burro management on sensitive plants are different than those expected from livestock grazing, the types of impacts are similar and include the following: trampling, which can result in direct mortality of individuals and loss of entire occurrences; herbivory, which can result in direct mortality or reduced vitality and reproduction of individuals; alteration of habitat through soil compaction, which can reduce water infiltration and change hydrology and may render areas less suitable or unsuitable for sensitive plants; and increased competition for light, nutrients and water through introduction or spread of non-native invasive species, which may reduce sensitive plant species abundance or result in the loss of occurrences.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs and has the potential to compound the effects of wild horse and burro management on these lands, the FEIS considers wild horse and burro management only a “lesser threat” with respect to “relative cumulative actions” within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS).

Under Alternative A, wild horse and burro Territories within MZ III, would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing on sensitive plants in MZs III, IV and V under Alternative A when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Minerals development within the sub-region consists of locatable mineral resources at various scales. Mining is primarily for gold, silver, and copper and is largely absent from the basalt-capped areas of northwestern Nevada. Leasable minerals include mineral material sales such as sand and gravel for road maintenance, and limited additional commodities such as potash. Oil and gas is in limited production occurring only in the far southeastern sub-region. Oil and gas leasing occurs over a much larger footprint in western Nevada and additional production is projected as new technologies expand recovery potential. Development of locatable and leasable mineral resources typically requires significant infrastructure and human activity for construction, operation, and maintenance.

Within the sub-region, most public lands are open to oil and gas leasing, saleable mineral material development, and solar development, although specific closures of areas to leasing such as Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat exist throughout the sub-region. Lands within the sub-region are generally open to mineral location. There are specific locatable mineral withdrawals for particular rights of way, designated wilderness areas, areas of critical environmental concern and other administrative needs, none specific to protecting Greater Sage-Grouse habitat. All locatable mineral activities are managed under the regulations at 43 CFR 3800 through approval of a Plan of Operations. Mitigation of effects to GRSG and its habitat are identified through the NEPA process approving plans of operation. Goals and objectives for locatable minerals are to provide opportunities to develop the resource while preventing undue or unnecessary degradation of public lands. Within the sub-region, most areas of public land would remain open for wind development.

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on sensitive plant species and their habitats. Impacts on sensitive plants from energy development would be similar to those for infrastructure development and maintenance discussed under Land Uses and Realty Management below, and could include direct mortality of individual plants or occurrences, loss of habitat within the disturbance footprint of new infrastructure, and reduction or loss of pollinators. Impacts on sensitive plants also could result from temporary ground disturbance (including the construction of temporary access routes, the establishment of laydown areas, vegetation clearing, etc.), which could alter vegetation assemblages, compact soils, alter hydrology, alter sunlight penetration, impact pollinators, and promote the establishment and spread of invasive non-native plants. Energy development would comply with land use plans and environmental laws and regulations, including the National Environmental Policy Act (NEPA), which would result in the implementation of measures to avoid, minimize, or mitigate impacts on

sensitive plants, as appropriate. Although conifer encroachment has not been specifically identified as a primary threat to any of the species in table 2, impacts could occur to any species that occurs within areas developed for energy.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative A, land tenure adjustments would be subject to current disposal, exchange, and acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, and plant and animal populations or natural communities of high interest. Although land tenure adjustments or withdrawals made in GRSG habitat could reduce the habitat available to sustain GRSG populations, unless provisions were made to ensure that GRSG conservation remained a priority under the new land management regime, land tenure adjustments would likely include retention of areas with GRSG, and would thus retain occupied habitats under BLM or FS management. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat.

Direction under existing land use plans would continue to apply under Alternative A. No changes would occur to the current National Forest System infrastructure, including power lines, wind turbines, solar panels, communications towers, fences, or roads. Although mitigation is typically developed under the NEPA process and most right of way and surface developments are subject to limited operation periods or other stipulations in local GRSG conservation strategies, permitted right-of-ways (ROWs) or special use authorities (SUAs) would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of GRSG habitat or result in barriers to migration corridors or

seasonal habitats. Construction, maintenance, and use of infrastructure and ancillary facilities would continue to lead to higher short-term concentrations of disturbance in GRSG habitat.

Impacts on sensitive plants could result from construction and maintenance of infrastructure, such as power lines, communication towers, fences, and roads. Within the footprint of permanent impacts, effects on sensitive plants could include direct mortality of individual plants or occurrences, loss of habitat, and reduction or loss of pollinators. Impacts on sensitive plants also could result from temporary ground disturbance associated with the construction of temporary access routes, the establishment of laydown areas, and vegetation clearing, which could alter vegetation assemblages, compact soils, alter hydrology, alter sunlight penetration, impact pollinators, and promote the establishment and spread of invasive non-native plants. Construction and maintenance of infrastructure would comply with land use plans and environmental laws and regulations, including the National Environmental Policy Act (NEPA), which would result in the implementation of measures to avoid, minimize, or mitigate impacts on sensitive plants, as appropriate.

Sensitive plants in table 2 for which infrastructure development and/or maintenance, particularly road construction and/or maintenance, has been identified as a primary threat include meadow pussytoes, Eastwood milkweed, broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Toquima milkvetch, slender moonwort, Nevada willowherb, Sunflower Flat buckwheat, Lewis's buckwheat, Grimes lathyrus, elegant penstemon, small-flower phacelia, and sagebrush cinquefoil.

Cumulative Effects

Current lands and realty management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Under Alternative A, there would be no changes to the current National Forest System Roads or transportation plans on the Humboldt-Toiyabe National Forest.

Recreation encompasses a wide range of activities, most of which involve some form of overland travel (motorized or non-motorized) and/or use of roads and/or trails. Under Alternative A, recreation would continue to be managed according to current direction. Current recreation activities would continue within GRSG habitat, and some of the areas within GRSG habitat would remain open to cross country motorized vehicle use.

In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within GRSG habitat. In addition, less restrictive travel conditions usually result in higher concentrations of human use adjacent to motorized routes. Impacts onsensitive plants from travel, transportation, and recreation management that would be expected under Alternative A include the following: direct mortality from trampling or crushing; reduced vitality and interference with reproduction from dust generation; habitat degradation associated with soil compaction and changes in hydrology; and reduction in abundance or loss of occurrences from the spread of invasive non-native species. Impacts on sensitive plants from development of infrastructure to support concentrated recreation activities would be as discussed for infrastructure under Land Uses and Realty Management above. Expansion or development of infrastructure to support recreation would follow existing direction and would comply with land use plans and environmental laws and regulations, including the National Environmental Policy Act (NEPA), which would result in the implementation of measures to avoid, minimize, or mitigate impacts on sensitive plants, as appropriate.

Of the sensitive plant species in table 2, recreation has been identified as a primary threat to broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Currant milkvetch, moosewort, Nevada willowherb, Sunflower Flat buckwheat, Lewis's buckwheat, elegant penstemon, small-flower phacelia, Williams combleaf, sagebrush cinquefoil, Charleston ground daisy, and Leiberg's clover. Of these species, off-road vehicle use has been identified as a primary threat to Currant milkvetch, moosewort, Lewis's buckwheat, small-flower phacelia, Williams combleaf, and Leiberg's clover.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" in the FEIS only within MZ V (Chapter 5 of the FEIS). Current travel, transportation, and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Determination

Under the current condition, existing conservation measures limit some, but not all, impacts to sensitive plant species and impacts to potentially suitable habitat for these species are possible. Therefore, Alternative A of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

Alternative B

Vegetation and Soils

Direct and Indirect Effects

Under Alternative B, invasive non-native plant species control efforts would follow current direction, and the types of direct and indirect impacts expected to sensitive plants would be the same as those discussed under Alternative A. However, vegetation management conservation measures under Alternative B would prioritize restoration efforts, including treatment of invasive non-native plants, in GRSG habitats, which would be expected to provide a long term benefit to sensitive plants that occur in those habitats. Short term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be done and appropriate avoidance or minimization measures would be incorporated.

Under Alternative B, the use of native seed would be favored in restoration efforts, though non-native seed could be used under certain circumstances. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in Alternative B is unlikely to result in any additional benefit to sensitive plant species over Alternative A. Monitoring and invasive species control after fuels treatments and at existing range improvements incorporated into Alternative B could benefit sensitive plant species by minimizing habitat degradation caused by invasive species. Overall, Alternative B would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A.

Like Alternative A, Alternative B would not directly address conifer encroachment. The types of impacts of conifer encroachment and associated management actions on sensitive plants under Alternative B would be expected to be the same as those under Alternative A; however, the conservation measures described above and the fuels treatments described in Fire and Fuels would likely reduce the magnitude of the negative impacts of conifer encroachment on sensitive plants and provide a long-term benefit to species that depend on healthy sagebrush habitats.

Impacts associated with managing conifer encroachment under Alternative B would be expected to increase relative to Alternative A and could negatively impact sensitive plants that are restricted to conifer habitats.

Cumulative Effects

Under Alternative B, current vegetation and soils management treatments within MZs III, IV and V (Chapter 5 of the FEIS) (including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper) would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. However, additional measures to conserve existing sagebrush habitat under Alternative B would provide further long-term benefits to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in MZs III, IV and V under Alternative B when combined with past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

Alternative B would incorporate GRSG habitat objectives and GRSG management considerations into livestock grazing management in PHMA. Actions would include completion of range condition assessments, consideration of grazing methods and systems to reduce impacts on GRSG habitat, modification of grazing systems to meet seasonal GRSG habitat requirements, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, incorporation of BMPs for West Nile Virus, and fence removal, modification or marking. Although the types of impacts on sensitive plants would be expected to be the same as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced in Alternative B. Sensitive plants that occur in PHMA would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands. Almost one-fourth of the sensitive plant species in table 2 occur in riparian areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of Alternative B on improving riparian, meadow, and other wetland habitat, sensitive wetland plant species may benefit from Alternative B more than upland species.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it a “lesser threat” with respect to “relative cumulative actions” within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which could compound the

effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative B, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level within MZs III, IV and V (Chapter 5 of the FEIS). Additional measures to conserve existing sagebrush habitat under Alternative B would further minimize negative impacts on sensitive plants that occurred within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in MZs III, IV and V under Alternative B when combined with past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

Under Alternative B, fire suppression would be prioritized in PHMA to protect mature sagebrush habitat. Suppression would be prioritized in GHMA only where fires threatened PHMA. Alternative B does not include any other specific wildland fire management actions in GHMA. Under Alternative B, fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, carefully evaluating the need for fuel breaks against additional sagebrush losses, applying seasonal restrictions for implementing management treatments, limiting fuels treatments in winter range, and emphasizing the use of native seed in restoration. Post-fuels treatments in PHMA would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments in PHMA would including monitoring and control of invasive non-native plants species, and fuels management BMPs in PHMA would incorporate invasive plant prevention measures.

The types of impacts on sensitive plants associated with fire and fuels under Alternative B would be similar to those under Alternative A; however the extent of those impacts and their distribution across the landscape would change. Under Alternative B, sensitive plant species requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression would be higher under Alternative B than under Alternative A. Because reseeding efforts would prioritize use of native seed in PHMA over other areas in years of short seed supplies, sensitive plants in areas outside PHMA could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside PHMA.

Cumulative Effects

Under Alternative B, management actions associated with fire and fuels would increase protection of GRSG habitat, primarily within PHMA. Under Alternative B, current wildfire suppression operations within MZs III, IV and V (Chapter 5 of the FEIS) would continue, however, additional emphasis would be placed on protecting existing sagebrush habitat during suppression activities, pre-suppression planning, and staging. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PHMA. Therefore, the direct and indirect effects of fire and fuels management on GRSG habitat in MZs III, IV and V under Alternative B, which would be largely beneficial to GRSG habitat and the sensitive plants that occur within it, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative B, wild horses and burros would be managed at established Appropriate Management Levels (AMLs) on the same number of acres as under Alternative A, and gathers would be prioritized in PHMA unless needed in other areas to address catastrophic environmental issues. Wild Horse Territory Plans would incorporate GRSG habitat objectives. Implementation of any range improvements would follow the same guidance identified for livestock grazing in this alternative, including designing and locating new improvements only where they conserve, enhance, or restore Greater Sage-Grouse habitat through improved grazing management. Design features could include developing or modifying waters to mitigate for West Nile virus, removing or modifying fences to reduce the chance of bird strikes, and monitoring and treating invasive species associated with range improvements. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs.

Although the types of impacts on sensitive plants would be expected to be the same under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative B. Sensitive plants that occur in PHMA would likely benefit from prioritized gathers in PHMA, the incorporation of GRSG habitat objectives in WHT Plans, and guidance for implementing range improvements.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs and has the potential to compound the effects of livestock grazing on these lands, the FEIS considers it a “lesser threat” with respect to “relative

cumulative actions" only within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS).

Under Alternative B, wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans within MZs III, IV and V (Chapter 5 of the FEIS). Additional measures to conserve existing sagebrush habitat under Alternative B would reduce overall negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in MZs III, IV and V under Alternative B when combined with past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Alternative B addresses energy development directly through its inclusion of provisions for fluid energy development. Actions within Alternative B relevant to the analysis of impacts on sensitive plants include the following: closing PHMA to fluid mineral leasing with possible exceptions; allowing geophysical operations in PHMA only to obtain information about areas outside and adjacent to PHMA; requiring exploratory operations within PHMA to be done using helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply; in PHMA prohibiting new surface occupancy on federal leases; for existing leases entirely within PHMA, applying NSO buffers around leks, and if the entire lease falls within this buffer, limiting disturbances within sections to the 3% threshold; applying BMPs to limit the impact of operations on PHMA; and applying BMPs to improve reclamation standards and successfully restore PHMA. All of these actions would be likely to reduce the level of impacts of fluid mineral development on sensitive plants relative to Alternative A.

Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances would apply to energy development and would limit the extent of all types of energy development in PHMA. Impacts on sensitive plants would be as discussed below for infrastructure under Land Uses and Realty Management.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative B, some of the current energy and locatable minerals management direction would continue within MZs III and IV, however, additional measures would conserve existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal. Therefore, the direct and indirect

effects on sensitive plants in GRSG habitat in MZs III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would minimize negative impacts to sensitive plants in GRSG habitat, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative B, all PHMA would be managed as exclusion areas, GHMA would be managed as an avoidance area for new ROW and SUA projects, and co-location of new ROWs or SUAs with existing infrastructure would occur in PHMA and GHMA. Alternative B also would entail the following within PHMA: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed, or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and the establishment of a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities). In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved.

Alternative B would benefit sensitive plants within PHMA and GHMA by maximizing habitat connectivity and minimizing habitat loss, fragmentation, degradation and disturbance. Under Alternative B, infrastructure related impacts on sensitive plant species could include direct mortality, loss or degradation of habitat, and loss or reduction of pollinators. Although the types of infrastructure related impacts would be similar to those under Alternative A, the 3% threshold that Alternative B would place on anthropogenic disturbance within PHMA would likely reduce the extent of those impacts in PHMA. As a result, limitations on disturbances could benefit individuals and occurrences of sensitive plants within PHMA. Sensitive plants outside PHMA would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PHMA rather than just reducing it within PHMA, the extent of impacts on sensitive plants outside PHMA could increase under Alternative B relative to Alternative A. The proposal under Alternative B to potentially bury some existing power lines that cross PHMA could impact sensitive plant species through direct mortality and/or degradation of habitat; however, because such actions would undergo site specific environmental review, including NEPA, measures to avoid, minimize, or mitigate impacts on sensitive plants would be incorporated, as appropriate.

Cumulative Effects

Management actions associated with lands and realty under Alternative B would increase protection of Greater Sage-Grouse habitat and provide an overall benefit to sensitive plants that occur within it. Under Alternative B, some of the current land and realty operations would continue within MZs III, IV and V (Chapter 5 of the FEIS), however, additional measures would conserve existing sagebrush habitat. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management on sensitive plants in MZs III, IV and V under Alternative B, which would provide an overall benefit to sensitive plants in GRSG habitat, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts on sensitive plants.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under Alternative B, motorized travel in PHMA would be limited to designated roads, primitive roads, and trails at a minimum. Only Recreation Special Use Authorizations (RSUAs) that were neutral or beneficial to sage-grouse would be permitted in PHMA. In addition, opportunities for road construction in PHMA would be limited, minimum standards would be applied, existing roads in PHMA could not be upgraded, and cross country driving would be prohibited in PHMA. Although the types of impacts on sensitive plants would be similar under Alternatives A and B, the degree and extent of impacts within PHMA would be reduced under Alternative B. The types of impacts that would be expected to decrease would include direct mortality from crushing or trampling individuals, negative impacts associated with dust generation, habitat degradation associated with soil compaction and changes in hydrology, and negative impacts associated with spread of invasive non-native species.

Cumulative Effects

The FEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PHMA, and minimize the negative impacts of recreation and travel management on sensitive plants that occur within those areas. Under Alternative B, some of the current travel, transportation and recreation management direction would continue within MZs III, IV and V, however, additional measures to conserve existing sagebrush habitat would be included. Because Alternative B would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in MZs III, IV and V, when combined with the past, present and reasonably foreseeable future actions this alternative would not substantially increase negative impacts on sensitive plant species.

Determination

Under Alternative B, proposed conservation measures would limit some, but not all, impacts to sensitive plant species and impacts to potentially suitable habitat for these species would be possible. Therefore, Alternative B of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

Alternative C

Vegetation and Soils

Direct and Indirect Effects

Under Alternative C, invasive non-native plant control efforts would follow current direction, and the types of direct and indirect impacts expected to sensitive plants would be the same as those discussed under Alternative A. Like Alternative B, vegetation management conservation measures under Alternative C would prioritize restoration efforts, including treatment of invasive non-native plants, in GRSG habitats, which would be expected to provide a long-term benefit to sensitive plants that occur in those habitats. Unlike Alternative B, Alternative C would extend this focus beyond PHMA to all occupied GRSG habitat. As a result, sensitive plants outside PHMA but within occupied GRSG could experience a long-term benefit under Alternative C that they would not under Alternative B. Under Alternative C, short-term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be done and appropriate avoidance or minimization measures would be incorporated. The use of native seed would be favored in restoration under Alternative C, as it would be under Alternative B. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in Alternative C is unlikely to result in a measurable additional benefit to sensitive plant species over Alternatives A or B. Monitoring and invasive species control after fuels treatments under Alternative C could benefit sensitive plant species by minimizing habitat degradation caused by invasive species. Overall, Alternative C would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A and may provide a marginal benefit over Alternative B.

Like Alternatives A and B, Alternative C does not directly address conifer encroachment. The types of impacts of conifer encroachment and associated management actions on sensitive plants under Alternative C would be expected to be the same as those under Alternative A; however, the conservation measures described above for invasive plants and the fuels treatments described

below in Fire and Fuels would likely reduce the magnitude of the impacts of conifer encroachment on sensitive plants relative to Alternative A. Because those measures generally would apply throughout occupied GRSG under Alternative C whereas they would be limited to PHMA under Alternative B, Alternative C could provide an additional reduction in the magnitude of impacts on sensitive plants from conifer encroachment relative to Alternative B. Because conifer encroachment measures would be applied over a larger area under Alternative C, negative impacts to sensitive plants from encroachment management discussed under Alternative A would be expected to be higher under Alternative C than under Alternatives A or B.

Cumulative Effects

Under Alternative C, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue within MZs III, IV and V (Chapter 5 of the FEIS), and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an additional long-term benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in MZs III, IV and V under Alternative C when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

Alternative C would prohibit grazing in all occupied GRSG habitat and remove all livestock water troughs, pipelines, and wells from occupied GRSG habitat. Sensitive plants that occur in occupied GRSG habitat could benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands by the elimination of negative impacts discussed under Livestock Grazing for Alternative A. Sensitive species in table 2 for which livestock grazing was identified as a major threat might be expected to benefit most from Alternative C. These species include meadow pussytoes, Eastwood milkweed, broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Toquima milkvetch, Currant milkvetch, Grouse Creek rockcress, slender moonwort, moosewort, Sunflower Flat buckwheat, Lewis's buckwheat, Grimes lathyrus, elegant penstemon, inconspicuous phacelia, small-flower phacelia, Williams combleaf, and Leiberg's clover. Of these species, almost 30% (meadow pussytoes, Lamoille Canyon milkvetch, slender moonwort, moosewort, and small-flower phacelia) occur in, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. As a result, the greatest benefit to sensitive plants from the elimination of grazing in occupied GRSG habitat may be to meadow pussytoes, Lamoille Canyon milkvetch, slender moonwort, moosewort, and small-flower phacelia.

Total elimination of grazing from occupied GRSG habitat may result in additional indirect impacts on occupied GRSG habitats, surrounding areas, and the sensitive plants that occupy them. Moderate grazing reduces herbaceous fuel loads on sagebrush steppe rangelands and is considered likely to reduce the probability and severity of wildfires and the continuity and size of burned areas (Davies et al. 2010). Thus the elimination of grazing could benefit fire adapted, fire dependent, and early successional sensitive plants that occur in currently grazed occupied GRSG habitats and adjacent areas. For sensitive plants that are not fire tolerant and/or require mature sagebrush habitat, negative impacts associated with the elimination of grazing could occur from wildfire in occupied sagebrush habitats and adjacent areas. The types of beneficial and negative impacts on sensitive plants would be as described under Fire and Fuels for Alternative A, though their extent and distribution across the landscape would likely differ.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it only a "lesser threat" with respect to "relative cumulative actions" within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Under Alternative C, livestock grazing within MZs III, IV and V (Chapter 5 of the FEIS) would be eliminated within all occupied GRSG habitat, providing a net benefit to sensitive species that occur there. Therefore, the direct and indirect effects of livestock grazing on sensitive plant species in MZs III, IV and V under Alternative C when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

The types of fire and fuels related impacts of Alternative C on sensitive plants would be similar to those discussed for Alternative B; however because Alternative C expands most GRSG conservation elements to all occupied habitat rather than limiting them to PHMA, the area over which those impacts could occur would be larger. Elements of Alternative C that would be the most likely change the extent of direct and indirect beneficial and negative impacts on sensitive plants relative to Alternative B include prioritizing suppression in all occupied habitat rather than limiting it to PHMA and applying fuels management treatment provisions (including post-fire revegetation and invasive species control) to all occupied GRSG habitat rather than limiting them to PHMA. Additional fire and fuels related impacts on sensitive plant species could result from the increased fire risk associated with the elimination of grazing. Those impacts are discussed above under Livestock Grazing.

Cumulative Effects

The cumulative effects of management actions related to fire and fuels under Alternative C when combined with the past, present and reasonably foreseeable future actions would be similar to

those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during active restoration processes related to livestock grazing, horses and burros would be expected to range over a larger area than under Alternative A and would necessitate the need for increased gather schedules.

The types of impacts of wild horse and burro management on sensitive plants under Alternative C would be expected to be the same as under Alternatives A and B; however their magnitude and spatial distribution would differ. The increase in access to riparian and upland habitats that are currently protected by fences, expected temporary increases in horses and burros over AML, and anticipated changes in water holding capacities of riparian areas under Alternative C could increase impacts to sensitive plants relative to Alternatives A and B through the following: increased trampling, which can result in direct mortality of individuals and loss of entire occurrences; increased herbivory, which can result in direct mortality or reduced vitality and reproduction of individuals; alteration of habitat through soil compaction, which can reduce water infiltration and change hydrology and may render areas less suitable or unsuitable for sensitive plants; and increased competition for light, nutrients and water through introduction or spread of non-native invasive species, which may reduce sensitive plant species abundance or result in the loss of occurrences.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Energy and Locatable Minerals Development

Direct and Indirect Effects

The types of impacts on sensitive plants from energy development under Alternative C would be the same as described above under Alternatives A and B, though their magnitude and spatial distribution would differ. Alternative C would extend some of Alternative B's provisions to all occupied GRSG habitat rather than limiting them to PHMA. Actions within Alternative C relevant to the analysis of impacts on sensitive plants include the following: closing occupied GRSG habitat to fluid mineral leasing, with possible exceptions; allowing geophysical operations in occupied GRSG habitat only to obtain information about areas outside and adjacent to PHMA; requiring exploratory operations within occupied GRSG habitat to be done using helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other applicable restrictions; in occupied GRSG habitat prohibiting new surface occupancy on federal leases; and for existing leases entirely within occupied GRSG habitat, applying NSO buffers around leks, and if the entire lease falls within this buffer, limiting disturbances within sections to the 3% threshold. All of these actions would be likely to reduce the level of impacts of fluid mineral development on sensitive plants relative to Alternative A. Since these actions would apply to all occupied GRSG habitat rather than just PHMA, they also could reduce the level of impacts of fluid mineral development on sensitive plants relative to Alternative B.

Unlike Alternative B, Alternative C directly addresses solar energy development by prohibiting it in occupied GRSG habitat and requiring it to be sited at least five miles from active GRSG leks. These actions could reduce negative impacts associated with energy development on sensitive plants that occur in occupied GRSG habitat relative to Alternative A. They also could reduce negative impacts associated with energy development in occupied GRSG outside PHMA relative to Alternative B.

In addition to provisions in Alternative C that specifically address energy development, the3% threshold for anthropogenic disturbances would limit the extent of all types of energy development in occupied GRSG habitat. Impacts on sensitive plants would be as discussed above for infrastructure under Land Uses and Realty Management for Alternative C.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative C, some of the current energy and locatable minerals management direction would continue within MZs III and IV, however, additional measures would conserve existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal. Therefore, the direct and indirect effects of energy and locatable minerals development on sensitive plants in MZs III, IV and V under Alternative C when combined with the past, present and reasonably foreseeable

future actions would not substantially increase negative impacts on sensitive plants (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

As with Alternative A, impacts from land uses and realty management on sensitive plant species under Alternative C could include direct mortality, loss or degradation of habitat, and loss or reduction of pollinators. The extent of these impacts would be expected to be less overall than under Alternatives A and B. Under Alternative C, new transmission corridors, new ROWs for corridors, and new communication towers would be prohibited in occupied GRSG habitat and would be sited outside occupied GRSG habitat and bundled with existing corridors to the maximum extent possible. As for Alternative B, the proposal under Alternative C to potentially bury some existing power lines in occupied GRSG habitat could impact sensitive plant species through direct mortality and/or degradation of habitat. Because the undergrounding of power lines could occur within a larger area than under Alternative B, which focuses on PHMA, more sensitive plant species or occurrences could be impacted. However, such impacts would be minimized or avoided because the burial of power lines would undergo site specific environmental review, including NEPA, and conservation measures or design features would be applied for sensitive plants.

In addition to the above measures, which focus on specific types of infrastructure, Alternative C is similar to Alternative B in placing a 3% threshold on anthropogenic disturbance. However, Alternative C would apply that threshold throughout occupied GRSG habitat rather than limiting it to PHMA, as Alternative B would. Although under Alternative C the types of infrastructure related impacts would be similar to those under Alternative A, the 3% threshold that Alternative C would place on anthropogenic disturbance within GRSG habitat would likely reduce the extent of those impacts in those areas. As a result, limitations on disturbances could benefit individuals and occurrences of sensitive plants within occupied GRSG habitat. Sensitive plants outside occupied GRSG habitat would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside occupied GRSG habitat rather than just reducing it within such habitat, the extent of impacts on sensitive plants outside occupied GRSG habitat could increase under Alternative C relative to Alternative A.

Cumulative Effects

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat and provide an overall long-term benefit to the sensitive plants that occur there. Under Alternative C, some of the current land and realty operations would continue within MZs III, IV and V (Chapter 5 of the FEIS), however, measures would be added to conserve existing sagebrush habitat. Lands and realty management activities

would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management on sensitive plants in MZs III, IV and V under Alternative C, which would provide an overall benefit to sensitive plants in GRSG habitat, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Similar to Alternative B, Alternative C would allow Recreation Special Use Authorizations (RSUAs) that were neutral or beneficial to GRSG, but Alternative C would extend this provision to all occupied habitat rather than restricting it to PHMA. Opportunities for road construction in occupied GRSG habitat would be limited, minimum standards would be applied, existing roads could not be upgraded, and cross country driving would be prohibited in occupied GRSG habitat. Although the types of impacts on sensitive plants would be similar under Alternatives A, B, and C, the degree and extent of impacts within occupied GRSG habitat would be reduced under Alternative C relative to Alternative A. The degree and extent of impacts within occupied GRSG habitat outside PHMA would be reduced under Alternative C relative to Alternative B. The types of impacts that would be expected to decrease would include direct mortality from crushing or trampling individuals, negative impacts associated with dust generation, habitat degradation associated with soil compaction and changes in hydrology, and negative impacts associated with spread of invasive non-native species.

Cumulative Effects

The FEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, which would provide an overall long-term benefit to sensitive plants that occur there. Under Alternative C, some of the current travel, transportation and recreation management direction would continue within MZs III, IV and V (Chapter 5 of the FEIS), however, measures would be added to conserve existing sagebrush habitat. Because Alternative C would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in MZs III, IV and V, when combined with the past, present and reasonably foreseeable future actions, this alternative would not substantially increase negative impacts on sensitive plant species.

Determination

Under Alternative C, proposed conservation measures would limit some, but not all, impacts to sensitive plant species and impacts to potentially suitable habitat for these species would be possible. Therefore, Alternative C of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact

individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

Alternative D

Vegetation and Soils

Direct and Indirect Effects

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an Integrated Vegetation Management (IVM) approach using fire, chemical, mechanical, and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation hindering the achievement of sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats could be used as long as the animals were intensely managed and removed when the utilization of desirable species reached 35%. Where feasible, sagebrush steppe would be restored in perennial grass, invasive annual grass, and conifer-invaded cover types.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives, and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintained sagebrush and shrub cover and composition would be used in areas with a sagebrush component.

Alternative D would be more protective of GRSG habitat than Alternative B because it would include several conservation measures specifically targeted to invasive species infestations and pinyon-juniper encroachment and it would apply them over a larger area (within priority and general habitat) than Alternative B (only PHMA). Under Alternative D, the types of impacts of vegetation and soils management on sensitive plants would be similar to those described under Alternative A; however, the conservation measures described above would likely reduce the magnitude of negative impacts on sensitive plants and provide a long-term benefit to species that depend on healthy sagebrush habitats.

Cumulative Effects

Under Alternative D, current vegetation and soils management treatments within MZs III, IV and V (Chapter 5 of the FEIS), including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. However, additional measures to conserve existing sagebrush

habitat under Alternative D would provide further long-term benefits to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in MZs III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

Similar to Alternative B, Alternative D would implement beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. Actions that would be particularly relevant to assessing potential positive and negative impacts on sensitive plants include the following: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat; consideration of retiring vacant allotments; improvement in the management of riparian areas and wet meadows; evaluation of existing introduced perennial grass seedings; authorization of new water developments and structural range improvements only when beneficial to GRSG; potential modification of grazing systems to meet seasonal sage-grouse habitat requirements; and fence removal, modification or marking. The main difference between Alternatives B and D is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PHMA as Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health were being met.

Although the types of impacts on sensitive plants would be expected to be the same as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative D relative to Alternative A and reduced slightly relative to Alternative B. Sensitive plants that occur in PHMA and GHMA would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands. Almost one-fourth of the sensitive plant species in table 2 occur in riparian areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of Alternative D on improving riparian, meadow, and other wetland habitat, sensitive wetland plant species may benefit from Alternative D more than upland species.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it only a “lesser threat” with respect to “relative cumulative actions” in for MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM

land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative D, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level within MZs III, IV and V (Chapter 5 of the FEIS). Additional measures to conserve existing sagebrush habitat under Alternative D would further minimize negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in MZs III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

Unlike Alternative B, which would prioritize suppression in PHMA but only in GHMA where fires threatened PHMA, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments would be similar to those under Alternative B and would emphasize maintaining, protecting, and expanding GRSG habitat. Specifically, measures under Alternative D would include generally enhancing or maintaining sagebrush canopy cover and community structure to match expected potential for the ecological site consistent with GRSG habitat objectives and requiring the use of native seeds in different types of restoration efforts. Unlike Alternative B, Alternative D would apply these measures to priority and general habitat rather than limiting them to PHMA. In addition, Alternative D would prohibit fuels treatment in priority and general habitat if it were determined the treatment would not be beneficial to GRSG or its habitat and identify opportunities for the use of prescribed fire. Alternative D also would prioritize pre-suppression activities in sage-grouse habitats vulnerable to wildfire and prescribe actions important for their protection, implement post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse, and establish fuel breaks inside and outside of priority habitat to prevent large scale loss of habitat. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A.

The types of impacts on sensitive plants associated with fire and fuels under Alternative D would be similar to those under Alternative A; however the extent of those impacts and their distribution across the landscape would change. Under Alternative D, sensitive plant species requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression would be higher under Alternative D than under Alternative A. Because reseeding efforts would prioritize use of native seed in PHMA and GHMA over other areas in years of short seed supplies,

sensitive plants outside these areas could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside PHMA and GHMA. Because Alternative D would expand some sagebrush conservation measures to include all occupied GRSG habitat rather than limiting them to PHMA, Alternative D would be expected to increase beneficial impacts to sensitive plants that depend on mature sagebrush habitat and increase negative impacts to sensitive plants that are fire adapted or fire dependent and/or require early successional sagebrush habitat. Alternative D also would be expected to increase negative impacts associated with suppression and fuels management relative to Alternative B.

Cumulative Effects

The cumulative effect of fire and fuels management under Alternative D when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Alternative D would prioritize wild horse and burro gathers in priority and general habitat as opposed rather than prioritizing them only PHMA, as Alternative B would. Otherwise, Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that could be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on GRSG habitat described under Alternative A over a larger area than Alternative B.

Although the types of impacts on sensitive plants would be expected to be the same under Alternative D as they would be under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative D. Sensitive plants that occur in PHMA and GHMA would likely benefit from prioritized gathers in these areas and from other conservation measures that would be applied to these areas.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although

livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, the FEIS considers it only a "lesser threat" with respect to "relative cumulative actions" in MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS).

Under Alternative D, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans within MZs III, IV and V (Chapter 5 of the FEIS). Additional measures to conserve existing sagebrush habitat under Alternative D would reduce overall negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in MZs III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in PHMA and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in GHMA. Geophysical exploration that did not entail crushing of sagebrush vegetation or creating new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat would have to achieve no net unmitigated loss of priority habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority or general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat. Loss of habitat through would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see Land Uses and Realty Management), whereas Alternative B would manage PHMA as a new ROW exclusion area and GHMA as a new ROW avoidance area.

Alternative D would be less protective of PHMA than Alternative B with respect to new fluid mineral leasing because Alternative B would close PHMA to new fluid mineral leasing. On the other hand, it would be more protective of GHMA than Alternative B with respect to new fluid

mineral leasing because Alternative B would not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PHMA under Alternative B.

Under Alternative D, the types of impacts of energy and locatable minerals development on sensitive plants would be similar to those described under Alternative A, but their magnitude and spatial distribution would differ. Because of its inclusion of GRSG habitat conservation measures, Alternative D would be expected to reduce negative impacts of energy and locatable minerals development on sensitive plants relative to Alternative A. Sensitive plant impacts associated with energy and locatable minerals development under Alternative D are harder to assess relative to Alternative B because each alternative includes some measures that are more protective than the other in different areas and under different circumstances; however, overall differences in sensitive plant impacts between the two alternatives are likely to be minor because any ground disturbing activity would be subject to project-level NEPA, which would incorporate appropriate avoidance, minimization, and/or avoidance measures for sensitive plants.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative D, some of the current management direction associated with energy and locatable minerals development would continue within MZs III, IV, and V, however, additional measures would conserve existing sagebrush. Alternative D would be the same as Alternative A with respect to areas closed to entry, but would add NSO restrictions to all PHMA and GHMA without waiver, exception, or modification. NSO restrictions would apply to GHMA with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Collectively, these measures would minimize negative impacts on sensitive plants in GRSG habitat. The direct and indirect effects of energy and locatable minerals development on sensitive plants in MZs III, IV and V from the added management actions under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants (Chapter 5 of the FEIS).

Land Uses and Realty Management

Direct and Indirect Effects

Like Alternative B, Alternative D would include provisions to retain public ownership of priority GRSG habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of

new ROWs or SUAs associated with valid existing rights with existing development, and, where appropriate, bury new and existing utility lines as mitigation unless. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporated appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development resulted in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-deterring devices during ROW renewal process. These conservation measures would make this alternative more protective than Alternative A, although the general effects and types of impacts on sensitive plants would be the same. Alternative D would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. As a result, negative impacts to sensitive plants within these avoidance areas could be greater under Alternative D than under Alternatives B and C. However, Alternative D would be more protective than Alternatives B and C with respect to large-scale commercial wind and solar energy facilities because Alternative D would exclude such facilities in priority and general habitat altogether. This exclusion would likely reduce negative impacts on sensitive plants in PHMA and GHMA under Alternative D relative to Alternatives B and C.

Cumulative Effects

Management actions associated with land uses and realty management under Alternative D would increase conservation of Greater Sage-Grouse habitat. Under Alternative D, some of the current land and realty operations would continue within MZs III, IV and V (Chapter 5 of the FEIS), however, additional measures would conserve existing sagebrush habitat and thereby minimize long-term negative impacts on sensitive plants that occur there. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in MZs III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts on sensitive plants.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, limit opportunities for road construction and apply minimum standards, prohibit the upgrading of current roads, and permit only recreational

SUAs that were neutral or beneficial to sage-grouse. Unlike Alternative B, Alternative D would extend these measures beyond PHMA to include GHMA. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority or general habitat. Although general impacts would be the same as Alternative A, Alternative D would be more restrictive than Alternative A or Alternative B. It would likely reduce loss, fragmentation and disturbance of GRSG habitat by minimizing human use and road construction or upgrades.

Although the types of impacts of travel, transportation, and recreation management on sensitive plants would be expected to be the same under Alternative D as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative D because conservation measures would be applied throughout GRSG habitat.

Cumulative Effects

The FEIS considers recreation only a "lesser threat" with respect to "relative cumulative actions" within MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase conservation of Greater Sage-Grouse habitat within PHMA and GHMA, and thereby minimize potential negative impacts on sensitive plants that occur within those habitat areas. Under Alternative D, some of the current travel, transportation and recreation management direction would continue within MZs III, IV and V (Chapter 5 of the FEIS), however, additional measures to conserve existing sagebrush habitat would be included. Because Alternative D would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in MZs III, IV and V, when combined with the past, present and reasonably foreseeable future actions this alternative would not substantially increase negative impacts on sensitive plant species.

Determination

Under Alternative D, proposed conservation measures would limit some, but not all, impacts to sensitive plant species and impacts to potentially suitable habitat for these species would be possible. Therefore, Alternative D of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

Alternative E

Vegetation and Soils

Direct and Indirect Effects

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseeding of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides, or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species.

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment efforts for GRSG habitat compared to Alternative A and addresses it more specifically than Alternatives B or C.

The types of impacts of vegetation and soils management on sensitive plants species would be similar to those described under Alternative A; however, the magnitude and spatial distribution of those impacts would differ. Because Alternative E includes more intensive invasive plant control efforts in GRSG habitat than Alternative A, sensitive plants that occur in healthy GRSG impacts would likely experience a long-term benefit from Alternative E. Treatment activities could have negative impacts on sensitive plant species that occur in treatment areas, as described under Alternative A, and the magnitude of these impacts on species that occur within GRSG habitat would be expected to increase under Alternative E relative to Alternative. Because conifer encroachment would be managed more aggressively under Alternative E than under Alternatives A or B, Alternative E would likely reduce the magnitude of the negative impacts on sensitive plants associated with conifer encroachment and provide a long-term benefit to species that depend on healthy sagebrush habitats relative to these other alternatives. Impacts associated

with managing conifer encroachment under Alternative E would be expected to increase relative to Alternatives A and B and could negatively impact sensitive plants that are restricted to conifer habitats.

Cumulative Effects

Under Alternative E, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue within MZs III, IV and V (Chapter 5 of the FEIS), and the short-term negative impacts of these activities on sensitive plants within GRSG habitats would continue to be outweighed by the long-term beneficial impacts of improved habitat conditions. Additional measures to conserve existing sagebrush habitat under Alternative E would provide a further net benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative E when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action.

Under Alternative E, the types of impacts on sensitive plants from livestock grazing would be expected to be the same as discussed for Alternative A. However, in comparison with Alternative A, management under Alternative E could increase the level of impacts to sensitive plant species within riparian areas because of its promotion of riparian grazing. Although newly grazed riparian areas would be managed to current standards, such management would minimize but not eliminate potential impacts on sensitive plants.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it only a “lesser threat” with respect to “relative cumulative actions” in MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands

within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Alternative E would impose fewer management limitations on livestock grazing within MZs III, IV and V (Chapter 5 of the FEIS) than Alternative A and would promote grazing in riparian areas. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing in conjunction with the past, present and reasonably foreseeable future actions could increase fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

Under Alternative E, fire and fuels management would emphasize sagebrush habitat protection and restoration within the State of Nevada Sage-Grouse Management Areas. With respect to hazardous fuels treatments, this alternative would set a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E would integrate the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventive actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to those under Alternative B, with added emphasis on coordination of state and local agencies and individual landowners.

Under Alternative E, the types of impacts of fire and fuels management on sensitive plants would be similar to those discussed under Alternative A, though their magnitude and spatial distribution would be expected to differ as a result of the management actions designed to conserve GRSG habitat. Positive and negative impacts of these actions on sensitive plants that occur within GRSG habitat and adjacent areas within which preventive actions and suppression may occur would be expected to increase relative to Alternative A.

Cumulative Effects

The cumulative effect of fire and fuels management actions under Alternative E when combined with the past, present and reasonably foreseeable future actions would be similar those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS).

Wild Horse and Burro Management

Direct and Indirect Effects

Under Alternative E, wild horse and burro management would be similar to that under Alternative A, though Alternative E would include additional management measures to benefit the GRSG. Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land Use Plans and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act.

The types of impacts of wild horse and burro management under Alternative E on sensitive plants would be similar to those discussed for Alternative A; however Alternative E would likely improve conditions for sensitive plants that occur within GRSG habitat slightly relative to Alternative A by reducing the direct and indirect negative impacts of wild horses and burros and improving GRSG habitat conditions.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management on sensitive plants in MZs III, IV and V under Alternative E when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts on sensitive plants.

Energy and Locatable Minerals Development

Direct and Indirect Effects

Alternative E would minimize conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside habitat wherever possible. Projects with an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been stipulated in project approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and

avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. As previously stated, Alternative E would not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PHMA and GHMA designations.

Under Alternative E, the types of impacts on sensitive plants from energy and locatable minerals development would be similar to those discussed under Alternative A. However, the magnitude of such impacts under Alternative E could be greater because projects with an approved BLM notice, plan of operation, right-of-way, or drilling plan would be explicitly exempt from new mitigation requirements, which could provide for greater conservation of GRSG habitats, whereas such project would not necessarily be exempt under Alternative A.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Unlike Alternatives B, C, D, or F, Alternative E would not incorporate any defined exclusion or avoidance areas within MZs III, IV and V (Chapter 5 of the FEIS). Alternative E would leave all management subject to an avoid, minimize, and mitigate approach, which would provide a lower level of habitat conservation certainty than Alternatives with defined exclusion or avoidance areas. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Land Uses and Realty Management

Direct and Indirect Effects

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments showed credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides few conservation measures when compared to Alternative A to reduce direct or indirect

impacts to GRSG and GRSG habitats. As a result, the types, level, and spatial distribution of impacts on sensitive plants from land uses and realty management under Alternative E would be similar to those discussed under Alternative A.

Cumulative Effects

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for Greater Sage-Grouse habitat conservation under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, the types, level, and spatial distribution of impacts on sensitive plants from travel, transportation, and recreation management under Alternative E would be similar to those discussed under Alternative A.

Cumulative Effects

The FEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” in MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that would be neutral or beneficial to sensitive plants within GRSG habitat, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS) and contribute to negative cumulative impacts on sensitive plants.

Determination

Under Alternative E, proposed conservation measures would limit some, but not all, impacts to sensitive plant species and impacts to potentially suitable habitat for these species would be

possible. Therefore, Alternative E of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

Alternative F

Vegetation and Soils

Direct and Indirect Effects

Like Alternative B, Alternative F generally would follow existing direction for invasive species control. However, Alternative F would include the following additional measures: (1) monitor and control invasive vegetation in treated, burned, or restored sagebrush steppe; (2) restrict activities in GRSG habitat that facilitate the spread of invasive plants; (3) in GRSG habitat, ensure that soil cover and native herbaceous plants are at their ecological potential to help protect against invasive plants; and (4) develop and implement methods for prioritizing and restoring sagebrush steppe invaded by non-native plants. Like Alternative B, vegetation management under Alternative F would prioritize restoration of GRSG habitats, which would be expected to provide a long-term benefit to sensitive plants that occur in those habitats. Under Alternative F, short-term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be done and appropriate avoidance or minimization measures would be incorporated.

Under Alternative F, the use of native seed would be required for reseeding of closed roads, primitive roads, and trails. The use of native seed would be favored in other types of restoration under Alternative F, as it would be under Alternative B. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in Alternative F is unlikely to result in a measurable additional benefit to sensitive plant species over Alternatives A or B. Monitoring and invasive species control after fuels treatments and at existing range improvements incorporated into Alternative F could benefit sensitive plant species by minimizing habitat degradation caused by invasive species. Overall, Alternative F would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A and may provide a marginal benefit over Alternative B.

Like Alternatives A and B, Alternative F does not directly address conifer encroachment. The types of impacts of conifer encroachment on sensitive plants under Alternative F would be expected to be the same as those under Alternative A. Although the types of impacts would be the same, the conservation measures described above for invasive plants and the fuels treatments

described below in Fire and Fuels would likely reduce the magnitude of the impacts on sensitive plants associated with conifer encroachment relative to Alternative A and could provide an additional reduction in the magnitude of impacts on sensitive plants from conifer encroachment relative to Alternative B.

Cumulative Effects

Under Alternative F, current vegetation and soils management treatments within MZs III, IV and V (Chapter 5 of the FEIS) (including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper) would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. Additional measures to conserve existing sagebrush habitat under Alternative F would provide a further net benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in MZs III, IV and V from the management actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

Like Alternative B, Alternative F would incorporate GRSG habitat objectives and GRSG management considerations into livestock grazing management, but Alternative F would extend those to all occupied habitat rather than limiting them to PHMA. Actions that would be expected to directly or indirectly impact sensitive plants include completion of range condition assessments, consideration of grazing methods and systems to reduce impacts on occupied GRSG habitat, modification of grazing systems in occupied GRSG habitat to meet seasonal GRSG habitat requirements, improved management of riparian areas and wet meadows in occupied GRSG habitat, evaluation of existing introduced perennial grass seedings in occupied GRSG habitat, prohibiting new water developments in occupied GRSG, avoiding new structural range improvements in occupied GRSG habitat unless studies show they benefit GRSG, incorporation of BMPs for West Nile Virus, and fence removal. Additional actions in Alternative F that entail more than an extension of Alternative B actions to all occupied habitat include excluding livestock grazing from burned areas until woody and herbaceous plants achieve GRSG habitat objectives, closing the entire allotment if burned GRSG habitat cannot be fenced from unburned habitat, and increasing monitoring of vegetation treatments.

The types of impacts on sensitive plants from livestock grazing management under Alternative F would be expected to be the same as under Alternatives A, B, and F. Overall, the level and extent of negative impacts would be expected to be reduced in Alternative F. Sensitive plants that occur in occupied GRSG would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands. Almost one-quarter of the sensitive plant species

in table 2 occur in riparian areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of Alternative F on improving riparian, meadow, and other wetland habitat throughout occupied GRSG habitat, sensitive wetland plant species may benefit from Alternative B more than upland species.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it only a "lesser threat" with respect to "relative cumulative actions" for MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative F, livestock grazing would continue to be managed through existing grazing plans within MZs III, IV and V (Chapter 5 of the FEIS), and wild horse and burro territories would be managed for Appropriate Management Level. Additional measures to conserve existing sagebrush habitat under Alternative F would further minimize potential negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in MZs III, IV and V under Alternative F when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

Because fire and fuels management under Alternative F would be essentially the same as under Alternative B, the types of fire and fuels related impacts of Alternative F on sensitive plants would be the same as those discussed above for Alternative B. Under Alternative F, sensitive plant species requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression would be higher under Alternative F than under Alternative A. Because reseeding efforts would prioritize use of native seed in GRSG habitat over other areas in years of short seed supplies, sensitive plants in areas outside GRSG habitat could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside GRSG habitat.

Elements of Alternative F that differ from those of Alternative B and could lead to differences in the extent of direct and indirect beneficial and negative impacts on sensitive plants between the two alternatives include the following: (1) excluding livestock grazing from burned areas in GRSG occupied habitat until woody and herbaceous plants achieve GRSG habitat objectives; and (2) applying fuels management provisions (including post-fire revegetation and invasive species control) to all occupied habitat rather than limiting them to PHMA. These differences would decrease the negative effects of fire and fuels management on sensitive plants in burned areas and increase the impacts on sensitive plants in treatment areas. As discussed in the previous paragraph, impacts to sensitive plants in treatment areas could be positive or negative, depending on their habitat requirements. Overall, the difference in impacts on sensitive plants between Alternatives B and F would likely be negligible because the differences between fire and fuels management under the two alternatives would be minimal.

Cumulative Effects

The cumulative effects of fire and fuels management actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS.)

Wild Horse and Burro Management

Direct and Indirect Effects

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B, although Alternative F would extend some management provisions to all GRSG habitat rather than limiting them to priority habitat. Specific provisions that would be expanded to all habitat under Alternative F include: (1) amending herd management area and herd area plans within all GRSG habitat to incorporate sage-grouse habitat objectives; and (2) addressing the direct and indirect effects on sage-grouse populations and habitat when conducting NEPA analysis for free-roaming horse and burro management activities, water developments, or other range developments for free-roaming horses in sage-grouse habitat.

Because wild horse and burro management under Alternative F would be very similar to that under Alternative B, the types of impacts to sensitive plants would be the same as discussed above for Alternative B. However, the expansion of some management measures that would promote habitat conservation to all GRSG habitat under Alternative F may provide a marginal benefit to sensitive plants that occur in GRSG habitat but outside PHMA relative to Alternative B.

Cumulative Effects

The cumulative effects of wild horse and burro management actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would be similar to

those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS.)

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under Alternative F, energy and locatable minerals development would be similar to proposed management under Alternative B. Under Alternative F the following also would apply: siting of wind energy development would be prevented in PHMA; PHMA would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; PHMA would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals; and a 3% disturbance cap would be applied to PHMA. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PHMA. Like Alternative B, Alternative F does would not include specific management for locatable, or saleable or nonenergy minerals in GHMA. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PHMA: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat, and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing.

Under Alternative F, the types of impacts of energy and locatable minerals development on sensitive plants would be similar to those described for Alternative A, though their magnitude and spatial distribution would differ. With its conservation measures in PHMA, Alternative F would likely decrease negative impacts on sensitive plants relative to Alternative A. Because Alternative F is similar to Alternative B but also addresses wind energy and fluid minerals leasing outside PHMA more thoroughly that Alternative B, Alternative F would likely reduce negative impacts of energy and locatable minerals development on sensitive plants relative to Alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative F, some of the current energy and locatable minerals management direction would continue within MZs III and IV, however, additional measures would conserve existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal. Therefore, the direct and indirect effects on sensitive plants in GRSG habitat in MZs III, IV and V from the management actions associated with energy and locatable minerals under Alternative F when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Land Uses and Realty Management

Direct and Indirect Effects

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B, so associated impacts on sensitive plants would be as described for Alternative B above.

Cumulative Effects

The cumulative effects of land uses and realty actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS.)

Travel, Transportation and Recreation Management

Direct and Indirect Effects

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PHMA, only recreational SUAs that were neutral or beneficial to GRSG would be permitted; opportunities for new route construction would be limited, and upgrading of existing routes generally could occur only if they would not result in a new route category (road, primitive road, or trail) or capacity. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PHMA to include GHMA, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would be closed seasonally, road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented permanently or seasonally, and new road construction would be prohibited within 4 miles of active sage-grouse leks.

Although the types of impacts of travel, transportation, and recreation management on sensitive plants would be expected to be the same under Alternative F as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative F because it would incorporate additional measures to conserve GRSG habitat.

Cumulative Effects

The FEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” for MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase conservation of Greater Sage-Grouse habitat within PHMA and, in some instances, GHMA and PHMA, and minimize the negative impacts of recreation and travel management on sensitive plants that occur in those areas. Under Alternative F, some of the current travel, transportation and recreation management direction would continue within MZs III, IV and V (Chapter 5 of the

FEIS), however, additional measures to conserve existing sagebrush habitat would be included. Because Alternative F would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in MZs III, IV and V, when combined with the past, present and reasonably foreseeable future actions, this alternative would not substantially increase negative impacts on sensitive plant species.

Determination

Under Alternative F, proposed conservation measures would limit some, but not all, impacts to sensitive plant species and impacts to potentially suitable habitat for these species would be possible. Therefore, Alternative F of the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

Proposed Plan

Vegetation and Soils

Direct and Indirect Effects

Most Proposed Plan conservation measures would apply to priority and general habitat management areas and sagebrush focal areas. The plan includes measures that limit disturbance. The 3 percent disturbance cap, in priority habitat management areas and sagebrush focal areas, would be calculated at both the BSU and the project level scales, thus adding additional protection from disturbance. The Proposed Plan also incorporates sagebrush ecosystem resistance and resilience concepts from the Fire and Invasives Assessment Tool (FIAT) (Appendix F of the FEIS, Fire and Invasives Assessment Tool) to prioritize landscape-level habitat restoration, fire operations, and post-fire recovery projects. The Proposed Plan would provide the planning-level framework for more detailed implementation-level FIAT assessments that address the threat of fire, invasive annual grasses, and conifer encroachment in GRSG habitat throughout the planning area and Great Basin region.

In addition, the Proposed Plan includes several guidelines related to invasive species spread that would be implemented at the project level: design features to limit the spread and effect of undesirable non-native plant species, native plant species would be used when possible to restore, enhance, or maintain desired habitat conditions, treatment methodologies would be based on the treatment area's resistance to annual invasive grasses and the resilience of native vegetation to respond after disturbance, prescribed fire prescriptions would minimize undesirable effects on vegetation and soils, and fire-associated vehicles and equipment would be power-washed before entering and exiting the area to minimize the introduction of undesirable invasive plant species.

Vegetation management under the Proposed Plan would prioritize restoration of GRSG habitats, which would be expected to provide a long-term benefit to sensitive plants that occur in those habitats. Short-term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be conducted and appropriate avoidance or minimization measures would be incorporated. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in the proposed plan is unlikely to result in a measurable additional benefit to sensitive plant species over the other alternatives. If native seed are used in GRSG habitat, sensitive plants in areas outside GRSG habitat, in years of short seed supplies, could be more susceptible to habitat degradation from invasive species if limited seed availability reduced revegetation success outside GRSG habitat. Reseeding efforts would prioritize fire resistant species, preferably natives, but with the possibility for fire resistant non-natives (GRSG-FM-GL-002-Guideline). As a result, non-native species might be more likely to be introduced and could change the restored plant communities from their original condition. Overall, the Proposed Plan would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A. The Proposed Plan does not include some of the conservation measures included in Alternative D. For instance, targeted grazing to reduce invasive plant species cover is not mentioned in the Proposed Plan. However, given the emphasis on reducing disturbance and incorporating the concepts of resistance and resilience and expanding conservation measures to incorporate SFAs, the Proposed Plan is likely to reduce impacts of invasive non-native plant species compared to Alternative D.

The Proposed Plan directly addresses conifer encroachment with an objective and schedule of encroachment removal every 10 years. The plan also includes other measures, such as avoiding treatment in old growth conifer stands, which would provide protection for some conifer stands and their associated species, and would require the types of treatment used to be based on the resilience of the native vegetation (GRSG-GRSGH-GL-009-Guideline). Under the Proposed Plan, priority for treatment would be in Phase I and early Phase II pinyon and juniper stands. Treatments in late Phase II or Phase III condition should only be authorized to create movement corridors, connect habitats, or reduce the potential for catastrophic fire. This means that sensitive plants in older growth pinyon-juniper stands would be less likely to be disturbed and that smaller trees would be removed, thereby reducing the amount of disturbance somewhat. Almost half of the sensitive plant species listed in table 2 occur in pinyon-juniper stands. Any that occur in Phase I and early Phase II encroaching stands would susceptible to disturbance when the stands are removed. However, impacts are expected to be minimal because project-level analysis for sensitive plant occurrences and mitigations measures would be required before trees are removed.

The types of impacts of conifer encroachment on sensitive plants under the proposed plan would be expected to be the same as those under Alternative A. Although the types of impacts would be the same, the conservation measures described above for invasive plants and the fuels treatments described below in Fire and Fuels would likely reduce the magnitude of the impacts on sensitive plants associated with conifer encroachment in sagebrush habitats relative to Alternative A and could provide an additional reduction in the magnitude of impacts on sensitive plants from conifer encroachment relative to Alternative D since more area is included in the conservation measures.

Cumulative Effects

Under the proposed plan, current vegetation and soils management treatments within MZs III, IV and V (Chapter 5 of the FEIS) (including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper) would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. Additional measures to conserve existing sagebrush habitat under the proposed plan would provide a further net benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to greater sage-grouse in MZs III, IV and V from the management actions under the proposed plan when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Livestock Grazing

Direct and Indirect Effects

The Proposed Plan would extend conservation measures to all priority and general habitat areas and sagebrush focal areas. Forest Service units would be required to amend their plans to apply grazing-use guidelines to nesting and brood rearing habitat during nesting and brood rearing seasonal dates. Grazing allotments, pastures, or portions of pastures would be considered for closure or management as a forage reserve as opportunities arise under applicable regulations, where removal of livestock grazing would enhance the ability to achieve desired habitat conditions. Water developments would be prohibited unless they would benefit sage-grouse. Restrictions would be placed on grazing and construction of livestock facilities near leks. Grazing management would be adjusted to move towards desired habitat conditions consistent with the ecological site capability.

The types of impacts on sensitive plants from livestock grazing management under the Proposed Plan would be expected to be the same as under Alternatives A and D. Overall, the level and extent of negative impacts would be expected to be reduced under the Proposed Plan because more habitat areas are included under the plan conservation measures. Sensitive plants that occur in sage-grouse habitat would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands (GRSG-GEN-DC-003-Desired Condition GRSG-

GRSGH-GL-007-Guideline). Almost one-quarter of the sensitive plant species in table 2 occur in riparian areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of the proposed plan on improving riparian, meadow, and other wetland habitat throughout sagegrouse habitat, sensitive wetland plant species may benefit from the conservation measures related to livestock grazing in the Proposed Plan more than upland species.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, the FEIS considers it only a "lesser threat" with respect to "relative cumulative actions" for MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Additional measures to conserve existing sagebrush habitat under the proposed plan would further minimize potential negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in MZs III, IV and V under the proposed plan when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Fire and Fuels

Direct and Indirect Effects

Under the Proposed Plan, conservation measures for fire and fuels management generally refer to priority and general habitat management areas and sagebrush focal areas. There would be no prescribed fire except pile burning in low precipitation areas, unless necessary to facilitate restoration. Guidelines would be implemented at the project level. Sagebrush removal from nesting and rearing habitat would be restricted, unless removal reduces the risk of wildfire. Fire resistant plants would be used for restoration of fuel breaks. Fire-fighting facilities would be restricted in all habitats. Cross-country vehicle travel would be restricted during fire-fighting operations. Loss of habitat would be minimized where possible. And, undesirable effects on vegetation and soils would be minimized during prescribed fires. Roads and natural fuel breaks would be incorporated into fuel break design to minimize loss of sagebrush habitat.

Under the Proposed Plan, sensitive plant species requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in

suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression could be higher under the Proposed Plan than under Alternative A. Reseeding efforts would prioritize fire resistant species, preferably natives, but with the possibility for fire resistant non-natives. As a result, non-native species might be more likely to be introduced and could change the restored plant communities from their original condition. If native seed are used in GRSG habitat, sensitive plants in areas outside GRSG habitat, in years of short seed supplies, could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside GRSG habitat.

Cumulative Effects

The cumulative effects of fire and fuels management actions under the Proposed Plan when combined with the past, present and reasonably foreseeable future actions would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS.)

Wild Horse and Burro Management

Direct and Indirect Effects

Conservation measures related to wild horses and burros in the Proposed Plan apply to priority and general habitat. Under the Proposed Plan, management levels for wild horses and burros would be adjusted if greater sage-grouse management standards are not met due to degradation that can be at least partially attributed to wild horse or burro populations. Wild horses and burros would be removed outside of wild horse and burro territory. Herd gathering would be prioritized when wild horse and burro populations exceed the upper limit of the established appropriate management level. Wild horse and burro population levels would be managed at the lower limit of established appropriate management level ranges. Removals or exclusions would be considered after emergency situations (such as fire, flood, and drought).

Wild horse and burro management under the Proposed Plan would be similar to that under Alternative D. The Proposed Plan would differ in managing at the lower limit of established appropriate management level ranges and considering removals or exclusions after emergency situations. These additional conservation measures may provide a marginal benefit to sensitive plants that occur in GRSG habitat in wild horse and burro territories.

Cumulative Effects

The cumulative effects of wild horse and burro management actions under the Proposed Plan when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative D and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS.)

Energy and Locatable Minerals Development

Direct and Indirect Effects

Under the Proposed Plan, energy and locatable mineral provisions generally apply to priority and general habitat and sagebrush focal areas. For fluid unleased minerals, in priority habitat management areas and sagebrush focal areas, any new oil and gas leases would include a no surface occupancy stipulation. There would be limited opportunities for exceptions in priority habitat (GRSG-M-FMUL-ST-001-Standard). In general habitat management areas, there would be appropriate controlled surface use and timing limitation stipulations for any new leases. Proposed geothermal projects may be considered in priority management areas outside of sagebrush focal areas in certain circumstances (GRSG-M-FMUL-ST-004-Standard). Development would be prioritized in non-habitat areas. Geophysical exploration activities would only be allowed if they would be consistent with vegetation objectives, there would be a net conservation gain, and they include seasonal restrictions.

Provisions for leased minerals would minimize surface disturbance, require reclamation to vegetation condition standards, and prioritize development in non-habitat areas first.

For fluid mineral operations, the Proposed Plan provisions apply to priority and general habitat management areas and sagebrush focal areas. Provisions include prohibiting employee camps, minimizing effects to soils, reclamation of sites as soon as no longer needed, and minimizing effects to habitat,

For mineral materials, in priority and sagebrush focal management areas, new mineral material disposal or development would be prohibited, there would be restrictions within 2 miles of leks, and requirements for operations and reclamation of existing sites to restore, enhance, or maintain desired conditions.

Under the Proposed Plan in priority and general habitat management areas and sagebrush focal areas, new solar utility-scale and/or commercial energy development would be prohibited, except for on-site power generation associated with existing industrial infrastructure (e.g., mine site). In priority habitat management areas and sagebrush focal areas, new wind energy utility-scale and/or commercial development would be prohibited. In general habitat management areas, new wind energy utility-scale and/or commercial development should be avoided. If development cannot be avoided due to existing authorized uses, adjacent developments, or split estate issues, stipulations would be incorporated into the authorization to protect greater sage-grouse and their habitats.

Under the Proposed Plan, energy and minerals development would be similar to proposed management under Alternative D. The additional measures listed above would also apply.

Under the Proposed Plan, the types of impacts of energy and minerals development on sensitive plants would be similar to those described for Alternative A, though their magnitude and spatial

distribution would differ. With its conservation measures, the Proposed Plan would likely decrease negative impacts on sensitive plants relative to Alternative A. Because it is similar to Alternative D but also addresses sagebrush focal areas, the Proposed Plan would likely reduce negative impacts of energy and minerals development on sensitive plants relative to Alternative D.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III, but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under the Proposed Plan some of the current energy and minerals management direction would continue within MZs III and IV, however, additional measures would conserve existing sagebrush habitat by adding priority and general habitat and sagebrush focal areas to existing closures. Therefore, the direct and indirect effects on sensitive plants in GRSG habitat in MZs III, IV and V from the management actions associated with energy and minerals development under the Proposed Plan when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

Land Uses and Realty Management

Direct and Indirect Effects

Proposed action conservation measures apply to priority and general habitat management areas and sagebrush focal areas. Provisions would restrict development and activities which contribute to ground disturbance, locate upgrades to existing transmission lines within the existing designated corridors unless an alternate route would benefit greater sage-grouse or their habitats, co-locate new infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers) within existing infrastructure to limit disturbance to the smallest footprint, bury new transmission lines and pipelines to limit disturbance to the smallest footprint unless explicit rationale is provided that the biological impacts to greater sage-grouse are being avoided, minimize land transfers, utilize land withdrawals as a tool, where appropriate and subject to valid existing rights, to prevent activities that would be detrimental to greater sage-grouse or their habitats.

Land uses and realty management under the Proposed Plan would be similar to Alternative D, but most measures would apply to priority and general habitat management areas and sagebrush focal areas. As a result, the Proposed Plan may provide more protection to sensitive plant species that Alternative D.

Cumulative Effects

The cumulative effects of land uses and realty actions under the Proposed Plan when combined with the past, present and reasonably foreseeable future actions would be similar to those

described for Alternative D and would not be expected to substantially increase negative impacts on sensitive plants within MZs III, IV and V. (Chapter 5 of the FEIS.)

Travel, Transportation and Recreation Management

Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions.Under the Proposed Plan, recreation standards and guidelines generally apply to priority and general habitat management areas and sagebrush focal areas. Provisions would limit recreation facilities and activities that result in loss of habitat or have long-term negative effects, particularly within 0.25 miles from the perimeter of active leks.

In priority and general habitat management areas and sagebrush focal areas, roads and transportation standards and guidelines would limit disturbance during breeding, nesting, and wintering periods, prohibit new road construction (with some exceptions), reduce risk of human-caused wildfires and the spread of invasive plants, consider road closures during breeding and nesting, consider over-snow motorized vehicles in wintering areas, require dust abatement measures, and prohibit road and trail maintenance activities within 2 miles from the perimeter of active leks. Road and road-way maintenance activities should be designed and implemented to reduce the risk of vehicle or human-caused wildfires and the spread of invasive plants. Such activities include but are not limited to the removal or mowing of vegetation a car-width off the edge of roads; use of weed-free earth-moving equipment, gravel, fill, or other materials; and blading or pulling roadsides and ditches that are infested with noxious weeds only if required for public safety or protection of the roadway.

In priority habitat management areas and sagebrush focal areas, provisions would restrict public access on temporary energy development roads, restrict road construction within riparian areas and mesic meadows, and require restoration when decommissioning roads and unauthorized routes.

With respect to travel, transportation and recreation, the Proposed Plan is similar to Alternative D, but the Proposed Plan would extend many measures to SFAs in addition to priority and general habitat management areas. Although the types of impacts of travel, transportation, and recreation management on sensitive plants would be expected to be the same under the Proposed Plan as under Alternatives A and D, the level and extent of negative impacts would be expected to be reduced under the Proposed Plan because the plan would extend conservation measures to sagebrush focal areas in addition to priority and general habitat management areas.

Cumulative Effects

The FEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” for MZ V and does not consider it a threat elsewhere (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under the Proposed Plan would increase conservation of greater sage-grouse habitat within priority and general habitat management areas and sagebrush focal areas and minimize the negative impacts of recreation and travel management on sensitive plants that occur in those areas. Under the Proposed Plan, some of the current travel, transportation and recreation management direction would continue within MZs III, IV and V (Chapter 5 of the FEIS), however, additional measures to conserve existing sagebrush habitat would be included. Because the Proposed Plan would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in MZs III, IV and V, when combined with the past, present and reasonably foreseeable future actions, this alternative would not substantially increase negative impacts on sensitive plant species.

Determination

Under the Proposed Plan, proposed conservation measures would limit some, but not all impacts to sensitive plant species and impacts to potentially suitable habitat for these species would be possible. Therefore, the Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement Proposed Plan may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species in the plan area for each of the sensitive plant species listed in table 2.

C. Literature Cited

Barneby, R. C. 1989. Fabales. Pages 1-279 in: A. Cronquist, A. H. Holmgren, N. H. Holmgren, J. L. Reveal, and P. K. Holmgren. Intermountain flora vol. 3, part B. Bronx: The New York Botanical Garden.

Beever, E.A. and C.L. Aldridge. 2011. Influences of free-roaming equids on sagebrush ecosystems with a focus on sage grouse In Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats, Studies in Avian Biology No. 38. U.C. (Berkeley) Press. Pages 273-290.

Bell, T., K. Tolhurst, and M. Wouters. 2005. Effects of the fire retardant Phos-Chek on vegetation in eastern Australian heathlands. International Journal of Wildland Fire 14:199-211.

Berger, Joel. 1986. Wild horses of the Great Basin: social competition and population size. University of Chicago Press. 348 pages.

Blomberg, E. J., J.S. Sedinger, M.T. Atamian, and D.V. Nonne. 2012. Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations. Ecosphere 3(6):55, 20pp.

Bradley, P.V., M.J. O'Farrell, J.A. Williams, and J.E. Newmard. Editors. 2006. The Revised Nevada Bat Conservation Plan. Nevada Bat Working Group. Reno, Nevada. 216 pp.

Braun, C. E., M. F. Baker, R. L. Eng, J. W. Gashwiler, and M. H. Schroeder. 1976. Conservation committee report on effects of alteration of sagebrush communities on the associated avifauna. Wilson Bull. 88:165-171.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Connelly, J.W., S.T. Knick, M.A. Schroeder, and S.J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Unpublished Report, Western Association of Fish and Wildlife Agencies. Cheyenne, WY. 610pp.

Connelly, J.W., C.A. Hagen, and M.A. Schroeder. 2011a. Characteristics and dynamics of greater sage-grouse populations. Pp. 53-68 in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Connelly, J.W., E.T. Rinkes, and C.E. Braun. 2011b. Characteristics of greater sage-grouse habitats: a landscape species at micro and macro scales. Pp. 69-84 in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species

and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Doherty, K.E., D.E. Naugle and B.L. Walker. 2011. Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales. Journal of Wildlife Management 74:1544-1553.

Franklin, M.A. 1999. Field survey of Tunnel Spring beard-tongue (Penstemon concinnus Keck): Cedar City and Fillmore Field Offices Beaver, Iron and Millard Counties, Utah. Final Report for 1996 Challenge Cost Share Project with Utah Department of Natural Resources and USDI Bureau of Land Management. 12 pgs + Appendices.

Garton, E.O., J.W. Connelly, J.S. Horne, C.A. Hagen, A. Moser, and M. Schroeder. 2011. Greater sage-grouse population dynamics and probability of persistence. Pp. 293-382 in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Garton, E.O, A.G. Wells, J.A. Baumgardt and J.W. Connelly. 2015. Greater Sage-Grouse Population Dynamics and Probability of Persistence. Report to Pew Charitable Trust (18 March 2015). 90 pp. (unpublished report).

Heidel, B. 2013. Status of Antennaria arcuata (Meadow pussytoes) in Sublette County, Wyoming. Prepared for Bureau of Land Management - Pinedale and Rock Springs Field Offices by Wyoming Natural Diversity Database, Laramie, Wyoming. 47 pp.

Holmgren, N.H., P.K.Holmgren and A.A. Cronquist. 2005. Intermountain Flora, New York, NY: The New York Botanical Garden, Vol.2 Part B, pgs.24-27.

Hunter, M.E., P.N. Omi, E.J. Martinson, and G.W. Chong. 2006. Establishment of non-native plant species after wildfires: effects of fuel treatments, abiotic and biotic factors, and post-fire grass seeding treatments. International Journal of Wildland Fire. 15:271-281.

Jamieson, I. G. and F. W. Allendorf. 2012. How does the 50/500 rule apply to MVP's? TREE 27:578-584.

S.T. Knick and S.E. Hanser. 2011. Connecting Pattern and Process in Greater Sage-Grouse Populations and Sagebrush Landscapes. in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Menard, C., P. Duncan, G. Fleurance, J. Georges and M. Lila. 2002. Comparative foraging and nutrition of horses and cattle in European wetlands. Journal of Applied Ecology 39:120-133.

Miller, R.F. and R.J. Tausch. 2001. The role of fire in juniper and pinyon woodlands: a descriptive analysis. Pages 15-30 In Galley, K.E.M. and T.P. Wilson (eds). Proceedings of the invasive species workshop: The role of fire in the control and spread of invasive species. Fire Conference 2000: The First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, FL. 146pp.

Miller, R.F., S.T. Knick, D.A. Pyke, C.W. Meinke, S.E. Hanser, M.J. Wisdom, and A.L. Hild. 2011. Characteristics of sagebrush habitats and limitations to long-term conservation. Pp. 145-184 in S. T. Knick and J. W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitat. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Morefield, J. D. (Editor). 2001. Nevada Rare Plant Atlas Maps and Fact Sheets. Nevada Natural Heritage Program Department of Conservation and Natural Resources. Carson City: Nevada Natural Heritage Program, compiled for the U.S. Department of the Interior, Fish and Wildlife Service, Portland, Oregon and Reno, Nevada.

NatureServe Explorer: An online encyclopedia of life [web application]. 2013. Brachylagus idahoensis - Pygmy Rabbit. Available at http://www.natureserve.org/explorer.

Natureserve. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, VA. Available at http://www.natureserve.org/explorer. (Accessed: June 2013)

NatureServe. 2015. NatureServe Explorer. Version 7.1. NatureServe, Arlington, Virginia. Internet website: http://www.natureserve.org/explorer.

Nevada Department of Wildlife. 2012a. Nevada Wildlife Action Plan. bighorn sheep – Ovis Canadensis. Available online: http://www.ndow.org/uploadedFiles/ndoworg/Content/public_documents/Nevada_Wildlife/Mammals.pdf

Nevada Department of Wildlife. 2012b. Nevada Wildlife Action Plan. Pygmy rabbit – Brachylagus idahoensis. Available online: http://www.ndow.org/uploadedFiles/ndoworg/Content/public_documents/Nevada_Wildlife/Mammals.pdf

Nevada Department of Wildlife. 2013. Nevada Department of Wildlife 2012-2013 big game status. 141 p. + appendices.

Patterson, R.L. 1952. The sage grouse in Wyoming. Wyoming Game and Fish Commission, Sage Books Inc., Denver, CO. 344pp.

Rowland, M.M., M.J. Wisdom, L.H. Suring and C.W. Meinke. 2006 Greater Sage-Grouse as an Umbrella Species for Sagebrush-associated Vertebrates. Biological Conservation 129:323-335.

Sage-grouse National Technical Team. 2011. A Report on National Greater Sage-Grouse Conservation Measures. December 21, 2011. 74 pp.

Schroeder, M. A., C. L. Aldridge, A. D. Apa, J. R. Bohne, C. E. Braun, S. D. Bunnell, J. W. Connelly, P. A. Deibert, S. C. Gardner, M. A. Hilliard, G. D. Kobriger, C. W. McCarthy, J. J. McCarthy, D. L. Mitchell, E. V. Rickerson, and S. J. Stiver. 2004. Distribution of sage-grouse in North America. Condor 106:363-373.

Schroeder, M.A., J.R. Young, and C.E. Braun. 1999. Sage grouse (Centrocercus urophasianus). 28 pages In Poole, A. and F. Gill, eds. The Birds of North America, No. 425. The Birds of North America, Inc., Philadelphia, PA.

U.S. Fish and Wildlife Service (USFWS). 2010. Endangered and threatened wildlife and plants: 12-month findings for petitions to list the Greater Sage-Grouse (Centrocercus urophasianus) as threatened or endangered. Federal Register 75(55): 13910-14014.

U.S. Fish and Wildlife Service (USFWS). 2013. Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013.

Wisdom, M.J., M.M Rowland, L.H. and Suring. 2005. Habitat Threats in the Sagebrush Ecosystem: Methods of Regional Assessment and Applications in the Great Basin. Alliance Communications Group, Lawrence, KS.

VII. MANAGEMENT INDICATOR SPECIES REPORT

A. Introduction

The National Forest Management Act (NFMA) directs National Forests to identify Management Indicator Species (MIS). MIS are chosen based on five criteria (36 CFR 219.19 (a)(1)) that include endangered and threatened plant and animal species identified on State and Federal lists; species commonly hunted, fished, or trapped; non-game species of special interest; species with special habitat needs that may be influenced significantly by planned management programs; additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.as a representative of certain habitat conditions important to a variety of other species. MIS are often selected because they are presumed to be sensitive to habitat changes. By monitoring and assessing populations of MIS, managers examine the outcome of implementing land management plans. The Humboldt and Toiyabe National Forest Plans (USDA Forest Service 1986a and USDA Forest Service 1986b, respectively) identify the species listed in table 3 as MIS for the Humboldt-Toiyabe National Forest. Land and resource management plans for the Humboldt National Forest and the Toiyabe National Forest were finalized in 1986. The forests were managed separately until they were administratively combined into the Humboldt-Toiyabe National Forest in 1996. Because the forests have not undergone a forest plan revision since they were combined, each unit continues to follow its respective plan and associated amendments. There are no plant MIS on the Humboldt-Toiyabe National Forest.

Table 3. Humboldt-Toiyabe National Forest MIS list

Common Name	Scientific name	Forest(s)
Mule deer	*Odocoileus hemionus*	Humboldt & Toiyabe
Pine marten	*Martes martes*	Toiyabe
Palmer's chipmunk	*Neotamias palmeri*	Toiyabe
Northern goshawk	*Accipiter gentilis*	Humboldt & Toiyabe
Greater Sage-Grouse	*Centrocercus urophasianus*	Humboldt & Toiyabe
Yellow warbler	*Dendroica petechia*	Toiyabe
Hairy woodpecker	*Picoides villosus*	Toiyabe
Williamson's sapsucker	*Sphyrapicus thyroideus*	Toiyabe
Yellow-bellied sapsucker	*Sphyrapicus varius*	Toiyabe
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*	Humboldt & Toiyabe

Common Name	Scientific name	Forest(s)
Paiute cutthroat trout	*Paiute cutthroat trout*	Toiyabe
Bonneville cutthroat trout	*Oncorhynchus clarkii utah*	Humboldt
Other trout species	*n/a*	Humboldt
Macroinvertebrates	*n/a*	Toiyabe

The 1982 (36 CFR 219.19) regulations for viability state that the Forest Service has the responsibility to provide sufficient habitat that can support viable populations of native and desired nonnative vertebrates across the planning area at a level that populations are likely to persist on National Forest System (NFS) lands.

On December 18, 2009 the Department of Agriculture issued a final rule reinstating the National Forest System Land and Resource Management Planning rule of November 9, 2000, as amended (2000 rule) (74 FR 242 [67059-67075]). This rescinded the 1982 planning rule. The 2000 rule states: Projects implementing land management plans must comply with the transition provisions of 36 CFR §219.35, but not any other provisions of the planning rule. Projects implementing land management plans and plan amendments, as appropriate, must be developed considering the best available science in accordance with §219.35(a). Projects implementing land management plans must be consistent with the provisions of the governing plans.

In order to address the MIS species, the issues surrounding the change in planning rules, and to assure the best available science was used our approach was as follows:

1. Identify habitat and population characteristics/trends by Forest
2. Identify the role of the habitat on each Forest in the overall viability of the population
3. Analyze effects of each alternative based on relevant threats, as well as current and past management
4. Make a determination whether the effects of the alternatives will affect overall viability

Table 4 shows Humboldt-Toiyabe National Forest MIS, their presence in the analysis area, and anticipated effects due to implementation of an action alternative.

Table 4. Humboldt-Toiyabe National Forest MIS, presence in the analysis area, and anticipated effects from implementation of an action alternative.

Common name of MIS	Management issue	Species present in analysis area?	Habitat present in analysis area?	Summary of anticipated effects from implementation of an action alternative to MIS
Mule deer	All vegetative types (Humboldt); deer habitat (Toiyabe)	Y	Y	A widespread resident of NV, with habitats ranging from low-elevation shrublands to upper elevation subalpine communities
Pine marten	Habitat capability (only for the Sierra Nevada Range)	N	N	Usually in dense deciduous, mixed, or (especially) coniferous upland and lowland forest. No habitat within mapped PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of pine marten or their habitat. Therefore, this species will not be evaluated in more detail.
Palmer's chipmunk	Coniferous forest (SMRNA)	N	N	Uses large rocks, logs, or cliff crevices in coniferous forests. No habitat within mapped PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of Palmer's chipmunk or their habitat. Therefore, this species will not be evaluated in more detail.
Northern goshawk	Old growth cottonwood, aspen and fir stands associated with riparian areas (Humboldt); Mature and	N	N	Typically inhabit late seral or old growth forests that have closed canopies (greater than 40 percent) and a relatively open understory. No habitat within mapped PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of northern goshawk or their habitat. Therefore, this species will not be evaluated in more detail.

Common name of MIS	Management issue	Species present in analysis area?	Habitat present in analysis area?	Summary of anticipated effects from implementation of an action alternative to MIS
	old growth habitats (DF, Mixed Fir) - now may refer to mature/old growth Apsen (Toiyabe)			
Sage-Grouse	Sagebrush-grass, riparian (Humboldt); livestock impacts on key habitat (Toiyabe)	Y	Y	Uses the following habitats in Nevada: sagebrush, montane shrubland, wet meadow; agriculture, springs; montane riparian, aspen; and Great Basin Lowland Riparian with sagebrush species (esp. Wyoming big sagebrush, mountain big sagebrush, and low sagebrush), flowering forbs, agricultural crops (particularly alfalfa), variety of montane shrubs, aspen, alder, willow
Yellow warbler	Willow and riparian habitat	N	N	Uses open scrub, second-growth woodland, thickets, farmlands, and gardens, especially near water; riparian woodlands, especially willows, with closed canopies. The alternatives propose some changes to grazing management, but it is not anticipated that these actions will affect in more than a negligible way the yellow warbler or its habitat. This species will not be evaluated in more detail.
Hairy Wood-pecker	Snag habitat	N	N	Utilizes forested environment with suitable snags or live trees for nesting habitat. No habitat within mapped PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of hairy woodpecker or their habitat. Therefore, this species will not be evaluated in more detail.
William-	Snag habitat	N	N	Utilizes forested environment with suitable snags or live trees for nesting habitat.

Common name of MIS	Management issue	Species present in analysis area?	Habitat present in analysis area?	Summary of anticipated effects from implementation of an action alternative to MIS
son's sapsucker				No habitat within mapped PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of Williamson's sapsucker or their habitat. Therefore, this species will not be evaluated in more detail.
Red-naped sapsucker	Snag habitat (SMRNA)	N	N	Utilizes forested environment with suitable snags or live trees for nesting habitat. No habitat within mapped PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of red-naped sapsucker or their habitat. Therefore, this species will not be evaluated in more detail.
Lahontan cutthroat trout	Riparian (Humboldt); occupied aquatic habitat (Toiyabe)	Y	Y	Inhabit both lakes and streams, but are obligatory stream spawners in habitat is characterized by well-vegetated and stable streambanks, stream bottoms with relatively silt-free gravel/rubble substrate, cool water, and pools in close proximity to cover and velocity breaks. There are records of the species within PHMA/GHMA habitat. Subsequent review of the alternatives indicates that this species will experience no effects to its habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for Lahontan cutthroat trout or its life requirements. Based on these factors, Lahontan cutthroat trout will not be analyzed in additional detail.
Paiute cutthroat trout	Occupied aquatic habitat	N	N	Historic range included the Silver King Creek system, Toiyabe NF, CA, and introduced populations occur in CA – all outside of the range of GSG PHMA or GHMA habitat. Implementation of the alternatives will cause no changes to populations of Paiute cutthroat trout or their habitat. Therefore, this species will not be evaluated in additonaldetail.
Bonneville cutthroat trout	Riparian	Y	Y	Occur within the Bonneville Basin in relatively cool, well-oxygenated water with clean, well-sorted gravels and minimal fine sediments. There are records of the species within PHMA/GHMA habitat. Subsequent review of the alternatives indicates that this species will experience no effects to its habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for Bonneville cutthroat trout or its life requirements. Based on these factors, Bonneville cutthroat trout will not be

Common name of MIS	Management issue	Species present in analysis area?	Habitat present in analysis area?	Summary of anticipated effects from implementation of an action alternative to MIS
				analyzed in additional detail.
Other trout species	Riparian	Y	Y	Includes seven salmonid species present within perennial waters on the Humboldt National Forest: Lahontan and Bonneville cutthroat trout (separately considered MIS species), bull trout, redband trout, rainbow trout, brown trout, and brook trout. There are records of these species within PHMA/GHMA habitat. Subsequent review of the alternatives indicates that these species will experience no effects to their habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for trout species or their life requirements. Based on these factors, other trout species will not be analyzed in additional detail.
Macroinvertebrates	Aquatic habitat	Y	Y	Live on the bottom of freshwater habitats during all or part of their life cycle. Widespread throughout the Toiyabe National Forest and can be found in all types of perennial and ephemeral aquatic habitats including lakes, streams, seeps, and springs. Although freshwater habitats within PHMA and GHMA habitat may contain these species, subsequent review of the alternatives indicates that these species will experience no effects to their habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for macroinvertebrates or their life requirements. Based on these factors, macroinvertebrates will not be analyzed in additional detail.

B. Species Information and Effects Analysis (Direct, Indirect and Cumulative)

1. Greater Sage-Grouse (*Centrocercus urophasianus*)

Life History

Sage-grouse depend on a variety of semiarid shrub-grassland (shrub steppe) habitats throughout their life cycle, and are considered obligate users of sagebrush (e.g., *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush), *A. t.* ssp. *vaseyana* (mountain big sagebrush), and *A. t. tridentata* (basin big sagebrush)) (Patterson 1952; Braun *et al.* 1976; Connelly *et al.* 2000; Connelly *et al.* 2004; Miller *et al.* 2011). Sage-grouse also use other sagebrush species (which can be locally important) such as *A. arbuscula* (low sagebrush), *A. nova* (black sagebrush), *A. frigida* (fringed sagebrush), and *A. cana* (silver sagebrush) (Schroeder *et al.* 1999; Connelly *et al.* 2004). Sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder *et al.* 2004; Connelly *et al*. 2011b). Sage-grouse exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas) (Connelly *et al.* 2004; Connelly *et al*. 2011a). Adult sage-grouse rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder *et al*. 1999). (Life history section was copied from the COT (USFWS 2013).

Based on GIS analysis of the EIS planning area, the following table describes the number of acres of GRSG PHMA and GHMA on the Humboldt-Toiyabe National Forest and the percentage of the Forest considered occupied habitat.

FOREST NAME	Forest Acres	PHMA	GHMA	Total Occupied	% of Forest
Humboldt-Toiyabe	4,653,437	880,055	913,199	1,793,254	39%

Habitat conditions and population information were largely taken from the COT (USFWS 2013).

Habitat and Population Condition and Trend by Forest

Humboldt-Toiyabe NF

The Humboldt-Toiyabe (H-T) National Forest is unique in that there are 7 ranger districts that contain sage-grouse habitat that are spread out over a very large area in the central and southern portion of the Great Basin in Nevada. All of the ranger districts that comprise the Humboldt-Toiyabe National Forest are found within two grouse populations: Great Basin core and Quinn Canyon.

The Nevada portion of this population contains the largest number of sage-grouse in this population delineation. Suitable habitats are somewhat uncharacteristic of sage-grouse habitats because use areas are disjunct, but connected. This is due to the “basin and range” topography that is characteristic of this region. Lower elevation valley bottoms often are dominated by

playas and salt desert shrub vegetation, but transcend quickly into sagebrush dominated benches, which often comprises the breeding and winter habitat. Moving up in elevation, pinyon-juniper woodlands dominate the mid-elevation and gives way to little sagebrush, mountain big sagebrush and mountain shrub communities used by sage-grouse as nesting and brood rearing habitat in the higher elevations (> 2,200 m). There are a total of 880,055 acres of PHMA and 913,199 acres of GHMA on the Humboldt-Toiyabe National Forest.

Garton et al. (2011) determined that this population has declined by 19 percent from the period

1965-69 through 2000-2007 and that average rates of population change were <1.0 for three of the eight analysis periods from 1965-2007. In addition, Garton et al. (2011) determined that this population has a two percent chance of declining below 200 males within the next 30 years and a

78 percent chance of declining below 200 males within 100 years (by 2107).

The Quinn Canyon population is a very small and isolated population located in southeastern Nevada. There were not enough data for Garton *et al.* (2011) to conduct an analysis on population trends or persistence. Two to three leks have been identified in this area, but there is very little information associated with these sites and most of this information is anecdotal. Habitat within this area has been compromised by pinyon-juniper encroachment. Very little sagebrush exists within this population. Overall this is a high risk population.

Garton et al. (2015) published a follow-up report building on the range-wide analysis of Garton et al. (2011). The 2011 book chapter in Knick and Connelley (eds.) 2011 evaluated changes in GRSG populations from roughly 1965 to 2007 examining population trajectories at multiple spatial scales. The more recent manuscript employed the same analytical methods but extends the field survey data to include 2008 through 2013. Garton et al (2015) provides reconstructed estimates for population trajectories across the species' range using for the array of populations examined in 2011.

From 2007 to 2013, data suggests that minimum counts for breeding males range-wide fell from 109,990 to 48,641, a decline of 56%. Using population persistence models consistent with those from Garton et al. (2011), Garton et al. (2015) examines future scenarios for males range-wide (excluding Colorado) and for individual populations at multiple spatial scales. For example, a minimum number of males counted at leks for the entire range-wide distribution, excluding Colorado, were 40,505 birds in 2013 and projected to decline to 19,517 males in 30 years (2030), and 8,154 males in 100 years (2107) based on the scenario examined.

As outlined in past review, many factors potentially contribute to projected declines (Stiver et al. 2006, Sage-grouse National Technical Team 2011, and U.S. Fish and Wildlife Service 2013; e.g. drought, climate change, disease, invasive plants, wildfire, habitat destruction). Garton et al (2015) suggests that environmental conditions and management actions through 2013 have not reversed the pattern of population declines observed in most populations since the 1970's or 1980's. Alternative A (continue current management), as outlined in this FEIS, most closely reflects the scenario examined in Garton et al (2011) and Garton et al (2015). As noted earlier, the Determinations in this biological evaluation reflect an evaluation of conditions for GRSG and the consequences of management for future populations of GRSG under each of the analyzed alternatives for NFS lands based on requirements for providing environmental conditions to

assure the persistence of GRSG habitats within the capability of the unit to support these habitats when GRSG use them. The evaluation for each alternative carefully considers the context provided by the Garton et al (2011) and Garton et al (2015) analysis for those population using NFS lands.

Threats by Forest
Humboldt-Toiyabe NF

Threats to sage-grouse on and around the Humboldt-Toiyabe NF include, but are not limited to fragmentation and loss of habitat, primarily from fire, wind and solar energy development, grazing, and recreation. In addition some of the historic habitat available to sage-grouse within this population has transitioned to pinyon-juniper woodlands. Miller and Tausch (2001) estimated that the area of pinyon-juniper woodlands has increased approximately 10-fold throughout the western United States since the late 1800s. Additionally, Wisdom *et al*. (2005) determined that 35 percent of the sagebrush area in the eastern Great Basin is at high risk to future displacement by pinyon-juniper woodlands and that mountain big sagebrush appeared to be most at risk, which could have meaningful impacts to sage-grouse brood rearing habitats within the upper elevations of mountain ranges within this region. In addition to this threat, much of the Great Basin is also susceptible to sagebrush displacement by cheatgrass. The most at risk vegetative community in this region is Wyoming basin big sagebrush (Wisdom *et al.* 2005) located predominately within the lower elevation benches of mountain ranges. In some areas, this condition has already been realized and the future risk for existing sagebrush habitats is moderate to high. This threatens both breeding and winter habitats for sage-grouse. For example, in a study conducted within this region (in Eureka County, NV), Blomberg *et al.* (2012) determined that sage-grouse leks that were not impacted by exotic grasslands experienced recruitment levels that were six times greater than those impacted by exotic grasslands. Additionally, this study found that drought is a major contributor to reduced recruitment and low population growth within the Southern Great Basin. Other threats such as mining and infrastructure have the potential to affect this sage-grouse population due to mine expansions, as well as new mines and the infrastructure associated with them. Existing mining claims are virtually ubiquitous throughout the Southern Great Basin PAC. Overall, sage-grouse in the Southern Great Basin in Nevada are potentially at-risk.

Alternatives A – F and the Proposed Plan:

Please refer to the biological evaluation Greater Sage-Grouse effects analysis section for Alternatives A – F and the Proposed Plan. The direct, indirect, and cumulative effects are the same.

2. Mule Deer (*Odocoileus hemionus*)

Life History

Mule deer (including all subspecies) are distributed throughout western North America from southern Alaska, south to Baja Mexico, east to central Canada and the Plains states. The species is a widespread resident of Nevada, with habitats ranging from low-elevation shrublands to upper elevation subalpine communities. Mule deer in Nevada generally summer at higher elevations and migrate to lower woodlands or shrublands in winter to find food and seek cover from winter weather.

Mule deer occur in a diversity of habitat types throughout Nevada but occur in highest densities in montane shrub dominated communities [Nevada Department of Wildlife (NDOW) 2012]. Cover habitat is utilized to ameliorate thermal conditions, as well as provide security. Vegetation providing cover may include basin big sagebrush, pinyon-juniper, aspen, and conifer stands. Dietary composition consists of a mix of grasses, grass-like plants (i.e. sedges and rushes), forbs, shrubs, and trees. Species selection and ratio of relative use varies locally, regionally, and seasonally. Shrubs and trees (browse) dominate deer diets during the winter. During the spring, consumption of forbs, grasses, and grass-like species increases. As grasses cure, forbs and browse become the species utilized as summer forage, and in the fall use of shrubs and trees increase and again are the predominate forage. Lands on the Humboldt National Forest provide the full complement of seasonal habitats and encompass a considerable portion of mule deer range in Nevada (Figure 3).

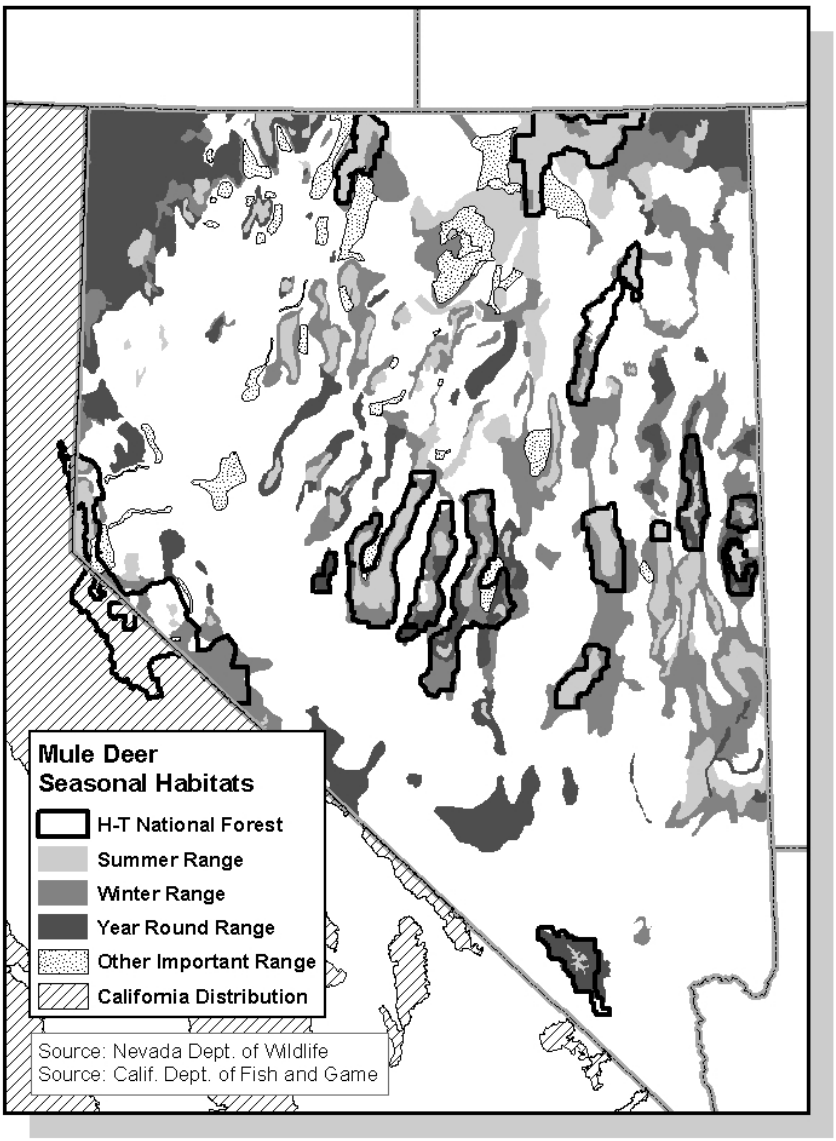


Figure 3. Mule deer habitat distribution in Nevada

Habitat loss and degradation are the primary concerns for this species: invasive weeds, increase in number and frequency of large-scale fires, pinyon-juniper encroachment, shrubland decadence, urban development and expansion, and drought all contribute to habitat degradation and loss (NDOW 2012). Decreases in quality of summer range and loss of critical wintering habitat in particular has been the biggest challenges to the species (NDOW 2012).

Statewide Population, Status, Abundance and Trend

Mule deer are monitored through annual aerial surveys (NDOW) and managed under the Mule Deer Species Policy Plan (NDOW) (NDOW 2012). Populations have been stable near the long-term average since 2002 and remain significantly higher than historic levels. The mule deer is ranked as secure (at very low risk of extirpation, extinction, or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats), both globally (G5) and in the State of Nevada (S5) (NatureServe 2010). Mule deer populations in Nevada have undergone dramatic highs and lows over the past 150 years. Today's numbers are estimated to be higher than historic populations. Statewide mule deer numbers have remained relatively stable over the past 10 years (Figure 4).

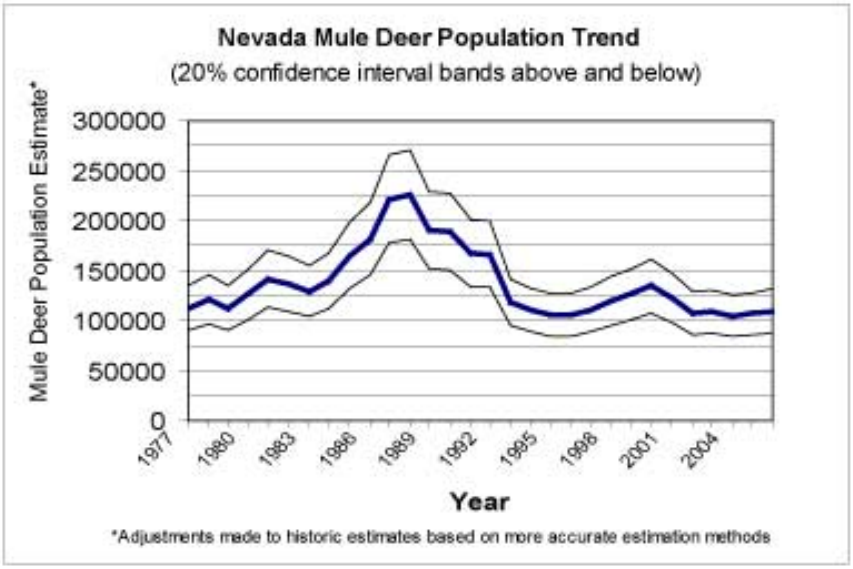


Figure 4. Approximate mule deer population trends in Nevada (source: NDOW 2006)

Forest MIS Monitoring

The 1986 Humboldt NF LRMP identified the mule deer as the MIS representing all vegetative types, and the current (1986) population of mule deer at 63,000 animals, with a maximum potential of 88,200 animals (July 1990 Amendment #2). The 1986 Toiyabe NF LRMP identified the mule deer as the MIS to evaluate Forest activities on deer habitat, with a population objective of 33.6 thousand deer by decade 3 (2001-2010) and maintained through 2030. Mule deer habitat has been carefully reviewed by the Humboldt-Toiyabe National Forest and is included in the Forest MIS Reports (Humboldt National Forest 2008 and Toiyabe National Forest 2008).

Alternative A - No Action

Vegetation and Soils – Direct and Indirect Effects

As previously discussed for GRSG, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species in parts of the sub-region. Invasive plants are thought to alter plant community structure and composition, productivity, nutrient

cycling, and hydrology, and may competitively exclude native plant populations. Cheatgrass competes with native grasses and forbs in sagebrush habitat. Invasive species cause direct degradation of sagebrush habitats including cover quality and composition, increased wildfire frequency and intensity (see *Fire and Fuels* discussion below) and are a particular threat to mule deer habitat. As discussed below in *Fire and Fuels,* the encroachment of pinyon and juniper from higher elevations into sagebrush habitats can have a negative impact on sagebrush habitat. Expansion of conifer woodlands threatens mule deer habitat, because they do not provide suitable habitat and trees displace shrubs, grasses and forbs.

To reduce the likelihood of invasive weed spread and the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are utilized. Implementation of these techniques would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads and could reduce the amount of available cover although the amount would be expected to be small relative to the overall amount of available cover. Mechanical and manual treatments would also increase noise, vehicular traffic and human presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition benefitting mule deer. In addition, there would be a decrease in fire spread and intensity and a potential increase in water availability.

Cumulative Effects

Temporal and spatial boundaries used in the cumulative effects analysis for mule deer are the same as those for Greater Sage-Grouse. The baseline date for the cumulative impacts analysis is 2012. The temporal scope of this analysis is a 20-year planning horizon; land managment planning documents are generally evaluated on a 5-year cycle. The spatial boundary for cumulative effects analysis includes Western Association of Fish and Wildlife Agencies (WAFWA) MZs III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin) (Figure 2), which is large enough to encompass large-ranging species such as mule deer.

Under Alternative A, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would generally continue to be outweighed by the long-term beneficial impacts. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under Alternative A, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Livestock Grazing – Direct and Indirect Effects

Depending upon site-specific management, beneficial or adverse impacts of grazing on mule deer or sagebrush habitat would continue. Grazing practices can benefit habitat and mule deer by reducing fuel load, protecting intact sagebrush habitat and increasing habitat extent and

continuity. However, grazing at inappropriate intensity, season, or location may alter or degrade sagebrush ecosystems or meadow/wetland/spring/stream habitat In addition, grazing can negatively impact mule deer through competition for forage or disturbance or temporary displacement, particularly during movement or trailing operations. Depending on the type, structural range improvements such as fences can present potential movement barriers.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve standards. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to protect mule deer, these approaches would protect and enhance mule deer habitat by reducing the likelihood of the types of impacts described above.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative A, within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to *Wild Horse and Burro Management* section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under Alternative A, which would be largely neutral for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Fire and Fuels – Direct and Indirect Effects

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in some cases, re-burns before sagebrush has a chance to re-establish. Without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be converted to annual grasslands. Another factor affecting fire in some sagebrush sites is the encroachment of

pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above. The cheatgrass fire cycle causes sagebrush habitat loss and degradation on an annual basis. Currently, due to the extent of the threat, there are no management actions that can effectively alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the *Lands and Realty Management, Energy and Locatable Minerals Development* and *Travel, Transportation and Recreation* sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in sagebrush habitat and that habitat would subsequently continue to be degraded or lost. Sagebrush habitat could be removed or degraded because of the use of heavy equipment or hand tools. Disturbance from equipment associated with suppression could negatively impact behaviors and /or changes in mule deer movement patterns could occur due to areas devoid of vegetation. In addition, suppression may initially result in higher rates of juniper encroachment in some areas, eliminating forage for mule deer while increasing cover. Over time, conifer encroachment could culminate in heavy fuel loadings that can contribute to larger-scale wildfire events that eliminate forage in adjacent areas.

Cumulative Effects

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats, as well as, the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in MZs III, IV and V.

Wild Horse and Burro Management – Direct and Indirect Effects

Please refer to the Alternative A effects of *Wild Horse and Burro Management* for Grater Sage-Grouse. The general effects to mule deer would be similar except that, in addition, wild horses and burros could compete with large ungulates, such as mule deer, for water at spring sources..

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of wild horse and burro management on these lands, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS).

Under Alternative A, within MZ III, wild horse and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to mule deer in MZs III, IV and V from the management actions under Alternative A, which would be largely neutral for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Energy and Locatable Minerals Development – Direct and Indirect Effects

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on mule deer and their habitat including loss, degradation, and fragmentation of habitat by roads, pipelines and power lines, disturbance of foraging or other critical behaviors, or displacement from increased levels of noise, presence of roads/humans and anthropogenic structures in an otherwise open landscape.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat from energy and locatable minerals development in MZs III, IV or V (Chapter 5 of the FEISFEIS).

Land Uses and Realty Management – Direct and Indirect Effects

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat. Existing Land and Resource Management Plan direction would apply under Alternative A. There would be no

changes to the current National Forest System infrastructure including power lines, wind turbines, communications towers, fences, or roads. Permitted ROWs would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of sagebrush winter range habitat or result in barriers to migration corridors. Construction and maintenance of infrastructure would continue to lead to higher short-term concentrations of human noise and disturbance that could cause disruption of foraging, or other behaviors, or temporary displacement of individuals. These activities could also lead to new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on sagebrush habitat used by mule deer and seasonal migration routes. Vehicles traveling on associated roads would continue to pose a collision hazard to mule deer. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on mule deer and their habitat.

Cumulative Effects

Current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to mule deer in MZs III, IV and V (Chapter 5 of the FEISFEIS).

Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions.

Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of disturbance of wildlife and fragmentation of habitat. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption or temporary displacement of mule deer. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. This alternative has the highest potential to impact mule deer due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel

to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse and other sagebrush-associated species such as mule deer, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEISFEIS).

Alternative B

Vegetation and Soils – Direct and Indirect Effects

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, vegetation management conservation measures would benefit weed control efforts by prioritizing restoration efforts, including reducing invasive plants and, in turn, benefit mule deer habitat. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing range improvements. Alternative B incorporates fewer invasive plant management measures in GHMA compared to PHMA. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts to mule deer from invasive plants described under Alternative A although the effects of the treatments would be the same.

Cumulative Effects

Under Alternative B, within MZs III, IV and V, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and, potentially, increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Livestock Grazing – Direct and Indirect Effects

Alternative B would implement a number of beneficial management actions in PHMA to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sagebrush habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing

introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows, which would benefit mule deer. Together these efforts would reduce the negative grazing-related impacts on mule deer described under Alternative A.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative B, within MZs III, IV and V, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under Alternatives B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

Fire and Fuels – Direct and Indirect Effects

Under Alternative B, suppression would be prioritized in PHMA to protect mature sagebrush habitat. Suppression would be prioritized in GHMA only where fires threaten PHMA. Suppression-related juniper encroachment discussed under Alternative A could increase in some areas under Alternative B, eliminating sagebrush habitat and eventually resulting in heavy fuel loadings that could contribute to larger-scale wildfire events.

Alternative B does not include any other specific management for wildland fire management in GHMA. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. Invasive species monitoring and control measures would benefit mule deer by reducing or eliminating competition of invasive species with forage species. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A although the general effects of fire suppression and fuels treatments on mule deer would be similar to those of Alternative A.

Cumulative Effects

Management actions under Alternative B, with respect to fire and fuels, would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V, current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PHMA. Therefore, the direct and indirect effects of fire to mule deer in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PHMA habitat and emergency environmental issues. Wild Horse Territory Plans would incorporate GRSG habitat objectives in PHMA. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PHMA would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they "conserve, enhance, or restore GRSG habitat through improved grazing management". Design features could include treating invasive species associated with range improvements. Additional range improvements in PHMA would specifically address the needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs which would also likely benefit sagebrush-associated species, such as mule deer, by reducing the types of wild horse and burro management-related impacts discussed under Alternative A.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS).

Under Alternative B, within MZs III, IV and V, wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to mule deer. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV or V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

Energy and Locatable Minerals Development – Direct and Indirect Effects

Under this Alternative, PHMA would be closed to new fluid mineral leasing, non-energy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PHMA. A 3% disturbance cap to activities in PHMA would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PHMA. These measures would reduce the impacts of energy development described under Alternative A on mule deer within PHMA.

Alternative B does not include specific management for fluid, saleable, locatable, and non-energy leasable minerals in GHMA or wind energy or solar energy development in PHMA or GHMA. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See *Land Uses and Realty Management*) would apply to energy development and would limit the extent of all types of energy development in PHMA. These measures would reduce the impacts of energy development on mule deer described under Alternative A.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEISFEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PHMA, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to mule deer in MZs III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer.

Land Uses and Realty Management – Direct and Indirect Effects

Under this alternative, all PHMA would be managed as exclusion areas and GHMA would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PHMA and GHMA. It would also include the following within PHMA: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PHMA.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit mule deer by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PHMA by power lines, communication towers and roads. Mule deer and sagebrush habitat outside PHMA would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PHMA rather than just reducing it within PHMA, the extent of impacts on mule deer and sagebrush habitat outside PHMA could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These conservation measures make this alternative more protective of mule deer than Alternative A, although the general effects would be the same.

Cumulative Effects

Management actions associated with lands and realty under Alternatives B would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V (Chapter 5 of the FEISFEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in MZs III, IV and V under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under Alternative B, motorized travel in PHMA would be limited to designated roads, primitive roads, and trails. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PHMA and there would be limited opportunities for road construction in PHMA, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would likely reduce loss and fragmentation of mule deer habitat and disturbance to mule deer in PHMA by minimizing human use and road construction or upgrades, and reduce the potential for automotive collisions with individual mule deer within PHMA. However, if these measures ended up concentrating recreational use and additional roads outside PHMA rather than just reducing it within PHMA, the extent of impacts on mule deer outside PHMA could increase under Alternative B relative to Alternative A.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within MZs III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing

sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in MZs III, IV and V under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer.

Alternative C

Vegetation and Soils – Direct and Indirect Effects

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce the impacts of invasive plants on mule deer described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would generally make Alternative C more protective of mule deer and mule deer habitat than Alternatives A or B.

Cumulative Effects

Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitat would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

Livestock Grazing – Direct and Indirect Effects

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat reducing both the negative and positive grazing-related impacts on mule deer and sagebrush habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat treatments that benefit GRSG would be allowed; most GRSG habitat treatments would be expected to benefit mule deer habitat as well. Retirement of grazing would be allowed and fast tracked. Once grazing is eliminated, Alternative C could negatively impact mule deer by eliminating artificial water developments in higher-elevation allotments overlapping mule deer summer habitat that individuals have come to rely upon, but it could improve riparian conditions.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS). Under Alternative C, within MZs III, IV and V Chapter 5 of the FEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing to mule deer in MZs III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Fire and Fuels – Direct and Indirect Effects

Alternative C is similar to Alternative B except that it is more protective of mule deer habitat because prioritization of suppression would apply to All Occupied Habitat, it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. Some of the negative impacts of fire suppression on conifer encroachment and fire suppression and fuels treatments on mule deer discussed under Alternative A would be offset by the prioritization of restoration treatments described below for invasive plants. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

Cumulative Effects

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during "active restoration" processes related to livestock grazing, horses and burros would be expected to range over a larger area than in Alternative A and would necessitate the need for increased gather schedules. The increase in access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could reduce food and cover for mule deer, degrade riparian habitat or increase the potential for competition between wild horses and burros and large ungulates at spring sources.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro

management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Energy and Locatable Minerals Development – Direct and Indirect Effects

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see *Land Uses and Realty Management* below). Like Alternative B, the conservation measures proposed under Alternative C would reduce the impacts of energy and locatable minerals development on mule deer described under Alternative A, but to a larger degree than any of the other alternatives.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting mule deer. Under Alternative C, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to mule deer in Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Land Uses and Realty Management – Direct and Indirect Effects

Alternative C would have the most protective GRSG conservation measures with respect to mule deer and infrastructure. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on mule deer described under Alternatives A and B in a wider area than Alternative B. Unlike Alternative B, which would permit wind energy siting in PHMA provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on mule deer discussed under Alternative A more so than Alternative B. Like alternative B, Alternative C would aim to remove, bury, or modify existing power lines but would apply to all occupied GRSG habitat, having the potential to disturb more mule deer and sagebrush habitat during implementation and maintenance. This measure would protect larger areas of sagebrush habitat from degradation, fragmentation and has the potential to prevent or reduce disturbance to or displacement of mule deer over a larger area.

Cumulative Effects

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting mule deer rather than removing or

fragmenting habitat. Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in MZs III, IV and V under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Travel, Transportation and Recreation Management – Direct and Indirect Effects

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of sagebrush habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

Cumulative Effects

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative C, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in MZs III, IV and V under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Alternative D

Vegetation and Soils – Direct and Indirect Effects

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush

component. More so than Alternatives A, B or C, Alternative D has the potential to benefit mule deer habitat from more targeted pinyon and juniper removal. Possible short-term disturbance-related impacts to mule deer from treatments would be the same under Alternative D as under Alternative A as would the general long-term benefits.

Cumulative Effects

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Livestock Grazing – Direct and Indirect Effects

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PHMA as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce potential for negative impacts from grazing on mule deer described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer or sagebrush habitat.

Fire and Fuels – Direct and Indirect Effects

Unlike Alternative B, in which suppression would be prioritized in PHMA, but only in GHMA where fires threaten PHMA, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRSG habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PHMA. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRSG or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments on mule deer and sagebrush habitat would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PHMA under Alternative B, would make Alternative D more protective of mule deer and sagebrush habitat, in the long term, than Alternative B.

Cumulative Effects

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PHMA under Alternative B. Otherwise Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially

contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on mule deer described under Alternative A over a larger area than Alternative B.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (Chapter 5 of the FEIS).

Under Alternative D, within MZs III, IV and V, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under Alternative D, which would be largely beneficial mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on mule deer or their habitat.

Energy and Locatable Minerals Development – Direct and Indirect Effects

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority

and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see *Land Uses and Realty Management*), whereas Alternative B would manage PHMA as a new ROW exclusion area and GHMA as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on mule deer associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of mule deer habitat within PHMA than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PHMA to new fluid mineral leasing. On the other hand, it would be more protective of mule deer habitat within GHMA than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PHMA under Alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within MZs III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PHMA and GHMA without waiver, exception, or modification. NSO restrictions would apply to GHMA with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to mule deer in MZs III, IV and V from the added management actions under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat (Chapter 5 of the FEIS).

Land Uses and Realty Management – Direct and Indirect Effects

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-deterring devices during ROW renewal process. These conservation measures make this alternative more

protective of mule deer and sagebrush habitat than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective of mule deer and sagebrush habitat with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

Cumulative Effects

Management actions associated with land uses and realty under Alternative D would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in Zones III, IV and V under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PHMA to include GHMA. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce habitat loss or fragmentation and disturbance to mule deer by minimizing human use and road construction or upgrades and reduce automotive collisions with individual mule deer.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase protection of sagebrush habitat within PHMA and GHMA, thereby benefitting mule deeer rather than removing or fragmenting habitat. Under Alternative D, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in MZs III, IV and V under Alternative D, which would be largely beneficial for mule

deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

Alternative E

All management actions under Alternative E would correspond to areas identified on the Sage-Grouse Management Areas (SGMAs) Map contained in the "2012 Strategic Plan for the Conservation of Greater Sage-Grouse in Nevada" (2012 Plan) produced by Nevada stakeholders at the request of the governor. The SGMAs include four categories - Occupied Habitat, Suitable Habitat, Potential Habitat, and Non Habitat areas - as defined in the 2012 Plan. The Nevada Sagebrush Ecosystem Council would further refine the habitat categories within the SGMAs and determine where the best possible habitat exists based on recommendations from the Nevada Sagebrush Ecosystem Technical Team. All management Actions would be implemented through a coordinated effort among local, state and federal agencies, unless an agency is specifically noted. Alternative E would not provide fixed exclusion or avoidance areas, but would seek to achieve conservation through a goal of "no net loss" in the Occupied, Suitable and Potential Habitat categories for activities that could be controlled, such as a planned disturbance or development. Management under Alternative E would be subject to an avoid, minimize, and mitigate approach, which would provide a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PHMA and GHMA designations.

Vegetation and Soils – Direct and Indirect Effects

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment management for sagebrush habitat compared to Alternative A, B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseeding of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species. The effects under Alternative E would be similar to those under Alternative D although temporary road construction could increase disturbance effects to mule deer.

Cumulative Effects

Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under Alternative E, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Livestock Grazing – Direct and Indirect Effects

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats which could benefit mule deer as well. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would probably provide less protection to mule deer and sagebrush habitat. In general, fewer overall sagebrush-specific habitat enhancement or maintenance actions would occur under this alternative and impacts to riparian structure would be expected to be greater due to more areas being available for livestock use.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative E, within MZs III, IV and V (refer to Chapter 5 of the FEIS), there would be fewer restrictions on livestock grazing than under Alternative A. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in conjunction with the past, present and reasonably foreseeable future actions, could result in the

increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Fire and Fuels – Direct and Indirect Effects

Alternative E would utilize a very different approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the SGMAs. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners. While the general short-term impacts fire and fuels conservation measures on mule deer would be the same as those described under Alternative A, the long-term beneficial effects of the measures on mule deer would be similar to those of Alternative B.

Cumulative Effects

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management – Direct and Indirect Effects

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to mule deer are expected to be similar to that of Alternative A.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to mule deer in MZs III, IV and V from the management actions under Alternative E, which would be largely neutral for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer or sagebrush habitat.

Energy and Locatable Minerals Development – Direct and Indirect Effects

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PHMA and GHMA designations. Under Alternative E, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to sagebrush habitat would not be ruled out. Therefore, the general impacts of energy and locatable minerals development on mule deer discussed under Alternative A would have the potential to increase under Alternative E.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under Alternative E, within MZs III, IV and V (Chapter 5 of the FEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS).

Land Uses and Realty Management – Direct and Indirect Effects

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance

would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to mule deer and sagebrush habitats. Therefore, Alternative E would not be as protective of mule deer and sagebrush habitat as any of the other alternatives.

Cumulative Effects

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for sagebrush habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV or V (Chapter 5 of the FEIS).

Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to mule deer and sagebrush habitat under Alternative E are expected to be similar to those of Alternative A.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in MZs III, IV and V (Chapter 5 of the FEIS).

Alternative F

Vegetation and Soils – Direct and Indirect Effects

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by

prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PHMA and GHMA as opposed to only PHMA under Alternative B). Together, these measures would result in a net benefit to sagebrush habitat and, therefore, mule deer by reducing impacts from invasive plants and pinyon-juniper encroachment on sagebrush habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

Cumulative Effects

Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to mule deer. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Livestock Grazing – Direct and Indirect Effects

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, and fence removal, modification or marking. Together these efforts would reduce the impacts from grazing on mule deer described under Alternative A to a larger degree than Alternative B and expand the beneficial impacts discussed under Alternative B over a larger area.

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting

existing sagebrush habitat under Alternative F would provide an added benefit to mule deer. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under Alternative F, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Fire and Fuels – Direct and Indirect Effects

The types of fire and fuels related impacts of Alternative F on mule deer would be similar to those discussed for Alternative B; however because Alternative F expands most GRSG conservation elements to all occupied habitat rather than limiting them to PHMA, the area over which those impacts, both beneficial and negative, could occur would be larger. Elements of Alternative F that differ from those of Alternative B, and would be the most likely to result in differences in the extent of direct and indirect beneficial and negative impacts on mule deer and sagebrush habitat between the two alternatives, include the following: (1) prioritizing suppression in all occupied habitat (similar to Alternative C), compared to only PHMA; (2) excluding livestock grazing from burned areas in GRSG occupied habitat until woody and herbaceous plants achieve GRSG habitat objectives; and (3) applying fuels management treatment provisions (including post-fire revegetation and invasive species control) to all occupied habitat rather than limiting them to PHMA.

Cumulative Effects

The cumulative of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management – Direct and Indirect Effects

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PHMA, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on mule deer under Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of mule deer and mule deer habitat than Alternative B.

Cumulative Effects

Refer to Alternative B. Cumulative effects would be the same.

Energy and Locatable Minerals Development – Direct and Indirect Effects

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F, siting of wind energy development would be prevented in PHMA; PHMA would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to

reduce impacts from mineral exploration and development activities in PHMA. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in GHMA. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PHMA: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on mule deer and mule deer habitat, as described under Alternative A, more so than Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PHMA more thoroughly than Alternative B.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PHMA, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternatives B, within MZs III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PHMA to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to mule deer in MZs III, IV and V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Land Uses and Realty Management – Direct and Indirect Effects

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects on mule deer and sagebrush habitat would be the same.

Cumulative Effects

Management actions associated with land uses and realty under Alternative F would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in MZs III, IV and V under Alternative F, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

Travel, Transportation and Recreation Management – Direct and Indirect Effects

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PHMA, only recreational SUAs that are neutral or beneficial to GRSG would be permitted, there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PHMA to include GHMA, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road construction would be prohibited within 4 miles of active sage-grouse leks. Therefore, the general travel, transportation and recreation effects of Alternative F on mule deer would be the same as those for Alternatives A and B, although Alternative F would be more protective, particularly with respect to reducing disturbance to mule deer and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of sagebrush habitat within PHMA and, in some instances, GHMA and PHMA, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative F, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in MZs III, IV and V under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

Proposed Plan

Vegetation and Soils - Direct and Indirect Effects

The Proposed Plan would emphasize improving and/or restoring GRSG habitat based on GRSG seasonal habitat objectives. The most limiting seasonal habitat to an individual lek or population would be identified and would be given priority for vegetation treatments. Treatments would use native seed and establish appropriate sagebrush species/subspecies. Management strategies that reduce the threats to GRSG resulting from changes in invasive annual grasses, wildfires, and conifer expansion would be used in GRSG habitats. Similar to Alternative D, these strategies would reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem as well as reduce the rate of conifer encroachment in order to reduce GRSG habitat fragmentation and maintain or re-establish habitat connectivity over the long-term and at a landscape scale. Unlike alternative D, targeted grazing is not identified as a treatment method for vegetation management.

More so than Alternatives A, B or C, Like Alternative D, the Proposed Plan has the potential to benefit mule deer habitat from more targeted pinyon and juniper removal than Alternatives A, B, or C. Possible short-term disturbance-related impacts to mule deer from vegetation treatments would be the same under the Proposed Plan as under Alternative A as would the general long-term benefits.

Cumulative Effects

Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under the Proposed Plan would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

Livestock Grazing - Direct and Indirect Effects

Similar to Alternative D, the Proposed Plan would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management in PHMA and GHMA. In priority and general habitat management areas and sagebrush focal areas, livestock grazing is managed to provide for adequate nesting, breeding, and winter vegetation cover, construction of water developments, unless beneficial to greater sage-grouse habitat consistent with State approved water rights, is prohibited, grazing guidelines for seasonal (breeding and nesting, brood rearing and summer, and winter/fall) habitats should be applied, and closure of grazing allotments or portions of them should be considered where removal of livestock grazing would enhance the ability to achieve desired habitat conditions. In addition, construction of fences and new permanent livestock facilities (windmills, water tanks, corrals) would be discouraged within 1.2 miles from the perimeter of occupied leks and improved management of riparian areas and wet meadows that contribute to GRSG brood rearing and summer habitat would be emphasized. Like Alternative D, the guidelines under the Proposed Plan would reduce potential for negative impacts from grazing on mule deer described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat..

Cumulative Effects

Although livestock grazing occurs throughout all MZs, in the FEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for MZ V (Chapter 5 of the FEIS). In addition, portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within MZs IV and V do not

contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS].

Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under the Proposed Plan would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer or sagebrush habitat.

Fire and Fuels - Direct and Indirect Effects

The Proposed plan is similar to Alternative D. But, while Alternative D would prioritize suppression in PHMA and GHMA, the Proposed Plan would emphasize suppression along with pre-suppression activities and other conservation actions in PHMA, GHMA, as well as SFAs. Pre-suppression activities and other conservation actions, along with suppression efforts, would identify and prioritize GRSG habitats that are vulnerable to wildfire events and prescribe actions important to their protection. Under the Proposed Plan, several other conservation measures proposed under Alternative D would be extended beyond PHMA and GHMA to SFAs. They include: designing fuels treatments to restore, enhance, or maintain greater sage-grouse habitat; limiting prescribed fire use to only when clearly beneficial to GRSG or its habitat. In addition, the Proposed Plan includes measures to protect GRSG and sagebrush habitat during fire suppression activities in PHMA, GHMA, and SFAs. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments to mule deer and sagebrush habitat would be similar to those of Alternative A. Extending conservation measures beyond PHMA and GHMA to include SFAs under the Proposed Plan, would make the Proposed Plan more protective of mule and sagebrush habitat, in the long term, than Alternative D.

Cumulative Effects

The cumulative effect of management actions under Proposed Plan, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within MZs III, IV and V (Chapter 5 of the FEIS).

Wild Horse and Burro Management - Direct and Indirect Effects

The Proposed Plan is similar to management proposed in Alternative D: wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing PHMA or GHMA; adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; and gathers would be prioritized in PHMA and GHMA when wild horse and burro populations exceed the upper limit of the established AML. In addition, under the Proposed Plan, wild horse and burro population levels in

PHMA and GHMA would be managed at the lower limit of established AML ranges. Similar to Alternative D, the Proposed Plan would be expected to reduce the impacts of wild horses and burros on mule deer described under Alternative A over a larger area than Alternative B.

Cumulative Effects

Portions of MZ III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within MZs IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); Chapter 5 of the FEIS]. Although livestock grazing occurs throughout all MZs, and has the potential to compound the effects of livestock grazing on these lands, in the FEIS it is only considered a "lesser threat" with respect to "relative cumulative actions" and only for MZ V (see Chapter 5 of the FEIS).

Under the Proposed Plan, within MZs III, IV and V, wild horse and burro territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under the Proposed Plan would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in MZs III, IV and V from the management actions under the Proposed Plan, which would be largely beneficial to mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on mule deer or their habitat.

Energy and Locatable Minerals Development - Direct and Indirect Effects

The Proposed Plan is similar to Alternative D. The main difference is that the Proposed Plan includes SFAs that would be recommended for withdrawal from locatable mineral development and require no surface occupancy for fluid minerals. In addition, GHMA would be open to fluid mineral and geothermal development, with moderate constraints, as opposed to NSO under Alternative D, and under the Proposed Plan, some of types of minerals development, including saleable and non-energy, would be open in GHMA as opposed to closed under Alternative D.

The guidelines proposed under the Proposed Plan would, overall, reduce the general impacts on SAS associated with energy and locatable minerals development discussed under Alternative A. SAS within SFAs would receive a more protective benefit under the Proposed Plan. However, the benefit to those within GHMA might be slightly less under the Proposed Plan than under Alternative D.

Cumulative Effects

Energy development is currently a minor threat present only in MZ III but geothermal energy development potential is high throughout MZ IV (Chapter 5 of the FEIS). Mining is common across MZs III and IV in Nevada and occurs at a variety of scales. Under the Proposed Plan, within MZs III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting sagebrush would be included. The Proposed Plan adds NSO restrictions to SFAs and PHMA. Management under the Proposed Plan would add the application of guidelines and mitigation to areas open to mineral development. Therefore, the direct and indirect effects of energy and

locatable minerals development to mule deer in MZs III, IV and V from the added management actions under the Proposed Plan, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat (Chapter 5 of the FEIS).

Land Uses and Realty Management - Direct and Indirect Effects

The Proposed Plan is similar to Alternative D, but could be slightly less protective of sagebrush habitat and SAS because under the Proposed Plan new wind energy utility-scale and/or commercial development would be prohibited in SFAs and PHMA and avoided in GHMA, as opposed to excluded in PHMA and GHMA under Alternative D, and under the Proposed Plan, GHMA would be open to minor ROWs as opposed to avoidance areas under Alternative D.

Guidelines protecting GRSG and sagebrush habitat make this alternative more protective of SAS than Alternative A, although the general effects of land uses and realty management to mule deer would be the same as under Alternative A.

Cumulative Effects

Management actions associated with land uses and realty under Alternative the Proposed Plan would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in Zones III, IV and V under the Proposed Plan, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

Travel, Transportation and Recreation Management - Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative D, the Proposed Plan would limit motorized travel to designated routes, limit opportunities for new road construction, and prohibit construction of new recreation facilities, unless the development results in a net conservation gain to greater sage-grouse. Unlike Alternative D, the Proposed Plan would extend these measures beyond PHMA and GHMA to include SFAs. Whereas, Alternative D would only permit recreational SUAs that are neutral or beneficial to sage-grouse, the Proposed Plan would include terms and conditions that protect and/or restore greater sage-grouse habitat within the permit in new recreation special use authorizations. Although the general impacts of travel, transportation, and recreation management on mule deer under the Proposed Plan would be the same as Alternative A, the Proposed Plan is more restrictive than Alternative A and includes slightly more sagebrush habitat than Alternative D. It would likely reduce habitat loss or fragmentation and disturbance to mule deer by minimizing human use and road construction or upgrades and reduce automotive collisions with individual mule deer.

Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the FEIS and only for MZ V (see Chapter 5 of the FEIS). Management actions associated with travel, transportation and recreation under the Proposed Plan would increase protection of sagebrush habitat within PHMA, GHMA, and SFAs thereby benefitting mule deer rather than removing or fragmenting habitat. Under the Proposed Plan, within MZs III, IV and V (Chapter 5 of the FEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in MZs III, IV and V under the Proposed Plan, which would be largely beneficial for mule deer , when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

C. Literature Cited

Blomberg, E. J., J.S. Sedinger, M.T. Atamian, and D.V. Nonne. 2012. Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations. Ecosphere 3(6):55, 20pp.

Braun, C. E., M. F. Baker, R. L. Eng, J. W. Gashwiler, and M. H. Schroeder. 1976. Conservation committee report on effects of alteration of sagebrush communities on the associated avifauna. Wilson Bull. 88:165-171.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Connelly, J.W., S.T. Knick, M.A. Schroeder, and S.J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Unpublished Report, Western Association of Fish and Wildlife Agencies. Cheyenne, WY. 610pp.

Connelly, J.W., C.A. Hagen, and M.A. Schroeder. 2011a. Characteristics and dynamics of greater sage-grouse populations. Pp. 53-68 in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Connelly, J.W., E.T. Rinkes, and C.E. Braun. 2011b. Characteristics of greater sage-grouse habitats: a landscape species at micro and macro scales. Pp. 69-84 in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Garton, E.O., J.W. Connelly, J.S. Horne, C.A. Hagen, A. Moser, and M. Schroeder. 2011. Greater sage-grouse population dynamics and probability of persistence. Pp. 293-382 in S.T. Knick and J.W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Garton, E.O, A.G. Wells, J.A. Baumgardt and J.W. Connelly. 2015. Greater Sage-Grouse Population Dynamics and Probability of Persistence. Report to Pew Charitable Trust (18 March 2015). 90 pp. (unpublished report).

Humboldt National Forest. 2008. MIS & Range Suitability/Capability Analysis Humboldt NF Updated MIS Monitoring Report. Unpublished report.

Miller, R.F. and R.J. Tausch. 2001. The role of fire in juniper and pinyon woodlands: a descriptive analysis. Pages 15-30 In Galley, K.E.M. and T.P. Wilson (eds). Proceedings of the invasive species workshop: The role of fire in the control and spread of invasive species. Fire Conference 2000: The First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, FL. 146pp.

Miller, R.F., S.T. Knick, D.A. Pyke, C.W. Meinke, S.E. Hanser, M.J. Wisdom, and A.L. Hild. 2011. Characteristics of sagebrush habitats and limitations to long-term conservation. Pp. 145-184 in S. T. Knick and J. W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitat. Studies in Avian Biology (vol. 38). University of California Press, Berkeley, CA.

Nevada Department of Wildlife. 2012. Nevada Wildlife Action Plan. Available online: http://www.ndow.org/uploadedFiles/ndoworg/Content/public_documents/Nevada_Wildlife/Mammals.pdf

Patterson, R.L. 1952. The sage grouse in Wyoming. Wyoming Game and Fish Commission, Sage Books Inc., Denver, CO. 344pp.

Sage-grouse National Technical Team. 2011. A Report on National Greater Sage-Grouse Conservation Measures. December 21, 2011. 74 pp.

Schroeder, M. A., C. L. Aldridge, A. D. Apa, J. R. Bohne, C. E. Braun, S. D. Bunnell, J. W. Connelly, P. A. Deibert, S. C. Gardner, M. A. Hilliard, G. D. Kobriger, C. W. McCarthy, J. J. McCarthy, D. L. Mitchell, E. V. Rickerson, and S. J. Stiver. 2004. Distribution of sage-grouse in North America. Condor 106:363-373.

Schroeder, M.A., J.R. Young, and C.E. Braun. 1999. Sage grouse (Centrocercus urophasianus). 28 pages In Poole, A. and F. Gill, eds. The Birds of North America, No. 425. The Birds of North America, Inc., Philadelphia, PA.

Stiver, S.J., A.D. Apa, J.R. Bohne, S.D. Bunnell, P.A. Deibert, S.C. Gardner, M.A. Hilliard, C.W. McCarthy, and M.A. Schroeder. 2006. Greater Sage-grouse Comprehensive Conservation Strategy. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Toiyabe National Forest. 2008. MIS & Range Suitability/Capability Analysis Updated MIS Monitoring Report For The Western and Central Regions of Toiyabe National Forest. Unpublished report.

U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants: 12-month findings for petitions to list the Greater Sage-Grouse (Centrocercus urophasianus) as threatened or endangered. Federal Register 75(55): 13910-14014.

U.S. Fish and Wildlife Service. 2013. Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives Team: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February2013.

USDA Forest Service. 1986a. Land and Resource Management Plan for the Humboldt National Forest. Elko, Nevada. 883 pp.

USDA Forest Service. 1986b. Land and Resource Management Plan for the Toiyabe National Forest. Sparks, Nevada. 408 pp.

Wisdom, M.J., M.M Rowland, L.H. and Suring. 2005. Habitat Threats in the Sagebrush Ecosystem: Methods of Regional Assessment and Applications in the Great Basin. Alliance Communications Group, Lawrence, KS.

This page intentionally left blank.

Appendix R

Livestock Grazing

APPENDIX R
LIVESTOCK GRAZING

SUB-REGION GRAZING DATA

Table R-1 provides allotment specific data for all grazing allotments within PHMA and GHMA in the planning area.

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
BLM NEVADA				
Abel Creek	00023	1,956	11,607	5
Achurra Seeding	05401	757	2,529	5
Adobe	02129	526	2,484	5
Adobe Hills	02101	2,208	23,007	5
Alder Creek	00051	5,913	123,363	5
Anderson Creek	03201	5,559	21,560	3
Andorno	00018	883	9,578	5
Andrae	01001	4,565	17,102	5
Annie Creek	02102	592	2,404	5
Antelope	00016	562	4,746	5
Antelope	03202	478	3,250	5
Antelope Basin	03213	3,278	16,774	3
Antelope Mountain	03001	6,362	53,755	3
Antelope Springs FFR	03246	5	40	5
Antelope Valley	04301	5,246	45,950	5
Arambel	10031	1,349	45,526	4
Argenta	20001	17,202	141,689	5
Asa Moore	00044	684	7,074	5
Austin	10004	14,478	235,100	5
Badger Spring	00823	1,412	24,125	4
Badlands	04302	1,018	18,022	3
Baker Creek	10125	4,319	55,515	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Bald Mountain	04303	312	31,413	1
Barger FFR	04315	23	144	5
Barnes Seeding	05402	345	3,932	5
Barton	03203	810	2,938	5
Bassett Creek	10114	588	7,328	5
Bastian Creek	10121	1,778	13,527	4
Batterman Wash	11018	2,093	39,878	4
Bear Creek	03204	240	1,248	5
Beaver Creek	02103	14,258	75,139	5
Becky Creek	00404	671	12,904	4
Becky Springs	10101	3,842	40,621	5
Bellinger Seeding	05403	217	2,417	1
Bennett Creek	00409	37	1,473	4
Bennett Field	04304	180	1,125	1
Bennett Spring	21006	3,498	48,264	1
Big Bend	03205	10,207	49,306	5
Big Canyon	03004	3,050	14,898	5
Big Indian Creek	00410	99	6,144	4
Big Meadows	04305	722	13,191	5
Big Rock Seeding	00428	621	1,862	4
Big Six Well	00812	140	2,412	5
Bilk Creek	00147	3,030	40,999	5
Bishop Creek	03206	1,136	6,840	5
Bishop Flat	03207	226	1,519	5
Black Butte	03208	6,489	28,172	5
Black Canyon	11007	1,008	8,438	4
Black Hills	21008	156	3,610	5
Black Point	10032	4,312	59,430	2
Bloody Run	00043	2,084	37,489	5
Blue Basin	02104	6,467	37,700	5
Blue Wing/7 Troughs	00135	17,245	1,192,778	5
Bluff Creek	03209	6,923	51,166	5
Board Corral FFR	02139	24	2,013	5
Boone Springs	04307	2,002	77,888	3
Bottari	05404	687	2,368	1
Bottle Creek	00066	3,434	132,485	3
Boulder Field	02116	838	6,135	5
Brown Knoll	00831	161	10,366	3
Browne	05450	657	19,172	5
Bruffy	05405	1,806	18,399	5
Bruneau River	02105	838	3,655	5
Buckboard Spring	21011	264	10,842	4
Bucket Flat	01002	188	1,551	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Buffalo	00017	339	3,651	5
Buffalo Hills	00127	4,114	440,982	5
Buffalo Valley	10021	5,451	137,211	5
Bullhead	00033	12,050	142,361	5
Bullion Road	05406	117	4,128	5
Burner Basin	05408	144	1,308	5
Burnt Creek	03247	28	394	5
Butte Seeding	00507	275	976	4
Butterfield	00073	4,776	122,080	5
Buttermilk	00031	2,525	23,512	5
Caliente	21014	48	2,008	1
Canyon Allotment	03250	1,713	18,813	5
Carico Lake	10003	24,954	562,352	2
Carlin Canyon FFR	02126	51	1,022	5
Carlin Field	01005	2,442	18,797	5
Carson	03003	193	3,090	5
Cattle Camp/Cave Val	00903	6,878	75,846	2
Cave Valley Ranch	00904	2,403	38,524	4
Cave Valley Sdg	00908	200	942	5
Cedar Hill	03212	979	4,644	5
Cherry Creek	00403	6,197	153,107	4
Chimney Creek	00021	460	3,091	5
Chimney Creek	05409	1,551	4,762	5
Chimney Rock	00914	1,233	20,037	5
Chin Creek	10104	12,479	148,017	5
Chokecherry	10131	3,327	32,334	5
City	04313	161	1,477	5
Clan Alpine	03009	10,210	367,703	5
Clear Creek	00109	2,931	48,370	4
Clear Creek	10024	551	24,700	5
Cleveland Ranch	10119	1,021	11,656	4
Cliff Springs	21016	2,052	35,821	4
Clover Creek	21015	609	22,876	4
Clover Creek FFR	04310	2	35	5
Coal Canyon-Poker	00104	3,144	97,829	5
Coal Mine Basin	02106	1,524	8,749	5
Cold Creek	00603	5,803	62,103	2
Cold Spring	00909	1,265	10,253	5
Comet	21018	214	9,146	5
Condor Canyon	21019	676	44,035	1
Connors Summit	00915	2,449	27,316	5
Constantia South	03012	642	10,472	1
Copper Canyon	10002	5,023	60,948	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Copper Flat	00427	3,033	40,058	1
Cordero	00002	190	5,347	5
Cornucopia	01006	2,634	15,272	5
Corral Canyon Seeding	05410	525	2,059	5
Corta	10033	128	1,130	4
Corta FFR	05479	92	60	5
Cotant Seeding	02107	720	3,225	5
Cottonwood	00132	2,248	49,975	5
Cottonwood	03214	2,144	16,689	2
Cottonwood	11015	1,177	42,172	1
Cottonwood	20015	5,649	99,629	5
Cottonwood Seeding FFR	05480	2	62	5
Cow Canyon	03015	2,390	146,179	5
Coyote	00130	3,051	34,337	5
Coyote Hills	00053	2,633	38,315	5
Crane Springs	05438	1,281	21,691	5
Crowley Creek	00006	3,303	49,984	5
Currie	04311	5,504	148,254	3
Curtis Spring	04312	557	36,830	5
Cut-Off	05411	182	2,511	5
Dairy Valley	03215	7,231	51,769	5
Dalton	03245	333	1,465	1
Dark Peak	00827	1,826	19,477	5
Dee Gee Spring	00815	200	4,975	5
Deep Creek	10103	2,934	23,932	5
Deer Lodge	21026	167	6,880	1
Deeth	03216	20,548	125,397	3
Desert Valley	00059	1,596	56,965	5
Devils Gate	03217	6,118	49,796	5
Devils Gate	05412	374	3,026	5
Diamond S	00144	1,158	19,070	5
Diamond Springs	10035	3,680	69,679	2
Dixie Flats	05414	1,508	15,266	5
Dixie Valley	03018	6,341	282,801	5
Dolly Hayden	00121	1,066	53,154	5
Dorsey	02134	1,176	6,809	5
Double H	00010	1,687	47,276	5
Double Mountain	02109	5,126	38,242	5
Douglas Canyon	00811	175	11,422	4
Douglas Point	00810	368	19,318	2
Dry Creek	10036	5,702	149,225	5
Dry Farm	11024	1,530	32,464	4
Dry Mountain	00609	1,751	27,552	4

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Duckcreek	00423	321	9,531	4
Duckcreek Basin	00419	436	8,301	4
Duckcreek Flat	00412	1,347	32,406	4
Duckwater	00701	20,844	807,662	1
Dyke Hot	00052	1,636	23,346	5
Eagle Rock	01008	5,505	27,685	5
Eagle Rock 1	02108	1,365	8,345	5
East Big Springs	04306	10,150	252,367	3
East Buckhorn	04316	4,189	36,083	5
East Fork	05415	1,300	11,153	5
East Fork FFR	02131	17	40	5
East Wells	00830	122	3,542	5
Eastgate	03020	9,770	306,937	5
Eden Valley	00037	2,628	32,621	5
Edwards Creek	03021	3,300	55,730	3
El Jiggs	05413	5,597	46,716	5
Elko Hills	05416	972	7,099	5
Ely Springs Cattle	11029	4248	55,168	4
Ely Springs Sheep	21030	1800	22,927	1
Emigrant Spring	05417	1,286	13,245	5
Evans	00617	0	1,814	5
Evans FFR	02000	105	1,121	5
Fish Creek Ranch	10038	4,815	287,984	4
Flanigan	03022	5,015	56,079	1
Flat Creek	00007	3,170	24,378	5
Flynn/Parman Indiv.	10039	1,357	29,825	5
Forest Moon	01010	2,263	108,273	1
Fort Scott	00026	361	2,702	5
Four Mile Canyon	05420	642	4,948	5
Fox Mountain	11001	6,319	73,412	1
Fox Springs	02111	624	3,259	5
Francisco	00075	1,369	16,896	2
Frost Creek	05421	1,976	10,613	4
Ft Mcdermitt	00003	1,553	12,843	5
Gallagher Gap	00418	169	3,299	4
Gamble Individual	03218	17,938	209,799	5
Georgetown Ranch	00422	1,675	23,688	4
Geyser	05423	1,227	48,332	5
Geyser Ranch	01101	12,308	237,413	1
Gilbert Creek	10014	13,071	248,350	5
Gilford Meadows	00424	420	4,666	4
Giroux Wash	00826	5,326	48,200	1
Goat Ranch	00421	213	5,524	4

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Golconda Butte	00041	1002	16,413	5
Gold Canyon	00413	1,068	23,640	4
Goldbanks	00105	2,357	37,526	5
Gordon Creek	04317	141	794	5
Goshute Basin	00402	449	9,397	2
Goshute Mtn	00102	465	5,771	3
Granite	00027	216	1,966	5
Grass Valley	10006	17,701	282,854	2
Grindstone Mountain	05422	894	6,486	5
Grouse Creek	03220	1,983	16,902	5
Gulley	03221	1,633	11,201	5
Hadley	01011	4,276	27,323	5
Haggerty Wash	00907	194	904	1
Halleck FFR	02112	178	4,037	5
Hallelujah Junction	03026	1176	12,154	1
Hamblin Valley	00133	8,177	105,831	5
Hansel	05424	1,553	7,781	5
Hanson Creek	00025	151	1,664	5
Happy Creek	00056	3,724	95,126	5
Hardscrabble Canyon	03027	1,222	11,575	5
Hardy Spring	11022	3,478	124,008	4
Harmony	10111	348	6,786	5
Harrison	04318	620	7,635	5
HD	03222	22,827	238,165	5
Heusser Mountain	00416	1,486	33,956	2
Hicks Station	10067	117	24,240	2
Highland Peak	11035	3,704	45,542	4
Highway	01036	120	4,251	1
Hog Tommy	05426	211	1,986	1
Holborn	03223	2,267	26,598	5
Home Allotment	10019	901	18,845	5
Home Station Gap	10064	602	10,983	5
Horse Creek	00049	3,521	38,859	5
Horse Haven	00620	1,056	25,000	4
Horse Spring	03032	600	14,548	3
Horseshoe	01012	1629	14,014	5
Hot Creek	00084	6,363	154,483	5
Hot Creek	03224	4,066	16,856	3
Hot Springs Peak	00032	2,535	53,198	5
Hubbard Vineyard	03225	13,031	112,213	2
Hunts Canyon	00078	2,237	93,558	5
Hylton	04319	839	2,411	3
Indian Creek	00029	250	960	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Indian Creek	00401	177	3,167	2
Indian Creek FFR	01015	626	3,969	5
Indian George	10112	2,860	41,650	5
Indian Jake	00804	1,970	47,168	2
Indian Spring	05429	2,669	19,045	5
Ione	10071	2,235	189,099	5
Iron Blossom	05430	1,539	7,689	5
Iron Point	00039	1,240	17,360	5
Jackpot	03226	7,006	67,406	5
Jackson Mountain	00058	8,857	364,991	5
Jackstone	02138	652	7,100	5
Jake's Creek	01016	1392	34,037	5
Jakes Unit Trail	00821	832	15,056	4
JD	10041	7,799	97,740	2
Jersey Valley	00148	1,173	66,498	5
Jiggs	10069	721	4,575	5
Jordan Meadows	00004	11,720	106,495	5
JP	03249	485	6,401	5
Kennedy Seeding	05431	18	54	1
King Seeding	05432	199	614	5
Kings River	00048	12,192	1,459,993	5
Kingston	10042	2,720	78,881	2
Klondike	00124	4,606	85,496	5
Klondike	01085	681	7,072	4
Knott Creek	00065	5,936	64,062	5
Lake Area	00910	2,978	27,556	1
LDS	05433	128	1,097	5
LDS FFR	05485	109	693	5
Lead Hills	04321	3,314	79,936	3
Leadville	00141	1,291	54,013	5
Legarza FFR	05407	4	19	5
Leppy Hills	04322	2,257	49,013	3
Lime Mountain Field	01017	1,769	8,836	5
Lindsay Creek	05434	1,349	9,313	5
Little Goose Creek	03227	6,282	69,447	5
Little Horse Creek	00050	524	3,556	5
Little Humboldt	01018	8,279	68,879	5
Little Mountain	00414	399	18,575	N/A
Little Owyhee	00036	27,800	560,815	5
Little Porter	05435	288	3,595	5
Little Porter FFR	05478	24	105	5
Little White Rock	00913	904	13,012	5
Lone Mountain	02113	7,202	32,927	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Long Canyon	00020	1,695	27,025	5
Long Field	02133	209	4,892	5
Lovell Peak	00406	105	2,360	4
Lucky C	10043	3,054	108,666	2
Mahala Creek	02114	2,857	19,250	5
Majors Allotment	10126	12,535	99,193	5
Majuba	00140	3,325	186,083	5
Manhattan Mtn.	10005	1,746	63,234	5
Martin Creek	00068	300	6,160	5
Marys Mountain	01020	1,408	15,184	5
Mason Mountain	02115	186	839	5
Maverick Springs	00621	1,500	42,679	4
Maverick/Ruby#9	04323	2,774	61,037	3
Mccoy Creek	10135	504	5,289	5
Mccutcheon Springs	01054	446	18,276	1
Mckinley FFR	02128	727	5,651	5
Mcqueen Flat	00805	495	10,403	1
Meadow Creek	10113	444	8,273	5
Medicine Butte	00501	7,701	287,368	2
Melody	00103	1,020	4,048	5
Merkley FFR	05419	250	3,414	5
Merkley-Zunino Seeding	05437	139	1,950	5
Metropolis	03228	2,510	23,947	5
Metropolis Seeding	03229	1,126	2,455	1
Mexican Field	02117	546	2,979	5
Midas	01038	711	3,992	5
Middle Steptoe	00411	173	2,361	4
Mill Spring	10109	341	5,587	4
Mineral Hill	05439	1,555	24,907	5
Mitchell Creek	05440	1,301	18,420	5
Monitor	00077	0	92,463	5
Monte Cristo	00614	1,129	6,138	4
Moor Summit	04325	280	7,190	5
Moorman Ranch	00802	4,740	123,491	4
Morey	00083	1,304	72,806	5
Morgan Hill	03230	1,269	13,652	5
Mori	01022	2,245	9,753	5
Mount Airy	10020	3,651	80,093	5
Mountain Well-Laplat	03039	8,004	137,683	3
Mud Springs	03242	196	1,852	5
Mullinix	00030	133	1,485	5
Muncy Creek	20111	12,384	207,906	5
Murphy Wash	03503	728	54,307	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
N4/N5	01049	825	43,500	1
Needles	11016	2,679	85,500	4
Negro Creek	00120	3,727	31,985	4
New Pass	03038	177	4,328	5
Newark	00608	9,709	218,105	2
North Buffalo	02145	3,447	55,071	5
North Butte	00502	180	26,467	4
North Butte Valley	04308	2,424	30,993	3
North Diamond	10034	3,579	78,892	2
North Fork Group	02118	16,068	116,336	5
North Four Mile	02136	4,372	25,024	5
North Preston	04097	97	3,113	5
North Steptoe	00405	700	12,701	3
North Steptoe Trail	00426	252	1,181	5
Nyala	00088	13,255	321,274	5
Oak Springs	01050	9,276	193,609	4
Odgers	04328	0	25,304	5
Ogilvie - Orbe	05441	1,573	7,987	5
Olinghouse	03041	696	23,162	1
O'neil	03231	9,663	66,099	5
Osgood	00038	4,965	48,535	5
O'toole Ranches	10018	1,006	11,684	5
Owyhee	01024	23,247	370,300	2
Pah Rah	03042	184	4,504	5
Paiute Canyon	03043	4,800	71,514	5
Paiute Meadows	00057	3,549	168,538	5
Palacio	05443	369	993	5
Palisade	01021	1,336	10,635	5
Panaca Cattle	01053	453	16,275	4
Paradise Hill	00022	2,191	21,712	5
Pearl Creek	05444	659	1,436	5
Peck	01055	408	17,741	5
Petan Owyhee Unit	01019	2,094	12,604	5
Pilot	04330	4,430	101,126	3
Pilot Valley	03219	5,008	43,825	5
Pilot-Table Mountain	03574	5,667	512,449	5
Pine Creek	05445	150	14,771	5
Pine Creek	11012	2,667	34,693	4
Pine Forest	00054	9,700	136,200	5
Pine Mountain	05446	5,550	30,406	5
Pioche	01086	402	13,440	2
Pleasant Valley	00114	10,553	173,400	5
Plumas Station	03047	307	5,432	3

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Pole Creek	00008	2,988	34,348	5
Pole Creek	03232	597	5,301	5
Pony Creek	05447	1,629	16,176	5
Porter Canyon	10013	7,241	125,150	3
Potato Patch	05448	748	3,337	5
Potts	10045	9,262	167,600	5
Preston	00806	190	10,250	4
Preston Lund Trail	00822	1,569	10,856	4
Provo	00149	1,120	9,878	5
Pueblo Mountain	00046	2,137	33,648	5
Pumpernickel	00116	9,417	126,142	5
Quarter Circle S	01030	5,191	2,286	5
Rabbit Creek	03233	1,072	5,464	5
Rabbit Spring	01057	884	20,975	5
Ragged Top	00131	0	85,920	5
Railroad Field	03243	113	1,550	5
Railroad Pass	00601	3,542	27,025	2
Ralston	00076	0	368,682	5
Rattlesnake Canyon	02119	2,592	10,393	5
Rebel Creek	00012	990	8,376	5
Red Hills	00108	2,600	35,489	5
Red Rock	03014	454	3,560	1
Red Rock	05452	7,335	66,323	5
Reveille	00085	25,730	657,520	2
River	05453	210	4,978	5
Road Side	01061	32	1,123	1
Roberts Mountain	10046	9,624	151,060	5
Robinson Creek	05454	2,694	17,263	5
Robinson Mountain	05455	3,002	18,661	5
Robinson Mountain FFR	05486	36	262	5
Rock Canyon	00808	432	7,256	5
Rock Creek	00101	2,392	23,275	5
Rodeo Creek	00129	5,540	193,215	5
Romano	10047	2,887	76,070	4
Rough Hills	02121	887	5,233	5
Ruby #1	04332	170	395	1
Ruby #2	04333	236	818	1
Ruby #3	04334	683	5,151	1
Ruby #4	04335	257	1,055	1
Ruby #5	04336	2,058	15,651	1
Ruby #6	04337	1,563	15,061	5
Ruby #7	04338	1,405	10,870	1
Ruby #8	04339	1,963	29,063	1

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Ruby Hill	10048	1,286	14,659	1
Ruby Valley	00619	467	20,081	4
Rye Patch	00106	1980	40,019	5
Sacramento Pass	00123	1,945	40,582	5
Safford Canyon	05456	1,342	7,972	5
Salmon River	03234	27,304	278,157	3
Salt Wells	03050	1,626	58,611	3
Sampson Creek	10105	1,327	13,232	5
San Antone	00072	13,505	442,555	5
San Juan	10023	9,169	64,988	5
Sand Dunes	00060	2,839	87,634	5
Sand Pass	00042	540	20,985	5
Sand Springs	10086	5,727	203,868	4
Sandhill North	05457	330	1,242	5
Sandhill South	05458	173	615	5
Santa Fe/Ferguson	10049	6,410	84,375	5
Sawmill Bench	00807	114	319	2
Sawmill Canyon	01067	192	9177	4
Schellbourne	00407	685	16,316	4
Schoolhouse Spring	00420	191	7,033	4
Scott Spring	00040	419	22,764	5
Scotts Gulch	05459	1211	10,288	5
Scotty Meadows	10128	1,227	17,322	5
Second Creek	00417	358	7,776	4
Seven Mile	10050	5,573	88,420	2
Shannon Station	10051	2,520	32,888	2
Sheep Pass	00905	1,150	26,800	5
Sheep Spring	01070	407	31,077	5
Sheep Trail Seeding	00829	200	564	4
Shingle Creek	09436	575	9302	5
Shingle Pass	00906	2,724	74,788	4
Shoshone	05461	2,888	7,740	5
Shoshone Unit Trail	10140	483	16,517	5
Silverado	00623	338	6,284	4
Simpson Park	10052	3,446	97,167	2
Singus	00024	350	2,774	5
Six Mile	00613	1,209	21,335	4
Six Mile	01026	184	849	5
Six Mile Ranch	00814	162	2,232	4
Sleeman	05462	1,392	5,456	5
Smiley	04342	409	3,546	5
Smiraldo	05463	747	2,811	5
Smith Creek	20117	5,355	68,072	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Smoky	00074	5,593	125,247	2
Snow Water Lake	04343	1,106	12,599	5
Snowball	10053	991	27,261	2
Soldier Meadows	00128	12,168	331,691	5
Solid Silver	00028	246	1,901	5
Sonoma	10102	1,485	20,089	5
Sorensen Well	00818	193	5,880	5
South Buckhorn	05465	19,094	222,822	5
South Buffalo	00142	122	229,587	5
South Butte	00504	396	26,081	4
So. Butte Seeding	00506	245	968	1
Southfork FFR	05464	47	1,026	5
South Four Mile	02135	2,778	1,981	5
South Pancake	00615	1,155	31,088	4
Rochester	00117	3,177	170,807	5
South Smith Creek	20010	5,331	149,857	5
South Spring Valley	10130	6,329	79,323	5
Spanish Gulch	10054	647	5,985	2
Spanish Ranch	01023	22,201	142,173	5
Spanish Spr/Mustang	03052	1,542	25,521	3
Spratling	03235	1,013	5,449	5
Spring Creek	00034	2,488	22,791	5
Spruce	04346	10,965	534,447	3
Squaw Valley	01025	26,796	212,105	5
Stag Mountain	03236	8,273	40,000	5
Star Peak	00118	3,075	83,656	5
Stephens Creek	10118	318	3,784	5
Steptoe	00415	2,836	44,025	2
Steven's	02137	479	2,095	5
Stone Cabin	00082	13,963	389,499	5
Stone Flat	02123	717	3,117	5
Stone Flat Fenced Fr	02130	41	273	5
Stormy	03237	8,836	50,671	3
Strawberry	00607	1,032	21,135	2
Sugar Loaf	00045	602	5,567	5
Sunnyside	21023	5,402	219,519	4
Swamp Cedar	00832	192	6,333	5
Sweeney Wash	10055	478	7,220	2
T Lazy S	01027	11,907	68,797	5
Taft Creek	10116	1,831	28,294	4
Tamberlaine	00901	0	31,692	5
Taylor Canyon	01014	2,369	8,672	5
Ten Mile Creek	05466	343	5,636	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Thirty Mile Spring	00503	8,405	178,716	2
Thomas Creek	05467	1,078	4,857	5
Thomas Creek	10107	533	11,780	5
Thomas Creek FFR	05483	60	130	5
3-Bars	00064	5,840	76,740	5
Three Mile	10056	850	26,635	2
Tierney Creek	10022	817	17,642	5
Tippett	10106	7,092	200,041	5
Tippett Pass	20107	8,177	77,161	5
Tobar	04348	1,698	16,186	5
Tom Plain	00803	4,439	77,039	1
Tonka	05468	1,614	20,266	5
Town Creek	03238	1,110	5,507	5
Trail Canyon	10057	581	24,298	5
Trout Creek	03239	642	2,129	5
Tuscarora	01031	9,166	49,303	5
25 Allotment	01032	34,130	309,390	5
Twin Bridges	05469	358	1,668	5
Twin Creek East	05470	646	2,608	5
Twin Creek North	05471	747	2,670	5
Twin Creek South	05472	390	1,274	5
U C	00005	12,902	45,248	5
Underwood	10058	1,462	19,832	5
Union Mountain	05473	1,759	20,940	5
Upper Quinn River	00015	435	6,292	5
Valley Mountain	03248	4,532	260,930	3
Vn Pocket Petan	01039	983	6,623	5
Vn Pocket-Allied	01033	1,310	8,613	5
W & C Ruby #9 FFR	04359	70	188	1
Wagon Johnnie	00079	1,219	28,157	5
Walther	05474	47	198	5
Warm Creek	04349	118	1,537	5
Warm Springs	00606	7,709	306,971	4
Warm Springs	01080	74	1,401	1
Warm Springs Trl	00622	2,480	16,385	4
Washburn	10001	1,465	32,203	5
Washington Creek	10022	360	10,976	5
Wells	03240	494	2,658	5
Wells Station	00819	312	13,926	5
West Big Springs	00152	3,651	107,946	3
West Buckhorn	03210	2,586	22,017	5
West Cherry Creek	04350	2,674	62,939	5
West Schell Bench	00433	1,389	25,915	5

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Westside	03241	1,725	7,232	5
White Cloud	03057	1,884	79,663	1
White Flats FFR	02120	110	2,519	5
White Hills	01082	101	2,755	3
White Hills	03058	1,206	25,875	3
White Horse	00143	1,969	21,973	5
White Horse	04353	2,154	61,335	3
White River Trail	11005	1,505	19,300	4
White Rock	00902	5,622	80,513	2
White Rock	02124	795	5,318	5
Whiteman Creek	00408	384	5,417	4
Wild Horse Group	02125	5,095	29,478	5
Wildcat Canyon	10060	2,677	65,658	5
Wilder-Quinn	00047	14,379	188,274	5
Willard Creek	10127	438	10,246	4
William Stock	00035	5,905	63,989	5
Willow	05475	546	5,238	5
Willow Creek	00081	338	12,691	5
Willow Creek Pockets	05477	675	6,684	5
Willow Race Track	10061	252	590	5
Willow Ranch	00062	3,621	63,510	5
Willow Spr Addition	00825	103	660	4
Willow Spr Seeding	00824	63	300	4
Willow Springs	10129	6,608	46,967	5
Wilson Creek	01201	44,587	1,077,994	1
Wilson FFR	05484	188	1,398	5
Wilson Mountain	01035	308	3,168	5
Winnemucca Ranch	03059	3,230	43,457	5
Wood Hills	04354	815	38,466	5
Y P Allotment	01037	13,023	97,111	5
Total		**1,791,226**	**33,467,227**	

Source: BLM 2012, and BLM and Forest Service GIS 2015

Category 1—Information indicates standards met
Category 2—Determination signed, livestock a causal factor
Category 3—Determination not signed but information indicates possible grazing conflict
Category 4—One or more standards not achieved; livestock not a cause
Category 5—Determination not complete

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
BLM NORTHERN CALIFORNIA DISTRICT				
South Tablelands	00101	2,504	15,932	3
Russell Slough/Capik	00105	167	1,517	4
Portuguese Flat	00109	521	3,516	2
Blacks Canyon Rim	00127	59	823	3
Neer	00131	882	77	3
XL	00133	120	1,747	3
Prock	00134	58	548	3
Pine Creek Mesa	00135	257	2,390	3
North Tablelands	00137	3,612	24,202	3
Yankee Jim	00138	300	1,400	3
Thomas Creek	00140	69	467	3
Westside	00146	515	5,095	1
Pine Creek Field	00148	18	320	3
Corbie Field	00150	27	173	3
Loomis	00200	84	670	2
Chase Valley	00203	214	2,460	3
Dixie Valley	00205	1,291	16,332	2
Bald Mountain	00206	677	9,547	2
Haury	00211	64	769	3
South Juniper	00217	32	507	3
Silva Flat	00218	1,247	14,750	1
Indian Peak	00229	44	694	3
North Juniper	00232	263	1,753	3
Butte Creek	00236	42	511	3
Daisy Dean Spring	00237	37	1,025	3
Thompson	00244	613	5,460	2
Muck Valley	00246	1,371	12,186	2
Hencraft Field	00248	154	1,222	3
North Mitchell Hill	00299	400	4,055	2
North Ash Valley	00300	2,510	17,465	1
Cold Springs	00302	2,574	17,661	1
Crabtree	00303	15	340	1
Cramer	00304	36	645	3
South McDonald	00305	930	11,607	1
Dry Cow	00306	920	5,203	1
Rocky Prairie	00308	537	10,182	1
Tule Mountain	00310	7,606	49,376	3
Nelson Corral	00311	1,802	12,849	1
Warm Springs	00312	128	949	3
South Ash Valley	00316	1,714	15,467	1
Fillman-Diablo	00319	151	1,490	3
McDonald Mountain	00320	2,608	14,874	1

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
South Mitchell Hill	00321	460	3,593	2
Lower Highway	00322	90	640	3
Said Valley	00323	110	826	2
Dry Valley	00324	274	1,960	3
South Fork	00325	947	3,804	4
Summit Field	00326	146	1,238	3
Williams Allotment	00328	84	1,791	1
Brockman	00329	70	1,195	3
Coffin Allotment	00330	70	1,457	3
Walton Individual	00401	94	920	2
Said Valley	00402	232	1,483	2
Grasshopper Ridge	00403	204	4,165	2
Dry Valley South	00404	20	398	2
New Bailey Creek	00405	2,022	17,360	2
Williams Individual	00406	519	3,080	4
Rave A.M.P.	00407	2,848	29,691	2
North Horse Lake	00408	1,968	24,300	2
Slate Creek AMP	00409	2,132	31,855	2
Bucks Bay	00410	840	5,404	3
Crest	00413	154	11,835	2
Snowstorm	00414	3,605	45,480	2
Erick Allotment	00415	232	2,280	2
Wood Individual	00416	253	2,499	2
Cottonwood Fenced	00417	150	1,680	2
Stone Individual	00418	50	928	3
Walsh Mountain	00419	291	5,260	3
Barron Individual	00420	121	4,000	2
South Horse Lake	00421	3,036	41,720	2
Humphrey 3-C	00422	306	2,945	2
Tablelands	00423	2,354	16,052	4
Coffin Individual	00424	194	1,559	3
Rice Canyon	00425	715	11,520	3
Willow Creek	00426	234	7,124	3
Shaffer Mountain	00427	1,613	25,752	2
Ulch	00503	24	240	3
East Bald Mountain	00507	148	3,000	4
North Fort Sage	00510	189	6,410	2
West Fort Sage	00511	502	6,532	4
South Fort Sage	00512	127	4,879	1
Twin Peaks	00701	13,430	379,788	2
Winter Range Nevada	00702	1,504	45,393	4
Observation	00703	6,968	151,639	2
Deep Cut	00704	2,426	53,438	1

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Spanish Springs Individual	00708	259	958	2
Twin Buttes	00709	210	2,160	2
Spanish Springs AMP	00710	1,103	6,986	2
Shinn Peak	00711	270	4,725	2
Selic-Alaska	00800	821	4,982	3
Tuledad	00802	5,320	143,307	2
Red Rock Lake	00803	198	990	3
Bare	00900	13,260	193,211	2
Duck Lake	00901	3,284	60,625	1
Denio	00902	1,542	23,515	3
Home Camp	00903	9,088	142,434	1
Highway	00904	25	1,360	3
Lower Lake	00905	483	20,331	3
Wall Canyon (West)	00906	2,609	36,475	2
Bicondoa	00907	200	10,845	4
Corral	00908	88	1,560	3
Boggs	01001	1,483	18,734	2
Bull Creek	01002	2,178	65,716	1
Little Basin	01004	1,857	28,776	2
Long Valley	01005	2,660	59,079	2
Bitner	01006	1,702	24,640	2
Massacre Lakes	01007	3,215	44,480	1
Massacre Mountain	01008	4,200	121,381	3
McCulley	01009	28	1,000	2
Nut Mountain	01010	4,893	74,721	1
Sand Creek	01012	3,563	65,716	2
Granger	01013	30	440	3
Wall Canyon (East)	01014	3,215	49,227	1
Upper Sand Creek	01015	42	480	2
Alkali Lake	01017	11	160	3
Calcutta	01100	778	10,260	2
Bally Mountain	01101	198	1,700	2
Board Corral	01102	690	15,330	1
South Larkspur	01103	1,040	17,243	2
East	01106	510	8,700	2
Crooks Lake	01107	2,880	35,277	2
Lartirigoyen	01108	364	988	2
Gravelly	01110	270	2,270	2
Mosquito Valley	01111	2,203	19,751	2
Nevada Coleman	01112	4,477	55,701	2
Nevada Cowhead	01113	2,880	38,460	1
North Cowhead	01114	453	3,983	2
North Larkspur	01115	150	5,432	2

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
12 Mile	01116	192	970	2
Warner Valley	01117	321	3,165	2
East Bally Mountain	01119	58	731	2
Scammon	01121	57	440	2
Ninemile	01123	30	440	2
Upper Lake	01125	168	759	2
Horse Lake	01126	2,124	31,417	3
Winter Range California	03737	617	11,388	4
Bloody Point	01308	175	956	2
Bryant Mountain	01309	495	2,570	3
Lava Flow	01317	139	965	3
Casuse Mountain	01325	30	195	3
North Bloody Point	01327	5	80	2
Cloud	10104	9	80	3
Strip	10106	246	7,398	2
Ryegrass Swale	10108	225	4,244	4
Fisher	10111	28	511	3
South Graves	10112	1,487	12,950	2
West Field	10114	25	864	2
East Field	10115	467	4,520	2
Crowder	10117	161	2,088	2
North Graves / Mackey	10118	421	3,901	2
Lakeshore	10119	10	516	3
Hagge	10120	33	400	3
Kelley	10122	7	80	3
Rimrock	10123	282	2,446	4
Total		**181,471**	**2,773,552**	

Source: BLM 2008a, 2008b, 2008c

Category 1—Areas where one or more standards have not been met, nor has significant progress been made toward meeting the standards, and livestock grazing is a significant factor.
Category 2—Areas where all standards have been met or significant progress has been made toward meeting the standards.
Category 3—Areas where one or more of the standards is not known or the cause of the failure to meet the standards is not known.
Category 4—Areas where one or more standards have not been met, nor has significant progress been made toward meeting the standards due to causes other than (or in addition to) livestock grazing. (Allotments where livestock grazing is the primary cause for failure are also included in Category 1.)

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
FOREST SERVICE				
76 Creek	00152	1,123	2,022	N/A
Allied C&H	00136	1,866	17,647	N/A
Angel Creek C&H	00235	143	459	N/A
Bade Flat	30300	1,527	3,685	N/A
Badger Creek	00150	413	6,913	N/A
Beadles Creek	00126	0	4,686	N/A
Beaver Creek	00142	358	7,131	N/A
Belmont C&H	00201	529	2,786	N/A
Berry Creek (Com.Use)	00421	782	5,306	N/A
Big Creek	00412	0	208	N/A
Birch Creek	30301	677	2,070	N/A
Black Rock	00403	540	3,015	N/A
Blue Jacket	00127	1,164	3,927	N/A
Boneyard (Com.Use)	00419	767	4,478	N/A
Boulder Creek Cu	00241	79	1,409	N/A
Bradshaw C&H	N/A	N/A	3,470	N/A
Brennan Creek C&H	00234	37	1,911	N/A
Bruneau Summer	00100	688	4,834	N/A
Buck Creek C&H	00302	5,149	4,120	N/A
Buffalo	00513	824	4,146	N/A
Bull Run	00102	1,993	9,044	N/A
Bunker	30323	1,504	178	N/A
Bureau C&H	00247	154	2,404	N/A
Burger Creek C&H	00242	44	661	N/A
Buttermilk	00501	3,225	35,483	N/A
Cahill	30314	1,010	3,801	N/A
Camp Creek S&G	00318	0	7,300	N/A
Carville Creek C&H	00211	1,959	11,929	N/A
Cass House Cu	00296	44	519	N/A
Cat Creek	00103	3,947	11,975	N/A
Caudle Creek C&H	00303	4,652	12,748	N/A
Cave Creek C&H	00203	795	3,364	N/A
Cherry Creek	00413	1,278	3,162	N/A
Cherry Creek C&H	00333	2,023	4,214	N/A
Cherry Springs C&H	00204	1,504	479	N/A
Chicken Creek	00104	2,589	9,345	N/A
Clear Creek C&H	00165	626	2,738	N/A
Cleve Creek	00432	826	2,913	N/A
Clover Creek C&H	00227	75	585	N/A
Cloverdale Winter	40400	338	1,852	N/A
Cloverdale-Reese River	40401	326	36,157	N/A
Cobb Creek	00133	370	1,639	N/A

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Columbia Basin	00134	1,164	5,186	N/A
Cooper	00417	1,743	2,041	N/A
Copper Basin	00135	14,974	74	N/A
Copper-Cottonwood	00157	0	1,389	N/A
Corral Creek C&H	00205	1,584	10,975	N/A
Corta S&G	00243	5,584	23,080	N/A
Cottonwood C&H	00249	664	4,437	N/A
Cottonwood Creek C&H	00304	557	11,885	N/A
Currant Creek	00405	1,382	1,789	N/A
Dave Creek C&H	00307	1,628	1,318	N/A
Deep Creek C&H	00166	895	11,099	N/A
Deer Creek C&H	00334	1,828	4,579	N/A
Diamond A	00105	1,378	8,536	N/A
Drown Peak C&H	00233	401	141	N/A
Dry Creek	00106	428	1,289	N/A
Duck Creek (Com.Use)	00420	796	1,704	N/A
East Blue Jacket	00138	1,164	3,887	N/A
East Independence	00107	1,614	22,989	N/A
East Ward	00406	266	143	N/A
Eight Mile	00502	0	7,987	N/A
Elkhorn	30302	1,076	15,765	N/A
Ellison Basin	00404	1,901	15,512	N/A
Fitzhugh	00424	962	2,116	N/A
Foreman Creek	00108	2,986	19,155	N/A
Francisco C&H	40416	158	1,382	N/A
Gedney Creek C&H	00208	273	940	N/A
Gilbert Creek C&H	00209	599	8,141	N/A
Goat Creek Cu	00322	232	2,472	N/A
Gold Park	30303	1,300	337	N/A
Granite Peak	00503	6,060	31,896	N/A
Gravel Creek	00161	1,104	4,679	N/A
Greys Creek C&H	00212	230	46	N/A
Guerry Sheep S&G	00326	4,333	15,163	N/A
Harrison Pass C&H	00213	1,043	2,969	N/A
Haystack Mtn	00129	1,914	10,792	N/A
Herder Creek C&H	00200	83	1,947	N/A
Hole In The Mountain C&H	00210	403	4,789	N/A
Home Place C&H	00256	116	762	N/A
Hooper Canyon	00411	0	608	N/A
Horse Creek C&H	00214	998	8,428	N/A
Horse Heaven C&H	30304	668	1,060	N/A
Hot Creek	40420	0	1,120	N/A
Hot Springs Winter	30305	997	33,090	N/A

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Humboldt Peak C&H	00236	409	5,539	N/A
Illipah	00401	895	22,318	N/A
Indian	00504	1,398	18,675	N/A
Irwin Canyon	00409	0	155	N/A
Jack Creek	00140	1,089	7,785	N/A
Jerrett Canyon S&G	00141	0	5,235	N/A
Jerritt Canyon C&H	00109	377	4,791	N/A
Kelly Creek/North Monitor	30306	0	26,662	N/A
Kingston	30307	0	1,043	N/A
Krenka Creek C&H	00220	371	1,241	N/A
Lake Flat	30345	210	21,631	N/A
Lamance	00505	1,314	5,858	N/A
Lamoille Canyon	00262	0	150	N/A
Lindsay-Brown C&H	00264	748	4,910	N/A
Little Fish Lake	40402	545	25,481	N/A
Lower Marys River C&H	00308	0	11,547	N/A
Lutts Creek C&H	00216	1,397	2,900	N/A
Martin Basin	00506	9,685	28,701	N/A
Marys River Basin S&G	00324	793	469	N/A
Marysville C&H	30308	1,617	11,102	N/A
Mayhew C&H	00239	465	1,152	N/A
Mc Donald Cr	00110	1,936	13,883	N/A
Mccoy	00430	791	241	N/A
Meadow Canyon	40422	0	36,239	N/A
Merritt Creek	00112	5,474	10,202	N/A
Mica C&H	00240	747	5,874	N/A
Mill Creek	00113	70	1,180	N/A
Miller Creek	00125	2,794	6,318	N/A
Monitor Complex	40403	1,733	13,977	N/A
Monitor Valley (East And West)	40417	0	19,476	N/A
Monitor Winter	30309	1,188	26,419	N/A
Moores Creek C&H	40406	371	13,164	N/A
Morey	40421	0	5,275	N/A
Mose Creek C&H	00217	636	1,229	N/A
Mountain City	00114	234	15,339	N/A
Muncy	00428	1,058	11,752	N/A
Murphy Wash	N/A	N/A	3,633	N/A
Myers Creek C&H	00218	850	1,241	N/A
North Copper Mtn	00146	0	686	N/A
North Fork	00507	1,282	5,857	N/A
North Huntington C&H	00207	11	850	N/A
North Monitor Winter	30311	198	5,922	N/A
North Moores Creek (Winter)	40407	998	13,637	N/A

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
North Shoshone	30312	5,312	7,615	N/A
Northumberland	30313	930	1,279	N/A
O'neil C&H	00309	2,742	4,914	N/A
Overland C&H	00221	465	423	N/A
Pablo Wall Canyon C&H	40408	132	11,260	N/A
Paradise	00508	2,235	4,405	N/A
Piermont	00429	1,048	9,619	N/A
Pine Creek Quinn Canyon	00414	1,376	43	N/A
Pixley Creek	00122	2,090	13,683	N/A
Polar Star C&H	00222	148	6,338	N/A
Pole Canyon C&H	00251	91	9,710	N/A
Pole Creek C&H	00310	2,196	4,460	N/A
Queen Springs (Com.Use)	00425	936	8,546	N/A
Quinn River	00509	13,886	56,243	N/A
Rebel Creek	00510	1,008	4,162	N/A
Reeds/Indian Canyon C&H	30315	1,832	4,387	N/A
Riffe Creek C&H	00164	1,261	5,469	N/A
Road Canyon C&H	00244	455	1,629	N/A
Robinson Hole C&H	00335	202	3,000	N/A
Rockwall C&H	00245	269	3,181	N/A
Round Mountain (Winter)	40415	315	N/A	N/A
Ruby C&H	00206	2,188	8,346	N/A
Ruby Guard C&H	00202	638	2,970	N/A
Ruby Mattier	00427	722	11,206	N/A
Schmitt Creek	00116	991	7,057	N/A
School Creek C&H	00223	822	3,255	N/A
Segunda C&H	00237	219	53	N/A
Seigel (Com.Use)	00426	874	11,113	N/A
Seitz C&H	00274	253	244	N/A
Sherman Creek C&H	00224	1,496	4,624	N/A
Silver Creek	00434	758	2,276	N/A
Slaughterhouse	00130	466	1,262	N/A
Smith Creek C&H	00276	539	4,008	N/A
Snow Canyon	00147	1,337	12,591	N/A
South Clover C&H	00225	86	1,502	N/A
South Copper Mtn	00145	0	134	N/A
South Fork C&H	00226	523	2,343	N/A
South Kingston	30325	1,504	3,855	N/A
South Monitor	30316	0	93,780	N/A
South Shoshone	30317	2,377	48,484	N/A
Spring Creek C&H	00311	2,855	7,515	N/A
Steptoe	00418	566	144	N/A
Stone Cabin	40412	197	3,618	N/A

Table R-1
BLM and Forest Service Grazing Allotment Data

Allotment Name	Allotment Number	Permitted Active AUMs	Allotment Acres	Rangeland Health Category
Stoneberger	30318	1,098	54,364	N/A
Strawberry	N/A	N/A	205	N/A
Sun Creek S&G	00327	417	5,626	N/A
Sunflower Flat	00117	4,495	20,310	N/A
Table Mountain C&H	40413	0	11,937	N/A
Taft	00431	499	626	N/A
Telephone C&H	00169	1,500	14,680	N/A
Tennessee Mountain S&G	00170	2,707	6,679	N/A
Tent Mountain C&H	00228	397	6,366	N/A
Thorpe Creek	00272	1,129	1,939	N/A
Tierney Creek C&H	30319	1,415	5,460	N/A
Timber Creek	00422	1,936	11,619	N/A
Timber Gulch	00118	502	2,722	N/A
Tom Plain	00402	2,647	20,345	N/A
Toyn Creek C&H	00231	1,134	4,617	N/A
Treasure Hill	00400	2,198	40,513	N/A
Trout Creek C&H	00229	519	619	N/A
Troy Mountain	00410	719	3,017	N/A
Twin Rivers	40414	0	135	N/A
Upper Marys River S&G	00328	793	529	N/A
Van Duzer	00162	2,167	6,842	N/A
Wagon Johnnie	40418	4,486	91,381	N/A
Washington	30320	2,616	16,612	N/A
West Bruneau River	00148	4,443	13,545	N/A
West Marys River S&G	00329	661	2,603	N/A
West Northumberland	N/A	N/A	451	N/A
West Side Flat Creek	00511	1,720	5,659	N/A
White Elephant C&H	00313	985	5,614	N/A
White Rock C&H	00121	6,275	8,112	N/A
Whiterock S&G	00155	1,164	3,244	N/A
Wickiup	00156	1,610	5,159	N/A
Wild Bill	00512	3,159	11,882	N/A
Wildcat C&H	00314	3,780	5,072	N/A
Wildhorse C&H	20226	2,647	15,494	N/A
Wildhorse S&G	00151	0	4,467	N/A
Willow Creek C&H	00315	0	6,865	N/A
Wilson Creek C&H	00316	1,688	5,790	N/A
Wilson Creek Pasture C&H	00317	1,426	4,486	N/A
Wines Creek C&H	00230	647	1,076	N/A
Wiseman C&H	00292	166	3,510	N/A
Wood Gulch	00163	1,639	6,653	N/A
Yankee Bill	00123	1,737	3,864	N/A
Total		***278,253***	***1,792,696***	

This page intentionally left blank.

BLM NEVADA RESOURCE ADVISORY COUNCIL STANDARDS AND GUIDELINES

Mojave-Southern Great Basin Standards and Guidelines

This page intentionally left blank.

Standards and Guidelines for Nevada's Mojave-Southern Great Basin Area

September 2006

PREAMBLE - GRAZING

The Standards and Guidelines for grazing administration on Bureau of Land Management (BLM) lands in southern Nevada apply to livestock grazing. The Mojave-Southern Great Basin Resource Advisory Council (RAC) intends that the Standards and Guidelines will result in a balance of sustainable development and multiple use along with progress, over time, toward attaining desired rangeland conditions. Standards are expressions of physical and biological conditions required for sustaining rangelands for multiple uses. Guidelines point to management actions related to livestock grazing for achieving the Standards. Guidelines are options that move rangeland conditions toward the multiple use Standards. Guidelines are based on science, best rangeland management practices, and public input. Thus Guidelines indicate the types of grazing methods and practices for achieving the Standards for multiple use, are developed for functional watersheds and implemented at the allotment level.

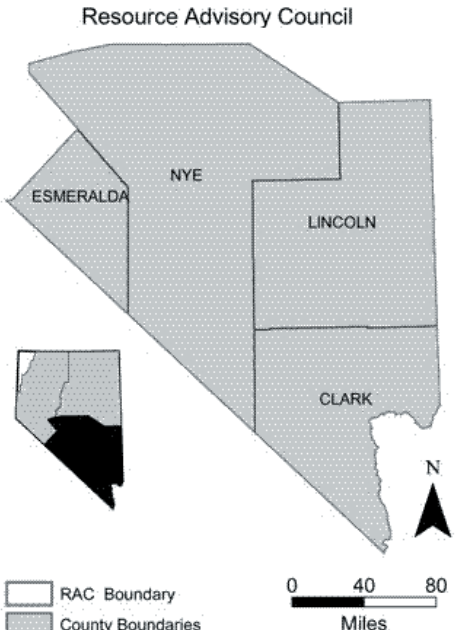
The Mojave-Southern Great Basin Resource Advisory Council recognizes that it will sometimes be a long-term process to restore rangelands to proper functioning condition. In some areas, it may take many years to achieve healthy rangelands.

The Resource Advisory Council may be requested by any party to assist reaching agreement in resolving disputes.

STANDARDS AND GUIDELINES

STANDARD 1. SOILS:

Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.



Soil indicators:
- Ground cover (vegetation, litter, rock, bare ground);
- Surfaces (e.g., biological crusts, pavement); and
- Compaction/infiltration.

Riparian soil indicators:
- Stream bank stability.

All of the above indicators are appropriate to the potential of the ecological site.

GUIDELINES:

1.1 Upland management practices should maintain or promote adequate vegetative ground cover to achieve the standard.

1.2 Riparian-wetland management practices should maintain or promote sufficient residual vegetation to maintain, improve, or restore functions such as stream flow energy dissipation, sediment capture,

groundwater recharge, and streambank stability.

1.3 When proper grazing practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate.

1.4 Rangeland management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

STANDARD 2. ECOSYSTEM COMPONENTS:

Watersheds should possess the necessary ecological components to achieve state water quality criteria, maintain ecological processes, and sustain appropriate uses.

Riparian and wetlands vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function).

Upland Indicators:
- Canopy and ground cover, including litter, live vegetation, biological crust, and rock appropriate to the potential of the ecological site.

- Ecological processes are adequate for the vegetative communities.

Riparian Indicators:
- Stream side riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows.

- Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics:
- Width/Depth ratio;
- Channel roughness;
- Sinuosity of stream channel;
- Bank stability;
- Vegetative cover (amount, spacing, life form); and
- Other cover (large woody debris, rock).

- Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.

Water Quality Indicators:
- Chemical, physical and biological constituents do not exceed the state water quality standards.
The above indicators shall be applied to the potential of the ecological site.

GUIDELINES:

2.1 Management practices should maintain or promote appropriate stream channel morphology and structure consistent with the watershed.

2.2 Watershed management practices should maintain, restore or enhance water quality and flow rate to support desired ecological conditions.

2.3 Management practices should maintain or promote the physical and biological conditions necessary for achieving surface characteristics and desired natural plant community.

2.4 Grazing management practices will consider both economic and physical environment, and will address all multiple uses including, but not limited to, (i) recreation, (ii) minerals, (iii) cultural resources and values, and (iv) designated wilderness and wilderness study areas.

2.5 New livestock facilities will be located away from riparian and wetland areas if they conflict with achieving or maintaining riparian and wetland functions. Existing facilities will be used in a way that does not conflict with achieving or maintaining riparian and wetland functions, or they will be relocated or modified when necessary to mitigate adverse impacts on riparian and wetland functions. The location, relocation, design and use of livestock facilities will consider economic feasibility and benefits to be gained for management of lands outside the riparian area along with the effects on riparian functions.

2.6 Subject to all valid existing rights, the design of spring and seep developments shall include provisions to protect ecological functions and processes.

2.7 When proper grazing practices alone are not likely to restore areas of low infiltration or permeability, land management practices may be designed and implemented where appropriate. Grazing on designated ephemeral rangeland watersheds should be allowed only if (i) reliable estimates of production have been made, (ii) an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and (iii) adverse effects on perennial species and ecosystem processes are avoided.

2.8 Rangeland management practices should address improvement beyond these standards, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

STANDARD 3. HABITAT AND BIOTA:

Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Habitat Indicators:
- Vegetation composition (relative abundance of species);
- Vegetation structure (life forms, cover, height, and age classes);
- Vegetation distribution (patchiness, corridors);
- Vegetation productivity; and
- Vegetation nutritional value.

Wildlife Indicators:
- Escape terrain;
- Relative abundance;
- Composition;
- Distribution;
- Nutritional value; and
- Edge-patch snags.

The above indicators shall be applied to the potential of the ecological site.

GUIDELINES:

3.1 Mosaics of plant and animal communities that foster diverse and productive ecosystems should be maintained or achieved.

3.2 Management practices should emphasize native species except when others would serve better for attaining desired communities.

3.3 Intensity, frequency, season of use and distribution of grazing use should provide for growth, reproduction, and when environmental conditions permit, seedling establishment of those plant species needed to reach long-term land use plan objectives. Measurements of ecological condition, trend, and utilization will be in accordance with techniques identified in the Nevada Rangeland Handbook.

3.4 Grazing management practices should be planned and implemented to provide for integrated use by domestic livestock and wildlife, as well as wild horses and burros inside Herd Management Areas (HMAs).

3.5 Management practices will promote the conservation, restoration and maintenance of habitat for special status species.

3.6 Livestock grazing practices will be designed to protect fragile ecosystems of limited distribution and size that support unique sensitive/endemic species or communities. Where these practices are not successful, grazing will be excluded from these areas.

3.7 Where grazing practices alone are not likely to achieve habitat objectives, land management practices may be designed and implemented as appropriate.

3.8 Vegetation manipulation treatments may be implemented to improve native plant communities, consistent with appropriate land use plans, in areas where identified standards cannot be achieved through proper grazing management practices alone. Fire is the preferred vegetation manipulation practice on B. (1) The combined aerial parts of plants and

cannot be achieved through proper grazing management practices alone. Fire is the preferred vegetation manipulation practice on areas historically adapted to fire; treatment of native vegetation with herbicides or through mechanical means will be used only when other management techniques are not effective.

3.9 Rangeland management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

GLOSSARY

Definitions are taken from "A Glossary of Terms Used in Range Management" developed through the Society for Range Management or Bureau of Land Management Technical Reference or from the Dictionary of Ecology, Evolution and Systematics except where noted. Other definitions are from Grazing Administration Regulations Code of Federal Regulations, Chapter 43 Sec. 4100.0.5. Definitions also include meanings that were developed by the Mojave-Southern Great Basin Resource Advisory Council to understand their intent in the Standards and Guidelines.

-A-

Annual Growth. The amount of production of new above ground plant biomass for a given site during a given year.

-B-

Biodiversity. The diversity of organisms in a region; made up of species diversity in individual community-types and the turnover of species across different community-types.

Biological (Cryptogamic) Crust. Community of non-vascular primary producers that occur as a "crust" on the surface of soils; made up of a mixture of algae, lichens, mosses, and cyanobacteria (bluegreen algae).

Biotic. Refers to living components of an ecosystem, e.g., plants and animals and micro-organisms.

-C-

Canopy. (1) The vertical projection downward of the aerial portion of vegetation, usually expressed as a percent of the ground so occupied; (2) The aerial portion of the overstory vegetation.

Canopy Cover. The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included. (BLM Technical Reference 4400-7)

Climate. The average or prevailing weather conditions of a place over a period of years. (BLM Technical Reference 4400-7)

Conservation. The planned management of natural resources; the retention of natural balance, diversity and evolutionary change in the environment.
The use and management of natural resources according to principles that assure their sustained economic and/or social benefits without impairment of environmental quality.

Cover. a. (1) The plants or plant parts, living or dead, on the surface of the ground. Vegetative cover or herbage cover is composed of living plants and litter cover of dead parts of plants; (2) The area of ground cover by plants of one or more species.
b. (1) The combined aerial parts of plants and mulch, and (2) Shelter and protection for animals and birds. (BLM Manual 4400)
c. (1) Plant material, living (vegetative cover) and dead (litter cover) on the soil surface; (2) The area of ground covered by the canopy projections of a particular plant species, expressed as a scale or as a percentage of total ground surface area.

Cultural Resources. A broad, general term meaning any cultural property and any traditional lifeway value. (BLM Manual 8100)

Cultural property. A definite location of past human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. (Manual 8100)

-D-

Desert Pavement. A cemented, hydrophobic layer of rocks or small pebbles that occurs over time on desert soil surfaces; prevents water infiltration into soils and wind/water erosion of the soil; often covered with a chemical varnish layer.

Desired Natural Plant Community. The type of plant community which is desired for a particular ecological site. This could include native and non-native species depending on the desired land use, but as a natural plant community it must have native species adapted to the climate and soil type as dominants or co-dominants in the community.

Desired Plant Community. Of the several plant communities that may occupy a site, the one that has been identified through a management plan to best

meet the plan's objectives for the site. It must protect the site as a minimum.
Diversity. (1) The absolute number of species in a community; species richness; (2) A measure of the number of species and their relative abundance in a community; low diversity refers to few species or unequal abundances, high diversity to many species or equal abundances.

-E-
Ecological Processes. Natural functions including the hydrologic cycle, the nutrient cycle, and energy flow (see also 43 CFR 4180.1(b)).
Ecological Site. The kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to management. (BLM Manual 4400)
Edaphic. Refers to the soil.
Endemic Species. Native to, and restricted to, a particular geographical region, community type, or specific habitat.
Ephemeral Rangelands. Rangelands characterized by low, highly seasonal and often episodic rainfall, resulting in annual plants comprising a significant proportion of annual primary production.
Erosion. (v.) Detachment and movement of soil or rock fragments by the action of water, wind, ice or gravity. (n.) The land surface worn away by running water, wind, ice, or other geologic agents, including such processes as gravitational creep.
Exotic. An organism or species which is not native to the region in which it is found. Synonym *non-native*: Not native; alien; a species that has been introduced into an area.

-F-
Forage. The plant material actually consumed by (or available to) grazing animals.
Fragile Ecosystems. Uncommon ecosystems of limited distribution and size that support unique sensitive/endemic species or communities; ecosystems that have low resilience to environmental stress or to disturbance.
Frequency. The ratio between the number of sample units that contain a species and the total number of sample units.
A quantitative expression of the presence of absence of individuals of a species in a population. It is defined as the percentage of occurrence of a species in a series of samples of uniform size. (BLM Technical Reference 4400-4)

-G-
Grazing Distribution. Dispersion of livestock grazing within a management unit or area.
Ground Cover. The percentage of material, other than bare ground, covering the land surface. It may include live and standing dead vegetation, litter, cobble, gravel, stones and bedrock. Ground cover plus bare ground would total 100 percent. (BLM Technical Reference 4400-4)
Ground Water. Subsurface water that is in the zone of saturation. The top surface of the ground water is the "water table." Source of water for wells, seepage and springs.

-H-
Habitat. The natural abode of a plant or animal, including all biotic, climatic, and edaphic factors affecting life.
Hydrologic Balance. The balance between hydrological inputs (infiltration of incident precipitation, run-on) and hydrological outputs (run-off, deep drainage) for an ecological site.

-I-
Infiltration. The flow of a fluid into a substance through pores or small openings. The process by which water seeps into a soil, as influenced by soil texture, aspect and vegetation cover.
Infiltration Rate. Maximum rate at which soil under specified conditions can absorb rain or shallow impounded water, expressed in quantity of water absorbed by the soil per unit of time, e.g., inches/hour.
Integrated Use. To merge the use of each type of public land use through a series of land management practices.

-L-
Land Use Plan. Land use plan means a resource management plan, developed under the provisions of 43 CFR part 1600, or management framework plan. These plans are developed through public participation in accordance with the provisions of the Federal Land Policy and Management Act of 1976 and establish management direction for resource uses of public lands. (43 CFR 4100)
Litter. The uppermost layer of organic debris on the soil surface; essentially the freshly fallen or slightly decomposed vegetal material. (BLM Technical Reference 4400-4)

-M-

Management Objective. The objectives for which rangeland and rangeland resources are managed which includes specified users accompanied by a description of the desired vegetation and the expected products and/or values.

Management Plan. A program of action designed to reach a given set of objectives.

Marsh. Flat, wet, treeless areas usually covered by standing water and supporting a native growth of grasses and grasslike plants.

Monitoring. The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives. (BLM Technical Reference 4400-7)

Monitoring. Monitoring means the periodic observation and orderly collection of data to evaluate: (1) Effects of management actions; and (2) Effectiveness of actions in meeting management objectives. (43 CFR 4100.0.5)

Morphology. The form and structure of an organism, with special emphasis on external features.

Multiple Use. The management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals watershed, wildlife and fish, natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return of the greatest unit output. (Federal Land Policy and Management Act)

-N-

Native Species. A species which is a part of the original fauna or flora of the area in question. Indigenous; living naturally within a given area and was part of the areas flora or fauna prior to human settlement of the region.

Naturalized Species. An exotic or introduced species that has become established and exhibits successful reproduction in an ecosystem.

-P-

Percolation. The flow of a liquid through a porous substance.

Productivity. The potential rate of incorporation or generation of energy or organic matter (biomass) by an organism, population or trophic unit per unit time per unit area; plant productivity is termed primary production, and animal productivity is termed secondary production.

Proper Functioning Condition. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filer sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambank against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. (BLM Technical Reference 1737-9)

-R-

Range Improvement. Range improvement means an authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means.

Residual Vegetation. Amount, cover, and species composition of the vegetation on a site after it has been grazed for a period of time.

Resource. Any component of the environment that can be utilized by an organism.

Riparian. Pertaining to, living or situated on, the banks of rivers and streams. 'Xeroriparian' refers to being situated on dry washes (ephemeral streams).

-S-

Seep. Wet areas, normally not flowing, arising from an underground water source.

Soil. (1) The unconsolidated mineral and organic

material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (2) The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including moisture and temperature effects), macro- and micro-organisms, and topography, all acting over a period of time and producing a product -soil- that differs from the material it was derived in many physical, chemical, biological, and morphological properties and characteristics.

Soil Productivity. The organic fertility or capacity of a given area or habitat.

Species. A taxon of the rank species; which is the basic unit, and lowest principal category, of biological classification; in the hierarchy of biological classification, the category below genus; a group of organisms formally recognized as distinct from other groups.

Species Composition. The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc. Synonym *Vegetative composition*.

Surface Characteristics. The amount of bare ground, litter, rock and basal cover of live vegetation, which may include cryptograms. (Nevada Rangeland Handbook.)

Sustained Yield. The achievement and maintenance in perpetuity of a high level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. (FLPMA)

-T-

Traditional lifeway values. The quality of being useful in or important to the maintenance of a specified social and/or cultural group's traditional systems of (a) religious belief, (b) cultural practice, or (c) social interaction, not closely identified with definite locations. Another group's shared values are abstract, nonmaterial, ascribed ideas that one cannot know about without being told. (BLM Manual 8100)

Trend. The direction of change in ecological status or resource value rating observed over time. Trend in ecological status should be described as *toward*, or *away from* the potential natural community, or as *not apparent*. (BLM Technical Reference 4400-4)

-U-

Upland. Terrestrial ecosystems located away from riparian zones, wetlands, springs, seeps and dry washes; ecosystems made up of vegetation not in contact with groundwater or other permanent water sources.

-V-

Vegetative Life Form. The characteristic structural features and method of perennation of a plant species, e.g., annuals, perennial forbs, shrubs, trees and succulents.

-W-

Watershed. (1) A total area of land above a given point on a waterway that contributes runoff water to the flow at that point. (2) A major subdivision of a drainage basin.

Wetlands. Areas characterized by soils that are usually saturated or ponded, i.e., hydric soils, that support mostly water-loving plants (hydrophytic plants).

In areas of arid low lying land that is submerged or inundated periodically by water, and is characterized by hydric soils that support mostly water-loving (hydrophytic) plants.

Cow grazing on Nevada rangelands.

STANDARDS AND GUIDELINES IMPLEMENTATION PROCESS

It is a requirement that grazing permits and leases shall contain terms and conditions that ensure conformance with the approved Standards and Guidelines.

The implementation process for Standards and Guidelines will occur under two separate processes as described below:

1. During the supervision and/or monitoring of an allotment, if it is determined that the existing terms and conditions of a grazing permit are not in conformance with the approved Standards and Guidelines and that livestock grazing was determined to be a significant factor in the non-attainment of a standard, then as soon as possible, or no later than the start of the next grazing year, the terms and conditions of the permit/lease will be modified to ensure that the grazing management practices or the levels of the grazing use will be in conformance with the Standards and/or Guidelines. The modification of the terms and conditions of the permit/lease will be implemented by agreement and/or by decision.
2. The allotment evaluation process will continue to be the process used to determine if existing multiple uses for allotments are meeting or making progress towards meeting land use plan objectives, allotment specific objectives, Rangeland Program Summary objectives and land use plan decisions, in addition to the Standards and Guidelines for grazing administration.

Additionally, allotment specific objectives may have to be developed or amended, objectives in the land use plans further quantified at the allotment specific level, and terms and conditions of permits changed or revised to reflect the Standards and Guidelines. Allotment evaluations will continue to be completed based on district priorities.

a. The allotment evaluation consists of or involves:
   1) The evaluation of current grazing use by all users (livestock, wild horses, wildlife) based on monitoring data analysis and interpretation;
   2) Recommendations to change or adjust grazing systems;
   3) Recommendations to change or adjust stocking levels; and
   4) Establishment of stocking levels for wild horses.

b. The allotment evaluation also serves as the basis for either issuing multiple use decisions, agreements, or a no-change determination. Multiple use decisions are prepared subsequent to completion of land use plans and are based on the attainment or non-attainment of objectives established in the land use plans and allotment evaluations.

During the evaluation process, the existing terms and conditions of a permit will be evaluated to determine if they are in conformance with the approved Standards and Guidelines. If it is determined that the existing terms and conditions are not in conformance and that livestock grazing was a significant factor in the non-attainment, then as soon as possible or no later than the start of the next grazing year, the terms and conditions of the permit/lease will be modified to ensure that the grazing management practices or the levels of grazing use will be in conformance.

At the conclusion of the evaluation process, the multiple use decision process will continue to be used to establish:

1) The terms and conditions of the grazing permits;
2) The appropriate management level for wild horses and burros that occur within the allotment; and
3) Any recommendations for wildlife populations or habitat management actions required if it is determined that these actions are necessary.

The preamble to the final regulations contains additional information regarding implementation. The following preamble language is found on page 9956 of the Federal Register notice:

"... The Department intends that failing to comply with a standard in an isolated area would not necessarily result in corrective action.
"The Department recognizes that it will sometimes be a long-term process to restore rangelands to

proper functioning condition. The Department intends that Standards and Guidelines will result in a balance of sustainable development and multiple use along with progress towards attaining healthy, properly functioning rangelands. For that reason, wording has been adopted in the final rule that will require the authorized officer to take appropriate action upon determining that existing grazing management practices are failing to ensure appropriate progress toward the fulfillment of standards. . . ."

"In some areas, it may take many years to achieve healthy rangelands, as evidenced by the fundamentals, established Standards, and Guidelines. The Department recognizes, that in some cases, trends may be hard to even document in the first year. The Department will use a variety of data, including monitoring records, assessments, and knowledge of the locale to assist in making the "significant progress determination."

The acceptance of progress toward reaching the desired end state is also addressed in the regulatory text in 43 CFR 4180.1 Fundamentals of Rangeland Health which includes the "making significant progress toward" language in each of the four fundamentals.

The concept of "making progress toward" is a specific consideration when determining a course of action during implementation. Determining whether a standard is being met is a distinctly different concept from determining whether progress is being made toward or away from the standard. Determining a course of action is then dependent on a variety of factors, one of which is whether progress is being made toward the standard.

With regard to actions, it is the BLM's policy and intent to work in a collaborative manner to achieve or maintain the Standards necessary for healthy, productive rangelands. It is not the policy or intent of the BLM to arbitrarily and immediately remove all livestock from an entire allotment based solely on finding a range site that is not meeting a standard. As a practical matter, the BLM has neither policy, intent, desire nor capability to arbitrarily remove all livestock where acceptable progress is being made toward meeting the Standards.

Sloan Canyon in southeastern Nevada.

PREAMBLE - WILD HORSE AND BURRO MANAGEMENT

Nevada is an arid State. The Standards for rangeland health and Guidelines for wild horse and burro management on BLM-administered lands in southern Nevada apply to HMAs. The Mojave-Southern Great Basin RAC intends that the Standards and Guidelines will result in a balance of sustainable development and multiple use.

The standards for rangeland health will be reached and maintained by managing wild horse and burro numbers so as not to exceed Appropriate Management Levels (AML) for each HMA. Controlling wild horse and burro numbers through gathers and other control programs is essential.

Standards are expressions of physical and biological conditions required for sustaining rangelands for multiple uses. Guidelines point to management actions related to HMAs for achieving the Standards. Guidelines are options that move rangeland conditions toward the multiple use Standards. Guidelines are based on science, best rangeland management practices, and public input. Guidelines indicate the types of management methods and practices for achieving the Standards for multiple use and are developed for functional watersheds and implemented within HMAs.

The Mojave-Southern Great Basin RAC recognizes that it may be a long-term process to achieve proper functioning condition(s) on degraded rangelands. Healthy rangelands contribute to healthy herds.

The RAC may be requested by any party to assist in addressing issues related to these Standards and Guidelines.

STANDARDS AND GUIDELINES

STANDARD 1. SOILS**:**

Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.

Soil indicators:
- Ground cover (vegetation, litter, rock, bare ground);
- Surfaces (e.g., biological crusts, pavement); and
- Compaction/infiltration.

Riparian soil indicators:
- Stream bank stability.

All of the above indicators are appropriate to the potential of the ecological site.

GUIDELINES: (for Soils Standard)

1.1 Upland management practices should maintain or promote adequate vegetative ground cover to achieve the Standards.

1.2 Riparian-wetland management practices should maintain or promote sufficient residual vegetation to maintain, improve, or restore functions such as stream flow energy dissipation, sediment capture, groundwater recharge, and streambank stability.

1.3 When wild horse and burro herd management practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate.

1.4 Wild horse and burro herd management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

STANDARD 2. ECOSYSTEM COMPONENTS:

Watersheds should possess the necessary ecological components to achieve State water quality criteria, maintain ecological processes, and sustain appropriate uses.

Riparian and wetlands vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function).
Upland Indicators:
- Canopy and ground cover including litter, live vegetation, biological crust, and rock appropriate to

the potential of the ecological site.
- Ecological processes are adequate for the vegetative communities.

Riparian Indicators:
- Stream side riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows.

- Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics:

- Width/Depth ratio;
- Channel roughness;
- Sinuosity of stream channel;
- Bank stability;
- Vegetative cover (amount, spacing, life form); and
- Other cover (large woody debris, rock).

- Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.

Water Quality Indicators:
- Chemical, physical and biological constituents do not exceed the State water quality Standards.

GUIDELINES: (for ECOSYSTEM COMPONENTS STANDARD)

2.1 Management practices should maintain or promote appropriate stream channel morphology and structure consistent with the watershed.

2.2 Watershed management practices should maintain, restore or enhance water quality and flow rate to support desired ecological conditions.

2.3 Management practices should maintain or promote the physical and biological conditions necessary for achieving surface characteristics and desired natural plant community.
2.4 Wild horse and burro herd management practices will consider both economic and physical environment and will address all multiple uses including, but not limited to, (i) recreation, (ii) minerals, (iii) cultural resources, (iv) wildlife, (v) domestic livestock, (vi) community economics, (vii) Areas of Critical Environmental Concern, (viii) designated wilderness (iv) and wilderness study areas (WSAs).

2.5 New facilities should be located away from riparian and wetland areas if existing facilities conflict with achieving or maintaining riparian and wetland functions. Existing facilities will be used in a way that does not conflict with achieving or maintaining riparian and wetland functions or they will be relocated or modified when necessary to mitigate adverse impacts on riparian and wetland functions.

2.6 Subject to all valid existing rights, the design of spring and seep developments shall include provisions to maintain or promote ecological functions and processes.

2.7 When proper wild horse and burro herd management is not likely to restore areas of low infiltration or permeability, land management practices may be designed and implemented where appropriate. When setting herd management levels on ephemeral rangeland watersheds, reliable estimates of production for drought conditions should be used to avoid adverse effects on perennial species and ecosystem processes and retain a desired minimum level of annual growth or residue remaining.

2.8 Wild horse and burro herd management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

STANDARD 3. HABITAT AND BIOTA:

Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Habitat Indicators:
- Vegetation composition (relative abundance of species);

- Vegetation structure (life forms, cover, height, and age classes);
- Vegetation distribution (patchiness, corridors);
- Vegetation productivity; and
- Vegetation nutritional value.

Wildlife Indicators:
- Escape terrain;
- Relative abundance;
- Composition;
- Distribution;
- Nutritional value; and
- Edge-patch snags.

The above indicators shall be applied to the potential of the ecological site.

GUIDELINES: (for HABITAT AND BIOTA STANDARD)

3.1 Mosaics of plant and animal communities that foster diverse and productive ecosystems should be maintained or achieved.

3.2 Management practices should emphasize native species except when others would serve better for attaining desired communities.

3.3 Wild horse and burro herd management should provide for growth, reproduction, and seedling establishment of those plant species needed to reach long-term land use plan objectives. Measurements of ecological conditions, trend, and utilization will be in accordance with techniques identified in the Nevada Rangeland Handbook.

3.4 Wild horse and burro herd management practices should be planned and implemented to provide for integrated use by domestic livestock and wildlife.

3.5 Wild horse and burro herd management practices will promote the conservation, restoration and maintenance of habitat for special status species.

3.6 Wild horse and burro herd management practices will be designed to protect fragile ecosystems of limited distribution and size that support unique sensitive/endemic species or communities. Where these practices are not successful, herd levels will be reduced or eliminated from these areas.

3.7 When wild horse and burro herd management practices alone are not likely to restore areas, land management practices may be designed and implemented where appropriate.

3.8 Vegetation manipulation treatments may be implemented to improve native plant communities, consistent with appropriate land use plans, in areas where identified standards cannot be achieved through wild horse and burro herd management practices alone. Fire is the preferred vegetation manipulation practice on areas historically adapted to fire; treatment of native vegetation with herbicides or through mechanical means will be used only when other management techniques are not effective.

3.9 Wild horse and burro herd management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

STANDARD 4: WILD HORSES AND BURROS

Wild horses and burros within HMAs should be managed for herd viability and sustainability. HMAs should be managed to maintain a healthy ecological balance among wild horse and/or burro populations, wildlife, livestock, and vegetation.

Herd health indicators.-
- General horse and/or burro appearance: Problems are often apparent and can be easily identified by just looking at the herd.

- Crippled or injured horses and/or burros: Excessive injuries can indicate problems.

Herd demographics indicators.
- Size of bands: A band with one stud or jack, one mare or jenny, and one foal indicates a problem. An oversized band also indicates there is a problem. Band sizes of 5-10 animals with one dominant stud per band is a good indicator.

- Size of Bachelor Bands: Large bachelor bands in the immediate vicinity of other bands could indicate potential problems.

Herd viability indicators.
- Heavy trailing into water sources may indicate a

significant problem with forage availability or water distribution. Animals may be traveling considerable distances to obtain water or forage.

- Waiting for water. When available water becomes so scarce that a waiting line develops, horses and burros are in trouble.

- Availability of water. Address legal and/or climatic considerations. Situations exist where wild horses and burros are present only because they currently have access to water which they could legally be deprived of under Nevada Water Laws. Situations exist where existing wild horse and burro populations are dependent upon water hauling. If water hauling were to cease these animals would die within a matter of days.

- Depleted forage near all available water sources. Adequate water and forage adjacent to water sources are essential.

GUIDELINES: (for WILD HORSES AND BURROS STANDARD)

4.1 Wild horse and burro population levels in HMAs should not exceed AML.

4.2 AMLs should be set to reflect the carrying capacity of the land in dry conditions based upon the most limiting factor: living space, water or forage. Management levels will not conflict with achieving or maintaining standards for soils, ecological components, or diversity of habitat and biota.

4.3 Interaction with herds should be minimized. Intrusive gathers should remove sufficient numbers of animals to ensure a period between gathers that reflects national wild horse and burro management strategies. Non intrusive gathers such as water trapping can be done on an “as needed” basis.

4.4 Herd Management Plans should be made with the best predictive information available. When emergency actions occur the Herd Management Plan should be re-evaluated.

4.5 Viable sex and age distribution should be a long-term goal of any wild horse and burro herd management plan. Sex and age distribution of the herd should be addressed when (after) AML has been reached.

4.6 When wild horse and burro herd management alone is not likely to restore areas, land management practices may be designed and implemented where appropriate.

4.7 Wild horse and burro herd management practices should address improvement beyond this standard, significant progress toward achieving standards, time necessary for recovery, and time necessary for predicting trends.

Wild horses roaming Nevada’s rangelands.

OFF HIGHWAY VEHICLE ADMINISTRATION GUIDELINES FOR NEVADA PUBLIC LANDS

INTRODUCTION

The Nevada Northeastern Great Basin RAC, the Sierra Front-Northwestern Great Basin RAC, and the Mojave-Southern Great Basin RAC, as chartered by the Department of the Interior, have developed Guidelines for the administration of Off-Highway Vehicle (OHV) use on public lands within the State of Nevada. These guidelines are intended to promote cooperation among user groups, to share resources, and to minimize conflicts in accordance with the Nevada Standards for Rangeland Health. While recognizing the legitimacy and necessity of OHV use on public lands, it has become necessary to define guidelines for management of OHVs to ensure the protection of land health and the availability of the public lands for all multiple users. These guidelines are to assist land managers in administrative and planning decisions. Administrators may use the guidelines for managing for land health and making decisions with regard to restricting, or not restricting OHV activity. Additionally, administrators may use the educational guidelines as tools to provide training for land managers and to inform the public on OHV use issues and ethics. Planners should use these guidelines in developing timely plans for resources and recreation use, while addressing the increasing demand for OHV use.

ON-THE-GROUND MANAGEMENT GUIDELINES

- Encourage OHV use on existing or designated roads and trails, except in closed areas, prior to land use plans being updated and road and trail inventories completed.
- Locate and manage OHV use to conserve soil functionality, vegetative cover, and watershed health. Manage OHV use to minimize the impact on the land, while maintaining OHV access.
- Manage OHV use by type, season, intensity, distribution, and/or duration to minimize the impact on plant and animal habitats. If seasonal closures become appropriate to minimize adverse OHV impact(s) on public lands resources, managers will strive to preserve public access by designating alternative routes.
- Manage OHV activities to conserve watershed and water quality.
- Monitor the impact(s) of OHV activities on all public land, water, air and other resources and uses.
- Maintain an inventory of existing road and trail systems.
- Manage OHV use to preserve cultural, historical, archaeological, and paleontological resources.
- Engineer, locate, and relocate roads and trails to accommodate OHV activities while minimizing resource impacts.
- Encourage cooperation in law enforcement among all agencies.
- OHV use pursuant to a permitted activity shall be governed by the terms of the permit.

PLANNING GUIDELINES

- In land use plans or plan amendments, designate areas as open, limited, or closed to OHV use.
- Address OHV management including land use and/or route designations, monitoring and adaptive management strategies, such as applying the Limits of Acceptable Change process, when developing new land use plans or amending existing land use plans. Work closely with local, state, tribal, and other affected parties and other resource users in OHV planning.
- Establish and maintain an inventory of existing routes and trails as part of the land use planning process.
- Provide for other resources and uses in OHV planning. This includes livestock grazing, other recreational uses, archaeological sites, wildlife, horses and burros, and mineral extractions and coordinate with other users of public lands.
- Conduct an assessment of current and future OHV demand, and plan for and balance the demand for this use with other multiple uses/users when developing all land use plans.
- Include in land use plans, social/economic effects of OHV use, including special

recreation events.

- Integrate concepts of habitat connectivity into OHV planning to minimize habitat fragmentation.
- For addressing/resolving local site-specific OHV issues/concerns, use collaborative planning groups consisting of local representative(s), affected/interested group(s) and agency(s).
- Clearly identify route and area designations.
- Where land health permits, develop sustainable OHV use areas to meet current and future demands, especially for urban interface.

EDUCATION GUIDELINES

- Cooperatively develop/improve public outreach programs to promote trail etiquette, environmental ethics, and responsible-use stewardship ethic.
- Promote/expand/disseminate materials from programs such as, but not limited to, "Tread Lightly!" and "Leave No Trace."
- Provide OHV management education and training for managers, staff, partners and volunteers. Training should focus on the art practices and be tailored to meet local needs. Encourage communication between agencies, managers, staff, partners and volunteers to share expertise and effective techniques.
- Encourage the private sector, as well as the public sector, to conduct responsible marketing of activities on public lands while avoiding the promotion of products, behaviors and services that are inconsistent with existing regulations and land use plans.
- Develop communication and environmental education plan(s). Assess all situations where OHV use may require public information and education. Develop materials and programs appropriate to each situation.
- Utilize high use areas and special events to maximize the dissemination of responsible use education materials and concepts to the public.

GEOGRAPHIC AREA COVERED BY THE STANDARDS AND GUIDELINES

The three RAC areas in Nevada are based on combinations of major land resource areas as developed by the Natural Resource Conservation Service for Nevada. This land classification system is recognized by the Bureau of Land Management, the Forest Service and other agencies as a basis for ecosystem data collection and analysis. The soil, vegetal and geophysical characteristics of each of the three areas are different and the text offered by the three RACs incorporates their understanding of the differing physical and biological needs of the rangeland ecosystems.

Recognition of these differences is critical to the successful protection of rangelands in Nevada. As a result of basing the RAC boundaries according to an ecosystem approach as opposed to strictly an administrative or jurisdictional approach, the RAC's advice and recommendations are more relevant to the on-the-ground management of natural resources. The area covered by the Standards and Guidelines is as follows. Adjustments will be made for grazing allotments that overlap the boundaries between the RAC areas.

The Mojave-Southern Great Basin RAC recommends actions to the BLM Nevada State Director for all or portions of Clark, Nye and White Pine counties. This includes all of the Las Vegas Field Office and portions of the Battle Mountain and Ely Field Offices.

BLM NEVADA OFFICES

NEVADA STATE OFFICE
State Director: Ron Wenker
Associate State Director: Amy Lueders
1340 Financial Blvd.
Reno, NV 89502
775-861-6590
FAX: 775-861-6601
Hours: 7:30am - 4:30pm weekdays

BATTLE MOUNTAIN FIELD OFFICE
Field Manager: Gerald Smith
50 Bastian Road
Battle Mountain, Nevada 89820
775-635-4000
FAX: 775-635-4034
Hours: 7:30am - 4:30pm weekdays

Tonopah Field Station
Field Station Manager: Bill Fisher
1553 South Main St.
PO Box 911
Tonopah, Nevada 89049-0911
775-482-7800
FAX: 775-482-7810
Hours: 7:30am - 4:30pm weekdays

ELY FIELD OFFICE
Field Manager: John Ruhs
775North Industrial Way
HC33 Box 33500
Ely, Nevada 89301-9408
775-289-1800
FAX: 775-289-1910
Hours: 7:30am - 4:30pm weekdays

Caliente Field Station
Field Station Manager: Ron Clementsen
U.S. Highway 93, PO Box 237
Caliente, Nevada 89008-0237
775-726-8100
FAX: 775-726-8111
Hours: 7:30am - 4:30pm weekdays

LAS VEGAS FIELD OFFICE
Field Manager: Juan Palma
4701 N. Torrey Pines Drive
Las Vegas, Nevada 89130-2301
702-515-5000
FAX: 702-515-5023
Hours: 7:30a.m. – 4:15pm weekdays

CARSON CITY FIELD OFFICE
Field Manager: Don Hicks
5665 Morgan Mill Road
Carson City, Nevada 89701
775-885-6000
FAX: 775-885-6147
Hours: 7:30am - 5:00pm weekdays

WINNEMUCCA FIELD OFFICE
Field Manager: Gail Givens
5100 East Winnemucca Boulevard
Winnemucca, Nevada 89445
775-623-1500
FAX: 775-623-1503
Hours: 7:30am - 4:30pm weekdays

ELKO FIELD OFFICE
Field Manager: Helen Hankins
3900 East Idaho Street
Elko, Nevada 89801
775-753-0200
FAX: 775-753-0255
Hours: 7:30am - 4:30pm weekdays

NAT'L WILD HORSE & BURRO CENTER AT PALOMINO VALLEY
Facility Manager: John Neill
PO Box 3270
Sparks, Nevada 89432-3272
775-475-2222
FAX: 775-475-2053
Hours: 8:00am – 4:00pm weekdays

NORTHEASTERN GREAT BASIN AREA STANDARDS AND GUIDELINES FOR GRAZING AND WILD HORSES AND BURROS

Preamble

The Nevada Northeastern Great Basin Resource Advisory Council (RAC), as chartered by the Department of the Interior to promote healthy rangelands, has developed Standards and Guidelines for grazing administration on about 16.2 million acres of public lands and Standards and Guidelines for maintaining healthy wild horse and burro herds on Herd Management Areas (HMA's) administered by the Bureau of Land Management within the designated geographic area of the Northeastern Great Basin.

The RAC, in developing these Standards and Guidelines, understands and agrees that grazing and wild horses and burros are two of the multiple uses recognized under the Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1739, 1740). The RAC recognizes the limited management options currently available for wild horses and burros. Unlike domestic stock that can be husbanded and controlled regularly, or wildlife that can be controlled through sport harvest, free-roaming wild horses and burros must be managed by capture and adoption or placement in sanctuaries to achieve a sustainable relationship with land and resources year-round.

The RAC, in recommending these Standards and Guidelines, urges the Bureau to aggressively implement the management strategies to expeditiously establish, achieve and maintain Appropriate Management Level's (AML's) of wild horses and burros within HMA's and remove them from outside HMA's. These recommended Standards and Guidelines reflect the stated goals of improving rangeland health while providing for the viability of the livestock industry, all wildlife species and wild horses and burros in the Northeastern Great Basin Area.

NE RAC's Intended Use of Standards and Guidelines

Standards and Guidelines will be implemented through terms and conditions of grazing permits, leases, and other authorizations, grazing-related portions of activity plans (including Allotment Management Plans), and through range improvement-related activities.

Standards and Guidelines for wild horses and burros will be implemented through control of population levels within established HMA's, related portions of activity plans (including Allotment Management Plans), and through range restoration related activities. Wild horse and burro herd management practices should consider both economic and physical environment and will address all multiple uses including, but not limited to recreation, minerals, cultural resources, wildlife, domestic livestock, community economics, Areas of Critical Environmental Concern, designated wilderness and wilderness study areas (WSAs).

The RAC anticipates that in most cases the Standards and Guidelines themselves will not be terms and conditions of various authorizations but that the terms and conditions will reflect the Standards and Guidelines.

The RAC intends that the Standards and Guidelines will result in a balance of sustainable development and multiple use along with progress towards attaining healthy, properly functioning rangelands and healthy wild horse and burro herds. For that reason, wording has been adopted in this final rule that will require the authorized officer to take appropriate action upon determining the existing management practices are failing to ensure significant progress toward the fulfillment of the Standards and towards conformance with the guidelines.

The RAC intends that assessments and corrective actions will be undertaken in priority order as determined by BLM. The BLM will use a variety of data including monitoring records, assessments, and knowledge of the locale to assist in making the "significant progress" determination. It is anticipated that in many cases it will take numerous seasons to determine direction and magnitude of trend. However, actions will be taken to establish significant progress toward conformance as soon as sufficient data are available to make informed changes relative to numbers of wild horses and burros, herd management decisions and grazing practices.

Standards and Guidelines

Standard 1. Upland Sites:
Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and land form.

As indicated by: Indicators are canopy and ground cover, including litter, live vegetation and rock, appropriate to the potential of the site.

Guidelines:
1.1 Livestock grazing management and wild horse and burro population levels are appropriate when in combination with other multiple uses they maintain or promote upland vegetation and other organisms and provide for infiltration and permeability rates, soil moisture storage, and soil stability appropriate to the ecological site within management units.

1.2 When livestock grazing management and wild horse and burro herd management alone are not likely to restore areas of low infiltration or permeability, land management treatments should be designed and implemented where appropriate.

1.3 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this standard.

See Appendix C(a) for additional guidelines for vegetation management.

Standard 2. Riparian and Wetland Sites:
Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria.

As indicated by:

Stream side riparian areas are functioning properly when adequate vegetation, large woody debris, or rock is present to dissipate stream energy associated with high water flows. Elements indicating proper functioning condition such as avoiding accelerating erosion, capturing sediment, and providing for groundwater recharge and release are determined by the following measurements as appropriate to the site characteristics:

- Width/Depth ratio; Channel roughness; Sinuosity of stream channel; Bank stability; Vegetative cover (amount, spacing, life form); and Other cover (large woody debris, rock).

Natural springs, seeps, and marsh areas are functioning properly when adequate vegetation is present to facilitate water retention, filtering, and release as indicated by plant species and cover appropriate to the site characteristics.

Chemical, physical and biological water constituents are not exceeding the state water quality standards.

Guidelines:
2.1 Livestock grazing management and wild horse and burro population levels will maintain or promote sufficient vegetation cover, large woody debris, or rock to achieve proper functioning condition in riparian and wetland areas. Supporting the processes of energy dissipation, sediment capture, groundwater recharge, and stream bank stability will thus promote stream channel morphology (e.g., width/depth ratio, channel roughness, and sinuosity) appropriate to climate, landform, gradient, and erosional history.

2.2 Where livestock grazing management and wild horse and burro herd management are not likely to restore riparian and wetland sites, land management treatments should be designed and implemented where appropriate to the site.

2.3 Livestock grazing management and wild horse and burro herd management will maintain, restore or enhance water quality and ensure the attainment of water quality that meets or exceeds state standards.

2.4 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this standard.

See Appendix c(a) for additional guidelines for vegetation management.

Standard 3. Habitat:
Habitats exhibit a healthy, productive, and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species.

As indicated by:

- Vegetation composition (relative abundance of species);
- Vegetation structure (life forms, cover, heights, or age classes)
- Vegetation distribution (patchiness, corridors);
- Vegetation productivity; and Vegetation nutritional value.

Guidelines:
3.1 Livestock grazing management and wild horse and burro population levels will promote the conservation, restoration and maintenance of habitat for threatened and endangered species, and other special status species as may be appropriate.

3.2 Livestock grazing intensity, frequency, season of use and distribution and wild horse and burro population levels should provide for growth and reproduction of those plant species needed to reach long-term land use plan objectives. Measurements of ecological condition and trend/utilization will be in accordance with techniques identified in the Nevada Rangeland Monitoring Handbook.

3.3 Livestock grazing management and wild horse and burro management should be planned and implemented to allow for integrated use by domestic livestock, wildlife, and wild horses and burros consistent with land use plan objectives.

3.4 Where livestock grazing management and wild horse and burro herd management alone are not likely to achieve habitat objectives, land treatments may be designed and implemented as appropriate.

3.5 When native plant species adapted to the site are available in sufficient quantities, and it is economically and biologically feasible to establish or increase them to meet management objectives, they will be emphasized over non-native species.

3.6 Livestock grazing management and wild horse and burro herd management are adequate when significant progress is being made toward this Standard.

See Appendix C(a) for additional guidelines for vegetation management.

Standard 4. Cultural Resources:
Land use plans will recognize cultural resources within the context of multiple use.

Guidelines:
4.1 Rangeland management plans will consider listings of known sites that are National Historic Register eligible or considered to be of cultural significance and new eligible sites as they become known.

4.2 Wild horse and burro herd management will be designed to avoid or mitigate damage to significant cultural resources.

Standard 5. Healthy Wild Horse and Burro Populations:
Wild horses and burros exhibit characteristics of a healthy, productive, and diverse population. Age structure and sex ratios are appropriate to maintain the long term viability of the population as a distinct group. Herd management areas are able to provide suitable feed, water, cover and living space for wild horses and burros and maintain historic patterns of habitat use.

As indicated by:

- Healthy rangelands that provide sufficient quantities and quality of forage and water to sustain the appropriate management level on a yearlong basis within a herd management area.

Wild horses and/or burros managed on a year-long basis for a condition class greater than or equal to five to allow them normal chances for survival in the winter (See glossary for equine body conditioning definitions).

Highly adoptable wild horses and burros that are readily available from herd management areas.

Wild horse and burro herds that exhibit appropriate age structure and sex ratio for short and long term genetic and reproductive health.

Guidelines:
5.1 Implement the objectives outlined in the Wild Free-Roaming Horses and Burros Tactical Plan for Nevada (May 1999).

5.2 Manage for wild horses and/or burros in herd management areas based on the capability of the HMA to provide suitable feed, water, cover and living space for all multiple uses.

5.3 Set appropriate Management Levels based on the most limiting habitat factor (e. g., available water, suitable forage, living space and cover) in the context of multiple use.

5.4 Manage herd management area populations to preserve and enhance physical and biological characteristics that are of historical significance to the herd.

5.5 Manage wild horse and burro herds for short and long term increases and to enhance adoptability by ensuring that wild horses and burros displaying desirable traits are preserved in the herd thus providing a reproductive base to increase highly adoptable horses and burros for future demands.

5.6 Identify and preserve historic traits and characteristics within the herd which have proven to be highly desirable by the adoption public to increase the long term availability of animals bearing these features.

5.7 Wild horse and burro selective removal criteria are modified on a per herd basis to correct deficiencies in population age and sex ratios which threaten short and long term genetic diversity and reproductive health.

Glossary

Most Definitions are taken from "A Glossary of Terms Used in Range Management" developed through the Society for Range Management. If a definition has been slightly modified it is marked with an *. Other definitions are from Grazing Administration Regulations Code of Federal Regulations, Chapter 43, Sec. 4100.0-5 or Bureau of Land Management Technical Reference. Definitions also include meanings that were developed by the Northeastern Great Basin Resource Advisory Council to understand their intent in the Standards and Guidelines.

B

Biotic - Refers to living components of an ecosystem, e.g., plants and animals.

C

Canopy - (1) The vertical projection downward of the aerial portion of vegetation, usually expressed as a percent of the ground so occupied. (2) The aerial portion of the overstory vegetation.

Canopy Cover - The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included.

Climate - The average or prevailing weather conditions of a place over a period of years.

D

*Distribution (Grazing) - Dispersion of grazing animals within a management unit or area.

E

Ecological Site - The kind of land with a specific potential natural community and

specific physical site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to management.

Edaphic - Refers to the soil.

Equine body conditioning -

1. Poor. Extremely emaciated; spinal processes, ribs, tailhead, tuber coxae and ischii projecting prominently, no fatty tissue can be seen.

2. Very Thin. Emaciated; slight fatty covering over base of spinal processes; transverse processes of lumbar vertebrae feel rounded; spinal processes, ribs, tailhead, tuber coxae and ischii prominent; withers, shoulders, and neck structure faintly discernible.

3. Thin. Fat buildup about halfway on spinal processes; transverse processes cannot be felt; slight fat covering over ribs; spinal processes and ribs easily discernible; tailhead prominent, but individual vertebrae cannot be identified visually; tuber coxae appear rounded but easily discernible, tuber ischii not distinguishable; withers, shoulders, and neck accentuated.

4. Moderately Thin. Slight ridge along back; faint outline of ribs discernible; tailhead prominence depends on conformation – fat can be felt around it; tuber coxae not discernible; withers, shoulders and neck not obviously thin.

5. Moderate. Back is flat (no crease or ridge); ribs not visually distinguishable but easily felt around tailhead and area beginning to feel spongy; withers appear rounded over spinal processes; shoulders and neck blend smoothly into body.

6. Moderately Fleshy. May have slight crease down back; fat over ribs spongy; fat around tailhead soft; fat beginning to be deposited along the side of withers, behind shoulders, and along sides of neck.

7. Fleshy. May have crease down back; individual ribs can be felt, but noticeable filling between ribs with fat; fat around tailhead soft; fat deposited along withers, behind shoulders and along neck.

8. Fat. Crease down back; difficult to feel ribs; fat around tailhead very soft; area along withers filled with fat; area behind shoulder filled with fat; noticeable thickening of neck; fat deposited along inner thighs.

9. Extremely Fat. Obvious crease down back; patchy fat appearing over ribs; bulging fat around tailhead, along withers, behind shoulders, and along neck; fat along inner thighs may rub together, flank filled with fat.

Erosion - (v.) Detachment and movement of soil or rock fragments by water, wind, ice or gravity. (n) The land surface worn away by running water, wind, ice, or other geologic agents, including such processes as gravitational creep.

Exotic - An organism or species which is not native to the region in which it is found. Synonym non-native.

G

*Grazing - For the purposes of this document grazing refers to the removal of vegetation by domestic livestock.

Ground Cover - The percentage of material, other than bare ground, covering the land surface. It may include live and standing dead vegetation, litter, cobble, gravel, stones and bedrock. Ground cover plus bare ground would total 100 percent.

Ground Water - Subsurface water that is in the zone of saturation. The top surface of the ground water is the "water table". Source of water for wells, seepage, springs.

Guidelines - Guidelines are livestock management practices (e.g. tools, methods, strategies and techniques) designed to achieve healthy public lands as defined by Standards and portrayed by Indicators. Guidelines are designed to provide direction, yet offer flexibility for local implementation through activity plans and grazing permits. Activity plans may add specificity to the Guidelines based on local goals and objectives as provided for in adopted manuals, handbooks and policy. Not all Guidelines fit all circumstances. Monitoring or site specific evaluation will determine if significant progress is being made towards achieving the standards, and if the appropriate guidelines are being applied.

H

Habitat - The natural abode of a plant or animal, including all biotic, climatic, and edaphic factors affecting life.

Herd Area - means the geographic area identified as having been used by a herd as its habitat in 1971.

Herd Management Area - Herd Area or portion of a Herd Area that has been designated through the planning process where horses and/or burros can be managed as a component of the public lands.

I

Indicators - Indicators are observations or measurements of physical, chemical or biological factors used to evaluate site conditions or trends, appropriate to the potential of the site. Indicators will be used to determine whether or not Standards are being met.

Infiltration - The flow of a fluid into a substance through pores or small openings. It connotes flow into a substance in contradistinction to the word percolation.

Infiltration Rate - Maximum rate at which soil under specified conditions can absorb rain or shallow impounded water, expressed in quantity of water absorbed by the soil per unit of time, e.g., inches/hour.

Intensity (Grazing) - A reference to grazing density per unit of time.

L

Land Use Plan - Land use plan means a resource management plan, developed under the provisions of 43 CFR part 1600, or management framework plan. These plans are developed through public participation in accordance with the provisions of the Federal Land Policy and Management Act of 1976 and establish management direction for resource uses of public lands. (43 CFR 4100.5)

Litter - The uppermost layer of organic debris on the soil surface; essentially the freshly fallen or slightly decomposed vegetal material.

M

Management Objective - The objectives for which rangeland and rangeland resources are managed which includes specified uses accompanied by a description of the desired vegetation and the expected products and/or values.

Management Plan - A program of action designed to reach a given set of objectives.

Marsh - Flat, wet, treeless areas usually covered by standing water and supporting a native growth of grasses and grasslike plants.

Monitoring - The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.

Morphology - The form and structure of an organism, with special emphasis on external features.

N

*Native Species - A species which is a part of the indigenous fauna or flora of the area in question.

O

Overstory - The upper canopy or canopies of plants. Usually refers to trees, tall shrubs and vines.

P

Percolation - The flow of a liquid through a porous substance.

Plant Cover - (1) The plants or plant parts, living or dead, on the surface of the ground. Vegetative cover or herbage cover is composed of living plants and litter cover of dead parts of plants. (2) The area of ground cover by plants of one or more species.

Proper Functioning Condition - Riparian-Wetland areas are functioning properly when adequate vegetation, land-form, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. [BLM Technical Reference 1737-9]

R

Range Improvement - Range improvement means an authorized physical modification or treatment which is designed to improve production of forage; change vegetation composition; control patterns of use; provide water; stabilize soil and water conditions; restore, protect and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means.

Riparian - Referring to or relating to areas adjacent to water or influenced by free water associated with streams or rivers on geologic surfaces occupying the lowest position of a watershed.

S

Seep - Wet areas, normally not flowing, arising from an underground water source.

Soil - (1) The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (2) The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including moisture and temperature effects), macro- and micro-organisms, and topography, all acting over a period of time and producing a product - soil - that differs from the material it was derived in many physical, chemical, biological, and morphological properties and characteristics.

Species - A taxon or rank species; in the hierarchy or biological classification, the category below genus.

Species Composition - The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc. Synonym Vegetative composition.

Spring - Flowing water originating from an underground source.

T

Trend - The direction of change in ecological status or resource value rating observed over time. Trend in ecological status should be described as toward, or away from the potential natural community, or as not apparent. Trend in a resource value rating for a specific use should be described as up, down or not apparent. Trends in resource value ratings for several uses on the same site at a given time may be in different directions, and there is no necessary correlation between trends in resource value ratings and trend in ecological status. Some agencies use trend only in the context of ecological status. Syn. range condition trend.

U

Utilization - The proportion of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole.

W

Watershed - (1) A total area of land above a given point on a waterway that contributes runoff water to the flow at that point. (2) A major subdivision of a drainage basin.

Wetlands - Areas characterized by soils that are usually saturated or ponded, i.e., hydric soils that support mostly water loving plants (hydrophytic plants).

Reference

This information was taken directly from the Northeastern Great Basin RAC website for Standards and Guidelines for Grazing and Wild Horses and Burros. http://www.blm.gov/nv/st/en/res/resource_advisory/northeastern_great/s_gs/wild_horses.html.

RAC STANDARDS AND GUIDELINES FOR RANGELAND HEALTH FOR THE SIERRA FRONT-NORTHWESTERN GREAT BASIN AREA

Preamble Standards for Rangeland Health

The Standards and Guidelines for livestock grazing on Bureau of Land Management lands are written to accomplish the four fundamentals of rangeland health, insofar as they are affected by livestock grazing practices. Those fundamentals are:

- Watersheds are properly functioning;
- Ecological processes are in order;
- Water quality complies with State Standards; and
- Habitats of protected species are in order.

Other uses can affect the health of the land, and Guidelines for these currently exist or will be developed as needed. In addition, implementation of livestock grazing guidelines must be coordinated with other uses of the land, and collectively these uses should not detract from the goal of achieving public land health.

Standards, Indicators and Guidelines will be implemented through Standard public land management practices as defined in the Nevada Rangeland Monitoring Handbook and the other documents listed in Appendix A [of this appendix].

Standards: The goal to be achieved.

Indicators: Indicators are observations or measurements of physical, chemical or biological factors that should be used to evaluate site conditions or trends, appropriate to the potential of the site. Indicators assist in determining whether Standards are met or Guidelines followed.

Guidelines: Guidelines are livestock management practices (e.g., tools, methods, strategies and techniques) designed to achieve healthy public lands as defined by Standards and portrayed by Indicators. Guidelines are designed to provide direction, yet offer flexibility for local implementation through activity plans and grazing permits. Activity plans may add specificity to the Guidelines based on local goals and objectives as provided for in adopted manuals, handbooks and policy. Not all Guidelines fit all circumstances. Monitoring and site specific evaluation will determine if the Standards are being met or the trend on a particular site is toward desired objectives, and if the correct Guidelines are being applied. The BLM Authorized Officer, in consultation with public land users, will identify and document acceptable or unavoidable exceptions on a case-by-case basis.

Standard 1. Soils:
Soil processes will be appropriate to soil types, climate and land form.

As indicated by:

- Surface litter is appropriate to the potential of the site;
- Soil crusting formations in shrub interspaces, and soil compaction are minimal or not in evidence, allowing for appropriate infiltration of water;
- Hydrologic cycle, nutrient cycle and energy flow are adequate for the vegetative communities;
- Plant communities are diverse and vigorous, and there is evidence of recruitment; and
- Basal and canopy cover (vegetative) is appropriate for site potential.

The Standards and Guidelines for livestock grazing on Bureau of Land Management lands are written to accomplish the four fundamentals of rangeland health, insofar as they are affected by livestock grazing practices. Those fundamentals are:

- Watersheds are properly functioning;
- Ecological processes are in order;
- Water quality complies with State Standards; and
- Habitats of protected species are in order.

Other uses can affect the health of the land, and Guidelines for these currently exist or will be developed as needed. In addition, implementation of livestock grazing guidelines must be coordinated with other uses of the land, and collectively these uses should not detract from the goal of achieving public land health.

Standards, Indicators and Guidelines will be implemented through Standard public land management practices as defined in the Nevada Rangeland Monitoring Handbook and the other documents listed in Appendix A [of this appendix].

Standard 2. Riparian/Wetlands:
Riparian/Wetland systems are in properly functioning condition.

As indicated by:

- Sinuosity, width/depth ratio and gradient are adequate to dissipate streamflow without excessive erosion or deposition;

- Riparian vegetation is adequate to dissipate high flow energy and protect banks from excessive erosion; and
- Plant species diversity is appropriate to riparian-wetland systems.

Standard 3. Water Quality:
Water quality criteria in Nevada or California State Law shall be achieved or maintained.

As indicated by:

- Chemical constituents do not exceed the water quality Standards;
- Physical constituents do not exceed the water quality Standards;
- Biological constituents do not exceed the water quality Standards; and
- The water quality of all water bodies, including ground water located on or influenced by BLM lands will meet or exceed the applicable Nevada or California water quality Standards. Water quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law, and as found in Section 303(c) of the Clean Water Act.

Standard 4. Plant and Animal Habitat:
Populations and communities of native plant species and habitats for native animal species are healthy, productive and diverse.

As indicated by:

- Good representation of life forms and numbers of species;
- Good diversity of height, size, and distribution of plants;
- Number of wood stalks, seed stalks, and seed production adequate for stand maintenance; and
- Vegetative mosaic, vegetative corridors for wildlife, and minimal habitat fragmentation.

Standard 5. Special Status Species Habitat:
Habitat conditions meet the life cycle requirements of special status species.

As indicated by:

- Habitat areas are large enough to support viable populations of special status species;
- Special status plant and animal numbers and ages appear to ensure stable populations;

- Good diversity of height, size, and distribution of plants;
- Number of wood stalks, seed stalks, and seed production adequate for stand maintenance; and
- Vegetative mosaic, vegetative corridors for wildlife, and minimal habitat fragmentation.

Guidelines for Grazing Management:

1. Waters must be free from high temperature, biocides, organisms pathogenic to human beings, toxic, corrosive or other deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or combinations to interfere with any beneficial use of the water. Compliance with the provisions of this subsection may be determined in accordance with methods of testing prescribed by the State. If used as an Indicator, survival of test organisms must not be significantly less in test water than in control water.

2. Grazing management practices should be planned and implemented to meet water quality provisions in either California State water law or Nevada Administrative Code Section 445A.120-121 as applicable.

3. Management practices within allotments will maintain or promote stream channel morphology, appropriate soil organisms; adequate amounts of ground cover to support infiltration, maintain soil moisture storage, and stabilize soils; and the hydrologic cycle, nutrient cycle and energy flow.

4. After a range fire or other natural catastrophic event, vegetation should be returned to the native species as rapidly as possible, to afford forage and habitat for native animals. If a nurse crop is needed to protect the land from erosion, all native nurse crops should be used first.

5. Treated areas will be rested from livestock grazing for two growing seasons or until seedlings are established or the vegetative response has achieved objective levels. Wild horse and burros removed from Herd Management Areas will be restored after rehabilitation objectives have been met.

6. Alternative solutions (e.g., reseeding, funding, labor, equipment use or rental) to facilitate fire rehabilitation may be included in cooperative agreements involving qualified groups and individuals who want to participate.

7. Appropriate livestock grazing treatments will be implemented to control the frequency, duration, and level of grazing use. Where livestock grazing is authorized, grazing systems will provide within any one grazing year one or more of the following treatments:

a. Rest or deferment from livestock grazing on a specified area as appropriate to meet Standards.

b. Systematic rotation of deferred use and/or rest from livestock grazing among two or more units.

c. Continuous, season-long use where it has been demonstrated to be consistent with achieving identified Standards. Once season long use is determined to be unacceptable, an alternative system will be developed and implemented before termination of season long use, prior to the next grazing season.

d. Excluding further livestock grazing within the affected use area through appropriate techniques when utilization objectives are reached.

8. Conservation of Federal threatened or endangered, proposed, species of concern (formally Category One and Two) and other special status species is promoted by the restoration and maintenance of their habitats.

9. Salt and/or supplements will be placed at least ¼ mile from live waters (springs/streams) and outside of associated riparian areas, permanent livestock watering facilities, wet or dry meadows, and aspen stands. Also salt should not be placed in known historic properties.

10. Night bedding of sheep will be located at least ¼ mile from live waters, streams, springs, seeps, associated riparian areas, wet or dry meadows, and aspen stands.

11. Encourage the use of prescribed and natural fires, meeting prescription objectives, for the restoration and maintenance of healthy rangelands.

12. Departure from traditional grazing management practices may be authorized by BLM to achieve Standards on a case by case experimental basis for rangeland restoration and rehabilitation.

13. The best available science and technology will be utilized in monitoring and assessing the condition of rangelands from the pasture to the BLM District level.

14. Recognizing State Water Law requirements, wildlife and wild horses/burros within their Herd Management Areas will have access to surface water they customarily use.

15. Design of water facilities will incorporate features to ensure safe access and escape for small animals and birds.

16. The development of springs and seeps or other projects affecting water and associated resources shall be designed to maintain the associated riparian area and assure the attainment of Standards.

17. Grazing management practices shall be planned and implemented to allow for habitat requirements of wildlife and wild horses and burros within Herd Management Areas.

18. Implement aggressive action to reduce the invasion of exotic plant species into native plant communities. Control the spread of noxious weeds through various methods such as, grazing management, fire management and other vegetative management practices.

19. Riparian structural developments (i.e., gabions, dams, etc.) designed to achieve improvement in riparian and wetland conditions shall only be implemented in conjunction with changes in existing grazing management practices, where grazing is a significant factor contributing to a riparian condition needing such attention. Where grazing is not a significant factor causing a riparian condition needing attention, structural developments designed to achieve improvement in riparian and wetland conditions may be implemented independent of changes in existing grazing management practices.

20. The utilization, monitoring and evaluation process will be used as a tool to promote healthy rangelands and achieve Standards.

21. Implement grazing management practices that sustain biological diversity across the landscape.

22. To prevent transmission of disease between domestic and bighorn sheep, adopt and implement the "Guidelines for Domestic Sheep Management in Bighorn Sheep Habitats" contained in *Mountain Sheep Ecosystem Management Strategy in the 11 Western States and Alaska*.

23. Rangeland management plans will consider listings of known historic properties and new eligible properties as they become known.

Reference

This information was taken directly from the Sierra Front – Northwestern Great Basin RAC website for Standards and Guidelines for Rangeland Health. http://www.blm.gov/nv/st/en/res/resource_advisory/sierra_front-northwestern/standards_and_guideline.html

This page intentionally left blank.

BLM CALIFORNIA RESOURCE ADVISORY COUNCIL STANDARDS AND GUIDELINES

Northeastern California and Northwestern Nevada Standards for Rangeland Health and Guidelines for Livestock Grazing Management

This page intentionally left blank.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Washington. D.C. 20240
http://www.blm.gov

In Reply Refer To:
4180 (220)

MEMORANDUM

To: The Secretary

Through: Sylvia V. Baca
Assistant Secretary, Land and Minerals Management

From: Director, Bureau of Land Management

Subject: Approval of Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing

In accordance with 43 CFR 4180.2(b), the Acting California State Director is submitting for Secretarial approval the attached Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing. BLM review finds that they comply with the requirements of the regulations. Standard and Guidelines development occurred in consultation with the Northeast California and Northwest Nevada Resource Advisory Council and with full public participation. BLM analyzed these standards and guidelines in an Environmental Impact Statement (EIS), which was protested. BLM appropriately considered and addressed the issues stated in the protests, and used them when it developed the Record of Decision (ROD) following the EIS. The ROD also incorporated the Standards and Guidelines into the appropriate land use plans.

I recommend that you approve the Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing.

I concur with (concur/not concur) with your recommendation and (approve/not approve) the Northeastern California and Northwestern Nevada Standards and Guidelines for Livestock Grazing.

Approved: _____

Date: JUL 13 2000

Attachment

Northeastern California
and
Northwestern Nevada

STANDARDS

for Rangeland Health

and

GUIDELINES

for Livestock Grazing Management

Prepared by the Bureau of Land Management
California State Office
June 1999

STANDARDS AND GUIDELINES for RANGELAND HEALTH in NE CALIFORNIA and NW NEVADA

TABLE of CONTENTS

1. PREAMBLE 1

2. STANDARDS for RANGELAND HEALTH 1
   - STANDARD 1: UPLAND SOILS 1
   - STANDARD 2: STREAMS 2
   - STANDARD 3: WATER QUALITY 2
   - STANDARD 4: RIPARIAN and WETLAND SITES 4
   - STANDARD 5: BIODIVERSITY 5

3. GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT 6
   - Guideline 1: Adequate stubble will be present on all stream-side areas at the end of the growing season 6
   - Guideline 2: Desired seral states will be determined through the allotment management plan 6
   - Guideline 3: Periods of rest from livestock grazing 6
   - Guideline 4: Plans for grazing on any allotment must consider other uses 6
   - Guideline 5: Intensity, frequency, season-of-use, and distribution of grazing shall provide for growth and reproduction of desired plant species 6
   - Guideline 6: Grazing permits will include site-specific, measurable terms and conditions 6
   - Guideline 7: Design and work towards implementation of a grazing management strategy 6
   - Guideline 8: Determination of grazing use by livestock must provide for the habitat requirements of fish and wildlife 7
   - Guideline 9: Grazing management practices must sustain biological diversity 7
   - Guideline 10: Take aggressive action to reduce the invasion of undesirable exotic plant species 7
   - Guideline 11: Prescribed fire and (natural) prescribed fire will be utilized 7
   - Guideline 12: Grazing and other management practices shall take advantage of transitional opportunities 7
   - Guideline 13: Development of springs, seeps, and other water related projects shall be designed to promote rangeland health 7
   - Guideline 14: Apply the management practices recognized and approved by the States of California and Nevada as Best Management Practices 7
   - Guideline 15: Protect, enhance, and restore beneficial uses of water 7
   - Guideline 16: Utilization Levels to be Applied to those Allotments Not Meeting or Making Significant Progress Toward Meeting the Standards 7
     - Utilization of key upland herbaceous species 8
     - Utilization of key upland browse species 8
     - Utilization of key riparian species 8
     - Application of the above utilization levels 9
     - Implementation of this guideline 9
     - If reductions in permitted use are required 11
   - Guideline 17: Rangeland monitoring 11

STANDARDS AND GUIDELINES for RANGELAND HEALTH in NORTHEASTERN CALIFORNIA and NORTHWESTERN NEVADA

1. PREAMBLE

Healthy rangelands contribute to the social and economic well being of rural communities in Northeastern California and Northwestern Nevada, and they provide, over the long-term, the most reliable harvest of rangeland resources. The objective of rangeland resource planning is to integrate BLM resources with other resources to achieve the mandate of multiple-use and sustained yield management of renewable resources in an environmentally sound and cost-effective manner.

The standards of rangeland health are expressions of physical and biological condition or degree of function required for healthy sustainable rangelands. The Standards are applied on a landscape scale. Some standards may not apply to all acres. For example, a mosaic of vegetation types and age classes may produce the diversity associated with healthy rangelands; however, some individual vegetation communities within the mosaic may lack diversity.

The Standards always relate to the capability or potential of a specific site. The land will not be expected to produce vegetation or support habitats not attainable due to climate, soils, or other limiting attributes. The Standards are designed to establish the threshold for healthy rangelands. The Standards contain exceptions for certain necessary or unavoidable circumstances (see, for example, Standard 4); however, the exceptions should be applied under extreme conditions only, and must be fully justified.

The guidelines for grazing management are the types of grazing management methods and practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. The Guidelines were designed to provide direction, yet offer flexibility for implementation through activity plans and terms and conditions for grazing permits. The BLM must operate within the constraints of other regulatory requirements that may affect how S&G's are applied for livestock grazing, for example the Wild Free-Roaming Horse and Burro Act (1971).

2. STANDARDS for RANGELAND HEALTH

STANDARD 1: UPLAND SOILS

> *Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform, and exhibit functional biological, chemical, and physical characteristics.*

Meaning that:

Precipitation is able to enter the soil surface and move through the soil profile at a rate appropriate to soil type, climate, and landform; the soil is adequately protected against human-caused wind or water erosion; and the soil fertility is maintained at, or improved to, the appropriate level.

Criteria to Meet Standard:

* Groundcover (vegetation, litter, and other types of groundcover such as rock fragments) is sufficient to protect sites from accelerated erosion.

* Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, and deposition of dunes is either absent or, if present, does not exceed what is natural for the site.

* Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community (DPC) for the site.

STANDARD 2: STREAMS

Stream channel form and function are characteristic for the soil type, climate, and landform.

Meaning that:

Channel gradient, pool frequency, width to depth ratio, roughness, sinuosity, and sediment transport are able to function naturally and are characteristic of the soil type, climate, and landform.

Criteria to Meet Standard:

* Gravel bars and other coarse textured stream deposits are successfully colonized and stabilized by woody riparian species.

* Stream bank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high stream flow events.

* The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.

* Portions of the primary floodplain are frequently flooded (inundated every 1-5 years).

STANDARD 3: WATER QUALITY

Water will have characteristics suitable for existing or potential beneficial uses. Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada State standards, excepting approved variances.

Management Objective: For water bodies, the primary objective is to maintain the existing quality and beneficial uses of water, protect them where they are threatened, and restore them where they are currently degraded. This objective is of even higher priority in the following situations:

a. where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act;

b. where aquatic habitat is present, has been present, or is potentially present for Federal threatened or endangered, candidate, and other special status species dependent on water resources; and

c. in designated water resource sensitive areas such as riparian and wetland areas.

Meaning That:

BLM will:

Maintain the physical, biological, and chemical integrity of waters flowing across or underlying the lands it administers.

Protect the integrity of these waters where it is currently threatened.

Insofar as is feasible, restore the integrity of these waters where it is currently impaired.

Not contribute to pollution and take action to remedy any pollution resulting from its actions that violates California and Nevada water quality standards, Tribal water quality standards, or other applicable water quality requirements (e.g., requirements adopted by SWRCB or RWQCB in California, or Environmental Protection Agency (EPA) pursuant to Section 303(d) of the Clean Water Act or the Coastal Zone Reauthorization Act). Where action related to grazing management is required, such action will be taken as soon as practicable but not later than the start of the next grazing year (in accordance with 43 CFR 4180.1).

Be consistent with the nondegradation policies as identified by the States.

Develop and execute a Management Agency Agreement with the States of California and Nevada for the efficient protection of water quality associated with the BLM's management.

Work with the States' water quality administrative agencies and the EPA to establish appropriate beneficial uses for public waters, establish appropriate numeric targets for 303(d)-listed water bodies, and implement the applicable requirements to ensure that water quality on public lands meets the objectives for the designated beneficial uses of the water.

Develop and implement Best Management Practices (BMP's) approved by the States to protect and restore the quality and beneficial uses of water, and monitor both implementation and effectiveness of the BMP's. These BMP's will be developed in full consultation, coordination, and cooperation with permittees and other interests.

State or Tribal approved variances or exceptions to water quality standards may be applicable within their Basin Plans for specific types of activities or actions. The BLM will follow State or Tribal administrative procedures associated with variances.

As Indicated By:

* The following do not exceed the applicable requirements for physical, chemical, and biological constituents including but not limited to: temperature, nutrients, fecal coliform, turbidity, sediment, dissolved oxygen, and aquatic organisms and plants (e.g., indicator macroinvertebrates, fish, algae, and plants).

* Achievement of the standards for riparian, wetlands, and water bodies.

* Monitoring results or other data that show water quality is meeting the standard.

STANDARD 4: RIPARIAN and WETLAND SITES

Riparian and Wetland areas are in properly functioning condition and are meeting regional and local management objectives.

Meaning that:

The riparian and wetland vegetation is controlling erosion, stabilizing stream banks, shading water areas to reduce water temperature, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater, and increasing recharge of ground water that is characteristic for these sites. Vegetation surrounding seeps and springs is controlling erosion and reflects the potential natural vegetation for the site.

Criteria to Meet Standard:

* Riparian vegetation is vigorous and mostly perennial and diverse in species composition, age class, and life form sufficient to stabilize stream banks and shorelines.

* Riparian vegetation and large woody debris are well anchored and capable of withstanding high stream flow events.

* Negligible accelerated erosion as a result of human related activities is evident.

* Age class and structure of woody riparian and wetland vegetation are appropriate for the site.

Exceptions and Exemptions to Standard 4 (where Standard 4 is not applicable)

* Structural facilities constructed for livestock/wildlife water or other purposes are not natural wetland and/or riparian areas. Examples are: water troughs, stock ponds, flood control structures, tailings ponds, water gaps on fenced or otherwise restricted stream corridors, etc.

STANDARD 5: BIODIVERSITY

Viable, healthy, productive, and diverse populations of native and desired plant and animal species, including special status species, are maintained.

Meaning that:

Native and other desirable plant and animal populations are diverse, vigorous, able to reproduce and support nutrient cycles and energy flows.

Criteria to Meet Standard:

* Wildlife habitats include seral stages, vegetation structure, and patch size to promote diverse and viable wildlife populations.

* A variety of age classes is present for most species.

* Vigor is adequate to maintain desirable levels of plant and animal species to ensure reproduction and recruitment of plants and animals when favorable events occur.

* Distribution of plant species and their habitats allow for reproduction and recovery from localized catastrophic events.

* Natural disturbances such as fire are evident but not catastrophic.

* Nonnative plant and animal species are present at acceptable levels.

* Habitat areas are sufficient to support diverse, viable, and desired populations and are connected adequately with other similar habitat areas.

* Adequate organic matter (litter and standing dead plant material) is present for site protection and decomposition to replenish soil nutrients and maintain soil health.

3. GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

The following guidelines are meant to apply to one or more of the standards for rangeland health.

Guideline 1: Adequate stubble will be present on all stream-side areas at the end of the growing season, or at the end of the grazing season if grazing occurs after fall dormancy. The residual or regrowth should provide sufficient herbaceous forage biomass to meet the requirement of plant vigor maintenance, bank protection, and sediment entrapment. Stubble height thresholds will be set on a site-specific basis, except for those allotments to which Guideline 16 applies (see Guideline 16 for an explanation of when Guideline 16 applies).

Utilization of stream-side herbaceous and woody plants should be limited to a specified amount of the current growth, and/or livestock should be removed to allow sufficient time for plant regrowth.

a. Late season use (summer or fall grazed pastures) requires more restrictive utilization based on site specific situations.

b. Special situations such as fragile fisheries habitats or easily eroded stream banks may require more restrictive utilization thresholds.

c. Hoof action impacts or chiseling on stream banks will not exceed specified thresholds so that stream bank stability is maintained or improved.

Guideline 2: Desired seral states will be determined through the allotment management plan (AMP) development process; generally the goal will be to achieve advanced ecological status in the riparian zone, except where site-specific objectives call for lower ecological status (such as meadows in important sage grouse habitat, where the objective might call for a pattern of meadows in different seral stages from mid-seral to the potential natural community). These site-specific objectives will be determined through AMP's or other plans and analyzed through the NEPA process.

Guideline 3: Periods of rest from livestock grazing or other avoidable disturbances must be provided during/after periods of stress on the land (e.g., fire, flood, drought) and during critical times of plant growth.

Guideline 4: Plans for grazing on any allotment must consider other uses (recreation, archaeological sites, wildlife, horses and burros, mineral resource extraction, etc.) and be coordinated with the other users of public lands so that overall use does not detract from the goal of achieving rangeland health.

Guideline 5: Intensity, frequency, season-of-use, and distribution of grazing shall provide for growth and reproduction of desired plant species and the achievement of the potential natural vegetation or DPC.

Guideline 6: Grazing permits will include site-specific, measurable terms and conditions.

Guideline 7: Design and work towards implementation of a grazing management strategy for livestock for each grazing unit (pasture) within I (Improvement) and M (Maintenance) category allotments, to maintain or improve rangeland health. This may consist of, but not be limited to, season-of-use, rotation, or by setting utilization levels for desirable plants. Each management plan implemented will incorporate the factors necessary to maintain the health of desirable plants.

Guideline 8: Determination of grazing use by livestock must provide for the habitat requirements of fish and wildlife.

Guideline 9: Grazing management practices must sustain biological diversity across the landscape. A mosaic of seral stages, vegetation corridors, and minimal habitat fragmentation must be maintained.

Guideline 10: Take aggressive action to reduce the invasion of undesirable exotic plant species into native plant communities. The spread of noxious weeds will be controlled through appropriate methods such as grazing management, fire management, and other management practices.

Guideline 11: Prescribed fire and (natural) prescribed fire will be utilized to promote a mosaic of healthy plant communities and vegetative diversity.

Guideline 12: Grazing and other management practices shall take advantage of transitional opportunities (e.g., drought, flood, fire) to enhance or establish populations of desirable tree, shrub, herbaceous, and grass species. Utilization levels will be established for desired seedlings, saplings, and/or mature plants to promote their presence in the plant community.

Guideline 13: Development of springs, seeps, and other water related projects shall be designed to promote rangeland health. Wherever possible, water sources shall be available year long for use by wildlife.

Guideline 14: Apply the management practices recognized and approved by the States of California and Nevada as Best Management Practices (BMP's) for grazing related activities to protect and maintain water quality.

Guideline 15: In watersheds draining into water bodies that have been listed or are proposed for listing as having threatened or impaired beneficial uses, and where grazing activities may contribute to the pollutants causing such impairment, the management objective is to fully protect, enhance, and restore the beneficial uses of the water.

Guideline 16: Utilization Levels to be Applied to those Allotments Not Meeting or Making Significant Progress Toward Meeting the Standards

If monitoring or documented observation indicates that one of more of the standards is not being met, and if significant progress is not being made toward meeting all of those standards that are not being met, and if there is evidence that current grazing practices are causing or contributing to this unsatisfactory condition, then the following utilization levels will be applied.

Utilization of key upland herbaceous species

UTILIZATION GUIDELINES (adapted from Holechek 1988 and Holechek et al. 1998)	
Community Type	Percent of Use of Key Herbaceous Species
Salt desert shrubland	25-35
Semi-desert grass and shrubland	30-40
Sagebrush grassland	30-40
California annual grassland	50-60*
Perennial grass communities within the California annual grassland vegetation type	30-40
Coniferous forest	30-40
Mountain shrubland	30-40
Oak woodland	30-40
Pinyon-juniper woodland	30-40
Alpine tundra	20-30

* Residual dry matter (RDM) guidelines will be used instead of these utilization levels for management of annual species in the California annual grassland. These RDM levels correspond approximately with these utilization levels. The RDM levels given in the table in the Final EIS under Alternative 5, Ukiah RAC Recommended Standards and Guidelines (Section 2.92), will be used for those few annual allotments within the area covered by the Northeastern California and Northwestern Nevada Standards and Guidelines.

Utilization of key upland browse species

There will be no more than 20 percent utilization of annual growth on key browse species prior to October 1 within identified deer concentration areas. These concentration areas are those areas within mule deer habitat where mule deer numbers are most likely to be concentrated during the winter season (winter season normally occurs from December 16 through March 31). These areas have been identified through State Fish and Game Agency fall and spring counts over a period of several years. Maps of these deer concentration areas are on file at the BLM Eagle Lake Field Office.

Utilization of key riparian species

A 4-6 inch minimum stubble height will remain at the end of the growing season in most riparian areas.

There should be no more than 20 percent utilization on key riparian trees and shrub species in those areas where the presence of woody riparian species is necessary to meet standards.

Application of the above utilization levels

These utilization guidelines will be applied to those areas of the allotment responsible for the determination that the allotment is not meeting the standards. For example, an allotment has 10 riparian areas, of which six have been determined to be in proper functioning condition and four have been determined to be functional–at risk. The utilization guidelines for riparian species given above would be applied to the four riparian areas that are functional–at risk, not to the six that are in proper functioning condition (although *all* of the riparian areas will be managed to meet the standards). Also, only those guidelines that are applicable to making progress toward meeting the standards that are not being met would be applied. For example, if only riparian standards are not being met, then only the guidelines applicable to utilization and stubble height of riparian vegetation would be applied.

These utilization levels will be implemented unless and until a current site-specific analysis is completed and new utilization levels are developed for specific allotments and documented in AMP's, other management plans, and/or in terms and conditions of grazing permits/leases. New site-specific utilization levels that are developed may be more restrictive than the guidelines presented above, consistent with achieving the desired resource conditions (as prescribed in land use plans and activity plans) and progress toward meeting the standards.

Implementation of this guideline

1. Uplands (including perennial grass and browse communities).

Guideline 16 will be implemented only on those upland areas that are responsible for the determination that the allotment is not meeting one or more of the standards and for which lighter utilization would be expected to move these areas toward meeting the standard(s).

Management changes (such as changes in season of use, timing, duration, and/or intensity; rotational grazing; fencing; herding; and/or adjustments in stocking rates) will be implemented if utilization guidelines on the average of the upland key areas across the pasture (or allotment if there is only one pasture) are exceeded for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70 percent of upland key areas on the pasture (or allotment) are not to exceed maximum utilization guidelines in most years. Because of the potential long-term damage to perennial grass species associated with severe grazing, severe grazing use (>70 percent utilization) in any upland key area in any year will result in a management change the following year. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents. The average (mean) utilization on key species will be estimated at each key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 of the Final EIS for further discussion on this issue.

The management options to be implemented to meet this guideline will be determined in full consultation, cooperation, and coordination with affected permittees and other interests.

For allotments not meeting or making significant progress toward meeting the standards (and for which lower utilization levels of perennial upland species would be expected to help move these allotments toward the standards), utilization data already in hand will be used to determine whether a management

change is necessary. Thus, for example, if utilization on a particular key area has exceeded the thresholds for the 2 years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring utilization levels within threshold values, close monitoring will follow to ensure that the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

2. Riparian areas (including herbaceous and woody plant communities).

Guideline 16 will be implemented only on those riparian areas that are nonfunctional or functional--at risk and lighter utilization levels would be expected to move these areas toward meeting the standards. The guideline will apply where the riparian area in a healthy state has the capability to produce vegetation of the prescribed height. The stubble heights will be measured at the end of the growing season to determine if the guideline has been met. Management changes (such as changes in season of use, timing, duration, and/or intensity; rotational grazing; fencing; herding; and/or adjustments in stocking rates) will be implemented if stubble heights on the average of the key riparian areas across the pasture (or allotment if there is only one pasture) fall below the guidelines for 2 consecutive years or in any 2 years out of every 5 years. In addition, at least 70 percent of riparian key areas on the allotment are to exceed minimum stubble heights in most years. If any particular key area fails to meet the guidelines for more than 2 consecutive years, then management action will be taken to remedy the problem in the area of the allotment that key area represents.

Because stream banks may be inadequately protected by heavy use in any one year and because stubble heights below 3 inches result in cattle shifting their preference to shrubs, stubble heights below 2 inches in any one year will require a management change in the following year.

The mean stubble height on key riparian species will be estimated at each riparian key area and used to determine if the guidelines have been met. There are indications that the median may be a better statistic to use than the mean; we will calculate both statistics from the same data sets and make a determination on which statistic to use after examining the data over a period of a few years. See Appendix 20 of the Final EIS for further discussion on this issue.

For allotments not meeting or making significant progress toward meeting the standards (and for which higher stubble would be expected to help move these allotments toward the standards), stubble height data already in hand will be used to determine whether a management change is necessary. Thus, for example, if stubble heights on a particular key area have fallen below the thresholds for the 2 years previous to the approval of these standards and guidelines, a management change will be implemented prior to the first grazing year following this approval. In addition to implementing management changes that are expected to bring stubble heights within threshold values, close monitoring will follow to ensure that the grazing use levels are not exceeded during the grazing period following the management changes. If utilization levels are exceeded or expected to be exceeded during this period, a reduction or curtailment of further grazing in the area represented by the key area will be required for the remainder of the grazing season. In addition, further management changes will be implemented prior to the start of the next grazing season to bring utilization levels within thresholds.

The management options to be implemented to meet this guideline will be determined in full consultation, coordination, and cooperation with affected permittees and other interests.

If reductions in permitted use are required

Any reductions in permitted use required as a result of implementing this guideline will be held in suspension and apportioned back to the permittee(s) or lessee(s) authorized to graze in the affected allotment if rangeland health improves to the extent that the authorized officer determines additional forage to be available.

Guideline 17: Rangeland monitoring to determine utilization of forage resources and trend of rangeland health will be conducted in each allotment based on current accepted practices and techniques as directed in the Interagency Technical References: *Utilization Studies and Residual Measurements* (BLM et al. 1996b) and *Sampling Vegetation Attributes* (BLM et al. 1996a). Monitoring methodologies will be applicable to local conditions and developed in consultation with permittees and interested publics.

To the extent possible, monitoring methods will be simple and easily accomplished. BLM, permittees, or others will do the monitoring. BLM will be responsible for ensuring that the monitoring is conducted in accordance with currently accepted practices and techniques, for analyzing and interpreting the data collected (in consultation, coordination, and cooperation with affected permittees and other interests), and for the accuracy of the data.

Existing key areas will be used where they exist. New key areas will be selected in full consultation, coordination, and cooperation with affected permittees and other interests. BLM will periodically review established key areas to determine if they continue to be appropriate to management. This review will be done in full consultation, coordination, and cooperation with affected permittees and other interests. If there is disagreement between BLM, permittees, and other interests over the location of key areas, the RAC will be asked for ideas on resolution. The final decision on the placement of key areas, however, rests with BLM.

BLM, in cooperation with other agencies, including Cooperative Extension, the Natural Resources Conservation Service, and the Forest Service, will provide training for permittees and other interested parties on rangeland monitoring methods.

IMPLEMENTATION of
STANDARDS AND GUIDELINES for RANGELAND HEALTH in NE CALIFORNIA and NW NEVADA

IMPLEMENTATION

The fallback standards (43 CFR 4180.2(f)(1)) have been in effect since August 12, 1997. An initial screening of allotments was made, based on existing information, to determine the status of each allotment with respect to meeting the fallback standards. Each allotment was placed into one of four categories as follows:

Category 1: Areas where one or more standards are not being met, or significant progress is not being made toward meeting the standards(s), and livestock grazing is a significant contributor to the problem.

Category 2: Areas where all standards are being met, or significant progress is being made toward meeting the standard(s).

Category 3: Areas where the status for one or more standards is not known, or the cause of the failure to not meet the standard(s) is not known.

Category 4: Allotments where one or more of the standards are not being met or significant progress is not being made toward meeting the standards due to causes other than (or in addition to) livestock grazing activities. (Those allotments where current livestock grazing is also a cause for not meeting the standards are included in Category 1 in addition to this category.) The authorized officer should take appropriate action based on regulation or policy; however, these actions not related to livestock grazing are outside the scope of this implementation plan and will not be addressed in this document.

An assumption has been made by the BLM field managers that, with few possible exceptions, the implementation needed for the regulatory fallback standards and guidelines will essentially be the same as for any anticipated set of final approved standards and guidelines implemented pursuant to this Record of Decision (ROD). Consequently, the categorization of allotments under the standards in this ROD is likely to be the same as the categorization under the fallback standards and guidelines. Existing allotment assessments and their resulting determinations as to category will be reviewed to ensure that the determination is correct under the standards set in place by this ROD.

New allotment assessments, reviews of existing allotment assessments, and determination of allotment category will be conducted in full consultation, coordination, and cooperation with permittees and other interests.

We intend to conduct rangeland health assessments on all allotments within the next 5 years. First priority for these assessments will be given to those allotments where we already know or suspect one or more of the standards is not being met. These include those allotments placed in Category 1 under the fallback standards and those allotments currently in Category 3 that we have reason to believe may not be meeting standards. After these allotments have been assessed, the remaining allotments will be assessed using the BLM I, M, and C priority management system, with first priority to I, second to M, and last to C.

For those allotments where the standards are not being met (Category 1), management actions will be implemented to correct the situation prior to the next grazing season turn-out period for the allotment. The management options will be determined in full coordination, consultation, and cooperation with permittees and other interests.

Monitoring will be conducted to evaluate the progress towards improving rangeland health and to evaluate the success of the specific management measures applied (see Guideline 17).

APPLICATION OF GUIDELINES

Once the guidelines are approved by the Secretary of the Interior, they will be applicable to the management of livestock grazing on all allotments not meeting the health standards. Some guidelines will be applicable regardless of the specific rangeland health condition, as they are designed to help protect and sustain rangeland health and are not intended to be applied only to remedy problems. Many of the guidelines will need to be more specifically identified and then applied as terms and conditions of a permit or lease, based upon the specific needs for meeting rangeland health standards. There will be instances where specific terms and conditions will be applied to grazing use authorizations for reasons other than those directly related to rangeland health, such as to accommodate other resource needs and land uses or to meet administrative requirements. Examples of this may include protecting cultural resource sites, requiring a specific breed of livestock to be used that is compatible with the needs of other permittees or lessees using the same allotment, or for meeting various regulatory requirements for grazing administration purposes. In some instances, existing terms and conditions will be carried over from previously made plans and commitments, such as those identified in allotment management plans or coordinated management plans. In these instances, the terms and conditions may or may not be related to rangeland health needs.

Any terms or conditions specified for a permit or lease must be consistent with and support appropriate BLM land use plans or other land use plans applicable to the public lands. BLM will also adhere to requirements such as those identified as terms or conditions from a biological opinion for protecting the habitat of a plant or animal under the Endangered Species Act.

Terms and conditions will be applied to grazing permits, leases, or other grazing authorizations as the authorized officer (Field Manager) determines the need. The determination of what terms and conditions will be applied will be made in full consultation, coordination, and cooperation with the respective permittees/lessees and other interested parties involved in the particular allotment. The same process will be used for making needed changes to any existing terms and conditions. Information from assessments and evaluations of monitoring data will be used to determine the management changes needed. Management options that would be expected to move allotments toward meeting the standards will be determined in full coordination, consultation, and cooperation with permittees/lessees and other interested parties.

Alternative management changes will be considered and evaluated through the NEPA process prior to making final determinations. It is anticipated that in most instances, the terms and conditions will be identified cooperatively and be agreed upon by the affected permittee/lessee and all interested parties. Where an agreement cannot be reached, then a formal decision (which is appealable) will be issued.

If reductions in permitted use are necessary to achieve the standards or meet the guidelines, the animal unit months (AUMs) by which the permitted use is reduced will be held in suspension. Once the authorized officer determines that rangeland health has recovered to an extent that all or part of the suspended permitted use can be restored, this suspended permitted use shall first be apportioned in satisfaction of suspended permitted use to the permittee(s) or lessee(s) authorized to graze in the allotment in which the forage is available (this is in accordance with 43 CFR 4110.3-1(b)).

REPORTING PROGRESS IN RANGELAND HEALTH ACHIEVEMENTS

Rangeland health conditions will be reported annually for each grazing allotment. This information will include the determinations of rangeland health conditions through assessments and monitoring and the progress made towards meeting rangeland health standards. At a minimum the report will identify, by allotment: (1) what standards, if any, are not being met; (2) whether significant progress is being made toward meeting those standards that are not currently being met; (3) the magnitude of those standards not being met, in terms such as acres, miles of stream, number of sites, etc.; (4) the progress that has been made in determining and implementing needed management changes; and (5) the results of making the management changes as determined from monitoring and assessment information. Additionally, any changes in the management categories of the allotments will be identified, accompanied by an explanation of the reasons for the change.

The above information will be gathered at the field office which administers the respective allotment(s). A summary of this information will be consolidated for all of the allotments within the EIS area and made available to the public annually.

Tables were provided in the Final EIS that showed all allotments in the State and the category to which they were assigned in 1997. Since that list was compiled, management changes have been implemented and additional assessment and monitoring work has been completed that makes those lists obsolete. When the annual report is compiled each year, an updated list of all allotments, by category, will be provided as part of the report.

Throughout all processes the public is encouraged to participate in the identification of rangeland health conditions, developing management remedies, monitoring results, and reviewing progress towards achieving rangeland health standards.

This page intentionally left blank.

FOREST SERVICE STANDARDS AND GUIDELINES

Humboldt LRMP Standards and Guidelines

Range	
GOAL: Manage all allotments to maintain suitable range presently in satisfactory ecological condition, and improve suitable range that is in less than satisfactory condition.	Humboldt LRMP Page IV-5 Range Goal 16
Objective: a. Develop improved management systems for all allotments by 1988. b. Develop grazing systems which include periodic rest, where possible.	Humboldt LRMP Page IV-5 Range Objective
MD: Manage allotments to maintain suitable range in satisfactory ecological condition and improve range in less than satisfactory ecological condition by developing management plans on all allotments and wild horse territories by 1988.	Humboldt LRMP Page IV-32 Range Management Direction
MD: Describe ecological sites and develop score cards to rage ecological status and resource value. Define management strategies for rangeland.	Humboldt LRMP Page IV-37 Range Management Direction
MD: Conduct monitoring and evaluation on all allotments in accordance with Forest Service Regional Handbook. The Nevada Rangeland Monitoring Handbook will be used as a guideline.	Humboldt LRMP Page IV-37 Range Management Direction
S&G: Develop allotment management and territory plans for each allotment and wild horse territory. Update allotment management and territory plans to reflect Forest standards and guidelines	Humboldt LRMP Page IV-32 Range Standard and Guidelines
S&G: Each new or updated allotment management or wild horse territory plan will contain specific monitoring standards developed with an interdisciplinary team	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: Develop an annual operating plan for each allotment which identifies the specific action items and techniques to be utilized during the current grazing season. the annual operating plan will consist of written section will include, where applicable: 1. Clear and definite instructions concerning management of livestock while on the allotment. This should include the schedule for each unit to be grazed, expected amount of time each unit will be grazed, how the livestock will be moved from unit, and standards for getting the livestock moved and "cleaned out" of a grazing unit. 2. Range improvement maintenance responsibility for the current year, when the maintenance will be accomplished, and the maintenance standards to be attained. 3. A list of range improvement projects to be started or completed during the year. 4. Any necessary instructions concerning training and/or trucking livestock.	Humboldt LRMP Page IV-33 Range Standard and Guidelines

Humboldt LRMP Standards and Guidelines

Range	
5. Special instructions on camp sanitation and fire prevention responsibilities of permittee. 6. Multiple use coordination requirements with which the permittee is expected to comply, including animal control practices and compliance with endangered and threatened species requirements. The graphic section should include: 1. A map showing allotment and management unit boundaries, range improvement, closed areas and special management situations. 2. Acceptable forms for recording actual use, losses, improvement, maintenance, and other management data.	
Update range allotment analysis according to Regional Guidelines Analysis or updates will be conducted according to Regional Guidelines	Humboldt LRMP Page IV-36 Range Standard and Guidelines
Evaluate livestock conversion requests based on resource needs capabilities and not solely on the desires of the livestock permittee	Humboldt LRMP Page IV-39 Range Standard and Guidelines
Vacant allotments and allotments in a nonuse status that are in satisfactory ecological conditions will be considered for livestock use.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
GOAL: Produce a sustained yield of forage on all lands available and suitable for livestock grazing while maintaining or enhancing the productivity of the land	Humboldt LRMP Page IV-6 Range Goal 17
Objective: a. Develop an acceptable balance between the available grazing capacity and livestock numbers through proper monitoring of allotment management plans, to insure that resource objectives are met. b. Complete vegetative treatment projects that are prescribed in allotment management plans that are compatible with other resources and are coat effective. c. Complete coordinated LUPs where private lands, BLM lands and other Federal lands can be managed in conjunction with National Forest System lands	Humboldt LRMP Page IV-5 Range Objective
S&G: Forage utilization standards are established for each grazing allotment as a part of the allotment management plan. As plans are updated the standards of utilization may be adjusted. These utilization standards are developed by an interdisciplinary team to insure that specific resource objectives are met	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: The District I.D. Team as supported by other resource specialists is responsible for determining Proper-use criteria. Ills essential that the Team consider the full spectrum of resource needs and values. The following forage utilization values are presented by non-riparian (upland) and riparian categories. They are applicable to key species and areas.	Humboldt LRMP Range Amendment #2

Humboldt LRMP Standards and Guidelines

Range	
Maximum Forage Utilization Values ***Riparian*** **Management Vegetation** / **Management Category Value** / **Percent Utilization Key Species/Grass** Season long: I-II Highest to high III-IV, 35; Moderate to Limited 50; V, Low 55 Deferred Rotation: I-II Highest to high III-IV, 45; Moderate to Limited 55; V, Low 65 Rest Rotation: I-II Highest to high III-IV, 45; Moderate to Limited 60; V, Low 65 High Intensity Short Duration (early season): I-II Highest to high III-IV, 55; Moderate to Limited 65; V, Low 70 1. Utilization of crested wheatgrass seedings may periodically exceed the above rates by 5-10% to regulate growth form. 2. The maximum utilization levels would normally be used only where the plan community is at or near the desired future condition. 3. The listed value is the maximum rate which can be prescribed unless otherwise approved by the Forest supervisor. - 4. Key species can vary by range site and management system. 5. Proper use based on the utilization of shrubs will normally not exceed 50% of the current year's growth. 6. Under the High intensity short duration (early season), timing in relation to the period remaining for regrowth is key. The system is dependent upon sufficient regrowth to meet plant physiological needs and other resource values. Physical damage to the vegetative and soils resource to be considered. 7. Sediment entrapment is essential to streambank restoration. This is an objective at least 3-4 inches of herbaceous stubble height is needed on site during high flow periods.	
S&G: Allotment management plans will identify and schedule detailed forage improvement opportunities and structural/nonstructural improvement needs	Humboldt LRMP Page IV-34 Range Standard and Guidelines
S&G: Range readiness, livestock numbers and ownership and compliance with annual plan of use will be monitored.	Humboldt LRMP Page IV-39 Range Standard and Guidelines

Humboldt LRMP Standards and Guidelines

Range	
S&G: Treatment of rangeland pests by APHIS will be requested when serious forage loss is expected.	Humboldt LRMP Page IV-40 Range Standard and Guidelines
GOAL: Manage livestock to recognize the special needs relating to vet meadows and riparian areas, and fisheries habitat	Humboldt LRMP Page IV-6 Range Goal 18
Objective: a. Emphasize proper range management techniques that will. improve livestock distribution. b. Utilize the latest research information available in designing and implementing grazing systems. c. Fence developed springs or small wet meadows that cannot otherwise be protected. d. Consider conversions from sheep allotments to cattle allotments only after careful consideration of these areas through an environmental analysis process.	Humboldt LRMP Page IV-6 Range Objective
S&G: Grazing systems will be developed to enhance riparian zones	Humboldt LRMP Page IV-32 Range Standard and Guidelines
S&G: Where possible, relocate stock driveways and trailing areas away from riparian zones.	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: Conversion from sheep grazing to cattle grazing will not be allowed where riparian areas would be adversely affected.	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: Minimize livestock/fisheries habitat conflicts in riparian areas: 1. Implement grazing systems that enhance riparian area streambank stability and vegetative cover. 2. Apply vegetative treatment which will improve habitat conditions. 3. Install structural improvements (range and fisheries) to aid recovery of riparian area resources.	Humboldt LRMP Page IV-36 Range Standard and Guidelines
S&G: Fence spring sources developed for livestock use to maintain water quality	Humboldt LRMP Page IV-38 Range Standard and Guidelines
S&G: Management will be directed toward having riparian areas in good or better ecological condition and stable or upward trend.	Humboldt LRMP Page IV-35 Range Standard and Guidelines

Humboldt LRMP Standards and Guidelines

Range	
S&G: Livestock management will consider sensitive areas such as riparian areas and critical wildlife habitat to maintain or enhance special values	Humboldt LRMP Page IV-35 Range Standard and Guidelines
GOAL: Reduce conflicts between livestock and wildlife for forages on key winter ranges.	Humboldt LRMP Page IV-6 Range Goal 19
S&G: Build all fences to provide ease of wildlife passage	Humboldt LRMP Page IV-35 Range Standard and Guideline
S&G: Coordinate livestock grazing with the wildlife habitat improvement program	Humboldt LRMP Page IV-35 Range Standard and Guideline
Minimize livestock/big game conflicts on key winter range: 1. Hold stocking levels of livestock on key winter ranges to the carrying capacity needed to meet objectives. 2. Implement grazing systems that reduce competition for forage on winter ranges. 3. Apply vegetative treatment on winter range which will improve habitat conditions. 4. Install structural improvements on winter range which will aid in controlling an d distributing livestock use.	Humboldt LRMP Page IV-35 Range Standard and Guideline
S&G: Coordinate non-structural improvements with wildlife habitat requirements. Complete non-structural improvements projects to treat deteriorated range, treat range to sustain existing use, and to improve range condition.	Humboldt LRMP Page IV-37 Range Standard and Guideline
S&G: Locate improvements to minimize adverse impacts on wildlife	Humboldt LRMP Page IV-38 Range Standard and Guideline
GOAL: Manage the Cherry Springs, Monte Cristo, and Quinn Wild Horse Territories in accordance with the Wild Horse and Burro Act and the approved territory plans.	Humboldt LRMP Page IV-6 Range Goal 20
MD: Manage allotments to maintain suitable range in satisfactory ecological condition and improve range in less than satisfactory ecological condition by developing management plans on all allotments and wild horse territories by 1988.	Humboldt LRMP Page IV-32 Range Management Direction
S&G: Develop allotment management and territory plans for each allotment and wild horse territory. Update allotment management and territory plans to reflect Forest standards and guidelines	Humboldt LRMP Page IV-32 Range Standard and Guidelines

Humboldt LRMP Standards and Guidelines

Range	
S&G: Each new or updated allotment management or wild horse territory plan will contain specific monitoring standards developed with an interdisciplinary team	Humboldt LRMP Page IV-32 Range Standard and Guidelines
S&G: Manage wild free-roaming horses and burros to population levels compatible with the resource capabilities and needs.	Humboldt LRMP Page IV-40 Range Standard and Guidelines
GOAL: Support predator control program by making recommendations on the need for control, methods to be used, and special precautions needed and by evaluating the environmental effects of predator control	Humboldt LRMP Page IV-7 Range Goal 23
S&G: Allow predator control on grazing allotments where there is a demonstrated need as shown by permittee reports or as verified on site by Forest Service or APHIS personnel.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
S&G: Allow the use of only environmentally acceptable methods of predator control.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
GOAL: Emphasize the control of priority 1 noxious weeds.	Humboldt LRMP Page IV-7 Range Goal 24
Objective: a. Cooperate with counties in the treatment and control of noxious weeds. b. Re-treat those areas where priority 1 noxious weeds have not been eliminated and concentrate new treatment on those areas posing the greatest threat.	Humboldt LRMP Page IV-7 Range Objective
S&G: Incorporate noxious weed control into mineral operating plans and allotment management plans.	Humboldt LRMP Page IV-38 Range Standard and Guidelines
S&G: Treat new infestation and priority one noxious weeds first.	Humboldt LRMP Page IV-38 Range Standard and Guidelines
S&G: Coordinate with permittees to treat poisonous plants where livestock losses have occurred and/or have the potential to occur.	Humboldt LRMP Page IV-38 Range Standard and Guidelines
Timber	
GOAL: Promote the utilization of fire-killed trees, chaining, and green pinyon-juniper through an aggressive firewood program.	Humboldt LRMP Page IV-7 Timber Goal 26

Humboldt LRMP Standards and Guidelines

Range	
Objective: a. By 1995, harvest 200 cords of green hardwood annually for firewood or other products. Initially, offer at least 50 cords per year. b. Develop a personal use firewood program that will provide 5,000 cords annually through the first two decades. c. Design sales of green softwoods to accomplish silvicultural, fuel management, wildlife, and other resource management goals. d. Open pinyon-juniper areas planned for type conversion for greenwood cutting prior to chaining or burning. e. Utilize the temporary roads concept to provide access to fuelwood not available by the existing road system.	Humboldt LRMP Page IV-7 Timber Objective
S&G: Encourage commercial firewood sales in more remote areas.	Humboldt LRMP Page IV-42 Timber Standard and Guidelines
S&G: Maintenance and improvement of wildlife habitat will be incorporated into fuelwood harvesting programs	Humboldt LRMP Page IV-44 Timber Standard and Guidelines
Range	
GOAL: Manage all allotments to maintain suitable range presently in satisfactory ecological condition, and improve suitable range that is in less than satisfactory condition.	Humboldt LRMP Page IV-5 Range Goal 16
Objective: a. Develop improved management systems for all allotments by 1988. b. Develop grazing systems which include periodic rest, where possible.	Humboldt LRMP Page IV-5 Range Objective
MD: Manage allotments to maintain suitable range in satisfactory ecological condition and improve range in less than satisfactory ecological condition by developing management plans on all allotments and wild horse territories by 1988.	Humboldt LRMP Page IV-32 Range Management Direction
MD: Describe ecological sites and develop score cards to rage ecological status and resource value. Define management strategies for rangeland.	Humboldt LRMP Page IV-37 Range Management Direction
MD: Conduct monitoring and evaluation on all allotments in accordance with Forest Service Regional Handbook. The Nevada Rangeland Monitoring Handbook will be used as a guideline.	Humboldt LRMP Page IV-37 Range Management Direction
S&G: Develop allotment management and territory plans for each allotment and wild horse territory. Update allotment management and territory plans to reflect Forest standards and guidelines	Humboldt LRMP Page IV-32 Range Standard and Guidelines

Humboldt LRMP Standards and Guidelines

Range	
S&G: Each new or updated allotment management or wild horse territory plan will contain specific monitor8ng standards developed with an interdisciplinary team	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: Develop an annual operating plan for each allotment which identifies the specific action items and techniques to be utilized during the current grazing season. the annual operating plan will consist of written section will include, where applicable: 1. Clear and definite instructions concerning management of livestock while on the allotment. This should include the schedule for each unit to be grazed, expected amount of time each unit will be grazed, how the livestock will be moved from unit, and standards for getting the livestock moved and "cleaned out" of a grazing unit. 2. Range improvement maintenance responsibility for the current year, when the maintenance will be accomplished, and the maintenance standards to be attained. 3. A list of range improvement projects to be started or completed during the year. 4. Any necessary instructions concerning training and/or trucking livestock. 5. Special instructions in camp sanitation and fire prevention responsibilities of permittee. 6. Multiple use coordination requirements with which the permittee is expected to comply, including animal control practices and compliance with endangered and threatened species requirements. The graphic section should include: 1. A map showing allotment and management unit boundaries, range improvement, closed areas and special management situations. 2. Acceptable forms for recording actual use, losses, improvement, maintenance, and other management data.	Humboldt LRMP Page IV-33 Range Standard and Guidelines
Update range allotment analysis according to Regional Guidelines Analysis or updates will be conducted according to Regional Guidelines	Humboldt LRMP Page IV-36 Range Standard and Guidelines
Evaluate livestock conversion requests based on resource needs capabilities and not solely on the desires of the livestock permittee	Humboldt LRMP Page IV-39 Range Standard and Guidelines
Vacant allotments and allotments in a nonuse status that are in satisfactory ecological conditions will be considered for livestock use.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
GOAL: Produce a sustained yield of forage on al lands available and suitable for livestock grazing while maintaining or enhancing the productivity of the land	Humboldt LRMP Page IV-6 Range Goal 17

Humboldt LRMP Standards and Guidelines

Range	
Objective: a. Develop an acceptable balance between the available grazing capacity and livestock numbers through proper monitoring of allotment management plans, to insure that resource objectives are met. b. Complete vegetative treatment projects that are prescribed in allotment management plans that are compatible with other resources and are coat effective. c. Complete coordinated LUPs where private lands, BLM lands, and other Federal lands can be managed in conjunction with National Forest System lands	Humboldt LRMP Page IV-5 Range Objective
S&G: Forage utilization standards are established for each grazing allotment as a part of the allotment management plan. As plans are updated the standards of utilization may be adjusted. These utilization standards are developed by an interdisciplinary team to insure that specific resource objectives are met	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: The District I.D. Team as supported by other resource specialists is responsible for determining Proper-use criteria. Ills essential that the Team consider the full spectrum of resource needs and values. The following forage utilization values are presented by non-riparian (upland) and riparian categories. They are applicable to key species and areas. **Maximum Forage Utilization Values** ***Riparian*** **Management Vegetation** / **Management Category Value** / **Percent Utilization Key Species/Grass** Season long / I-II Highest to high III-IV, Moderate to Limited V, Low / 35, 50, 55 Deferred Rotation / I-II Highest to high III-IV, Moderate to Limited V, Low / 45, 55, 65 Rest Rotation / I-II Highest to high III-IV, Moderate to Limited V, Low / 45, 60, 65 High Intensity Short Duration (early season) / I-II Highest to high III-IV, Moderate to Limited V, Low / 55, 65, 70 1. Utilization of crested wheatgrass seedings may periodically exceed the above rates by 5-10% to regulate growth form. 2. The maximum utilization levels would normally be used only where the plan community is at or near the desired future condition.	Humboldt LRMP Range Amendment #2

Humboldt LRMP Standards and Guidelines

Range	
3. The listed value is the maximum rate which can be prescribed unless otherwise approved by the Forest supervisor. - 4. Key species can vary by range site and management system. 5. Proper use based on the utilization of shrubs will normally not exceed 50% of the current year's growth. - 6. Under the High intensity short duration (early season), timing in relation to the period remaining for regrowth is key. The system is dependent upon sufficient regrowth to meet plant physiological needs and other resource values. Physical damage to the vegetative and soils resource to be considered. 7. Sediment entrapment is essential to streambank restoration. This is an objective at least 3-4 inches of herbaceous stubble height is needed on site during high flow periods.	
S&G: Allotment management plans will identify and schedule detailed forage improvement opportunities and structural/nonstructural improvement needs	Humboldt LRMP Page IV-34 Range Standard and Guidelines
S&G: Range readiness, livestock numbers and ownership and compliance with annual plan of use will be monitored.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
S&G: Treatment of rangeland pests by APHIS will be requested when serious forage loss is expected.	Humboldt LRMP Page IV-40 Range Standard and Guidelines
GOAL: Manage livestock to recognize the special needs relating to vet meadows and riparian areas, and fisheries habitat	Humboldt LRMP Page IV-6 Range Goal 18
Objective: a. Emphasize proper range management techniques that will. improve livestock distribution. b. Utilize the latest research information available in designing and implementing grazing systems. c. Fence developed springs or small wet meadows that cannot otherwise be protected. d. Consider conversions from sheep allotments to cattle allotments only after careful consideration of these areas through an environmental analysis process.	Humboldt LRMP Page IV-6 Range Objective
S&G: Grazing systems will be developed to enhance riparian zones	Humboldt LRMP Page IV-32 Range Standard and Guidelines
S&G: Where possible, relocate stock driveways and trailing areas away from riparian zones.	Humboldt LRMP Page IV-33 Range Standard and Guidelines

Humboldt LRMP Standards and Guidelines

Range	
S&G: Conversion from sheep grazing to cattle grazing will not be allowed where riparian areas would be adversely affected.	Humboldt LRMP Page IV-33 Range Standard and Guidelines
S&G: Minimize livestock/fisheries habitat conflicts in riparian areas: 1. Implement grazing systems that enhance riparian area streambank stability and vegetative cover. 2. Apply vegetative treatment which will improve habitat conditions. 3. Install structural improvements (range and fisheries) to aid recovery of riparian area resources.	Humboldt LRMP Page IV-36 Range Standard and Guidelines
S&G: Fence spring sources developed for livestock use to maintain water quality	Humboldt LRMP Page IV-38 Range Standard and Guidelines
S&G: Management will be directed toward having riparian areas in good or better ecological condition and stable or upward trend.	Humboldt LRMP Page IV-35 Range Standard and Guidelines
S&G: Livestock management will consider sensitive areas such as riparian areas and critical wildlife habitat to maintain or enhance special values	Humboldt LRMP Page IV-35 Range Standard and Guidelines
GOAL: Reduce conflicts between livestock and wildlife for forages on key winter ranges.	Humboldt LRMP Page IV-6 Range Goal 19
S&G: Build all fences to provide ease of wildlife passage	Humboldt LRMP Page IV-35 Range Standard and Guideline
S&G: Coordinate livestock grazing with the wildlife habitat improvement program	Humboldt LRMP Page IV-35 Range Standard and Guideline
Minimize livestock/big game conflicts on key winter range: 1. Hold stocking levels of livestock on key winter ranges to the carrying capacity needed to meet objectives. 2. Implement grazing systems that reduce competition for forage on winter ranges. 3. Apply vegetative treatment on winter range which will improve habitat conditions. 4. Install structural improvements on winter range which will aid in controlling and distributing livestock use.	Humboldt LRMP Page IV-35 Range Standard and Guideline

Humboldt LRMP Standards and Guidelines

Range	
S&G: Coordinate non-structural improvements with wildlife habitat requirements. Complete non-structural improvements projects to treat deteriorated range, treat range to sustain existing use, and to improve range condition.	Humboldt LRMP Page IV-37 Range Standard and Guideline
S&G: Locate improvements to minimize adverse impacts on wildlife	Humboldt LRMP Page IV-38 Range Standard and Guideline
GOAL: Manage the Cherry Springs, Monte Cristo, and Quinn Wild Horse Territories in accordance with the Wild Horse and Burro Act and the approved territory plans.	Humboldt LRMP Page IV-6 Range Goal 20
MD: Manage allotments to maintain suitable range in satisfactory ecological condition and improve range in less than satisfactory ecological condition by developing management plans on all allotments and wild horse territories by 1988.	Humboldt LRMP Page IV-32 Range Management Direction
S&G: Develop allotment management and territory plans for each allotment and wild horse territory. Update allotment management and territory plans to reflect Forest standards and guidelines	Humboldt LRMP Page IV-32 Range Standard and Guidelines
S&G: Each new or updated allotment management or wild horse territory plan will contain specific monitoring standards developed with an interdisciplinary team	Humboldt LRMP Page IV-32 Range Standard and Guidelines
S&G: Manage wild free-roaming horses and burros to population levels compatible with the resource capabilities and needs.	Humboldt LRMP Page IV-40 Range Standard and Guidelines
GOAL: Support predator control program by making recommendations on the need for control, methods to be used, and special precautions needed and by evaluating the environmental effects of predator control	Humboldt LRMP Page IV-7 Range Goal 23
S&G: Allow predator control on grazing allotments where there is a demonstrated need as shown by permittee reports or as verified on site by Forest Service or APHIS personnel.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
S&G: Allow the use of only environmentally acceptable methods of predator control.	Humboldt LRMP Page IV-39 Range Standard and Guidelines
GOAL: Emphasize the control of priority 1 noxious weeds.	Humboldt LRMP Page IV-7 Range Goal 24

Humboldt LRMP Standards and Guidelines

Range	
Objective: a. Cooperate with counties in the treatment and control of noxious weeds. b. Re-treat those areas where priority 1 noxious weeds have not been eliminated and concentrate new treatment on those areas posing the greatest threat.	Humboldt LRMP Page IV-7 Range Objective
S&G: Incorporate noxious weed control into mineral operating plans and allotment management plans.	Humboldt LRMP Page IV-38 Range Standard and Guidelines
S&G: Treat new infestation and priority one noxious weeds first.	Humboldt LRMP Page IV-38 Range Standard and Guidelines
S&G: Coordinate with permittees to treat poisonous plants where livestock losses have occurred and/or have the potential to occur.	Humboldt LRMP Page IV-38 Range Standard and Guidelines

Toiyabe LRMP Standards and Guidelines

Range Management	
GOAL: Rangelands will be in satisfactory condition or better	Toiyabe LRMP Range Mgt. PG IV-4 Goal 1
Objective: Ninety-five percent of all rangelands will have been brought to satisfactory condition. Management plans will have been approved for all grazing allotments and wild and free-roaming horse and burro territories. Livestock and wild hone/burro use will have been maintained at pre-existing levels. Noxious farm weeds will be under control.	Toiyabe LRMP Range Mgt PG IV-4 DFC
S&G: Describe ecological sites, develop SCORE cards to rate ecological status and resource values, and define management strategies for rangeland management	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 10
S&G: Utilize Toiyabe National Forest range suitability standards	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 11
S&G: Strive to achieve or maintain a minimum of 60 percent ground cower on upland rangelands with the exceptions of low sagebrush types, Wyoming big sagebrush types, crested wheatgrass seedings, pinyon/juniper types, and south facing sagebrush types on granitic slopes of the Sierra Nevada.	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 12
S&G: Conduct monitoring and evaluation in accordance with FSH 2209.21, Rage Environmental Analysis Handbook, and the Nevada Rangeland Monitoring Handbook	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 14
S&G: Achieve or maintain rangeland in satisfactory condition which is defined as: (1) having a resource value rating (RVR) of 50 or above for vegetation or other features; or (2) being in a mid-succession or higher class of ecological status; and (3) having a stable or upward trend in soil and vegetation. NOTE: Criteria for RVR of vegetation include species, growth forum, Collage type, forage value, roper use factor, production, cover, density, frequency, abundance, or other. The criteria used depend upon the particular use or benefit of highest Importance of the site or area. For example, status of soil and vegetation on a watershed may be the most Important resource value; or the production of braise on key dear winter range; or vegetative cover along stream; or plant diversity as related to scenic beauty.	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 15
S&G: Complete range analysis, including inventory and evaluation, following Regional standards and the schedule set by the Forest Supervisor.	Toiyabe LRMP Forest S&G Range PG IV-27 S&G 18
S&G: Priority will be given to range improvement on allotments with a high percentage of land in unsatisfactory condition	Toiyabe LRMP Forest S&G Range PG IV-28 S&G 24

Toiyabe LRMP Standards and Guidelines

Range Management	
S&G: Forage Utilization Standards described below are to be used as maximum standards for the development of proper use criteria. Deign of management systems will include the specific utilization standards to be applied. These standards should be applied based on utilization of key plant species by key area. Soil disturbance any also be used to determine proper use and is often the best measure of proper use on sheep ranges and on granitic slopes.	Toiyabe LRMP Forest S&G Range PG IV-28 S&G 25

TABLE IV-6 MAXIMUM FORAGE UTILIZATION STANDARDS

Management System	Vegetation Type	Maximum Percent Utilization By Key Species			
		GRASS OR FORB		SHRUB	
Season Long	Aspen Sagebrush, Mountain	Conditions Class Unsatisfactory Satisfactory		Conditions Class Unsatisfactory Satisfactory	
	Brush and Grassland	40%	45%	30%	40%
	Riparian	45%	55%	20%	30%
	Alpine	30%	40%	20%	30%
Best or Deferred	Sagebrush, Mountain brush and grassland, Aspen	45%	55%	40%	50%
	Riparian	55%	65%	25%	35%
	Alpine	40%	45%	25%	35%

S&G: Proper use criteria will be established, in writing, for each unit of each crazing allotment. Proper use criteria are a mandatory pert of each allotment management plan. Long-term trend studies are also mandatory to determine if proper use criteria are correct and to determine what is occurring in regard to range condition. Proper use criteria will be developed through m tern input. It is necessary that criteria be based on the factor that becomes critical first - the limiting factor. In some range units or pastures, it may be necessary to establish more than one set of proper use criteria. This is especially true where riparian areas are involved. Establishing proper use criteria requires the ID Team involvement. Proper use criteria define the permissible grazing level in the range unit or pasture. The following standard. mist be observed when identifying limiting factors and proper use criteria: A. Soil and vegetation are the basic resources. The condition of these two resources oust be maintained or improved. If they are in satisfactory condition, then they must be maintained in this condition. If they are in less than satisfactory condition, then allowance oust be nude for improvement in condition. Any use causing a downtrend condition of these two resources should be modified or elimination whether coed by livestock, wildlife or any other use. B. After requirements for the soil and vegetative resources have been provided, the other resources, such as livestock grazing, wildlife, and aesthetics, can be considered. This is the point where the tern is involved. Trampling of soils by grazing animals by result in either soil displacement or soil displacement. This effect of grazing may become a limiting factor before the maxima allowed utilization of the key plant species is reached. In this situation, the amount of soil displacement or compaction will determine the limit of allowable grazing use rather than utilization of key species. Proper use guides based on soil displacement should generally be as follows: On steeper	Toiyabe LRMP Forest S&G Range PG IV-30 S&G 26

Toiyabe LRMP Standards and Guidelines

Range Management	
slopes and on loose sandy soils, evidence of trampling should not exceed 10 percent as determined within sample plots. Usually trampling can be tolerated on slopes less than five percent and on slopes up 11 to 30 percent with heavier textured soils. Certain stream baa zones may be an exception. Soil compaction is detrimental on heavy soils, particularly if they are wet. Meadows are most susceptible to compaction. Proper use is defined as moderate compaction or less.	
S&G: Allow no livestock grazing for two grazing seasons after prescribed or natural fires and plantings or seedings.	Toiyabe LRMP Forest S&G Range PG IV-30 S&G 27
S&G: Allow livestock conversions based on resource needs, capability, and management objectives and not solely based on the desires of the livestock A. Conversions will be made in accordance with a management plan, and current range analysis, and if the necessary range improvement structures are in place. B. When conversions are made mainly for convenience of the permittee, the range improvement structures necessary to complete the conversion will be financed and constructed by the permittee. Construction will be in accordance with Forest Service standards	Toiyabe LRMP Forest S&G Range PG IV-31 S&G 30
GOAL: All grazing allotments and wild and free-roaming horse and burro territories will be under approved management plans	Toiyabe LRMP Range Mgt PG IV-4 Goal 2
Objective: Ninety-five percent of all rangelands will have been brought to satisfactory condition. Management plans will have been approved for all grazing allotments and wild and free-roaming horse and burro territories. Livestock and wild hone/burro use will have been maintained at pre-existing levels. Noxious farm weeds will be under control.	Toiyabe LRMP Range Mgt PG IV-4 DFC
S&G: Maintain range administration improvements at a level sufficient to meet the purpose of the project and for the life of the project	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 2
S&G: Develop allotment management plans for all active range allotments and wild free—roaming horse and burro territories.	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 4
S&G: Ensure that water developments and other range improvements meet wildlife needs.	Toiyabe LRMP Forest S&G Range PG IV-26 S&G 6
S&G: Update allotment and territory management plans that are not consistent with the Forest Plan, following the schedule found in Chapter V.	Toiyabe LRMP Forest S&G Range PG IV-27 S&G 17
S&G: Develop allotment management plan in consultation with all parties Involved, including permittee(s), state, or other federal agencies, and any other organizations or individuals.	Toiyabe LRMP Forest S&G Range PG IV-27 S&G 19

Toiyabe LRMP Standards and Guidelines

Range Management	
S&G: Each allotment management plan shall preset administrative and management requirements of the specific range allotment or wild free-raining horse or burro territory, Each plan will contain sections on objectives, actions, monitoring, and evaluation. A. The action section will include seasons of use, mater of livestock permitted, the grazing system, schedule of range rehabilitation, and schedules for initiating and maintaining rage improvements. Schedules are to Include priorities, responsibilities, and planed completion dates. The action section fiat also include a statement of actions required to allow for other uses and resources, and for resolving conflicts. B. The monitoring and evaluation section will address actual use by livestock, production and utilization, ecological, status and trends, and permittee compliance with management requirements.	Toiyabe LRMP Forest S&G Range PG IV-27 S&G 20
S&G: Prepare an annual operating plan for each grazing allotment. The annual operating plan is the action plan that implements management decisions during the current year. Anal operating plans should be mutually developed by the District Ranger and permittee. The annual operating plan will consist of a narrative and graphics. A. The narrative will include, where applicable: 1. Clear and definite instructions concerning management of livestock while on the allotment. This should include the schedule for each unit to be grazed, expected anoint of time each unit will be grazed, allowable forage, utilization, how the livestock will be moved from unit to unit, and standards for livestock removal from the allotment. 2. Range improvement maintenance responsibility for the current year, when the maintenance will be accomplished, and the maintenance standards to be attained. 3. A list of range improvement projects to be started or completed during the current year. 4. Any necessary instructions concerning trailing and/or trucking livestock to and/or the allotment. 5. Special instructions on amp sanitation and fire prevention responsibilities of the permittee. 6. Multiple-use coordination requirements with which the permittee is expected to comply, including animal control practices and compliance with endangered and threatened species requirements. B. The graphic section should include: 1. A map showing allotment and management unit boundaries, range improvements, closed areas, and special management situations. 2. Acceptable forms for recording actual use, losses, improvement maintenance, and other management data.	Toiyabe LRMP Forest S&G Range PG IV-27 S&G 22
S&G: Involve livestock permittees, other federal and state agencies, and interested parties in the development of allotment and territory management plans. Utilize the Coordinated Resource Management and Planning Process as appropriate.	Toiyabe LRMP Forest S&G Range PG IV-28 S&G 23
S&G: Allow no livestock grazing for two grazing seasons after prescribed or natural fires and plantings or seedings.	Toiyabe LRMP Forest S&G Range PG IV-30 S&G 27
S&G: Notify the Nevada Department of Wildlife and the California Department of Fish and Game one year in advance of implementation of re-vegetation projects.	Toiyabe LRMP Forest S&G Range PG IV-31 S&G 29

Toiyabe LRMP Standards and Guidelines

Range Management	
S&G: WILD FREE-ROAMING HORSES AND BURROS 1. Manage wild free-roaming horses and burros In accordance with the Wild Free-Roaming Horse and Burro Ant of 1971. 2. Carry out interagency agreements with the Inyo National Forest and the BLM. 3. Involve interested federal and state agencies and other groups in the management of wild free-roaming horses and burros. 4. Manage wild free-roaming horses and burros to population levels compatible with resource capabilities and requirements	Toiyabe LRMP Forest S&G Range PG IV-31

Appendix S

Areas of Critical Environmental Concern Evaluation Report

APPENDIX S
AREAS OF CRITICAL ENVIRONMENTAL CONCERN EVALUATION REPORT

This appendix contains the Areas of Critical Environmental Concern Evaluation Report prepared by the BLM Nevada State Office in July 2013.

This page intentionally left blank.

United States Department of the Interior
Bureau of Land Management

Nevada State Office
1340 Financial Blvd
Reno, NV 89502

AREAS OF CRITICAL ENVIRONMENTAL CONCERN EVALUATION REPORT

RELEVANCE AND IMPORTANCE EVALUATIONS FOR AREAS NOMINATED AS AREAS OF CRITICAL ENVIRONMENTAL CONCERN FOR GREATER SAGE-GROUSE AND ITS HABITAT

PREPARED BY THE NEVADA STATE OFFICE
JULY 2013

TABLE OF CONTENTS

Chapter Page

1. INTRODUCTION S-1

2. DEFINITION OF AN AREA OF CRITICAL ENVIRONMENTAL CONCERN S-2

3. CRITERIA REQUIREMENTS FOR ACEC DESIGNATION S-2

3.1 Relevance Criteria S-2
3.2 Importance Criteria S-2

4. THE ACEC EVALUATION PROCESS S-3

4.1 Identification / Nomination S-3
4.2 Evaluation of Nominations for Relevance and Importance S-3
4.3 Consideration of Proposed ACECs S-3
4.4 Comment on Proposed ACECs S-3
4.5 Designation S-3

5. ACEC EVALUATION S-4

5.1 Relevance Criteria S-5
5.2 Importance Criteria S-6

6. RELEVANCE AND IMPORTANCE EVALUATION OF ACEC NOMINATIONS S-13

FIGURES

Page

5-1 Northeast California-Nevada Sub-regional Plan Amendment ACEC Process S-12
6-1 Nominated Areas of Critical Environmental Concern S-14
6-2 Alternative C: Areas of Environmental Concern S-15
6-3 Alternative F: Areas of Environmental Concern S-16

TABLES

Page

5-1 Proposed ACECs Evaluated for Relevance and Importance S-9
6-1 Proposed Areas of Critical Environmental Concern According to Alternative S-13

ACRONYMS AND ABBREVIATIONS

	Full Phrase
ACEC	area of critical environmental concern
BLM	United States Department of the Interior, Bureau of Land Management
CFR	Code of Federal Regulations
EIS	environmental impact statement
FLPMA	Federal Land Policy and Management Act
GIS	Geographic Information System
GRSG	Greater Sage-Grouse
NDOW	Nevada Department of Wildlife
PMU	Population Management Unit
RMP	resource management plan
ROD	record of decision
SRPA	Sub-regional Plan Amendment
US	United States
WSA	wilderness study area

APPENDIX S
AREAS OF CRITICAL ENVIRONMENTAL CONCERN EVALUATION REPORT

1. INTRODUCTION

In December 2011, the United States (US) Department of the Interior, Bureau of Land Management (BLM) initiated the official public scoping period to prepare multiple resource management plan amendments and revisions on a sub-regional basis to address Greater Sage-Grouse (GRSG) conservation across its entire range west-wide via publication of a Notice of Intent in the *Federal Register* (FR Vol. 76, Number 237, page 77008-77011) (December 9, 2011). As part of the Notice of Intent, the public, stakeholders, and agencies were invited to nominate areas of critical environmental concern (ACECs) within the planning sub-regions.

The BLM is required under the Federal Land Policy and Management Act of 1976, as amended (FLPMA), to do land use planning under Title II. Sec. 202 (c) (3) requires the BLM to give priority to the designation and protection of ACECs as part of the land use planning process. Among various land use plan decisions to be addressed in the sub-regional plan amendments for the Great Basin Region, the BLM will address administrative designations such as ACECs.

To be designated as an ACEC, an area must meet both the relevance and importance criteria listed under 43 CFR 1610.7-2(a)(1)(2). Nominations may come from BLM staff, other agencies, or members of the public. In addition to new nominations, the BLM also evaluates any past nominations received that have not previously been considered in a planning process. Nominations that have been received that have gone through land use planning and had decisions made on them will not be re-evaluated in this effort. To date, the Nevada State Office has received a total of 82 nominations for the Northeast California-Nevada Sub-Region.

2. DEFINITION OF AN AREA OF CRITICAL ENVIRONMENTAL CONCERN

BLM regulations (43 CFR part 1601.0-5(a)) define an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The identification of a potential ACEC shall not, of itself, change or prevent change of the management or use of public lands."

3. CRITERIA REQUIREMENTS FOR ACEC DESIGNATION

To be designated as an ACEC, an area must meet the relevance and importance criteria listed in the regulations and require special management. As part of the sub-regional planning effort, a BLM interdisciplinary team reviewed all ACEC nominations to determine if they met the ACEC criteria to be considered proposed ACECs. The two elements of ACEC criteria are listed below.

3.1 RELEVANCE CRITERIA

Does the area contain one or more of the following:

1. A significant historic, cultural, or scenic value?
2. A fish and wildlife resource?
3. A natural process or system?
4. A natural hazard?

3.2 IMPORTANCE CRITERIA

Does the value, resource, system, process, or hazard described above have substantial significance or value? Does it meet one or more of the following:

1. Is it more than locally significant, especially compared with similar resources, systems, processes, or hazards within the region or nation?
2. Does it have qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change?
3. Has it been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA?
4. Does it have qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare?
5. Does it pose a significant threat to human life and safety or property?

4. THE ACEC EVALUATION PROCESS

There are several steps in the identification and evaluation of ACECs (see **Figure 5-1**, page S-12). These steps include nomination of areas that may meet the relevance and importance criteria, evaluation of the nominated areas, and consideration of proposed ACECs in various alternative scenarios. The effects of proposed alternatives including proposed ACECs are analyzed in the Draft Sub-regional Plan Amendment (SRPA)/Environmental Impact Statement (EIS) which is subject to a 90-day public review and comment period. After the close of the 90-day public comment period, public comments are reviewed and adjustments to the proposed SRPA and proposed ACECs are made and included in the Final SRPA/EIS. Designation of ACECs occurs in the record of decision (ROD) approving the SRPA.

4.1 IDENTIFICATION / NOMINATION

ACECs can be nominated at any time but can only be designated through land use plans. Nominations were solicited from the public during the public scoping process.

4.2 EVALUATION OF NOMINATIONS FOR RELEVANCE AND IMPORTANCE

Nominations were evaluated to determine whether they meet the relevance and importance criteria. The relevance and importance criteria are detailed in the "Evaluation Process" section of this report.

4.3 CONSIDERATION OF PROPOSED ACECS

Proposed ACECs are considered as SRPA alternatives are developed. Each ACEC is proposed for designation in at least one management alternative. The need for special management and the resulting effects from applying such management are assessed in the EIS. The Agency Preferred Alternative identifies which ACECs are proposed for designation.

4.4 COMMENT ON PROPOSED ACECS

A notice of any areas proposed for ACEC designation is published in the Federal Register along with a Notice of Availability of the Draft SRPA/EIS requesting public comment. Comments received on the Draft SRPA/EIS will be considered in the preparation of the Final SRPA/EIS. After a 30-day protest period, a ROD is prepared and the plan is approved along with applicable ACECs (see below designation section).

4.5 DESIGNATION

An ACEC is proposed for designation if the area requires special management. Special management is defined as management outside of standard or routine practices, and usually includes more detail than other prescriptions contained within the plan. If analysis determines that special management is required, the area is recommended for designation of an ACEC. Designation of ACECs occurs when the ROD is signed approving the SRPA.

5. ACEC EVALUATION

The BLM is responsible for evaluating a nominated area to determine if it meets the relevance/importance criteria and requires special management. The SRPA evaluation team was comprised of an interdisciplinary team composed of specialists and managers representing different resource backgrounds and agencies. The team evaluated nominations provided by the public, state agencies, and BLM staff. The evaluation considered all current nominations. The SRPA ACEC evaluation team was comprised of the following specialists:

Name	Position and Office
BLM	
Marguerite Adams	Planning and Environmental Coordinator, Nevada State Office
Brian Amme	Planning and Environmental Coordinator, Nevada State Office
Sandy Gregory	Fuels Lead, Nevada State Office
Emily Jennings	Natural Resources Supervisor, Eagle Lake Field Office
Arlene Kosic	Wildlife, Alturas Field Office
Dave Mermejo	GIS, Nevada State Office
Sue Noggles	Planning and Environmental Coordinator, Eagle Lake Field Office
Paul Podborny	Supv. RMS, Elko District Office
Doug Siple	Mining Engineer, Nevada State Office
Joe Tague	Nevada State Office
Leisa Wesch	GIS Specialist Nevada State Office
Forest Service	
David Reis	Humboldt-Toiyabe National Forest
Contractors	
Holly Prohaska	Project Manager, Environmental Management and Planning Solutions, Inc.
Marcia Rickey	GIS, Environmental Management and Planning Solutions, Inc.
Paul Roush	Contractor, Nevada State Office
Randy Sharp	Contractor, Forest Service

The evaluation team analyzed 82 nominations for ACECs (see **Figure 6-1**).

Two nomination evaluation meetings were held. The first meeting was held on May 16, 2012, at the Nevada State Office. The second meeting was held August 15 and 16, 2012, at the Nevada State Office. All nominations were reviewed in each meeting. The first meeting was held to determine if relevance and importance criteria were met. The second meeting was held to develop a spatial component to where these relevant and important values were believed to exist within the state regardless of land ownership. The evaluation process was conducted through the use of geographic information systems (GIS) tools projected on a screen for the team to review. All the ACEC nominations received were encompassed within Nevada Department of Wildlife (NDOW) Population Management Units (PMUs). Each PMU has been mapped by NDOW into five habitat categories (March 2012).

For interim management and planning purposes, in March 2012 the BLM adopted the NDOW Categories 1 and 2 to as preliminary priority habitat (PPH), the most important and irreplaceable habitat for GRSG. The BLM used NDOW Category 3 to represent preliminary general habitat (PGH).

The ACEC interdisciplinary team agreed that relevance criterion 2, a fish or wildlife resource is present was met for the GRSG. In general, habitat that was considered NDOW Category 1 and 2 were considered to meet importance criterion 2 that it does have qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change. In addition, on a more regional basis, importance criterion 1 is also met for areas considered to be important strongholds for the species. No other relevance or importance criteria were deemed to be met.

The analyses of the ACEC criteria as identified in BLM Manual 1613.1 Characteristics of ACECs are summarized below:

5.1 RELEVANCE CRITERIA

An area meets the "relevance" criterion if it contains one or more of the following:

1. A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archeological resources and religious or cultural resources important to Native Americans).

   No. Although historic, cultural and scenic values occur widespread on public lands, the nominations did not highlight any such values as part of the nomination for GRSG habitat. A general reference to the presence of various resource values without specifying why the values are significant in the context of an ACEC does not provide rationale for meeting this criterion.

2. A fish and wildlife resource (including but not limited to endangered, sensitive, or threatened species, or habitat essential for maintaining species diversity).

   Yes. The sensitive wildlife resource and essential habitat for GRSG is present within the areas nominated as ACECs.

3. A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relic plants or plant communities which are terrestrial, aquatic, or riparian; or rare geological features)

   No. Although natural systems and processes occur on public lands, the sagebrush vegetation community and the various habitat requirements of GRSG across its range are not comprised of plant

species or communities as described in this criterion and were not highlighted as comprising a natural system.

4. A natural hazard (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the resource management planning process that it has become part of the natural process?

   No. The public lands nominated as ACECs do not constitute a natural hazard as described in this criterion.

5.2 IMPORTANCE CRITERIA

The value, resource, system, process, or hazard described above has substantial significance or value in order to satisfy the "importance" criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

1. Has more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.

   Yes. Although concerns are based on a broad range of threats that vary in scope and intensity across the range of the species regarding habitat fragmentation and disturbances, there are recognized "strongholds" for GRSG habitat and populations that exhibit on a regional or range-wide basis, composition and integrity of habitat and condition as well as strength of populations that are sustainable over the long-term. These qualities give these areas a sense of special worth and cause for concern.

2. Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.

   Yes. The areas nominated as ACECs have the following qualities described under this criterion: fragile, sensitive, irreplaceable, and vulnerable to adverse change. The resource on a range-wide basis is not rare, exemplary, unique, or endangered or threatened (i.e. listed species).

3. Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA.

   No. Although conservation of GRSG is of current national concern to the agency due to the warranted but precluded status in regard

to listing by the United States Fish and Wildlife Service, and initiation of the GRSG planning strategy, the agency has been emphasizing GRSG conservation since the late 1990s. In 2005, the BLM issued WO-IM-2005-024 directing that GRSG conservation measures be included in all resource management plans within the range of the species by 2015. At the time, there existed no secretarial or executive orders or public laws identifying GRSG as a national priority for protection beyond management of the species habitat which falls within the purview of implementation of the Endangered Species Act and FLPMA.

4. Has qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare.

   No. Qualities regarding safety and public welfare are not present within the areas nominated as ACECs for GRSG habitat.

5. Poses a significant threat to human life and safety or to property.

   No. Areas nominated as ACECs for GRSG habitat do not pose a significant threat to human life and safety or to property.

The interdisciplinary team initially reviewed each nominated ACEC by NDOW PMU across Nevada for presence or absence of GRSG habitat. The evaluation was conducted by PMU rather than by exact nominated ACEC because there were several overlapping nominations with various boundaries. Several factors were considered in determining if an area met the relevance and importance criteria. The non-exhaustive list of factors includes but is not limited to:

- Category 1 and 2 habitat (BLM PPH)
- Potential for connectivity habitat
- Presence/absence of active leks (2007 – 2010 data)
- # of birds counted on leks (2007 – 2010 data)
- Local telemetry data
- Land tenure (inholdings)
- Nesting habitat
- Core breeding habitat
- Local migratory characteristics
- Fire history
- Degraded/transitional habitat
- Artificial habitat (agriculture)
- Degraded habitat through urban and urban interface influences

Through this initial review, the team found that proposed ACECs based upon the PMUs to be unwieldy in that much of the proposed acreage either did not contain any Greater Sage grouse habitat or did not contain PHMA which proved to be the determining factor in identifying the Relevance and Importance values. As part of the review process, the team then restructured the boundaries to define where the Relevance and Importance values were located in relation to the original proposal. A matrix table identifying each proposed area and determination of Relevance and Importance values was developed. See **Table 5-1**. To identify the proposed ACECs for Alternative C and Alternative F, another matrix table details the specific proposals. See **Table 6-1**.

Table 5-1
Proposed ACECs Evaluated for Relevance and Importance

DEIS PMU Name	FEIS - BSA/BSU Name	Proposed ACEC Name	Nominator	Proposed Acreage	Acreage With R & I Values*	R & I Value	Comments
Pine Forest / Black Rock	Black Rock	Black Rock	WWP	2,147,742	239,300	Y	Compilation of Vya; Sheldon; Massacre; Buffalo-Skedaddle; Black Rock and Pine Forest ACEC nominations. Only PHMA acreage determined to have R & I value.
Butte/Buck/White Pine	Butte/Buck/White Pine	Butte/Buck/White Pine	WWP / NDOW / WEG	2,835,642	669,800	Y	Compilation of Butte; Buck; White Pine and Telegraph Mountain ACEC nominations. Only PHMA acreage determined to have R & I value.
North Fork / O'Neil Basin / Snake / Islands	Central Elko	Central Elko	WWP	3,557,003	1,680,500	Y	Compilation of Islands; O'Neil Basin; North Fork; Islands and Snake ACEC nominations. Only PHMA acreage determined to have R & I value.
Cortez / Diamond / Shoshone / Three Bar / Toiyabe	Central Great Basin	Central Great Basin	WWP / NDOW	3,496,360	1,261,500	Y	Compilation of Cortez; Diamond; Cortez Range; Shoshone; Three Bar; Roberts Mountain; Bates Mountain ACEC nominations. Only PHMA acreage determined to have R & I value.
East Valley /Schell / Antelope	East High Desert	East High Desert	WWP	2,827,390	241,500	Y	Compilation of East Valley; Schell; Antelope ACEC nominations. Only PHMA acreage determined to have R & I value.
Buffalo / Skedaddle / Virginia –Pahrah / Pahrah	Lassen / South Washoe	Lassen / South Washoe	WWP / Eagle Lake FO	712,181	683,400	Y	Compilation of Horse Lake Unit 1 & 1A; Tunnison; Chalk Bluff Unit 2 & 2A; Shaffer; Shinn Unit 3; Rush Creek; Dry Valley Unit 4; Skedaddle; Virginia-Pahrah ACEC nominations. Only PHMA acreage determined to have R & I value.
Lone Willow	Lone Willow	Lone Willow	WWP	480,121	332,200	Y	Only PHMA acreage was determined to have R & I value.
Monitor	Monitor	Monitor	WWP / NDOW / CBD	4,901,831	444,100	Y	Compilation of Toiyabe; Monitor; Bates Mountain, Monitor Valley, Little Fish Lake Valley ACEC nominations. Only PHMA acreage determined to have R & I value.
Gollaher	Northeast Elko	Northeast Elko	WWP	942,342	317,600	Y	Compilation of Gollaher ACEC nomination. Only area with PHMA acreage determined to have R & I value.
Sheldon / Massacre / Vya	Northwest Great Basin – NV	Northwest Great Basin – NV	Surprise FO / WWP	199,251	1,086,700	Y	Wall Canyon ACEC nomination. Only PHMA acreage determined to have R & I value.

Table 5-1
Proposed ACECs Evaluated for Relevance and Importance

DEIS PMU Name	FEIS - BSA/BSU Name	Proposed ACEC Name	Nominator	Proposed Acreage	Acreage With R & I Values*	R & I Value	Comments
Battle Mountain / Fish Creek / East Range / Sonoma / Humboldt	Northwest Interior	Northwest Interior	WWP / NDOW	1,391,957	176,500	Y	Compilation of Limbo, Nightingale, Fish Creek Mountains & 9 other ACEC nominations. Only PHMA acreage determined to have R & I value.
Desert / Santa Rosa / Tuscarora	Owyhee	Owyhee	WWP	3,541,344	1,357,900	Y	Compilation of Desert, Santa Rosa, Tuscarora ACEC nominations. Only PHMA acreage determined to have R & I value.
	Pueblo Range	Pueblo Range		6,500	7,200	Y	Only PHMA acreage determined to have R & I value.
South Fork / Ruby Valley	Ruby	Ruby	WWP	2,954,839	504,200	Y	Compilation of Ruby Valley; South Fork; Pińon Range ACEC nominations. Only PHMA acreage determined to have R & I value.
Clan Alpine / Desatoya / Reese River	Smith / Reese	Smith Reese	WWP	2,357,174	283,200	Y	Compilation of Clan Alpine; Desatoya; Reese River ACEC nominations. Only PHMA acreage determined to have R & I value.
Lincoln / Spring/Snake Valley / Steptoe Cave	Southeastern Nevada	Southeastern Nevada	WWP	3,371,534	315,900	Y	Compilation of Lincoln; Snake Valley; Spring and Steptoe Cave ACEC nominations. Only PHMA acreage determined to have R & I value.
Majuba 3 / Trinity 1	Western Pershing	Western Pershing	WWP	198,285	7,200	Y	Compilation of Majuba 3 and Trinity 1 ACEC nominations. Only PHMA acreage determined to have R & I value.
	Likely Tables PMU	Likely Tables PMU	WWP	468,134	9,600	Y	Only PHMA acreage determined to have R & I value.
Toiyabe	Central Great Basin	Bates Mountain	WEG	374,627	242,200	Y	Only PHMA acreage determined to have R & I value.
Cortez	Central Great Basin	Cortez Range	WEG	129,656	76,300	Y	Only PHMA acreage determined to have R & I value.
Fish Creek	Northwest Interior	Fish Creek Mountains	WEG	68,181	39,500	Y	Only PHMA acreage determined to have R & I value.
Monitor	Monitor	Little Fish Lake Valley	WEG	119,780	87,700	Y	Only PHMA acreage determined to have R & I value.
Monitor	Monitor	Monitor	WEG	550,683	53,400	Y	Only PHMA acreage determined to have R & I value.
Monitor	Monitor	Monitor Valley	WEG	247,008	173,600	Y	Only PHMA acreage determined to have R & I value.
Reese River	Smith/Reese	Reese River	WEG	105,655	92,200	Y	Only PHMA acreage determined to have R & I value.

Table 5-1
Proposed ACECs Evaluated for Relevance and Importance

DEIS PMU Name	FEIS - BSA/BSU Name	Proposed ACEC Name	Nominator	Proposed Acreage	Acreage With R & I Values*	R & I Value	Comments
Three Bar	Central Great Basin	Roberts Mountain	WEG	98,617	74,400	Y	Only PHMA acreage determined to have R & I value.
Butte/Buck/White Pine	Butte/Buck/White Pine	Telegraph Mountain	WEG	12,780	9,100	Y	Only PHMA acreage determined to have R & I value.
-Not Part of EIS-	Devil's Garden PMU	Devil's Garden PMU	WWP	1,140,074			The Devil's Garden PMU ACEC nomination is being analyzed under Modoc NF document.
Eden Valley			WWP	76,783		N	Only PHMA acreage was determined to have R & I values. Area does not contain PHMA acreage.
Eugenes			WWP	59,407		N	Only PHMA acreage was determined to have R & I values. Area does not contain PHMA acreage.
Kawich			WWP	267,108		N	Only PHMA acreage was determined to have R & I values. Area does not contain PHMA acreage.
Limbo/ Nightingale / Majuba 1, 2, 4 & 5 / Sahwave 1 & 2			WWP	364,029		N	Only PHMA acreage was determined to have R & I values. Area does not contain PHMA acreage.
Quinn			WWP	1,985,719		N	Only PHMA acreage was determined to have R & I values. Area does not contain PHMA acreage.
Stillwater			WWP	249,316		N	Only PHMA acreage was determined to have R & I values. Area does not contain PHMA acreage.
Bodie Hills / Desert Creek / Flales / Mount Grant / Pine Nut / South Mono / White Mountains			WWP	4,527,963		N	Outside of planning area

*Acreage revised to reflect the Relevance and Importance Values in PHMA

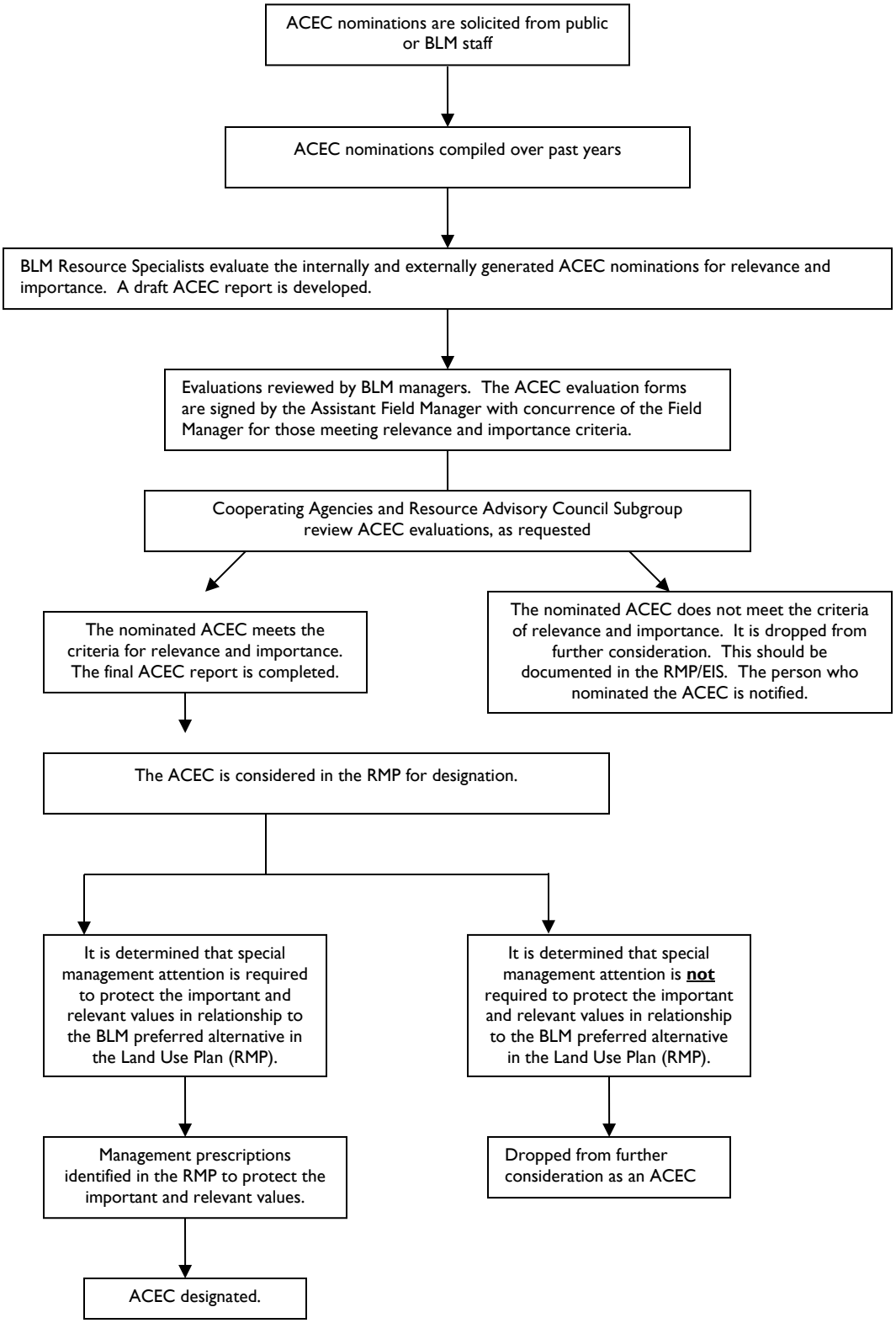


Figure 5-1 Northeast California-Nevada Sub-regional Plan Amendment ACEC Process

6. Relevance and Importance Evaluation of ACEC Nominations

Table 6-1 lists the ACECs by Alternative that were evaluated and found to meet the relevance and importance criteria. All ACECs were assessed for GRSG population and habitat values, and it was determined that all ACECs met relevance criteria #2 (unique population) and importance criteria #2 (irreplaceable habitat).

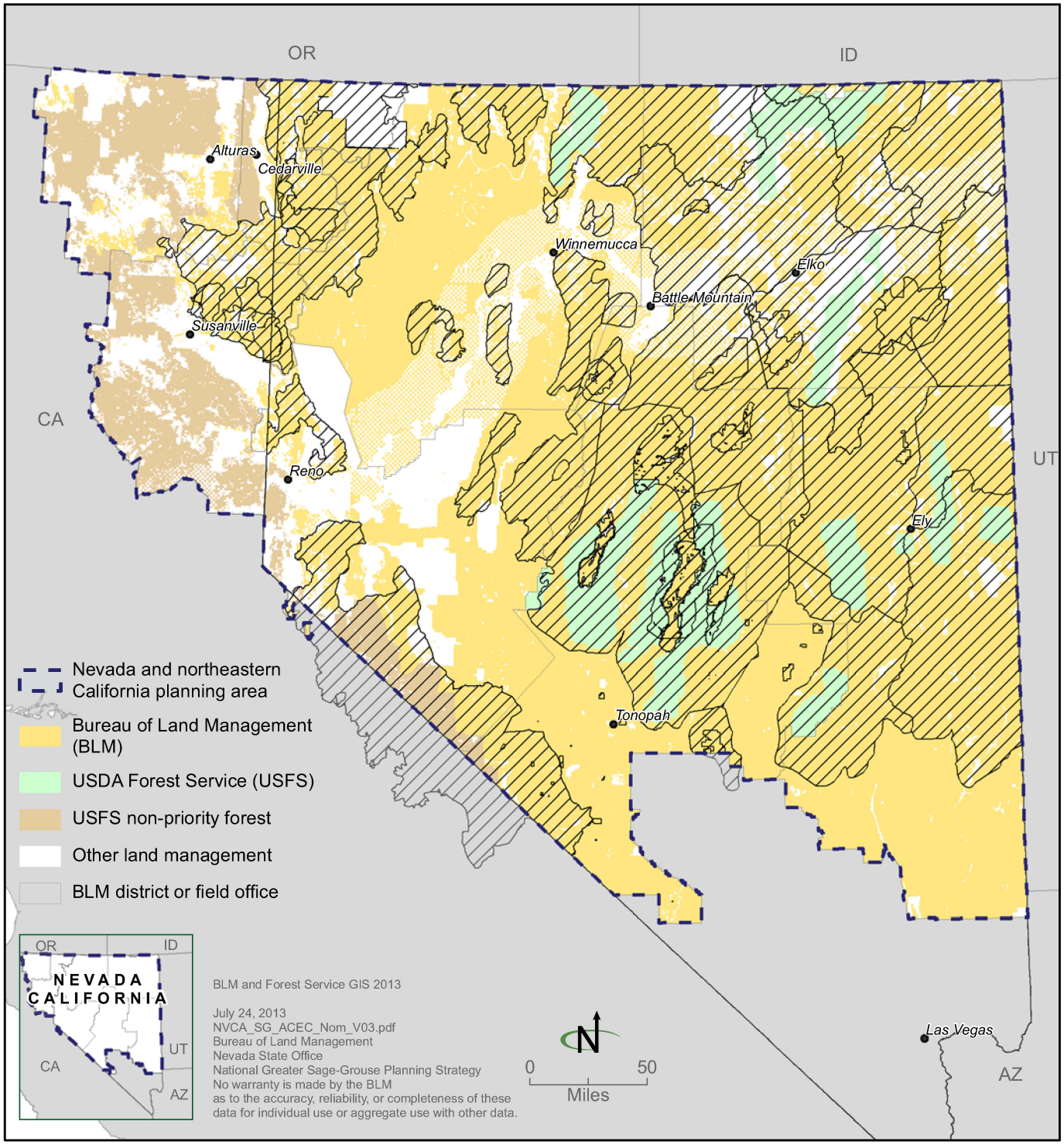
Table 6-1
Proposed Areas of Critical Environmental Concern According to Alternative

Proposed ACEC	Acres	Proposed ACEC	Acres
Alternative C			
Black Rock	239,300	Northeast Elko	317,600
Butte/Buck/White Pine	669,800	Northwest Great Basin – NV	1,086,700
Central Elko	1,680,500	Northwest Interior	176,500
Central Great Basin	1,216,500	Owyhee	1,357,900
East High Desert	241,500	Pueblo Range	7,200
Lassen / South Washoe	683,400	Ruby	504,200
Likely Tables PMU	9,600	Smith / Reese	283,200
Lone Willow	332,200	Southeastern Nevada	315,900
Monitor	444,100	West Pershing	7,200
Alternative F			
Bates Mountain	242,200	Monitor Valley	173,600
Cortez Range	76,300	Reese River	92,200
Fish Creek Mountains	39,500	Roberts Mountain	74,400
Little Fish Lake Valley	87,700	Telegraph Mountain	9,100
Monitor	53,400		

Devil's Garden PMU	**14,600**
This ACEC proposal is not being carried forward in the GRSG EIS. The proposal will be analyzed in a separate Forest Service plan amendment by the Modoc National Forest.	

Nominated Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACECs) were nominated by Nevada Division of Wildlife, Western Watersheds Project, Center for Biological Diversity, BLM Eagle Lake Field Office, BLM Surprise Field Office, and BLM Elko District Office.

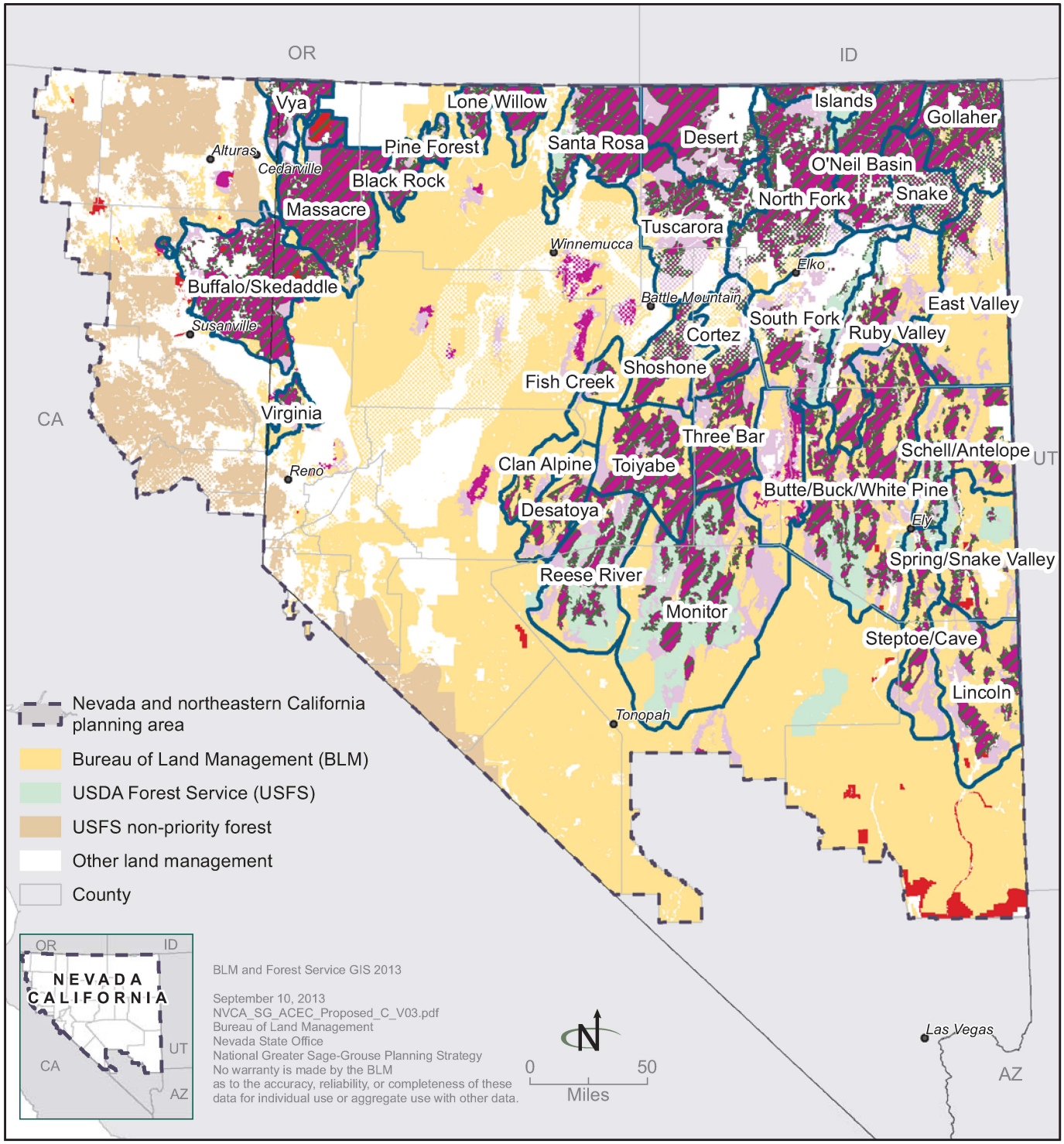


Nominated ACEC

Figure 6-1

Alternative C:
Areas of Critical Environmental Concern

Action C-SD 1: Designate proposed ACEC's to preserve, protect, conserve, restore, and sustain GRSG populations and the sagebrush ecosystem on which the GRSG relies.

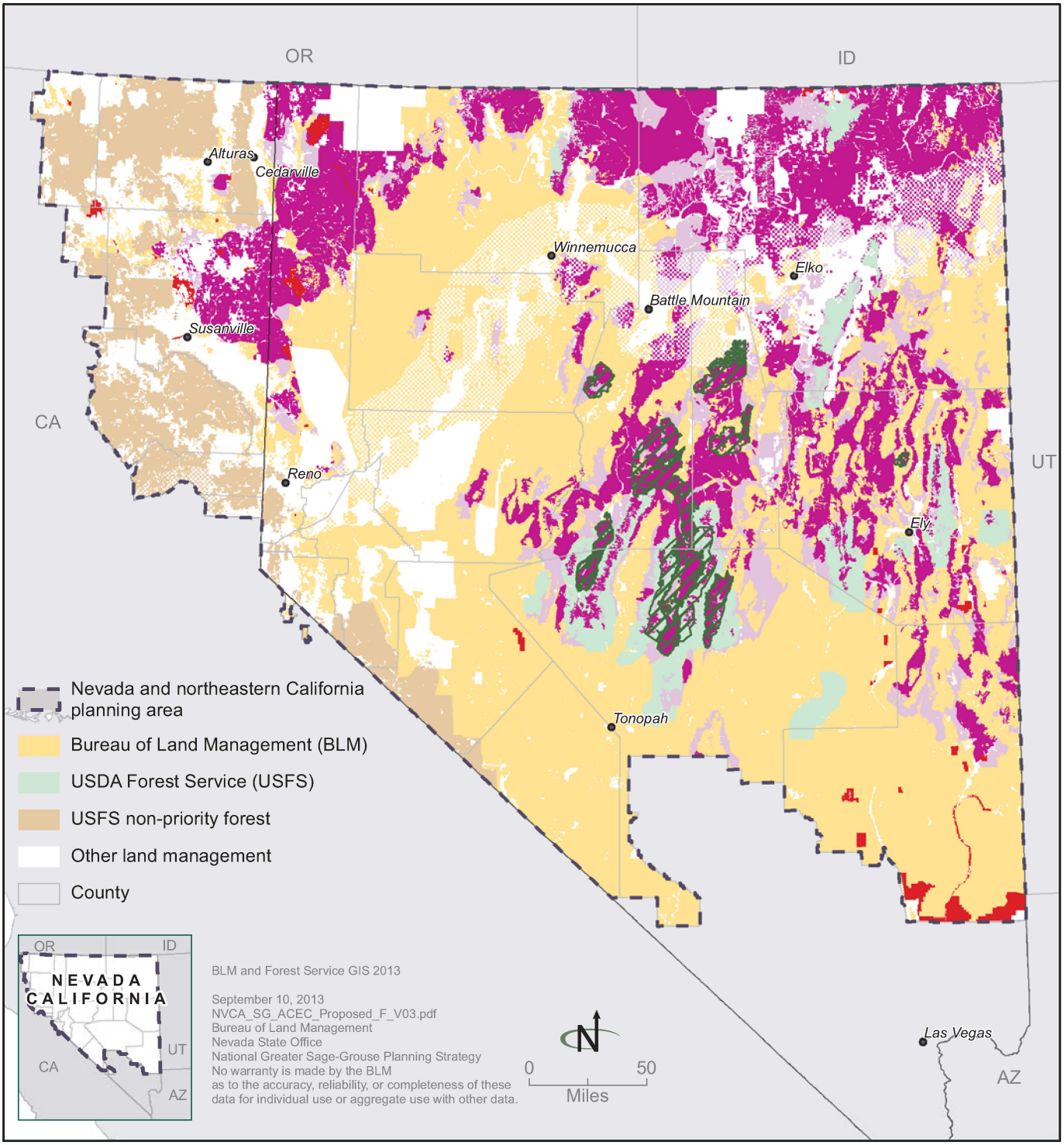


Existing Area of Critical Environmental Concern (ACEC)
Proposed ACEC
Existing Preliminary Priority Habitat
Existing Preliminary General Habitat
Population management unit with PPMA

Figure 6-2

Alternative F:
Areas of Critical Environmental Concern

Action F-SD 1: Designate proposed ACEC's (BLM) and Special Conservation Areas (Forest Service) as sagebrush reserves to conserve GRSG and other sagebrush-dependent species.



Existing Area of Critical Environmental Concern (ACEC)

Proposed ACEC

Existing Preliminary Priority Habitat

Existing Preliminary General Habitat

Figure 6-3

Appendix T

Detailed Employment and Earnings Data

Table T-1
Employment Levels by Industry Sector and County in 2010[1,2]

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Farm	758	575	61	717	680	163	476	132	134	700	323	231	0	433	163
Forestry, fishing, & related activities[3]	(D)	187	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	226	(D)
Mining (including oil and gas)	(D)	69	(D)	(D)	2,113	3,912	1,923	1,682	89	188	1,030	368	(D)	1,412	(D)
Utilities	57	(D)	(D)	122	107	84	(D)	(D)	(D)	66	115	(D)	(D)	537	(D)
Construction	470	(D)	(D)	1,176	1,811	(D)	717	(D)	(D)	899	639	31	181	12,220	179
Manufacturing	113	(D)	(D)	454	290	19	290	(D)	(D)	2,114	210	86	395	11,691	52
Wholesale trade	124	114	(D)	374	835	(D)	150	(D)	(D)	311	158	(D)	(D)	9,917	75
Retail trade	1,180	392	57	2,045	2,656	56	1,170	302	238	2,398	1,827	197	(D)	26,027	468
Transportation and warehousing	173	(D)	(D)	1,065	712	(D)	(D)	244	46	719	289	37	1,331	11,419	(D)
Information	117	(D)	(D)	322	181	(D)	94	20	(D)	80	137	(D)	(D)	3,161	45
Finance and insurance	270	89	(D)	2,418	582	(D)	145	(D)	68	587	583	(D)	(D)	15,368	161
Real estate and rental and leasing	465	220	(D)	2,771	603	(D)	223	(D)	51	747	895	(D)	(D)	16,205	109
Professional and technical services	(D)	(D)	64	1,379	701	18	(D)	(D)	303	710	1,788	49	105	16,464	109
Management of companies and enterprises	(D)	0	0	269	321	(D)	(D)	0	(D)	31	62	(D)	(D)	3,922	22
Administrative and waste services	323	(D)	59	1,363	713	(D)	424	(D)	(D)	696	1,052	(D)	(D)	15,390	119
Educational services	71	(D)	11	251	(D)	(D)	(D)	12	12	(D)	(D)	(D)	(D)	2,958	(D)
Health care and social assistance	1,214	(D)	100	1,508	1,544	(D)	(D)	53	72	(D)	(D)	(D)	(D)	23,336	(D)

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.
[3] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T-1
Employment Levels by Industry Sector and County in 2010[1,2]

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Arts, entertainment, and recreation	137	(D)	(D)	1,281	632	15	171	(D)	(D)	892	728	15	102	8,286	59
Accommodation and food services	716	(D)	(D)	942	5,494	63	1,073	(D)	(D)	726	1,494	152	131	29,571	536
Other services, except public administration	689	391	(D)	1,564	1,240	45	474	93	(D)	958	855	82	203	11,709	187
Federal government	1,928	306	(D)	1,537	541	0	211	99	57	225	313	34	(D)	4,782	257
State government	2,841	57	(D)	120	1,000	(D)	265	55	125	81	174	(D)	(D)	9,301	560
Local government	2,072	897	(D)	1,315	2,412	(D)	1,050	408	455	2,099	1,598	(D)	(D)	15,482	697
Categories for which data were not disclosed	558	1,233	998	314	243	537	1,313	711	484	1,015	1,245	996	1,121	0	1,357
Total Employment	14,276	4,530	1,350	23,307	25,411	4,912	10,169	3,811	2,134	16,242	15,515	2,278	3,569	249,817	5,155

Source: US Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T-2
Employment Percentages by Industry Sector and County in 2010[1,2]

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Farm	5.3%	12.7%	4.5%	3.1%	2.7%	3.3%	4.7%	3.5%	6.3%	4.3%	2.1%	10.1%	0.0%	0.2%	3.2%
Forestry, fishing, & related activities[3]	(D)	4.1%	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	0.1%	(D)
Mining (including oil and gas)	(D)	1.5%	(D)	(D)	8.3%	79.6%	18.9%	44.1%	4.2%	1.2%	6.6%	16.2%	(D)	0.6%	(D)
Utilities	0.4%	(D)	(D)	0.5%	0.4%	1.7%	(D)	(D)	(D)	0.4%	0.7%	(D)	(D)	0.2%	(D)
Construction	3.3%	(D)	(D)	5.0%	7.1%	(D)	7.1%	(D)	(D)	5.5%	4.1%	1.4%	5.1%	4.9%	3.5%
Manufacturing	0.8%	(D)	(D)	1.9%	1.1%	0.4%	2.9%	(D)	(D)	13.0%	1.4%	3.8%	11.1%	4.7%	1.0%
Wholesale trade	0.9%	2.5%	(D)	1.6%	3.3%	(D)	1.5%	(D)	(D)	1.9%	1.0%	(D)	(D)	4.0%	1.5%
Retail trade	8.3%	8.7%	4.2%	8.8%	10.5%	1.1%	11.5%	7.9%	11.2%	14.8%	11.8%	8.6%	(D)	10.4%	9.1%
Transportation and warehousing	1.2%	(D)	(D)	4.6%	2.8%	(D)	(D)	6.4%	2.2%	4.4%	1.9%	1.6%	37.3%	4.6%	(D)
Information	0.8%	(D)	(D)	1.4%	0.7%	(D)	0.9%	0.5%	(D)	0.5%	0.9%	(D)	(D)	1.3%	0.9%
Finance and insurance	1.9%	2.0%	(D)	10.4%	2.3%	(D)	1.4%	(D)	3.2%	3.6%	3.8%	(D)	(D)	6.2%	3.1%
Real estate and rental and leasing	3.3%	4.9%	(D)	11.9%	2.4%	(D)	2.2%	(D)	2.4%	4.6%	5.8%	(D)	(D)	6.5%	2.1%
Professional and technical services	(D)	(D)	4.7%	5.9%	2.8%	0.4%	(D)	(D)	14.2%	4.4%	11.5%	2.2%	2.9%	6.6%	2.1%
Management of companies and enterprises	(D)	0.0%	0.0%	1.2%	1.3%	(D)	(D)	0.0%	(D)	0.2%	0.4%	(D)	(D)	1.6%	0.4%
Administrative and waste services	2.3%	(D)	4.4%	5.8%	2.8%	(D)	4.2%	(D)	(D)	4.3%	6.8%	(D)	(D)	6.2%	2.3%
Educational services	0.5%	(D)	0.8%	1.1%	(D)	(D)	(D)	0.3%	0.6%	(D)	(D)	(D)	(D)	1.2%	(D)
Health care and social assistance	8.5%	(D)	7.4%	6.5%	6.1%	(D)	(D)	1.4%	3.4%	(D)	(D)	(D)	(D)	9.3%	(D)
Arts, entertainment, and recreation	1.0%	(D)	(D)	5.5%	2.5%	0.3%	1.7%	(D)	(D)	5.5%	4.7%	0.7%	2.9%	3.3%	1.1%

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.
[3] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T-2
Employment Percentages by Industry Sector and County in 2010[1,2]

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Accommodation and food services	5.0%	(D)	(D)	4.0%	21.6%	1.3%	10.6%	(D)	(D)	4.5%	9.6%	6.7%	3.7%	11.8%	10.4%
Other services, except public administration	4.8%	8.6%	(D)	6.7%	4.9%	0.9%	4.7%	2.4%	(D)	5.9%	5.5%	3.6%	5.7%	4.7%	3.6%
Federal government	13.5%	6.8%	(D)	6.6%	2.1%	0.0%	2.1%	2.6%	2.7%	1.4%	2.0%	1.5%	(D)	1.9%	5.0%
State government	19.9%	1.3%	(D)	0.5%	3.9%	(D)	2.6%	1.4%	5.9%	0.5%	1.1%	(D)	(D)	3.7%	10.9%
Local government	14.5%	19.8%	(D)	5.6%	9.5%	(D)	10.3%	10.7%	21.3%	12.9%	10.3%	(D)	(D)	6.2%	13.5%
Categories for which data were not disclosed	3.9%	27.2%	73.9%	1.3%	1.0%	10.9%	12.9%	18.7%	22.7%	6.3%	8.0%	43.7%	31.4%	0.0%	26.3%

Source: US Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T-3
Labor Income Levels by Industry Sector and County and Non-Labor Levels by County in 2010, presented in 2010 dollars (millions)

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Population	34,811	9,695	3,229	24,804	48,958	1,997	16,602	5,792	5,363	52,112	43,818	6,755	3,996	422,328	10,064
Non-labor income[1]	$362.8	$162.2	$50.4	$332.4	$449.7	$17.3	$178.2	$56.0	$55.6	$625.5	$694.8	$60.6	$57.8	$7,547.2	$113.9
Dividends, interest, and rent	$134.4	$62.6	$23.2	$140.3	$234.5	$8.7	$90.8	$24.7	$20.6	$262.6	$269.1	$23.2	$34.4	$4,956.3	$47.9
Personal current transfer receipts[1]	$228.4	$99.6	$27.2	$192.1	$215.2	$8.6	$87.4	$31.3	$35.0	$362.8	$425.7	$37.4	$23.4	$2,590.9	$66.0
Adjustment for residence[2]	-$15.6	$6.7	$20.9	$43.2	$284.0	-$357.3	-$2.0	-$34.1	-$7.7	$309.3	$74.0	$9.1	-$67.9	-$75.6	$33.4
Contributions for government social insurance[3]	$64.7	$16.6	$4.7	$61.6	$132.4	$48.0	$55.6	$25.0	$7.1	$64.5	$82.2	$8.2	$19.5	$1,194.6	$22.3
Total personal income	$960.9	$328.4	$107.3	$1,006.6	$1,854.0	$65.7	$674.5	$242.2	$114.3	$1,438.7	$1,373.6	$160.3	$139.6	$17,794.2	$371.8
Earnings by place of work[4]	$678.3	$176.2	$40.8	$692.6	$1,252.7	$453.6	$554.0	$245.3	$73.5	$568.4	$687.0	$98.8	$169.1	$11,517.2	$246.7
Total earnings by place of work by sector[5,6]															
Farm	$34.2	$39.0	$1.0	$15.9	$17.5	$5.5	$21.1	$5.7	$0.6	$25.9	$21.0	$7.6	$0.0	$5.0	$3.9
Forestry, fishing, & related activities[7]	(D)	$6.3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	$4.0	(D)
Mining (including oil and gas)	(D)	(L)	(D)	(D)	$209.2	$417.7	$184.8	$164.0	$0.4	$7.1	$84.0	$26.8	(D)	$55.0	(D)
Utilities	$3.5	(D)	(D)	$15.0	$9.5	$10.4	(D)	(D)	(D)	$6.2	$13.8	(D)	(D)	$65.3	(D)

[1] Personal current transfer receipts are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.
[2] Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs.
[3] Contributions for government social insurance consist of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly-administered workers' compensation; military medical insurance; and temporary disability insurance.
[4] Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.
[5] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[6] (L) Less than $50,000, but the estimates for this item are included in the totals.
[7] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T-3
Labor Income Levels by Industry Sector and County and Non-Labor Levels by County in 2010, presented in 2010 dollars (millions)

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Construction	$19.0	(D)	(D)	$33.8	$138.4	(D)	$59.2	(D)	(D)	$32.9	$23.3	$0.8	$11.5	$714.0	$6.6
Manufacturing	$0.7	(D)	(D)	$19.2	$12.7	(L)	$16.2	(D)	(D)	$100.4	$5.3	$2.4	$26.1	$780.7	$1.5
Wholesale trade	$6.1	$4.8	(D)	$9.3	$64.9	(D)	$8.5	(D)	(D)	$17.5	$6.3	(D)	(D)	$671.2	$2.9
Retail trade	$34.7	$10.3	$0.8	$50.4	$82.0	$0.8	$38.8	$6.8	$4.4	$78.2	$49.9	$5.4	(D)	$820.8	$12.0
Transportation and warehousing	$4.9	(D)	(D)	$61.8	$48.5	(D)	(D)	$12.8	$2.9	$30.2	$8.2	$2.4	$61.9	$576.2	(D)
Information	$3.8	(D)	(D)	$10.6	$7.3	(D)	$2.8	$0.6	(D)	$1.4	$4.4	(D)	(D)	$166.1	$1.0
Finance and insurance	$8.1	$2.2	(D)	$33.0	$17.9	(D)	$5.0	(D)	$1.5	$10.3	$7.9	(D)	(D)	$678.0	$3.4
Real estate and rental and leasing	$6.2	$1.3	(D)	$14.6	$8.6	(D)	$2.5	(D)	$1.0	$3.9	$4.1	(D)	(D)	$288.0	$1.3
Professional and technical services	(D)	(D)	$1.3	$36.5	$33.2	$0.2	(D)	(D)	$16.9	$20.2	$143.0	$1.1	$2.4	$898.2	$2.1
Management of companies and enterprises	(D)	$0.0	$0.0	$0.2	$44.0	(D)	(D)	$0.0	(D)	$2.9	$2.4	(D)	(D)	$391.1	$2.8
Administrative and waste services	$6.0	(D)	$0.6	$32.0	$18.0	(D)	$16.4	(D)	(D)	$12.2	$62.6	(D)	(D)	$442.8	$1.6
Educational services	$1.3	(D)	(L)	$2.9	(D)	(D)	(D)	(L)	(L)	(D)	(D)	(D)	(D)	$81.0	(D)
Health care and social assistance	$51.5	(D)	$4.3	$56.2	$75.4	(D)	(D)	$1.5	$2.0	(D)	(D)	(D)	(D)	$1,361.7	(D)
Arts, entertainment, and recreation	$1.7	(D)	(D)	$12.0	$16.5	(L)	$2.9	(D)	(D)	$22.7	$17.4	(L)	$1.2	$178.7	$0.9
Accommodation and food services	$13.0	(D)	(D)	$19.6	$165.3	$0.8	$25.0	(D)	(D)	$11.7	$32.4	$2.4	$2.6	$871.0	$11.6
Other services, except public administration	$23.5	$8.4	(D)	$41.6	$41.3	$0.9	$18.3	$4.4	(D)	$26.7	$23.0	$2.1	$7.0	$422.0	$6.8
Federal government	$176.4	$24.5	$4.4	$147.9	$42.6	$0.7	$15.9	$8.4	$3.9	$12.5	$26.8	$1.9	$0.8	$418.8	$19.2
State government	$168.5	$3.6	(D)	$7.6	$53.2	(D)	$13.5	$2.5	$8.3	$5.6	$10.6	(D)	(D)	$582.1	$34.7
Local government	$102.0	$43.6	(D)	$70.2	$143.7	(D)	$63.7	$22.4	$22.5	$112.8	$98.3	(D)	(D)	$1,045.5	$45.6

Table T-3
Labor Income Levels by Industry Sector and County and Non-Labor Levels by County in 2010, presented in 2010 dollars (millions)

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Categories for which data were not disclosed	$13.3	$32.1	$28.5	$2.4	$3.0	$16.7	$59.3	$16.3	$9.0	$27.1	$42.3	$45.9	$55.5	$0.0	$88.8

Source: US Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T-4
Labor Income Percentages by Industry Sector and County and Non-Labor Income Percentages by County in 2010

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Population	34,811	9,695	3,229	24,804	48,958	1,997	16,602	5,792	5,363	52,112	43,818	6,755	3,996	422,328	10,064
Non-labor income as proportion of total personal income[1]	37.8%	49.4%	46.9%	33.0%	24.3%	26.3%	26.4%	23.1%	48.6%	43.5%	50.6%	37.8%	41.4%	42.4%	30.6%
Dividends, interest, and rent as a proportion of total personal income	14.0%	19.1%	21.6%	13.9%	12.6%	13.3%	13.5%	10.2%	18.0%	18.3%	19.6%	14.5%	24.6%	27.9%	12.9%
Personal current transfer receipts as a proportion of total personal income[1]	23.8%	30.3%	25.3%	19.1%	11.6%	13.1%	13.0%	12.9%	30.7%	25.3%	31.0%	23.3%	16.8%	14.6%	17.8%
Adjustment for residence as a proportion of total personal income[2]	-1.6%	2.0%	19.5%	4.3%	15.3%	-544.3%	-0.3%	-14.1%	-6.8%	21.5%	5.4%	5.7%	-48.7%	-0.4%	9.0%
Contributions for government social insurance as a proportion of total personal income[3]	6.7%	5.1%	4.4%	6.1%	7.1%	73.1%	8.2%	10.3%	6.2%	4.5%	6.0%	5.1%	14.0%	6.7%	6.0%

[1] Personal current transfer receipts are benefits received by persons for which no current services are performed. They are payments by government and business to individuals and institutions, such as retirement and disability insurance benefits.
[2] Residence adjustment represents the net inflow of the earnings of inter-area commuters. A positive number indicates that, on balance, area residents commute outside to find jobs; a negative number indicates that, on balance, people from outside the area commute in to find jobs.
[3] Contributions for government social insurance consist of payments by employers, employees, the self-employed, and other individuals who participate in the following government programs: Old-age, Survivors, and Disability Insurance; Medicare; unemployment insurance; railroad retirement; pension benefit guarantee; veterans' life insurance; publicly-administered workers' compensation; military medical insurance; and temporary disability insurance.

Table T-4
Labor Income Percentages by Industry Sector and County and Non-Labor Income Percentages by County in 2010

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Total personal income by place of residence ($ millions)	$960.9	$328.4	$107.3	$1,006.6	$1,854.0	$65.7	$674.5	$242.2	$114.3	$1,436.7	$1,373.6	$160.3	$139.6	$17,794.2	$371.8
Earnings by place of work ($ millions)[1]	$678.3	$176.2	$40.8	$692.6	$1,252.7	$453.6	$554.0	$245.3	$73.5	$568.4	$687.0	$98.8	$169.1	$11,517.2	$246.7
Total earnings by place of work by sector [2,3]															
Farm	5.0%	22.1%	2.5%	2.3%	1.4%	1.2%	3.8%	2.3%	0.9%	4.6%	3.1%	7.7%	0.0%	0.0%	1.6%
Forestry, fishing, & related activities[4]	(D)	3.6%	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	0.0%	(D)
Mining (including oil and gas)	(D)	(L)	(D)	(D)	16.7%	92.1%	33.4%	66.8%	0.6%	1.2%	12.2%	27.1%	(D)	0.5%	(D)
Utilities	0.5%	(D)	(D)	2.2%	0.8%	2.3%	(D)	(D)	(D)	1.1%	2.0%	(D)	(D)	0.6%	(D)
Construction	2.8%	(D)	(D)	4.9%	11.1%	(D)	10.7%	(D)	(D)	5.8%	3.4%	0.8%	6.8%	6.2%	2.7%
Manufacturing	0.1%	(D)	(D)	2.8%	1.0%	(L)	2.9%	(D)	(D)	17.7%	0.8%	2.5%	15.4%	6.8%	0.6%
Wholesale trade	0.9%	2.7%	(D)	1.3%	5.2%	(D)	1.5%	(D)	(D)	3.1%	0.9%	(D)	(D)	5.8%	1.2%
Retail trade	5.1%	5.9%	2.0%	7.3%	6.5%	0.2%	7.0%	2.8%	6.0%	13.8%	7.3%	5.5%	(D)	7.1%	4.9%
Transportation and warehousing	0.7%	(D)	(D)	8.9%	3.9%	(D)	(D)	5.2%	3.9%	5.3%	1.2%	2.4%	36.6%	5.0%	(D)
Information	0.6%	(D)	(D)	1.5%	0.6%	(D)	0.5%	0.2%	(D)	0.2%	0.6%	(D)	(D)	1.4%	0.4%
Finance and insurance	1.2%	1.3%	(D)	4.8%	1.4%	(D)	0.9%	(D)	2.1%	1.8%	1.2%	(D)	(D)	5.9%	1.4%
Real estate and rental and leasing	0.9%	0.7%	(D)	2.1%	0.7%	(D)	0.5%	(D)	1.4%	0.7%	0.6%	(D)	(D)	2.5%	0.5%
Professional and technical services	(D)	(D)	3.1%	5.3%	2.7%	0.0%	(D)	(D)	23.0%	3.6%	20.8%	1.2%	1.4%	7.8%	0.9%
Management of companies and enterprises	(D)	0.0%	0.0%	0.0%	3.5%	(D)	(D)	0.0%	(D)	0.5%	0.4%	(D)	(D)	3.4%	1.1%

[1] Earnings by place of work differs from total personal income by the exclusion of dividends, interest, and rent, as well as adjustments to account for net transfer payments (e.g., unemployment benefits and Social Security taxes and payments) and the residential adjustment.
[2] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
[3] (L) Less than $50,000, but the estimates for this item are included in the totals.
[4] "Related activities" includes hunting and trapping, as well as agricultural services such as custom tillage.

Table T-4
Labor Income Percentages by Industry Sector and County and Non-Labor Income Percentages by County in 2010

	Lassen, CA	Modoc, CA	Sierra, CA	Churchill, NV	Elko, NV	Eureka, NV	Humboldt, NV	Lander, NV	Lincoln, NV	Lyon, NV	Nye, NV	Pershing, NV	Storey, NV	Washoe, NV	White Pine, NV
Administrative and waste services	0.9%	(D)	1.3%	4.6%	1.4%	(D)	3.0%	(D)	(D)	2.2%	9.1%	(D)	(D)	3.8%	0.7%
Educational services	0.2%	(D)	(L)	0.4%	(D)	(D)	(D)	(L)	(L)	(D)	(D)	(D)	(D)	0.7%	(D)
Health care and social assistance	7.6%	(D)	10.5%	8.1%	6.0%	(D)	(D)	0.6%	2.7%	(D)	(D)	(D)	(D)	11.8%	(D)
Arts, entertainment, and recreation	0.3%	(D)	(D)	1.7%	1.3%	(L)	0.5%	(D)	(D)	4.0%	2.5%	(L)	0.7%	1.6%	0.4%
Accommodation and food services	1.9%	(D)	(D)	2.8%	13.2%	0.2%	4.5%	(D)	(D)	2.1%	4.7%	2.5%	1.6%	7.6%	4.7%
Other services, except public administration	3.5%	4.8%	(D)	6.0%	3.3%	0.2%	3.3%	1.8%	(D)	4.7%	3.4%	2.1%	4.2%	3.7%	2.8%
Federal government	26.0%	13.9%	10.7%	21.4%	3.4%	0.2%	2.9%	3.4%	5.3%	2.2%	3.9%	1.9%	0.4%	3.6%	7.8%
State government	24.8%	2.1%	(D)	1.1%	4.2%	(D)	2.4%	1.0%	11.2%	1.0%	1.5%	(D)	(D)	5.1%	14.1%
Local government	15.0%	24.7%	(D)	10.1%	11.5%	(D)	11.5%	9.1%	30.6%	19.8%	14.3%	(D)	(D)	9.1%	18.5%
Categories for which data were not disclosed	2.0%	18.2%	69.9%	0.3%	0.2%	3.7%	10.7%	6.6%	12.3%	4.8%	6.2%	46.4%	32.8%	0.0%	36.0%

Source: US Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T-5
Employment Trends by Select Industry Sector and County, 2001-2009[1,2]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mining										
Lassen, CA	42	61	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Modoc, CA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	43	63	69
Churchill, NV	38	(D)	(D)	81	80	(D)	(D)	(D)	(D)	(D)
Elko, NV	1278	1213	1268	1682	1980	2216	2259	2398	1829	2113
Eureka, NV	3570	(D)	(D)	(D)	(D)	(D)	3962	(D)	4073	3912
Humboldt, NV	948	806	928	1073	1256	1410	1475	1608	1676	1923
Lander, NV	1123	1049	1023	(D)	1077	1110	1227	1368	1548	1682
Lincoln, NV	(D)	(D)	(D)	(D)	(D)	(D)	32	70	81	89
Nye, NV	1012	940	992	1058	977	1044	1078	1080	1019	1030
Pershing, NV	588	(D)	(D)	(D)	(D)	440	436	466	360	368
Washoe, NV	985	900	1015	939	898	991	1295	1394	1252	1412
Socioeconomic Study Area	9584	4969	5226	4833	6268	7211	11764	8427	11901	12598
Sierra, CA	(D)	(D)	(D)	(D)	19	15	14	(D)	(D)	(D)
Lyon, NV	164	146	226	214	178	196	217	234	166	188
Storey, NV	(D)	(D)	(D)	90	96	96	(D)	(D)	(D)	(D)
Farming										
Lassen, CA	680	760	748	779	668	627	714	698	709	758
Modoc, CA	650	659	674	640	614	571	605	580	596	575
Churchill, NV	784	743	769	742	738	726	709	711	696	717
Elko, NV	698	624	670	660	671	680	668	675	658	680
Eureka, NV	127	110	127	134	143	155	157	162	157	163
Humboldt, NV	503	438	477	471	475	483	463	471	460	476
Lander, NV	174	160	162	152	146	141	130	132	129	132
Lincoln, NV	158	147	150	143	141	137	132	133	130	134
Nye, NV	326	302	329	322	323	328	311	318	311	323
Pershing, NV	220	182	206	207	217	226	225	229	224	231
Washoe, NV	539	474	492	468	458	443	433	433	426	433
Socioeconomic Study Area	4859	4599	4804	4718	4594	4517	4547	4542	4496	4622
Sierra, CA	54	62	61	55	55	52	63	60	61	61
Lyon, NV	678	607	670	666	684	701	675	693	673	700
Storey, NV	0	0	0	0	0	0	0	0	0	0
Retail trade										
Lassen, CA	1481	1456	1422	1446	1449	1375	1442	1405	1261	1180
Modoc, CA	381	413	392	344	331	393	378	406	394	392
Churchill, NV	1750	2055	1969	1835	1919	2021	1977	2249	2127	2045
Elko, NV	2501	2411	2362	2378	2632	2843	2931	2833	2713	2656
Eureka, NV	(D)	(D)	(D)	(D)	46	(D)	(D)	59	60	56
Humboldt, NV	1131	1163	1180	1203	1204	1273	1389	1249	1186	1170
Lander, NV	328	308	311	327	355	369	397	349	336	302
Lincoln, NV	226	208	260	272	262	264	279	253	237	238
Nye, NV	1435	1415	1740	1886	2022	2158	2103	1979	1895	1827
Pershing, NV	232	211	199	203	209	212	210	186	196	197

[1] (D) Not shown to avoid disclosure of confidential information, and the estimates for this item are not included in the totals.
[2] (L) Less than 10 jobs, and the estimates for this item are not included in the totals.

Table T-5
Employment Trends by Select Industry Sector and County, 2001-2009[1,2]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Washoe, NV	25007	25531	26261	26875	27988	29474	29962	28472	26762	26027
Socioeconomic Study Area	34472	35171	36096	36769	38417	40382	41068	39440	37167	36090
Sierra, CA	73	74	71	71	(D)	(D)	(D)	(D)	(D)	57
Lyon, NV	2158	2102	2076	1932	2084	2240	2398	2746	2460	2398
Storey, NV	123	129	139	124	121	122	127	(D)	(D)	(D)
Accommodation and food services										
Lassen, CA	805	917	894	876	818	859	809	685	639	716
Modoc, CA	234	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Churchill, NV	703	863	849	888	930	974	994	965	945	942
Elko, NV	6160	6020	6091	6265	6012	5858	5977	5877	5509	5494
Eureka, NV	44	33	38	51	51	51	55	63	61	63
Humboldt, NV	1163	1146	1156	1141	1121	1130	1152	1163	1116	1073
Lander, NV	174	159	155	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Lincoln, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Nye, NV	1346	1388	1494	1621	1606	1578	1605	1542	1515	1494
Pershing, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	163	152
Washoe, NV	36819	34807	34761	34156	33846	34124	34941	33442	29896	29571
Socioeconomic Study Area	47448	45333	45438	44998	44384	44574	45533	43737	39844	39505
Sierra, CA	137	(D)	(D)	(D)	(D)	105	(D)	(D)	(D)	(D)
Lyon, NV	454	539	629	673	766	835	868	870	750	726
Storey, NV	142	148	109	107	106	116	125	130	145	131
Arts, entertainment, and recreation										
Lassen, CA	112	108	120	133	155	135	146	125	154	137
Modoc, CA	58	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Churchill, NV	986	1171	1120	1216	1213	1298	1384	1378	1277	1281
Elko, NV	530	518	395	360	542	540	677	698	651	632
Eureka, NV	(L)	(L)	(L)	(L)	(L)	(L)	(L)	14	14	15
Humboldt, NV	152	173	159	163	172	173	179	171	178	171
Lander, NV	16	31	43	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Lincoln, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Nye, NV	727	729	615	594	818	862	915	849	753	728
Pershing, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	14	15
Washoe, NV	8413	8621	8580	8492	8720	9076	9139	8661	8329	8286
Socioeconomic Study Area	10994	11351	11032	10958	11620	12084	12440	11896	11370	11265
Sierra, CA	(L)	(D)	(D)	(D)	(D)	13	13	(D)	(D)	(D)
Lyon, NV	634	684	690	738	904	1059	1121	1046	924	892
Storey, NV	71	77	110	119	132	115	116	121	100	102

Source: US Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm.

Table T-6
Labor Earnings Trends by Select Industry Sector and County, 2001-2009, presented in 2010 dollars (thousands)[1,2]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mining										
Lassen, CA	$1.7	$2.7	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Modoc, CA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(L)	(L)	(L)
Churchill, NV	$1.0	(D)	(D)	$1.0	$0.8	(D)	(D)	(D)	(D)	(D)
Elko, NV	$109.4	$100.5	$110.4	$144.3	$162.1	$192.9	$203.9	$249.9	$179.9	$209.2
Eureka, NV	$319.0	(D)	(D)	(D)	(D)	(D)	$376.4	(D)	$422.9	$417.7
Humboldt, NV	$68.7	$61.2	$71.6	$90.7	$93.7	$121.3	$121.6	$142.6	$155.8	$184.8
Lander, NV	$107.0	$99.0	$99.3	(D)	$96.6	$103.7	$99.2	$118.7	$142.7	$164.0
Lincoln, NV	(D)	(D)	(D)	(D)	(D)	(D)	$0.7	$0.5	$0.3	$0.4
Nye, NV	$74.9	$65.4	$69.5	$77.6	$71.7	$77.2	$81.2	$85.3	$80.6	$84.1
Pershing, NV	$39.4	(D)	(D)	(D)	(D)	$34.2	$38.2	$32.0	$25.1	$26.8
Washoe, NV	$55.2	$52.3	$37.2	$32.5	$34.4	$58.0	$95.2	$38.9	$35.1	$55.0
Socioeconomic Study Area	$776.3	$381.0	$388.0	$346.1	$459.4	$587.2	$1016.5	$667.8	$1042.2	$1,141.9
Sierra, CA	(D)	(D)	(D)	(D)	$0.7	$0.7	$0.5	(D)	(D)	(D)
Lyon, NV	$8.1	$7.6	$11.0	$12.7	$8.6	$9.0	$8.8	$8.9	$5.9	$7.1
Storey, NV	(D)	(D)	(D)	$4.8	$5.1	$5.1	(D)	(D)	(D)	(D)
Farming										
Lassen, CA	$7.0	$11.7	$13.2	$15.5	$17.8	$24.1	$21.6	$42.0	$34.6	$34.2
Modoc, CA	$6.5	$28.2	$27.0	$27.3	$20.8	$18.2	$24.8	$38.7	$45.0	$39.0
Churchill, NV	$12.4	$7.2	$6.1	$16.0	$17.0	$11.4	$11.3	$13.2	$3.9	$15.9
Elko, NV	$22.9	$13.2	$16.4	$17.0	$20.4	$14.9	$7.0	$10.8	$10.7	$17.5
Eureka, NV	$6.2	$3.7	$3.2	$3.6	$4.7	$4.7	$6.0	$11.4	$7.4	$5.5
Humboldt, NV	$15.0	$12.5	$11.2	$14.3	$15.1	$18.4	$13.3	$24.3	$25.0	$21.1
Lander, NV	$4.1	$5.7	$7.2	$9.6	$11.5	$8.5	$4.7	$8.8	$6.4	$5.7
Lincoln, NV	$6.0	$4.2	$3.4	$4.0	$2.5	$1.3	$0.9	$3.5	$2.0	$0.6
Nye, NV	$9.9	$5.0	$5.1	$12.4	$16.0	$13.1	$16.7	$18.3	$13.2	$21.0
Pershing, NV	$9.0	$5.9	$5.2	$5.4	$6.9	$5.9	$9.1	$14.4	$9.6	$7.6
Washoe, NV	$4.3	$3.7	$3.3	$4.9	$4.7	$6.3	$2.5	$3.9	$5.4	$5.0
Socioeconomic Study Area	$103.2	$101.1	$101.3	$130.0	$137.2	$127.0	$117.9	$189.2	$163.1	$173.1
Sierra, CA	$0.5	$0.2	$0.9	$1.3	$1.1	$0.9	$0.7	$0.5	$0.5	$1.0

[1] (D) Not shown to avoid disclosure of confidential information, and the estimates for this item are not included in the totals.
[2] (L) Less than $50,000, and the estimates for this item are not included in the totals.

Table T-6
Labor Earnings Trends by Select Industry Sector and County, 2001-2009, presented in 2010 dollars (thousands)[1,2]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lyon, NV	$26.6	$22.1	$22.2	$26.8	$22.7	$30.5	$18.9	$21.6	$33.6	$25.9
Storey, NV	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Retail trade										
Lassen, CA	$39.1	$39.2	$40.2	$40.4	$41.7	$39.2	$40.5	$34.5	$35.8	$34.7
Modoc, CA	$11.3	$11.5	$12.1	$12.3	$12.8	$14.1	$13.5	$10.1	$9.9	$10.3
Churchill, NV	$39.4	$43.1	$49.1	$49.7	$54.2	$55.9	$52.9	$52.5	$48.4	$50.4
Elko, NV	$74.8	$69.8	$69.4	$66.9	$75.9	$82.8	$86.3	$82.2	$82.7	$82.0
Eureka, NV	(D)	(D)	(D)	(D)	0.7	(D)	(D)	1.0	1.0	$0.8
Humboldt, NV	$32.0	$31.8	$33.8	$33.5	$33.7	$36.2	$38.5	$38.4	$37.7	$38.8
Lander, NV	$9.1	$7.0	$6.8	$6.8	$7.5	$7.5	$7.7	$6.8	$6.8	$6.8
Lincoln, NV	$3.8	$3.8	$4.9	$5.0	$5.3	$5.2	$5.2	$4.3	$4.2	$4.4
Nye, NV	$37.7	$36.9	$44.7	$47.6	$53.0	$55.5	$52.2	$50.7	$51.0	$49.9
Pershing, NV	$6.4	$5.7	$5.8	$5.8	$6.3	$6.1	$5.9	$5.1	$5.0	$5.4
Washoe, NV	$914.0	$922.6	$949.8	$963.3	$1004.4	$1011.3	$984.1	$885.3	$837.6	$820.8
Socioeconomic Study Area	$1,167.6	$1,171.4	$1,216.6	$1,231.3	$1,295.5	$1,313.8	$1,286.8	$1,170.9	$1,120.1	$1,104.3
Sierra, CA	$1.6	$1.8	$2.0	$1.6	(D)	(D)	(D)	(D)	(D)	$0.8
Lyon, NV	$66.7	$66.5	$65.2	$64.1	$70.7	$78.1	$84.2	$84.0	$78.0	$78.2
Storey, NV	$2.4	$2.2	$2.3	$2.3	$2.2	$2.3	$2.3	(D)	(D)	(D)
Accommodation and food services										
Lassen, CA	$12.4	$16.3	$16.9	$16.7	$15.5	$14.7	$14.7	$12.4	$10.7	$13.0
Modoc, CA	$2.7	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Churchill, NV	$10.4	$12.2	$12.1	$12.4	$13.1	$13.5	$14.5	$15.4	$12.2	$19.6
Elko, NV	$187.1	$187.4	$182.5	$192.3	$182.9	$182.1	$200.5	$172.8	$156.1	$165.3
Eureka, NV	$0.7	$0.6	$0.5	$0.7	$0.8	$0.9	$0.8	$0.7	$0.8	$0.8
Humboldt, NV	$21.8	$21.6	$21.3	$22.1	$22.0	$22.0	$$24.6	$23.1	$20.8	$25.0
Lander, NV	$2.4	$2.1	$2.0	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Lincoln, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Nye, NV	$29.5	$29.2	$30.0	$33.4	$33.7	$33.9	$36.2	$31.2	$30.3	$32.4
Pershing, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	$2.2	$2.4
Washoe, NV	$1216.7	$1154.3	$1119.8	$1114.4	$1085.2	$1078.2	$1150.6	$965.0	$803.7	$871.0
Socioeconomic Study Area	$1483.6	$1423.7	$1385.0	$1392.0	$1353.2	$1345.3	$1441.8	$1220.7	$1036.9	$1,129.5
Sierra, CA	$1.7	(D)	(D)	(D)	(D)	$1.4	(D)	(D)	(D)	(D)
Lyon, NV	$6.1	$8.4	$9.4	$10.4	$12.1	$12.0	$13.9	$12.5	$11.7	$11.7
Storey, NV	$2.9	$2.8	$2.0	$2.0	$2.0	$2.3	$2.5	$2.5	$2.6	$2.6

Table T-6
Labor Earnings Trends by Select Industry Sector and County, 2001-2009, presented in 2010 dollars (thousands)[1,2]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Arts, entertainment, and recreation										
Lassen, CA	$0.3	$0.5	$0.6	$0.9	$1.6	$0.7	$0.7	$1.2	$1.7	$1.7
Modoc, CA	$0.3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Churchill, NV	$9.7	$9.4	$11.8	$12.2	$12.1	$13.1	$13.5	$11.4	$10.7	$12.0
Elko, NV	$17.1	$16.0	$6.9	$6.4	$10.6	$12.2	$18.3	$16.2	$16.0	$16.5
Eureka, NV	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)
Humboldt, NV	$2.5	$2.8	$2.5	$2.7	$2.7	$3.0	$3.0	$2.8	$3.0	$2.9
Lander, NV	$0.1	$0.2	$0.6	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Lincoln, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Nye, NV	$16.9	$14.4	$15.1	$15.3	$21.7	$23.5	$24.3	$20.1	$16.9	$17.4
Pershing, NV	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(L)	(L)
Washoe, NV	$213.0	$194.9	$194.7	$192.4	$188.6	$202.2	$187.9	$182.0	$176.6	$178.7
Socioeconomic Study Area	$259.9	$238.1	$232.2	$230.0	$237.2	$254.9	$247.8	$233.8	$224.9	$229.1
Sierra, CA	$0.1	(D)	(D)	(D)	(D)	(L)	(L)	(D)	(D)	(D)
Lyon, NV	$13.7	$14.5	$14.9	$15.7	$19.8	$26.6	$27.2	$24.3	$23.0	$22.7
Storey, NV	$0.6	$0.8	$1.7	$1.7	$1.7	$1.4	$1.4	$1.4	$1.2	$1.2

Source: US Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Local Area Personal Income & Employment. Available at: http://www.bea.gov/regional/index.htm. Values were converted to 2010 dollars using the Consumer Price Index (BLS, 2012a).

Table T-7
Annual Population by County, 2000-2010[1]

Geographic Area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010[2]
Lassen, CA	33,719	33,548	33,430	33,930	34,458	34,488	34,605	35,615	35,221	35,160	34,805
Modoc, CA	9,431	9,406	9,350	9,362	9,501	9,605	9,565	9,617	9,525	9,551	9,685
Churchill, NV	23,984	24,024	24,342	24,155	24,026	24,226	24,593	24,842	24,961	25,049	24,810
Elko, NV	45,287	45,233	45,063	44,173	43,693	43,830	44,760	46,108	47,423	47,634	48,926
Eureka, NV	1,651	1,632	1,641	1,629	1,505	1,470	1,467	1,579	1,683	1,778	2,002
Humboldt, NV	16,081	15,868	15,211	14,776	14,630	14,912	15,046	15,420	15,658	15,958	16,606
Lander, NV	5,790	5,702	5,450	5,180	5,017	5,086	5,117	5,307	5,439	5,521	5,799
Lincoln, NV	4,165	4,179	4,194	4,294	4,366	4,401	4,612	4,729	4,859	5,106	5,362
Nye, NV	32,522	32,914	33,684	34,433	35,525	37,287	40,027	42,530	44,279	44,367	43,769
Pershing, NV	6,711	6,672	6,597	6,636	6,519	6,533	6,580	6,653	6,715	6,665	6,751
Washoe, NV	339,473	341,389	351,959	362,374	372,302	382,777	392,716	400,453	408,724	414,793	422,528
White Pine, NV	9,171	9,029	8,747	8,693	8,651	8,708	9,166	9,511	9,626	9,732	10,058
Socioeconomic Study Area	**527,985**	**529,596**	**539,668**	**549,635**	**560,193**	**573,323**	**588,254**	**602,364**	**614,113**	**621,314**	**631,101**
Sierra, CA	3,574	3,518	3,482	3,511	3,430	3,378	3,424	3,373	3,320	3,248	3,236
Lyon, NV	34,809	36,012	37,573	39,646	42,534	46,228	49,827	51,725	52,156	51,819	52,049
Storey, NV	3,393	3,382	3,332	3,411	3,531	3,830	3,913	4,000	4,099	4,065	4,002
California	**33,987,977**	**34,479,458**	**34,871,843**	**35,253,159**	**35,574,576**	**35,827,943**	**36,021,202**	**36,250,311**	**36,604,337**	**36,961,229**	**37,349,363**
Nevada	**2,018,741**	**2,098,399**	**2,173,791**	**2,248,850**	**2,346,222**	**2,432,143**	**2,522,658**	**2,601,072**	**2,653,630**	**2,684,665**	**2,704,642**

Source: US Census Bureau. 2011. Population Estimates, Intercensal Estimates of the Resident Population for Counties: April 1, 2000 to July 1, 2010. Available at: http://www.census.gov/popest/data/intercensal/county/CO-EST00INT-01.html.

[1] Population values provided as of July 1 of each year.
[2] The values for July 1, 2010 were produced by applying estimates of change in the population between April 1 and July 1 of 2010 to the 2010 Census counts. Further details on this methodology are available at http://www.census.gov/popest/methodology/intercensal_nat_meth.pdf.

Appendix U

Non-Market Valuation Methods

APPENDIX U
NON-MARKET VALUATION METHODS

This section addresses economic valuation of three categories of non-market resources that are present in the study area and could potentially be affected by the alternatives. These three categories of non-market value are recreation, values of GRSG to households in the intermountain west, and value of the ranching tradition to the ranchers themselves, residents, and visitors to the region. Recreation is included because actions that promote the conservation of GRSG habitat may result in changes in recreation opportunities, such as increasing the amount of habitat for other wildlife species that may be hunted or viewed that depend on public lands, roads open or closed for recreation access, and the quality of the recreation experience.

The economic non-market values described in this appendix are not directly comparable to regional economic indicators commonly used to describe how natural resources on public lands contribute to the regional economic indicators such as output/sales, labor income, and employment. These indicators provide valuable information to the local public as well as to regional government agencies for purposes of public service and infrastructure planning. These impacts or contributions are often referred to as distributional effects as they describe the effects to the region. However, these indicators do not represent net economic value. For example, in economic terms, labor income associated with mineral production would actually be considered a cost to the producer. Similarly, expenditures by a recreation visitor associated with a visit to public lands would be viewed by the recreationist as a cost. One last example would be the total sales generated by the sale of minerals extracted from federally owned minerals: the total sales do not reflect the net economic value since the costs associated with the extraction are not accounted for (including labor income, supplies, and equipment, as well as potentially non-market costs such as those associated with pollution). This section considers the economic value of the non-market outputs, a concept described below.

TOTAL NON-MARKET ECONOMIC VALUE

Many of the multiple uses in the study area are not bought and sold in competitive markets. For instance, many recreational visitors to public lands pay no or low admission fees, and the presence of wild animals such as GRSG have no "market price," yet both have value to people. In some cases people gain value from using these non-market resources, such as recreation on public lands; in other cases, protection of some natural resources provides both a use value (e.g., wildlife viewing) as well as a non-use value (e.g., the value some people hold for knowing that a specific natural resource exists and is protected even if they never intend to "use" or visit it).

Economists call the sum of these two values Total Economic Value. Use values typically can be consumptive use (e.g., hunting) and/or non-consumptive, such as viewing or being present on site (e.g., camping and hiking). In contrast, non-use values occur off-site to people who derive enjoyment from knowing a natural environment, habitat or species exists in its natural state, either for themselves (existence value) and/or future generations (bequest value). Krutilla (1967) documents the conceptual origins of these two elements of non-use value, and Freeman (2003) provides a rigorous theoretical treatment.

Non-use or existence values can potentially be enjoyed by millions if the good or service (e.g., the presence of a specific wild species such as wild salmon or rare bird species) is of widespread interest. Thus, while the non-use value per household may much lower than a value per day received by a visitor, in total, non-use values may be quite large.

RECREATION VALUES

Economists measure the net economic use and non-use values as "Consumer Surplus." At its most basic level, consumer surplus is the maximum amount a person would pay minus the amount they actually have to pay. Consumer surplus, which is also sometimes referred to as "net willingness to pay," is a measure of benefit that has been used by economists and federal agencies for decades (US Water Resources Council 1983; US Environmental Protection Agency 2009, 2010).

For public land recreation, especially on BLM and Forest Service recreation sites, entrance fees are typically very low or non-existent, so the value people place on these public land recreation opportunities is not fully measured simply by the entrance fees they pay. In economic terms, there is not a competitive market or a "market clearing price" for access to public recreation sites. Therefore, there can be a substantial difference between what people pay to visit a recreation site (e.g., entrance fees plus travel costs, including the value of time) and the maximum amount they would pay.

A common non-market valuation method used for recreation is the travel cost method. In this method, economists survey visitors to a recreation site and collect data on their frequency of trips, travel distance and costs incurred to

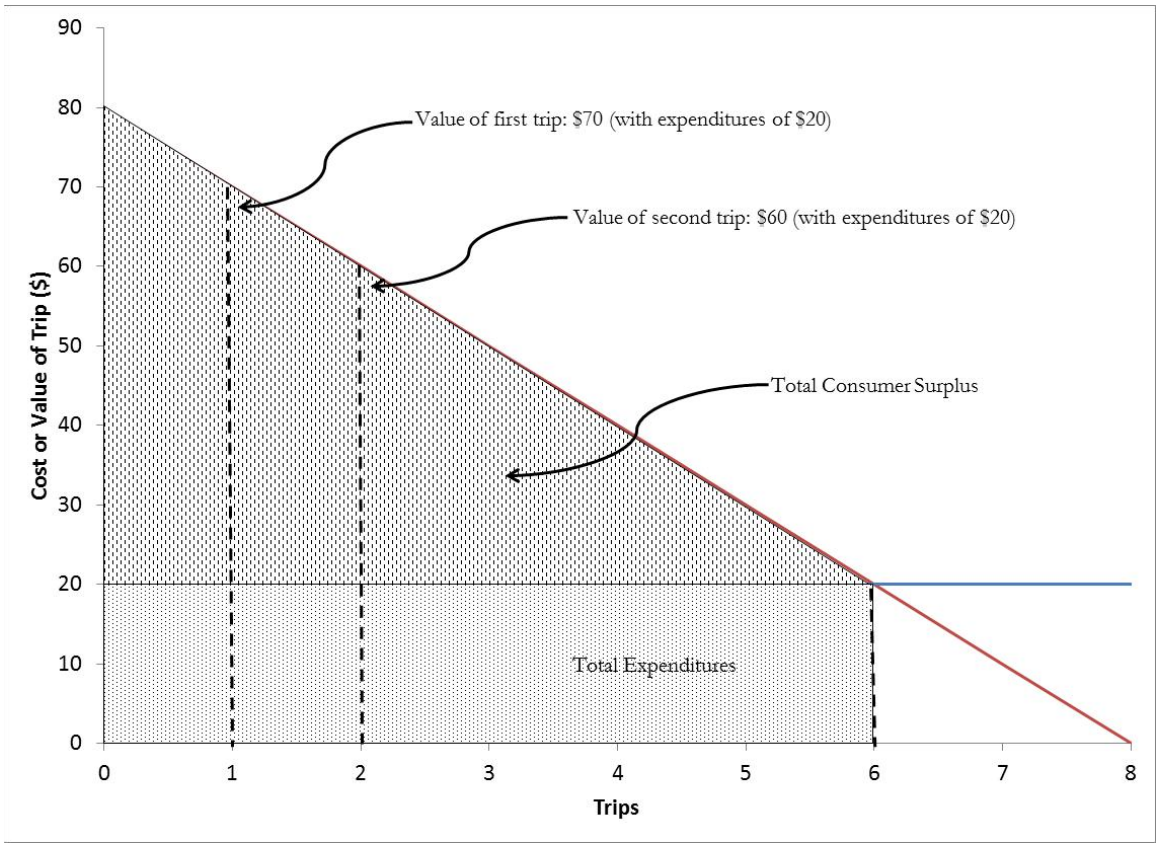
access the site. Because the survey uses information from actual visitors, the travel cost method is a "revealed preference" method of valuation; economists use the travel costs as a proxy to determine the value that people gain from using the site. Variations in the travel cost across visitors, along with their respective number of trips, allow economists to statistically estimate a relationship between travel cost and quantity of trips – an aggregate demand curve for the recreation site, much like a demand curve for goods and services that are sold in competitive markets. This aggregate demand curve will tend to show that individuals with a relatively high travel cost take fewer trips on average, while individuals with a lower cost take more trips on average. From this aggregate demand curve, economists can calculate consumer surplus. Many of the consumer surplus values for recreation in the literature (Loomis 2005) and recently developed by the Forest Service (Bowker et al. 2009) rely upon the travel cost method.

Diagram U-1, Consumer Demand Curve and Consumer Surplus for Recreation Trips, provides an illustration of a demand curve for recreation on a particular site. In **Diagram U-1**, the aggregate demand is shown on an average basis, that is, for an average individual consumer. The downward-sloping diagonal line in **Diagram U-1** represents the relationship between the travel cost and quantity of trips demanded by this average consumer. In the diagram, the value of the first several trips is relatively high ($70 for the first and $60 for the second trip), while the value of the sixth trip is lower ($20 in the diagram). In a travel cost method study, these values are statistically derived from the aggregate demand calculated for the entire population. The downward slope of the demand curve corresponds to declining value associated with each trip, which is typical for most goods and services.[1] It also corresponds to the fact that visitors will take fewer trips to areas with a higher travel cost.

Each visitor receives a net benefit from each trip, which is measured by the difference between what they had to pay and the maximum amount they would pay for each trip. In **Diagram U-1**, Consumer Demand Curve and Consumer Surplus for Recreation Trips, the net benefit for the average visitor is the difference between their actual expenditures of $20 per trip and the maximum amount they would pay for each trip. As shown, the first trip has a net benefit of $50 ($70 of value less $20 in expenditures), the second trip $40 ($60 less $20), and so on until the sixth trip. At the sixth trip the visitor's cost is the same as their benefit, and hence there is no net benefit from further trips. Thus, this gain to the visitor over and above what they spend is their "consumer surplus."

[1] Note that for some types of recreation use, users may gain increased value over a portion of the number of trips; for example, mountain bikers may experience increased enjoyment of subsequent trips to a single location as their trail-specific skills and knowledge increase with repeat visits. Climbers and other users may also experience similar gains over repeat visits. However, even these users will likely hit a point where the marginal value begins to decrease with more trips.

Diagram -1
Consumer Demand Curve and Consumer Surplus for Recreation Trips



Given the large range and diversity of sites in the study area, the BLM and Forest Service did not perform original travel cost method analysis of visitation in the study area. Rather, they relied upon transferring existing recreation values from travel cost method studies such as Bowker et al. (2009) and other recreation values from the existing literature (Loomis 2005; Loomis and Richardson 2007; USFWS 2009) to the recreation activities in the study area, focusing on existing studies in the Rocky Mountain and Great Basin area (Nevada, northeastern California, Utah, Colorado, Wyoming, Idaho, Montana, Arizona, and New Mexico). This approach, known as "Benefit Transfer," is well-developed in academic and policy literature and has been used by federal agencies including the US Environmental Protection Agency (see Griffiths et al. 2012 for a recent listing of economic studies where benefit transfer was used), US Army Corps of Engineers, US Bureau of Reclamation, Forest Service (Forest Service 1991; also see Ervin et al. 2012 for a recent application of benefit transfer to the Mount Hood National Forest), and other agencies. Benefit transfer is widely used in academic applications as well; see Wilson and Hoehn (2006) for a series of journal articles on benefit transfer.

The BLM measures recreation activity in various units, including a "visitor hour," which represents the presence of one or more persons in an area for continuous or simultaneous periods of time aggregating 1 hour (i.e., one person for 1 hour or two persons for 30 minutes each). A "visitor day" as defined by BLM represents 12 visitor hours (BLM 2003). The BLM Recreation Management Information System provides data on recreation visitor days (RVDs); to be compatible with these units, BLM identified non-market values for various recreation activities in units of dollars per RVD. Values from economic literature, based on primary research conducted on various recreation sites, were matched to BLM and Forest Service recreation activity classifications. **Table U-1** provides a listing of the values per day representing the Nevada and Northeast California sub-region.

Table U-1
Consumer Surplus for Recreation Activities

Recreation Activity Category	Consumer Surplus per Visitor Day (2012 dollars)
Backpacking	36.48
Camping	31.73
Cross Country Skiing	36.32
Fishing	42.00
Floatboating/Rafting/Canoeing	82.28
General Recreation	42.96
Hiking	107.16
Hunting	74.50
Motorboating	65.24
Mountain Biking	175.21
Off-Road Vehicle Driving/Off-Highway Vehicle	51.35
Other Recreation	47.69
Picnicking	52.27
Pleasure Driving	71.65
Rock Climbing	61.32
Sightseeing	41.33
Snowmobiling	51.75
Swimming	35.10
Waterskiing	69.23
Wildlife Viewing	50.00

Sources: Rosenberger 2012; Loomis 2005; Loomis and Richardson 2007; Bowker et al., 2009; USFWS 2009.

Consistent with the description above of consumer surplus and the travel cost method, readers should interpret the values in **Table U-1** as the consumer surplus or the amount of value that the average visitor derives from a full day of recreation beyond their actual expenditures. Thus, a typical off-highway vehicle user would pay an average value of $51.35 more than their trip cost to have the opportunity to participate in a typical day of driving off-road vehicles.

Table U-2 shows the total consumer surplus associated with recreation activities on BLM-administered and National Forest System lands for the sub-region, including the BLM Field Offices of Alturas, Black Rock, Caliente, Eagle Lake, Egan, Mount Lewis, Schell, Surprise, Tonopah, Tuscarora, Wells, and Winnemucca, as well as the BLM Carson City District Office and the Humboldt-Toiyabe National Forest. RVDs on BLM lands presented in **Table U-2** are calculated directly from Report 26 from the BLM RMIS (Report 26 provides RVDs based on recorded visitor hours – defined above – and dividing by twelve). For this analysis, BLM used average RVDs per year over the period 2008 to 2012. RVDs on the Humboldt-Toiyabe are calculated from the most recent available data (FY2006) from the USFS National Visitor Use Monitoring (NVUM) report (Forest Service 2013h). RVDs for National Forest lands were calculated based on the total number of site visits, the "main activity" reported by recreators, and the number of hours per day reported engaging in that activity, with the number of RVDs equal to the number of hours divided by 12. Note that conservation measures for GRSG may affect only specific types and fractions of the public lands that contributed to the visitor days used to estimate the surplus values in **Table U-2**.

To estimate impacts on consumer surplus associated with changes in RVDs, BLM economists worked with BLM and Forest Service recreation specialists to project how RVDs for various activities would change under the alternatives. Because both BLM and Forest Service recreation specialists indicated that RVDs would not differ under the alternatives, no differences in consumer surplus are anticipated.

VALUES ASSOCIATED WITH GREATER SAGE-GROUSE POPULATIONS

Economists have long recognized that wildlife species, especially rare, threatened, and endangered species, have economic values beyond just viewing. This is supported by a series of legal decisions and technical analyses. The US Court of Appeals in 1989 first clarified that the US Department of the Interior, in assessing damages in Natural Resource Damage Assessment cases, should include what it termed as "passive use values," that is, existence values provided to non-users of the species, as a compensable value in addition to any use value. These passive use values are also included in Oil Pollution Act damage assessments as well. The term passive values is interchangeable with the term non-use values defined previously. This ruling and subsequent analysis for Natural Resource Damage Assessment and Oil Pollution Act assessments are consistent with well-established economic theory showing that people derive value from passive use or non-use as well as active uses of resources (Krutilla 1967). Economists have devoted a great deal of conceptual and empirical work to refining concepts and developing methods to measure these passive use values.

Table U-2
Total Consumer Surplus for Recreation in Nevada and Northeast California Sub-Region

Recreation Activity	Average RVDs Per Year	Total Consumer Surplus (millions of 2012 dollars)
Backpacking	66,462	$2.4
Big Game Hunting	467,130	$34.8
Camping	1,452,785	$46.1
Cross Country Skiing	30,836	$1.1
Fishing	300,185	$12.6
Floatboating/Rafting/Canoeing	20,957	$1.7
General Recreation	77,147	$3.3
Hiking	328,608	$35.2
Hunting – Other	80,617	$6.0
Motorboating	20,779	$1.4
Mountain Biking	87,968	$15.4
Off Road Vehicle Driving/ Off-Highway Vehicle	794,571	$40.8
Other Recreation	596,216	$28.4
Picnicking	72,319	$3.8
Pleasure Driving	296,405	$21.2
Rock Climbing	15,794	$1.0
Sightseeing	172,691	$7.1
Small Game Hunting	209,783	$15.6
Snowmobiling	34,491	$1.8
Swimming	4,517	$0.2
Waterfowl Hunting	26,738	$2.0
Waterskiing	430	$0.03
Wildlife Viewing	67,411	$3.4
Total	**5,292,980**	**$285.4**

Source: BLM 2012v; Forest Service 2013h; consumer surplus per RVD shown in **Table U-1**, Consumer Surplus for Recreation Activities.

The dominant methods are "stated preference" methods, of which the most prominent is the Contingent Valuation Method. The basic element of this method is to use a survey to construct or simulate a market or referendum for protection or improvement of a natural environment, habitat, or species, and then having the respondent indicate whether or not they would pay for an increment of protection, and if so, how much they would pay. While the method has developed a great deal of sophistication that has increased the validity of the willingness to pay responses, there is admittedly a degree of bias that can result in stated willingness to pay exceeding actual willingness to pay by a factor averaging two to three (Loomis 2011; Murphy et al. 2005; List and Gallet 2001). While not a perfect estimator of willingness to pay, the Contingent Valuation Method provides a useful means for estimating the public's passive use values.

Numerous academic papers and even entire books have been written on the Contingent Valuation Method. Mitchell and Carson (1989) was one of the first, while Alberini and Kahn (2006) is a more recent treatment. To date there have been about 7,500 Contingent Valuation Method studies in over 130 countries (Carson 2011). A number of federal agencies have used or referenced stated preference methods, including the US Bureau of Reclamation, US Environmental Protection Agency, National Park Service, and state agencies such as the California Department of Fish and Game, Idaho Fish and Game, and Montana Fish, Wildlife, and Parks. The USFWS commissioned an original Contingent Valuation Method study of the economic values the public receives from reintroduction of wolves in the areas of Idaho, Montana, and Wyoming, and used those values in an EIS on wolf reintroduction (USFWS 1994b). The US Bureau of Reclamation, National Park Service, and Lower Elwha S'Klallam Tribe commissioned a Contingent Valuation Method study on the value of removal of the Elwha and Glines Canyon Dams (Meyer et al. 1995). The US Bureau of Reclamation also commissioned an original Contingent Valuation Method study on the values of providing stable river flows to benefit riparian vegetation, endangered species, and cultural resources. That study was cited by then-Secretary of the Interior Bruce Babbitt as a factor in selecting the more protective flow regime from Glen Canyon Dam despite it having more foregone hydroelectricity (Babbitt 1996).

The BLM and Forest Service conducted a literature search to demonstrate the potential range of values that could be associated with species that are candidates for listing as threatened or endangered, such as GRSG populations. Analysts first verified there are no existing studies on Total Economic Value or non-use valuation specific to the GRSG. This is not an uncommon occurrence, as there are dozens of rare or potentially threatened species that have not been valued despite the very high policy relevance of the species and the large magnitude of economic value at stake in these policy decisions.

The BLM and Forest Service used three criteria to identify studies that are most applicable to the current analysis: (1) whether the species valuation study was located in the same geographic region as the GRSG habitat; (2) whether the species was listed or not listed as threatened or endangered; and (3) whether the species was hunted or not (implying a mix of use and non-use values).

The primary database of articles was the recent peer-reviewed journal article by Richardson and Loomis (2009), which is a compilation of the economic values of threatened, endangered, and rare species. A literature review was also conducted to determine if there had been any recent studies on GRSG or closely related species. Unfortunately, there is not a perfect match in the literature in terms of geographic region (intermountain) and a species that is both hunted and rare. **Table U-3** provides a summary of the studies with features most similar to the GRSG species.

Table U-3
Existing Estimates of Annual Total Economic Value of Protecting Habitat for Species Similar to GRSG

Region	Species	Listed	Hunted	Annual Value per Household[b]	Change Valued
Four Corners (AZ, CO, NM, UT)	Mexican Spotted Owl	Yes	No	$58.49	Avoid extinction in 15 years in Four Corners region
New England	Wild Turkey	No	Yes	$16.72[a]	Avoid extinction in New England
Texas (also L.A., NYC, Chicago, Atlanta)	Whooping Crane	Yes	No	$43.69[a]	Avoid extinction
Maine	Peregrine Falcon	Yes	No	$32.37 (one time)	Restore self-sustaining population
South Carolina & Rest of US	Red-Cockaded Woodpecker	Yes	No	$14.69	Restore habitat to increase chance of survival to 99%

Sources: Loomis and Ekstrand 1997 (Mexican spotted owl); Stevens et al. 1991 (New England wild turkey); Bowker and Stoll 1988 (whooping crane); Kotchen and Reiling 2000 (peregrine falcon); Reaves et al. 1999 (red-cockaded woodpecker). All of these sources are as cited in Richardson and Loomis (2009).
Notes:

a. Average of estimates from the study.
b. As noted in the text, these stated preference values for household may have a degree of hypothetical bias that could overstate the actual monetary amount households would pay by a factor of two to three.

As can be seen in **Table U-3** there is one study with a geographic region overlapping the sub-region (Mexican spotted owl), and one study on a species that was hunted at the time (wild turkey). At the time of the study, the Mexican spotted owl was a threatened species under the Endangered Species Act, and respondents were told in the survey that it was a threatened species. The whooping crane, red-cockaded woodpecker, and peregrine falcon studies involved an endangered species.

All of these studies used the Contingent Valuation Method in a mail survey. Households were asked whether they would pay a specific dollar amount, with that amount varying across individuals in the sample (i.e., the valuation questions were "closed-ended," although the wild turkey study and red-cockaded woodpecker also used an open-ended valuation question for some respondents). Researchers used the closed-ended valuation questions to generate a statistical valuation function. This valuation function exhibited internal validity: the higher the dollar amount households were asked to pay, the lower the percentage of them that would pay that dollar amount.

With the exception of the peregrine falcon study, which asked respondents to commit to a one-time payment, each survey asked respondents to pay annually

to accomplish the stated goal (typically, preventing the species from going extinct in the region of interest, although this varied by study as the table shows). For the peregrine falcon and red-cockaded woodpecker, households were told that their payment would restore a self-sustaining population (i.e., one that would not go extinct).

The original wild turkey study provided an estimate of three values (in 1990 dollars) that were averaged and then adjusted to 2012 dollars using the Consumer Price Index, resulting in a value of $16.72 per household per year. The same procedure was used to update the 1996 dollar values of the Mexican spotted owl to 2012, resulting in values of $58.49 per household per year. The higher values for the Mexican spotted owl may be due to the large area of habitat (4.6 million acres stated in the survey and shown on a map) that would be protected in the Four Corners area by paying, and the fact the species was not a hunted species. The whooping crane values are fairly large at $43.69 per household per year; this value represents a Total Economic Value, including both use and non-use value, as some of the sample included people who actively "used" the species (as wildlife viewers).

The study values in **Table U-3** demonstrate that many people, or segments of the public, hold substantial value for protecting threatened and endangered species, which may carry over to the GRSG. However, additional studies would be needed to identify values specifically for GRSG protection. Given that protection is a public good available to all households in the intermountain west, the aggregate or intermountain regional value could be substantial.

VALUES ASSOCIATED WITH GRAZING LAND

Public lands managed for livestock grazing provides both market values (e.g., forage for livestock) and non-market values. Many ranchers themselves value the ranching lifestyle in excess of the income generated by the ranching operations. This is evident in some ranch sales transaction data which suggests some ranch properties have sold for more than the market value of the public land forage (Bartlett et al. 2002; Taylor 2006). One of the primary reasons public lands ranchers indicate they own land is for the "tradition, values and culture" rather than primarily for profit (Tanaka et al. 2005). Many public land ranchers work elsewhere part-time and rely on the ranch for only 20 percent of their income (Hanus 2011), relying instead on outside jobs or other savings to support their ranching lifestyle. Land appreciation has also provided increased value and therefore served as an economic resource for ranchers (Tanaka et al. 2005; Torell et al. 2005). As several of these authors note, changes in public land grazing that reduce the profitability of grazing may not directly translate to withdrawal from ranching, due to the fact that economic factors are not necessarily the primary motivation for public land ranching.

Some studies have found non-market values of ranching associated with use values to residents (Mangun et al. 2005) and tourists in the form of open space

and western ranch scenery (Ellingson et al. 2006). However, some others see non-market opportunity costs associated with livestock grazing that may, depending on management methods and other variables, reduce native plant species and forage for wildlife (Todres et al. 2003). The potential exists for other residents or visitors to prefer lifestyles or have lifestyle needs that are not consistent with grazing or ranching lifestyles or landscapes.

Methods available to measure the use values to residents and tourists associated with grazing land include stated preference methods similar to contingent valuation (Ellingson et al. 2006; Mangun et al. 2005). Methods for attempting to isolate any amenity values that ranchers themselves may hold include the hedonic price method. This method uses observed sale prices of ranch land as a function of the characteristics, including both conventional market factors (e.g., size of ranch and quantity of forage) but also amenity values (e.g., scenic views, presence of wildlife species, and on-site fishing or hunting opportunities) that may be provided by the ranch (Torell et al. 2005). The additional value that ranchers pay for the amenity values of the ranch provide some indication of how much they value these amenities. Using the hedonic price method to estimate a "lifestyle value" separate from the market and amenity values has yet to be done in the literature. This may be due to the fact that lifestyle values attributed to living on a ranch or ranching is present on nearly all ranch properties sold. As such, statistically it is difficult to isolate the contribution of ranching lifestyle to differences in ranch property values as ranching lifestyle is a common feature of nearly all ranch properties sold.

This page intentionally left blank.

Appendix V

Economic Impact Analysis Methodology

APPENDIX V
ECONOMIC IMPACT ANALYSIS METHODOLOGY

INTRODUCTION

This appendix describes the methods and data that underlie the economic impact modeling analysis. Input-output models such as the Impact Analysis for Planning (IMPLAN) model, an economic impact analysis model, provide a quantitative representation of the production relationships between individual economic sectors. Thus, the economic modeling analysis uses information about physical production quantities and the prices and costs for goods and services. The inputs required to run the IMPLAN model are described in the following narrative and tables. The resulting estimates from the IMPLAN model, by alternative, are in **Chapter 4**, Environmental Consequences, **Section 4.19**, Socioeconomics and Environmental Justice. The first portion of the following information describes general aspects of the IMPLAN model and how it was used to estimate economic impacts. The remaining sections provide additional detailed data used in the analysis for livestock grazing, recreation, and oil and gas.

THE IMPLAN MODEL

IMPLAN is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the ripple effect (also called the multiplier effect) of changes in economic sectors that may not be directly impacted by management actions, but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly impacted) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

This analysis used IMPLAN 2011; prior to running the model, cost and price data were converted to a consistent dollar year (2010) using sector-specific

adjustment factors from the IMPLAN model. The values in this appendix are expressed in year 2010 dollars.

The current IMPLAN model has 440 economic sectors, of which 309 are represented in the socioeconomic study area counties. This analysis involved direct changes in economic activity for 27 IMPLAN economic sectors, as well as changes in all other related sectors due to the ripple effect. The IMPLAN production coefficients were modified to reflect the interaction of producing sectors in the socioeconomic study area. As a result, the calibrated model does a better job of generating multipliers and the subsequent impacts that reflect the interaction between and among the sectors in the socioeconomic study area compared to a model using unadjusted national coefficients. Key variables used in the IMPLAN model were filled in using data specific to the socioeconomic study area, including employment estimates, labor earnings, and total industry output.

The trade data available in the current version of IMPLAN (Version 3.0) make it possible to do multi-region analysis to track how an impact on any of the IMPLAN sectors in the study area affects production in any of the sectors in any other region of the US. For this analysis, this feature allowed the estimation of how an impact in the primary study area disperses into the secondary study area, and how these effects in the secondary study area create additional local effects in the primary study area. As a result, it was possible to estimate not only the jobs and income generation in the primary study area, but to also estimate how the economic activity in the primary study area affected jobs and income generation in the secondary study area.

LIVESTOCK GRAZING

Economic impacts from changes to livestock grazing are a function of the amount of forage available and the economic value of forage.

Forage availability was measured in Animal Unit Months (AUMs), with one AUM defined as the amount of forage needed to feed one cow, one horse, or five sheep for one month. Data on forage availability were obtained from BLM's Rangeland Administration System (BLM 2012) and from the Forest Service's INFRA range module (Forest Service 2013). Two types of AUM measures were used: Active AUMs and Billed AUMs. Active AUMs measure the amount of forage from land available for grazing. The Forest Service designates this measure "permitted" AUMs. Billed AUMs measure the amount of forage for which the BLM and Forest Service bill annually (i.e., the amount of forage that ranchers actually use, which is typically less than the amount of forage available). The Forest Service uses the designation "authorized" AUMs. Billed AUMs may be less than active AUMs for various reasons. BLM may require non-use of a portion of the active AUMs granted for conservation and protection of habitat or for improvement of land health conditions. On the other hand, the permittee may choose to reduce the amount of AUMs after land treatments or fire

rehabilitation projects or for business reasons[1] (BLM 2014a; 2014b). .Data for 2011 were used for active AUMs, except for active AUMs on the Humboldt-Toiyabe National Forest, for which 2012 data were used. Data for 2000 to 2011 were used to develop a 12-year average for billed AUMs. Data capture AUMs for entire allotments when those allotments intersect with GRSG habitat.

Forage availability was estimated for all alternatives. Alternatives A, B, D, E, and the Proposed Plan used the current data for active AUMs in GRSG habitat. Alternative C discounted the current data to remove 100 percent of active AUMs in GRSG habitat. Alternative F discounted the current data to remove 62.5 percent of active AUMs in GRSG habitat.[2] The analysis estimated 2,250,950 active AUMs in GRSG habitat in the socioeconomic study area, including 278,253 in the Humboldt-Toiyabe National Forest, 181,471 in the California BLM planning area, and 1,791,226 in the Nevada BLM planning area. This information was used to calculate the total active AUMs that would be available for grazing under each alternative in GRSG habitat. The results of these calculations are presented in **Table V-1**, below.

Table V-1
Estimated Active Annual Animal Unit Months in GRSG habitat by Alternative for the Study Area

Agency	Initial	Alternatives A, B, D, E, and Proposed Plan	Alternative C	Alternative F
		Active		
Forest Service	278,253	278,253	0	104,345
California BLM	181,471	181,471	0	68,052
Nevada BLM	1,791,226	1,791,226	0	671,710
Socioeconomic Study Area	2,250,950	2,250,950	0	844,106

Sources: Calculated based on **Appendix S**, Livestock Grazing.

Table V-2 shows AUM reductions, calculated as the difference between the initial billed AUMs and reduced billed AUMs under each alternative, for two scenarios, a high impact scenario and a low impact scenario. AUMs are distinguished between those allocated to sheep, and those allocated to cattle and other animals, to allow different valuation of forage, as explained further below.

[1] Livestock operators often value the amount of AUMs permitted by BLM, whether they intend to bill the total amount active or not. This results from the view that the AUMs permitted add value to their operations (e.g., when applying for credit with banks).
[2] Under Alternative F, 25 percent of the area in GRSG habitat must be rested each year. Of the remaining 75 percent, 50 percent must be set aside. Thus, the total area available for forage in GRSG habitat is reduced by 62.5 percent.

Table V-2
Estimated Reduction in Annual Animal Unit Months by Alternative and Livestock Type

Agency	High Impact Scenario			Low Impact Scenario		
	Alternatives A, B, D, E, Proposed Plan	Alternative C	Alternative F	Alternatives A, B, D, E, Proposed Plan	Alternative C	Alternative F
Total						
Forest Service	0	-467,786	-280,203	0	-236,414	-132,069
California BLM	0	-241,710	-144,319	0	-113,321	-45,269
Nevada BLM	0	-2,201,200	-1,315,428	0	-1,053,720	-382,010
Socioeconomic Study Area	0	-2,910,696	-1,739,950	0	-1,403,455	-559,349
Cattle and Other						
Forest Service	0	-427,517	-255,035	0	-196,146	-109,574
California BLM	0	-237,231	-141,520	0	-108,842	-43,480
Nevada BLM	0	-2,120,257	-1,264,839	0	-972,777	-352,666
Socioeconomic Study Area	0	-2,785,006	-1,661,394	0	-1,277,765	-505,719
Sheep						
Forest Service	0	-40,269	-25,168	0	-40,269	-22,495
California BLM	0	-4,479	-2,799	0	-4,479	-1,789
Nevada BLM	0	-80,943	-50,589	0	-80,943	-29,345
Socioeconomic Study Area	0	-125,690	-78,556	0	-125,690	-53,629

Sources: Calculated based on data from **Appendix S**, Livestock Grazing.

For the low impact scenario, the analysis assumed that ranchers would continue to use as many of the initial billed AUMs as possible. If active AUMs were not reduced beyond the initial amount of billed AUMs, ranchers would continue to use the initial billed AUMs, resulting in no impact. If active AUMs were reduced beyond the initial amount of billed AUMs, ranchers would use all of the reduced active AUMs. Thus, when the number of reduced active AUMs was less than number of the initial billed AUMs, the analysis used the number of reduced active AUMs as the number of reduced billed AUMs under each alternative. Otherwise, the analysis assumed no change in the number of billed AUMs.

For the high impact scenario, the analysis assumed that ranchers would choose to maintain a constant ratio of active to billed AUMs so any reduction to active AUMs would result in a proportional reduction to billed AUMs. Thus, the analysis applied the current ratio of active to billed AUMs to the calculated number of reduced active AUMS under each alternative to calculate the corresponding number of reduced billed AUMs under each alternative.

In addition, the high impact scenario considered the possibility that the loss of AUMs on public lands could lead to the loss of AUMs on state and private lands as well. This would be the case if livestock operations have no reasonable alternative to seasonal grazing on public lands. Livestock grazing on federal lands is often done during the spring and summer seasons, with other feeding alternatives (hay) being used during fall and winter. If there are no grazing alternatives to federal lands during spring and summer, farmers may need to reduce their operations and the resulting loss of output, jobs, and earnings would be larger than currently estimated. Torell et al. (2014) provides estimates of the potential impacts to a model ranch in Nevada of seasonal closures of federal lands for cattle grazing. These estimates show the total number of AUMs lost for each AUM lost on BLM lands under various scenarios. These scenarios range from a 25 percent reduction in BLM AUMs to a complete elimination of AUMs on BLM lands with the livestock operation going out of business. The estimates are based on an economic model that assumes farmers respond to the loss of availability of federal lands for grazing in several ways to maximize their profits (gross margins), including reducing the size of their operations. Based on the Torell et al. (2014) estimates, BLM and Forest Service assumed that for each BLM AUM lost under Alternative C, an additional 1.18 AUMs would be lost for a total of 2.18 AUMs lost (mid-point between the scenarios of 100 percent loss of BLM AUMs with and without closure of operations). Under Alternative F, 1.08 additional AUMs would be lost for each reduction of BLM AUMs (mid-point of scenarios of loss of 50 percent of AUMs on BLM lands and scenario of loss of 75 percent of AUMs on BLM lands). These AUM adjustment factors are based on a model Nevada ranch that relies on a total of approximately 8,200 AUMs, of which 3,700 AUMs (30%) are linked to federal land. These estimates were applied only to cattle AUMs, because no similar estimate was available for sheep.

The economic value of forage is estimated based on the value of production associated with the forage. Values for cattle and sheep are estimated separately, with the value of forage for other animals considered equivalent to the value for cattle. Due to price fluctuations, average per-AUM values for cattle and sheep are based on the 2002 to 2011 average value of production estimates from the US Department of Agriculture, Economic Research Service (2012). The value for cattle is $50.37 per AUM, and the value for sheep is $57.20 per AUM in the socioeconomic study area (in 2010 dollars). Including indirect and induced impacts, the value of one AUM in the socioeconomic study area for cattle is $101.14 and for sheep is $124.91 (in 2010 dollars). **Table V-3**, shows the economic impact assumptions for cattle and sheep. The direct economic impact is the estimated change in livestock output per AUM; IMPLAN generates the indirect and induced impacts.

Table V-3
Assumptions for Analysis of Impacts on Output for Livestock Grazing

Economic Impact	Cattle	Sheep
Direct Economic Impact ($/AUM)	$50.37	$57.20
Indirect Economic Impact ($/AUM)[1]	$42.50	$56.27
Induced Economic Impact ($/AUM)[2]	$8.26	$11.45
Total Economic Impact ($/AUM)	$101.14	$124.91
Multiplier (Total Impact/Direct Impact)	2.01	2.18

Note: All dollar values are in 2010 dollars.
[1]Indirect impacts reflect increased demand in sectors that directly or indirectly provide supplies to the livestock industry.
[2]Induced impacts reflect increased demand in the consumer and government sectors.

Table V-4, provides a summary of the employment impacts that would result, according to IMPLAN, based on unit changes in livestock AUMs.

Table V-4
Assumptions for Analysis of Employment Impacts for Livestock Grazing

Employment Impact	Cattle	Sheep
Direct Employment (Jobs/ AUM	0.000559	0.000980
Indirect Employment (Jobs/AUM)	0.000435	0.000708
Induced Employment (Jobs/AUM)	0.000072	0.000099
Total Employment (Jobs/AUM)	0.001065	0.001787
Multiplier (Total Impact/Direct Impact)	1.91	1.82
Average Earnings per Job (2010 dollars)	$35,239	$21,672

Note: Direct, indirect, and induced employment impacts and average earnings per job are calculated using IMPLAN.

Output, labor, and earning impacts summarized in **Table 4-24** in the economic impact section of the FEIS are presented as lower and upper bound impacts. Estimates of lower bound impacts are equal to the 'low impact scenario' reductions in AUMs in **Table V-2** multiplied by impact coefficients in **Tables V-3** and **V-4**; calculations are performed for cattle and sheep separately and then added together. Estimates of upperbound impacts are equal to 'high impact scenario' reductions in AUMs in **Table V-2**, and multiplied by coefficients in **Tables V-3** and **V-4** in a similar manner; however, 'high impact scenario' AUM reductions for cattle are multiplied by the Torell production adjustment factors (i.e., 2.18 for Alternative C and 2.08 for Alternative F) as described earlier (Torell adjustment factors are not available for sheep).

The IMPLAN sectors used to model an exogenous change in demand for livestock grazing were the following (IMPLAN sector numbers are shown in brackets): grain farming (2), all other crop farming (10), support activities for agriculture and forestry (19), residential structures maintenance and repairs (40), wholesale trade (319), truck transportation (335), banking (354), real

estate (360), accounting (368), veterinary services (379), equipment repair and maintenance (417), and labor income (NA). Cattle grazing used the following additional sector: cattle ranching and farming (11). Sheep grazing used the following additional sectors: animal production except cattle and poultry and eggs (14) and retail-food and beverages (324).

GEOTHERMAL EXPLORATION AND DEVELOPMENT

Economic impacts from geothermal exploration and development are a function of construction and operation expenditures for geothermal electricity development, including drilling wells (exploratory, production, and injection), constructing power plants, and operating facilities. In the Reasonably Foreseeable Development scenario for geothermal development, BLM developed a scenario to serve as a basis for analyzing impacts resulting from future leasing and development of federal geothermal resources within the decision area over the next 20 years.

To estimate economic activity associated with geothermal development, BLM first used the National Renewable Energy Laboratory's Jobs and Economic Development Impact (JEDI) model (NREL 2012) to determine approximate capital and operating costs associated with a representative power plant. The assumptions used a 28.8 MW nameplate capacity (based on current average plant capacity in the area) and typical conditions for the planning area: a resource at about 310 degrees Fahrenheit at a depth of 5,500 feet; binary cycle; and 1.13 production wells per injection well (BLM 2014e). BLM used standard assumptions from the National Renewable Energy Laboratory for the local share of construction and operating expenses that would be spent within the state of Nevada, as an approximation for the study area (local spending assumptions were available at the state level but not the county level). BLM then used IMPLAN, calibrated to the specific region of the socioeconomic study area, to calculate indirect and induced impacts associated with a given direct expenditure. **Table V-5** shows the resulting assumptions for construction and operation of an individual power plant.

Table V-6 provides a summary of employment impacts according to IMPLAN results, based on construction and operation of an individual power plant.

Output, labor, and earning impacts summarized in **Table 4-27** in the economic impact section of the FEIS are presented for construction and operations of geothermal power plants. Impacts during construction are equal to the average number of plants built per year multiplied by impact coefficients in **Tables V-5** and **V-6**. Estimates of impacts during operations assume only a share of the wells drilled produce and about half of the production wells are producing by year 10. Impacts are estimated by multiplying the number of plamts in operation by the coefficients in **Tables V-5** and **V-6**.

Table V-5
Assumptions for Analysis of Impacts on Output for Geothermal Exploration and Development

Economic Impact (millions of 2010 dollars)	Traditional Hydrothermal Plant
Construction	
Direct Economic Impact[1]	$78.8
Indirect Economic Impact[2]	$6.9
Induced Economic Impact[3]	$17.3
Total Economic Impact	$102.9
Multiplier (total impact/direct impact)	1.31
Operation	
Direct Economic Impact[1]	$1.7
Indirect Economic Impact[2]	$0.0
Induced Economic Impact[3]	$0.9
Total Economic Impact	$2.6
Multiplier (total impact/direct impact)	1.56

Notes: Details may not add to total due to rounding.
[1]Direct economic impact is the average expenditure per plant, assuming an average nameplate capacity of 28.8 MW.
[2]Indirect impacts from IMPLAN reflect increased demand in sectors that directly or indirectly provide support for the geothermal exploration and development industry.
[3]Induced impacts from IMPLAN reflect increased demand in the consumer and government sectors (e.g., employee wages).

Table V-6
Assumptions for Employment Impact Analysis for Geothermal Exploration and Development Activities

Employment Impact (number of jobs per plant)	Traditional Hydrothermal Plant
Construction	
Direct Employment	457.1
Indirect Employment	58.9
Induced Employment	144.1
Total Employment	660.1
Multiplier (Total Impact/Direct Impact)	1.44
Average Earnings per Job (2010 dollars)	$57,107
Operation	
Direct Employment	13.2
Indirect Employment	0.0
Induced Employment	7.8
Total Employment	21.0
Multiplier (Total Impact/Direct Impact)	1.59
Average Earnings per Job (2011 dollars)	$94,220

Note: Direct, indirect, and induced employment impact and average earnings per job are calculated using IMPLAN, as described in the text.

The IMPLAN sectors used to model an exogenous change in demand for geothermal development were the following (IMPLAN sector numbers are shown in brackets): drilling oil and gas wells (28), support activities for oil and gas operations (29), construction of new manufacturing structures (35), nonresidential maintenance and repair (39), wholesale trade (319), retail – food and beverages (324), truck transportation (335), commercial and industrial equipment leasing (365), architectural and engineering services (369), environmental and consulting services (375), miscellaneous professional/scientific/technical services (380), and labor income change (NA).

OIL AND GAS

The economic impact of oil and gas reflects drilling, completion, and production activities. The number of wells expected to be developed, and how BLM developed its assumptions, is discussed in **Chapter 4**, Environmental Consequences, **Section 4.12**, Minerals – Fluid. BLM assumed a completion rate ranging from 10 percent to 75 percent, as well as production per well completed of 1,000,000 barrels over the lifetime of the well. **Table V-7** provides the resulting estimated numbers of wells and production that were used for the economic analysis.

Table V-7
Oil and Gas Wells and Production

	Oil Wells Expected to be Drilled			Oil Wells Expected to be Producing		
Alternative	Existing Leases	New Leases	Total	Existing Leases	New Leases	Total
A	75	25	100	36	5	41
B	52	20	72	24	4	28
C	30	18	48	13	3	16
D	35	19	54	15	4	19
E	64	21	85	30	4	34
F	30	18	48	13	3	16
Proposed Plan	59	19	78	12	4	16

Source: BLM (2014d). The BLM's analysis also indicates that there would be some gas production, which would be used on location or vented to the atmosphere (BLM 2014d). Because the gas may simply be vented without being used productively, the economic analysis does not factor in the potential to sell it.

The costs of drilling and completing wells and producing oil and gas also are relevant for the economic impact analysis. Starting with the estimate of $3.25 million for drilling and completion of one well (BLM 2014d), the estimate was adjusted from 2012 to 2010 dollars using price indices from IMPLAN, then the percentage of local spending and breakouts into drilling and completion costs were estimated based on IMPLAN factors and costs for wells in other parts of the Great Basin. The price for oil from Utah was used since the Energy

Information Administration does not provide a price for Nevada; the price and cost per barrel of oil were based on EIA 2010 and 2013. IMPLAN was then used to generate output, employment, and earnings multipliers per unit. Impacts were estimated by multiplying per-unit impact estimates by the number of wells drilled and completed, and number of barrels of oil produced. **Table V-8** provides a summary of the per-unit values used for output, employment, and earnings in the study area. A separate analysis was done for a five-county area where development of oil and gas would be expected to be concentrated. This five-county area includes Elko, Eureka, White Pine, Nye and Lincoln Counties. **Table V-9** provides a summary of the per-unit values used for output, employment, and earnings in the five-county area. Overall, a considerable share of the wells expected to be drilled and to be producing on existing leases are in the Elko-Noble area. The Elko-Noble project is a large project for the area and its success rate (55%) is expected to be higher than other parts of the planning area (20%).

Table V-8
Assumptions for Analysis of Output, Earnings, and Employment for Oil and Gas, Study Area

Economic Impact[1]	Drilling (per well)	Completion (per well)	Production (per MBO)
Direct output	$1,357,100	$994,335	$79,724
Indirect output	$257,013	$180,167	$10,937
Induced output	$478,418	$381,268	$5,373
Total output	$2,092,531	$1,555,770	$96,034
Multiplier[2]	1.54	1.56	1.20
Direct earnings	$717,311	$580,892	$4,405
Indirect earnings	$102,923	$73,455	$4,761
Induced earnings	$161,781	$128,959	$1,818
Total earnings	$982,015	$783,306	$10,984
Multiplier	1.37	1.35	2.49
Direct employment	8.1	6.7	0.060660
Indirect employment	2.0	1.5	0.074855
Induced employment	4.0	3.2	0.045061
Total employment	14.1	11.4	0.180576
Multiplier	1.74	1.70	2.98
Average earnings per job	$69,646	$68,711	$60,825

Sources: BLM 2014d, EIA 2010, EIA 2013, and the IMPLAN model, as described in the text.
MBO = thousands of barrels of oil
[1] All dollar figures are in 2010 dollars.
[2] Multiplier is calculated as total impact divided by direct impact.

Table V-9
Assumptions for Analysis of Output, Earnings, and Employment for Oil and Gas, Five County Area

Economic Impact[1]	Drilling (per well)	Completion (per well)	Production (per MBO)
Direct output	$961,435	$615,050	$79,724
Indirect output	$81,992	$51,106	$6,918
Induced output	$181,562	$129,989	$2,609
Total output	$1,224,989	$796,145	89,251
Multiplier[2]	1.27	1.29	1.12
Direct earnings	$513,448	$371,396	$4,499
Indirect earnings	$29,223	$18,185	$3,285
Induced earnings	$50,708	$36,304	$728
Total earnings	$593,379	$425,885	$8,512
Multiplier	1.16	1.15	1.89
Direct employment	6.0	4.1	0.060660
Indirect employment	0.7	0.5	0.049931
Induced employment	1.6	1.2	0.022613
Total employment	8.3	5.8	0.133203
Multiplier	1.38	1.41	2.20
Average earnings per job	$71,491	$73,428	$63,899

Sources: BLM 2014d, EIA 2010, EIA 2013, and the IMPLAN model, as described in the text.
MBO = thousands of barrels of oil
[1] All dollar figures are in 2010 dollars.
[2] Multiplier is calculated as total impact divided by direct impact.

Output, labor, and earning impacts summarized in **Tables 4-25** and **4-26** in the economic impact section of the FEIS are presented for drilling and completion and for operations of oil and gas wells. Impacts during drilling and completion are equal to the average wells drilled per year multiplied by impact coefficients in **Tables V-8** and **V-9**. Estimates of impacts during operations assume only a share of the wells drilled are completed and enter production, and about half of the production wells are producing by year 10. Impacts are estimated by multiplying the number of wells producing by the coefficients in **Tables V-8** and **V-19**.

The IMPLAN sectors used to model an exogenous change in demand for oil and gas well drilling were the following (IMPLAN sector numbers are shown in brackets): drilling oil and gas wells (28), support activities for oil and gas operations (29), construction of new manufacturing structures (35), construction of other new structures (36), wholesale trade (319), truck transportation (335), telecommunications (351), commercial and industrial equipment leasing (365), and architectural and engineering services (369). In the gas of oil and gas production, the sector used was oil and gas extraction (35).

WIND ENERGY

The economic impact of wind energy development reflects local expenditures made during construction and operations. BLM and Forest Service estimated impacts of current applications for wind energy development in three areas: a)

the study area as a whole; b) Elko and White Pine Counties; and c) Washoe and Lassen Counties. The number of MW expected to be developed under current management would be 980 MW in Elko and White Pine Counties and 151 MW in Washoe and Lassen Counties, for a total of 1,131 MW. **Table V-10** provides a summary of the per-unit values used for output, employment, and earnings.

Table V-10
Assumptions for Analysis of Output, Earnings, and Employment for Wind Energy Development

Economic Impact[1]	Study Area (per MW)		Elko and White Pine Counties (per MW)		Washoe/Lassen Counties (per MW)	
	Constr.	Operat.	Constr.	Operat.	Const.	Operat.
Direct output	$306,713	$14,761	$306,713	$14,761	$306,713	$14,761
Indirect output	$58,166	$345	$36,934	$206	$49,676	$348
Induced output	$74,560	$5,969	$43,320	$3,744	$79,866	$6,498
Total output	$439,440	$21,075	$386,967	$18,711	$436,255	$21,607
Multiplier[2]	1.43	1.43	1.26	1.27	1.42	1.46
Direct earnings	$131,147	$10,148	$128,268	$10,067	$131,209	$10,205
Indirect earnings	$21,346	$131	$13,252	$78	$20,127	$147
Induced earnings	$25,191	$2,017	$13,445	$1,162	$29,189	$2,375
Total earnings	$177,684	$12,296	$154,965	$11,307	$180,525	$12,727
Multiplier	1.35	1.21	1.21	1.12	1.38	1.25
Direct employment	1.646	0.153	1.691	0.162	1.640	0.149
Indirect employment	0.414	0.003	0.276	0.002	0.383	0.003
Induced employment	0.610	0.049	0.380	0.032	0.648	0.053
Total employment	2.670	0.205	2.347	0.196	2.671	0.205
Multiplier	1.62	1.34	1.39	1.21	1.63	1.37
Average earnings per job	$66,546	$59,864	$66,025	$57,688	$67,585	$61,962

Sources: IMPLAN model, as described in the text.

[1] All dollar figures are in 2010 dollars.

[2] Multiplier is calculated as total impact divided by direct impact.

Output, labor, and earning impacts summarized in **Table 4-28** in the economic impact section of the FEIS are presented for construction and operations of wind energy projects. Impacts during construction are equal to the average MW

of construction multiplied by impact coefficients in **Table V-10**. Estimates of impacts during operations assume half of the MW are installed and in production by year 10. Impacts are estimated by multiplying the number of MW being produced by the coefficients in **Table V-10**.

The IMPLAN sectors used to model an exogenous change in demand for wind energy development were the following (IMPLAN sector numbers are shown in brackets): sand and gravel mining (26), ready-mix concrete manufacturing (161), wholesale trade (319), retail-building materials and garden supply (323), hotels and motels (411), food services and drinking places (413), and labor income change (NA). In the case of wind energy operations, the IMPLAN sectors used were the following: electrical power (31), nonresidential maintenance and power (39), wholesale trade (319), retail – motor vehicle and parts (320), retail – building materials and garden supply (323), retail – gasoline stations (326), other state and local government enterprises (432), labor income change (NA), state and local government – non-educational (NA), and state and local government – educational (NA). Unlike other sectors modeled in IMPLAN for this EIS, the state and local government sector was included when modeling wind energy operations following the NREL JEDI model on which the model for this EIS was based.

REFERENCES

BLM (United States Department of the Interior, Bureau of Land Management). 2012. Data from BLM Rangeland Administration System.

_____ 2014a. Personal communication with BLM grazing specialist Michael Tietmeyer

_____. 2014b. Fact Sheet on the BLM's Management of Livestock Grazing. Internet Website: http://www.blm.gov/wo/st/en/prog/grazing.html. Accessed in June 2014.

_____. 2014c Grazing Impacts. Data provided by Josh Sidon in June 2014.

_____. 2014d. Oil and Gas Data. Data provided in personal communication from John Menghini, Petroleum Engineer, BLM, May and June 2013 and January 2014.

_____. 2014e Geothermal RFD. Personal communication with Dave Davis, Nevada State Office. July 2014.

Forest Service (United States Department of Agriculture, Forest Service). 2013. Humboldt-Toiyabe National Forest Permitted and Authorized AUMs. Data provided in personal communication from Chris Miller, US Forest Service, May and June 2013.

NREL (National Renewable Energy Laboratory). 2012. Jobs and Economic Development Impact Geothermal Model, Release GT08.02.12. Internet Web site: http://www.nrel.gov/analysis/jedi/download.html. Accessed in May 2013.

US Department of Agriculture, Economic Research Service. 2012. Commodity Costs and Returns. Internet Web site: http://www.ers.usda.gov/data-products/commodity-costs-and-returns.aspx. Accessed in August 2012.

EIA (Energy Information Administration). 2010. 2009 Oil & Gas Lease Equipment & Operating Costs, Oil Production for the Rocky Mountain Region. Internet Web site: http://www.eia.gov/pub/oil_gas/natural_gas/data_publications/cost_indices_equipment_production/current/coststudy.html. Accessed in June 2013.

_____. 2013. Utah Crude Oil First Purchase Price (Dollars per Barrel), converted to 2010 dollars. Internet Web site: http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=f004049__3&f=m. Accessed in June 2013.

Torell, L.A, N. Rimbey, J. Tanaka, D. Taylor, J. Ritten, T. Foulke. 2014. Ranch-Level Economic Impacts of Altering Grazing Policies on Federal Land to Protect the Greater Sage-Grouse.

Appendix W

Biological Assessment

This page intentionally left blank

Biological Assessment
for the

Nevada and Northeastern California

Greater Sage-Grouse
Land Use Plan Amendment and Final
Environmental Impact Statement

8 May 2015

Table of Contents

INTRODUCTION 4
Background 4
Purpose and Need for GRSG LUP Amendment 5
Habitat Definitions 5
Description of Planning Area 6
DESCRIPTION OF THE PROPOSED ACTION 9
SPECIES CONSIDERED IN THE ANALYSIS 10
SPECIES INFORMATION AND CRITICAL HABITAT 21
Plants 21
Webber's Ivesia (*Ivesia webberi*) 21
Webber's Ivesia Designated Critical Habitat 22
ANALYSIS OF EFFECTS OF THE PROPOSED ACTION BY SPECIES 25
Plants 25
Webber's Ivesia (*Ivesia webberi*) 25
Webber's Ivesia Designated Critical Habitat 28
DETERMINATIONS OF EFFECTS SUMMARY BY SPECIES 33
LITERATURE CITED 45
APPENDIX A: ADDITIONAL RATIONALE BEHIND NO EFFECT DETERMINATIONS FOR SELECT SPECIES Oregon GROUPS OF SPECIES IN TABLES 1 AND 2 47
Gray Wolf 47
Western yellow-billed cuckoo and Proposed Critical Habitat 48
Oregon Spotted Frog and Proposed Critical Habitat 52
Fishes (Big Spring spinedace, bull trout, Clover Valley speckled dace, cui-ui, desert dace, Hiko White River springfish, Independence Valley speckled dace, Lahontan cutthroat trout, Lost River sucker, Modoc sucker, Pahrump poolfish, Railroad Valley springfish, shortnose sucker, Warm springs pupfish, Warner sucker, White River spinedace, White River springfish) 53
Big Spring spinedace, bull trout, desert dace, Hiko White River springfish, Lost River sucker, Modoc sucker, Railroad Valley springfish, shortnose sucker, White River spinedace and White River springfish Critical Habitats 56
Carson Wandering skipper 56
Appendix B: BLM Proposed Plan Amendment 67
Appendix C: Forest Service Proposed Plan Amendment 110

Acronyms

BA	biological assessment
BLM	Bureau of Land Management
BMP	best management practice
COA	condition of approval
EIS	environmental impact statement
ESA	Endangered Species Act
FIAT	Fire and Invasive Assessment
FEIS	final environmental impact statement
GHMA	general habitat management area
GRSG	Greater Sage-Grouse
IPM	integrated pest management
LUP	land use plan
LUPA	land use plan amendment
NEPA	National Environmental Policy Act
NSO	no surface occupancy
OHMA	other habitat management area
ORV	off road vehicle
PCE	primary constituent element
PHMA	priority habitat management area
RDF	required design feature
RMP	resource management plan
SFA	sagebrush focal area
USFWS	US Fish and Wildlife Service

INTRODUCTION

Background

The Bureau of Land Management (BLM) and US Forest Service (Forest Service) have prepared amendments to their respective land use plans (LUPs) to provide direction for the conservation of Greater Sage-Grouse (GRSG; *Centrocercus urophasianus*) in the following locations:

- Alturas Field Office
- Black Rock Field Office
- Caliente Field Office
- Eagle Lake Field Office
- Egan Field Office
- Humboldt River Field Office
- Mt. Lewis Field Office
- Schell Field Office
- Sierra Front Field Office
- Stillwater Field Office
- Surprise Field Office,
- Tuscarora Field Office
- Tonopah Field Office
- Wells Field Office
- Humboldt-Toiyabe National Forest

Also included are portions of Nevada administered by the Idaho Jarbidge and Bruneau Field Offices.

The intent is to analyze the environmental effects that could result from implementing the proposed action. A Draft LUP Amendment Environmental Impact Statement (EIS) was published on November 1, 2013. The Proposed LUP Amendment (LUPA) and Final EIS (FEIS) is a refinement of the Preferred Alternative (Alternative D) from the Draft LUPA, with consideration given to public comments, comments from the States of Nevada and California, corrections made where necessary, and rewording for clarification.

The purpose of this biological assessment (BA) is to review the proposed LUPA to determine the extent that its implementation may affect proposed, threatened, and endangered species and proposed or designated critical habitats in the Planning Area. Because the LUP is a planning document, this BA focuses on the effects of management actions to be implemented as a part of this planning.

Under provisions of the Endangered Species Act (ESA) of 1973, as amended (16 USC, Section 1531 et seq.), federal agencies are directed to conserve threatened and endangered species and their habitats. Section 7(a)(1) states that all federal agencies shall "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species…." Thus, the conservation and recovery of threatened and endangered species is not simply the responsibility of the US Fish and Wildlife Service (USFWS), but of all federal agencies. In order to meet this requirement, the BLM and Forest Service would implement management actions, standards and guidelines, protective stipulations, conditions of approval (COAs), conservation measures, required design features (RDFs), best management practices (BMPs), mitigation, habitat restoration, and protections afforded through the LUP.

Section 7(c) of the ESA requires the BLM to complete a BA to determine the effects of implementing a resource management plan (RMP) on listed species, based on compliance with

Section 102 of the National Environmental Policy Act (NEPA). Federal agencies are required to consider and avoid or prevent adverse impacts on fish and wildlife species. Federal agencies are also required to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or their critical habitat. The ESA requires action agencies, such as the BLM and Forest Service, to not only consult or confer with the USFWS when there is discretionary federal involvement or control over the action, but also to ensure that resources are afforded adequate consideration and protection. Formal consultation becomes necessary when the action agency requests consultation after determining that the proposed action is likely to adversely affect listed species or critical habitat, or the aforementioned federal agencies do not concur with the action agency's finding (USFWS 1998).

This programmatic BA provides documentation and analysis for the proposed action to meet the federal requirements and agreements set forth among the federal agencies. It addresses proposed and federally listed threatened and endangered species, and proposed or designated critical habitat. It has been prepared under the 1973 ESA Section 7 regulations, in accordance with the 1998 procedures set forth by USFWS and the National Marine Fisheries Service. The BLM and Forest Service, in coordination with the USFWS, analyzed the effects of the LUPA on listed species.

Purpose and Need for the GRSG LUPA

The BLM and Forest Service have prepared amendments with associated EISs for LUPs containing GRSG habitat. This responds to the need to inform USFWS's March 2010 "warranted, but precluded" ESA listing petition decision. In its finding on the petition to list the GRSG, the USFWS listed inadequacy of regulatory mechanisms as a significant threat. The need is to ensure that the BLM and Forest Service have adequate regulatory mechanisms in their LUPs for the USFWS to consider a year in advance of its anticipated 2015 listing. The USFWS identified the principal regulatory mechanisms for the BLM and the Forest Service as conservation measures embedded in LUPs. Changes in management of GRSG habitats are necessary to avoid the continued decline of populations that are anticipated across the species' range. These LUP amendments will focus on areas affected by threats to GRSG habitat identified by USFWS in the March 2010 listing decision.

The purpose for the LUP amendments is to identify and incorporate appropriate conservation measures in LUPs to conserve, enhance, or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. Because the BLM and the Forest Service administer a large portion of GRSG habitat in the affected states, changes in their management of GRSG habitats are anticipated to have a considerable beneficial impact on present and future GRSG populations. They could reduce the need to list the species as threatened or endangered under the ESA.

Habitat Definitions

The LUP amendment and this BA identify and analyze proposed management actions in the following GRSG habitat types:

- Priority Habitat Management Area (PHMA)—These are areas that have been identified as having the highest conservation value to maintain sustainable GRSG populations, specifically areas for breeding, late brood-rearing, and winter concentration.

- General Habitat Management Area (GHMA)—These are areas outside of PHMA and occupied by GRSG seasonally or year-round.

- Other Habitat Management Area (OHMA)—These are mapped areas outside of PHMA and GHMA where GRSG use has been observed or suspected, areas and habitats that may be necessary to maintain viability of GRSG, or where the activity would affect GRSG or their habitat in PHMA or GHMA.

- Sagebrush Focal Area (SFA)—All federal lands in these areas will be managed as PHMA, with two exceptions: 1) all fluid leasable minerals are no surface occupancy (NSO), with no modification, exceptions or waivers and 2) locatable minerals are recommended for withdrawal from mineral entry.

Description of Planning Area

The planning area is where the BLM and Forest Service will make decisions. Its boundary is all lands, regardless of jurisdiction. For this LUPA/EIS, the planning area is the entire sub-region (Figure 1). Lands addressed in the LUPA are those in BLM- and Forest Service-administered GRSG habitats, including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the LUPAs would apply only to BLM- and Forest Service-administered lands (the decision area). The LUP amendments would be limited to making land use planning decisions specific to conserving GRSG and their habitat.

There are 11 RMPs that are the subject of the LUPA/EIS, all administered by the BLM district offices of Battle Mountain, Carson City, Elko, Ely, and Winnemucca, Nevada, and the BLM field offices in Alturas, Eagle Lake, and Surprise, California. In addition, the Humboldt-Toiyabe National Forest administers two forest land and resource management plans that would also be affected by this LUPA/EIS. The Nevada and Northeastern California sub-regional GRSG planning area covers all or a portion of 16 counties in northern Nevada and portions of four counties in northeastern California. Of these 20 counties, 12 contain GRSG habitat. Lands in the planning area are a mix of private, federal, and state lands; however, decisions related to this LUPA/EIS apply only to BLM-administered and National Forest System lands.

There are approximately 77,800 acres of public lands in Elko County, Nevada, north of the Humboldt-Toiyabe National Forest and south of the Idaho-Nevada state line, next to the Bruneau and Jarbidge field offices in Idaho. The BLM Nevada and the BLM Idaho state offices signed a memorandum of understanding to transfer administration of those lands to the BLM Idaho State Office. This was because of the lands' remoteness from other BLM-administered lands in Nevada and because they are contiguous with major blocks of public lands in Idaho.

For purposes of the GRSG LUPAs in Idaho and in Nevada, planning for these lands will be done through the Nevada and Northeastern California Greater Sage-Grouse LUPA/EIS. The Jarbidge and Bruneau field offices in Idaho will implement and administer the regulatory measures and decisions that are put in place for the GRSG through the record of decision; therefore, the mapped decision and action area for the Nevada and Northeastern California LUPA/EIS will

include lands administered by the Jarbidge Field Office in Nevada that end at the Nevada state line.

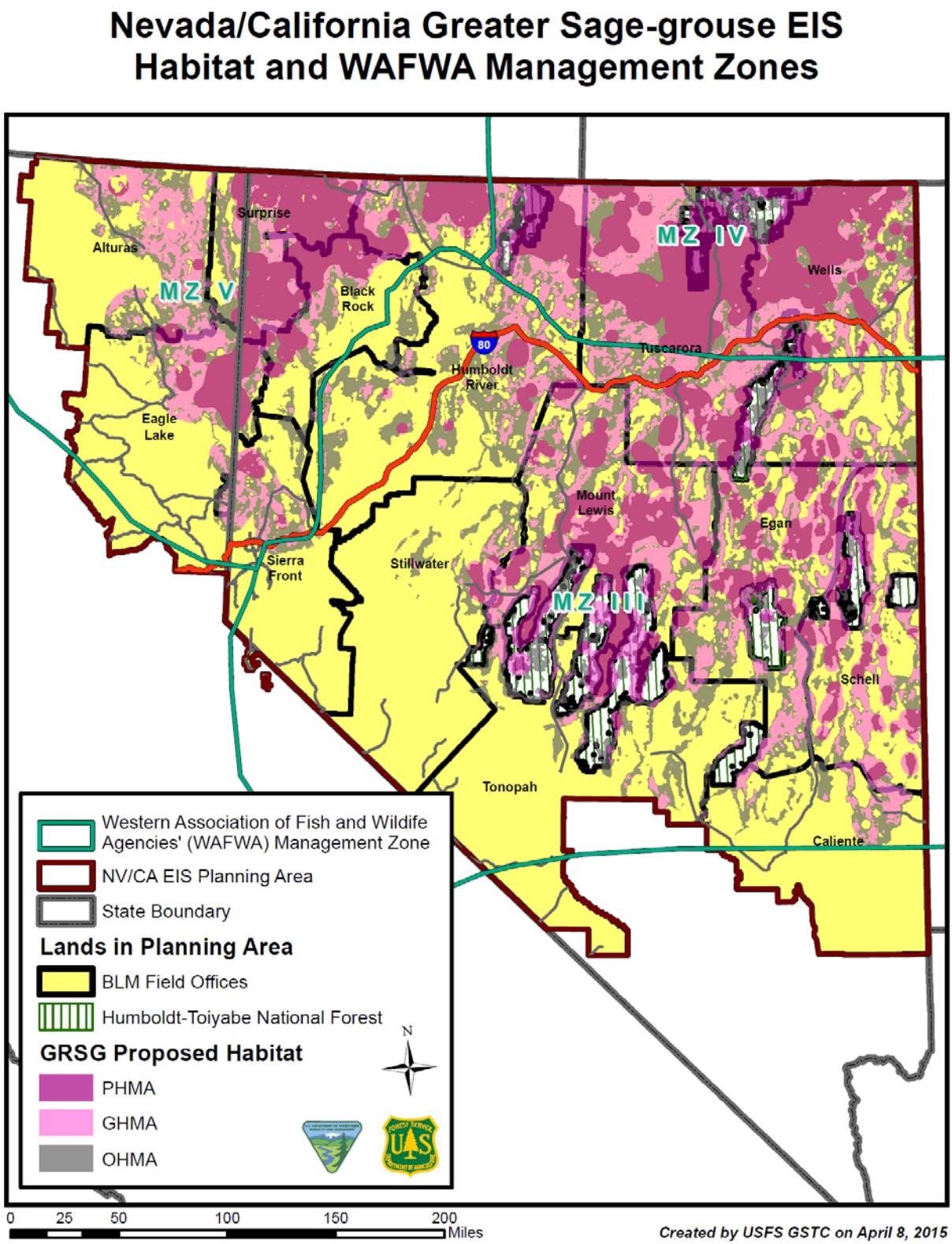


Figure 1. Nevada and Northeastern California Greater Sage-Grouse Planning Area

DESCRIPTION OF THE PROPOSED ACTION

As a result of public comments, best available science, cooperating agency coordination, and internal review of the Draft LUPA/EIS, the BLM and Forest Service have developed the Proposed LUPAs/FEISs.

The proposed plans incorporate the following GRSG goals: Conserve, enhance, and restore the sagebrush ecosystem that GRSG depend on in order to maintain or increase their abundance and distribution, in cooperation with other conservation partners. There are two selected actions, one for the BLM and one for the Forest Service. Largely, the two plans are the same, but there are minor differences, primarily due to land management planning terminology. For the full details of each agency's proposed plan, please refer to Chapter 2 of the FEIS. (For the purposes of the USFWS review, the BLM and Forest Service proposed plan amendments are Appendices B and C, respectively, of this BA.)

The proposed plan amendments seek to allocate resources among competing interests and land uses and the conservation of natural resource values, including GRSG habitat. At the same time, they would sustain and enhance ecological integrity across the landscape, including plant, wildlife, and fish habitat. The plans incorporate adjustments made in response to public comments on the Draft LUPA, as well as cooperating agency input. Conservation measures are focused on PHMAs and GHMAs and active leks (regardless of which type of habitat the active lek is in). Conservation measures are presented in categories of established program areas. The program areas are similar for each agency but not exactly the same.

The BLM program areas are as follows:

- GRSG
- Vegetation
- Wildland fire
- Livestock grazing
- Wild horses and burros
- Lands and realty
- Minerals
- Comprehensive travel and transportation
- Recreation and visitor services
- Tribal interests

The Forest Service program areas are as follows:

- General GRSG
- Adaptive management
- Lands and realty
- Wind and solar
- GRSG habitat
- Livestock grazing
- Fire management
- Wild horses and burros

- Recreation
- Roads/transportation
- Minerals

SPECIES CONSIDERED IN THE ANALYSIS

This BA is a detailed analysis of all federally listed (endangered or threatened) species, proposed species, and designated or proposed critical habitat that may be affected by the actions proposed in the LUPA. Development of this BA was guided by the regulations on Interagency Cooperation (Section 7 of the ESA) in 50 CFR, Part 402, and BLM Manual 6840.

The USFWS's list of threatened, endangered, and proposed species is composed of plants, birds, mammals, amphibians, fish, and invertebrates. The subject of the analysis was those species or the critical habitat that may occur in the action area[1] or be affected by activities associated with the Preferred Alternative in the FEIS.

Tables 1 and 2 list USFWS threatened, endangered, and proposed species that may be in or are known to be in the planning area and designated or proposed critical habitat for those species. The species and critical habitat in Tables 1 and 2 were considered in this analysis and compared to five criteria. The criteria were used to identify species or proposed or designated critical habitat that would experience "no effect" from the action alternative and could therefore be eliminated from detailed analysis. These criteria, listed below, are referred to as evaluation criteria in the tables:

1. Action area is outside species' range
2. Potential habitat for the species does not exist in GRSG habitat (sagebrush-steppe) or is outside the GRSG elevation range
3. Type or intensity of the activity in the proposed action is expected to have no impact on the species or its habitat
4. No overlap between critical habitat polygons and PHMAs or GHMAs
5. Critical habitat polygons may overlap PHMAs or GHMAs, but primary constituent elements (PCEs) do not overlap; no essential features of critical habitat would be affected

[1]The action area is the BLM- and Forest Service-administered lands within the LUPA boundary.

Table 1. USFWS listed endangered, threatened, and proposed species and critical habitat[2] that may be present in the action area and that may be influenced by the preferred alternative

	Field Office or National Forest																		
Species (Status)[3, 4]	**Alturas**	**Black Rock**	**Caliente**	**Eagle Lake**	**Egan**	**Humboldt River**	**Mt. Lewis**	**Schell**	**Sierra Front**	**Stillwater**	**Surprise**	**Tuscarora**	**Tonopah**	**Wells**	**Humboldt-Toiyabe**	**Jarbidge**	**Bruneau**	**Evaluation Criteria**	**Initial Biological Determination**
Gray wolf (E) *Canis lupus*	D	Y	N	D	N	Y	U	N	N	N	N	Y	N	S	N	Y	N	3	No effect See Appendix A
Western yellow-billed cuckoo (T) *Coccyzus americanus*	N	Y	S	N	N	Y	N	N	D	N	N	Y	N	D	N	Y	U	3	No effect See Appendix A
Western yellow-billed cuckoo proposed critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect
Oregon spotted frog (P-T) *Rana pretiosa*	Y	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	3	No effect See Appendix A
Oregon spotted frog proposed critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect

[2] For habitat description and range, see table 2.
[3] E = Endangered; T = Threatened; P-T = Proposed Threatened
[4] D = Documented; S = Suspected; Y = Suitable habitat present; N = Suitable or critical habitat not present; U = Unknown if suitable habitat is present.
Sources: October 25, 2013 letter from Amy Lueder (Nevada State Director, BLM), James G. Kenna (California State Director, BLM) and William Dunkelberger (Forest Supervisor, Humboldt-Toiyabe National Forest) to Edward Koch (Field Supervisor, Nevada Ecological Services Field Office, USFWS); December 18, 2013, memo from Edward Koch to State Director, Nevada State Office, BLM, Reno; State Director, California State Office, BLM, Sacramento; Forest Supervisor, Humboldt-Toiyabe National Forest, Forest Service, Sparks, Nevada.

	Field Office or National Forest																		
Species (Status)[3, 4]	**Alturas**	**Black Rock**	**Caliente**	**Eagle Lake**	**Egan**	**Humboldt River**	**Mt. Lewis**	**Schell**	**Sierra Front**	**Stillwater**	**Surprise**	**Tuscarora**	**Tonopah**	**Wells**	**Humboldt-Toiyabe**	**Jarbidge**	**Bruneau**	**Evaluation Criteria**	**Initial Biological Determination**
Big Spring spinedace (T) *Lepidomeda millispinis pratensis*	N	N	S	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1, 2	No Effect
Big Spring spinedace critical habitat	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	No effect See Appendix A
Bull trout (T) *Salvelinus confluentus*	N	U	N	N	N	U	N	N	N	N	N	D	N	D	D	U	D	3	No effect See Appendix A
Bull trout critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	4	No effect See Appendix A
Clover Valley speckled dace (E) *Rhinichthys osculus oligoporus*	N	N	N	N	N	N	N	N	N	N	N	D	N	D	N	U	N	3	No effect See Appendix A
Cui-ui (E) *Chasmistes cujus*	N	N	N	N	N	N	N	N	D	N	N	N	N	N	N	N	N	3	No effect See Appendix A
Desert dace (T) *Eremichthys acros*	N	D	N	N	N	U	N	N	N	N	N	N	N	N	N	Y	N	3	No effect See Appendix A
Desert dace critical habitat	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect See Appendix A
Hiko White River springfish (E) *Crenichthys baileyi grandis*	N	N	N	N	N	N	N	N	N	D	N	N	N	N	N	N	N	3	No effect See Appendix A
Hiko White River springfish critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect

	Field Office or National Forest																		
Species (Status)[3, 4]	**Alturas**	**Black Rock**	**Caliente**	**Eagle Lake**	**Egan**	**Humboldt River**	**Mt. Lewis**	**Schell**	**Sierra Front**	**Stillwater**	**Surprise**	**Tuscarora**	**Tonopah**	**Wells**	**Humboldt-Toiyabe**	**Jarbidge**	**Bruneau**	**Evaluation Criteria**	**Initial Biological Determination**
Independence Valley speckled dace (E) *Rhinichthys osculus*	N	N	N	N	N	N	N	N	N	N	N	D	N	D	N	U	N	3	No Effect See Appendix A
Lahontan cutthroat trout (T) *Oncorhynchus clarkii henshawi*	N	D	N	N	N	D	D	N	D	D	N	D	N	D	D / S	D	N	3	No Effect See Appendix A
Lost River sucker (E) *Deltistes luxatus*	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	No Effect See Appendix A
Lost River sucker critical habitat	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No Effect See Appendix A
Modoc sucker (E) *Catostomus microps*	D	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	No Effect See Appendix A
Modoc sucker critical habitat	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No Effect See Appendix A
Pahrump poolfish (E) *Empetrichthys latos*	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1, 2	No Effect
Railroad Valley springfish (T) *Crenichthys nevadae*	N	N	N	N	S	N	N	S	N	D	N	N	D / S	N	N	N	N	3	No Effect See Appendix A
Railroad Valley springfish critical habitat	N	N	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N	N	4	No Effect See Appendix A

	Field Office or National Forest																		
Species (Status)[3, 4]	**Alturas**	**Black Rock**	**Caliente**	**Eagle Lake**	**Egan**	**Humboldt River**	**Mt. Lewis**	**Schell**	**Sierra Front**	**Stillwater**	**Surprise**	**Tuscarora**	**Tonopah**	**Wells**	**Humboldt-Toiyabe**	**Jarbidge**	**Bruneau**	**Evaluation Criteria**	**Initial Biological Determination**
Shortnose sucker (E) *Chasmistes brevirostris*	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	No effect See Appendix A
Shortnose sucker critical habitat	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect See Appendix A
Warm Springs pupfish (E) *Cyrpinodon nevadensis pectoralis*	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1, 2	No Effect
Warner sucker (T) *Catostomus warnerensis*	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	3	No effect See Appendix A
White River spinedace (E) *Lepidomeda albivalis*	N	N	N	N	D / S	N	N	D / S	N	N	N	N	N	N	N	N	N	3	No effect See Appendix A
White River spinedace critical habitat	N	N	N	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	4	No effect See Appendix A
White River springfish (E) *Crenichthys baileyi baileyi*	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	3	No effect See Appendix A
White River springfish critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect

	Field Office or National Forest																		
Species (Status)[3, 4]	**Alturas**	**Black Rock**	**Caliente**	**Eagle Lake**	**Egan**	**Humboldt River**	**Mt. Lewis**	**Schell**	**Sierra Front**	**Stillwater**	**Surprise**	**Tuscarora**	**Tonopah**	**Wells**	**Humboldt-Toiyabe**	**Jarbidge**	**Bruneau**	**Evaluation Criteria**	**Initial Biological Determination**
Carson wandering skipper (E) *Pseudocopaeodese unus obscurus*	U	U	N	S	N	U	N	N	D	N	Y	N	N	N	N	N	N	3	No effect See Appendix A
Vernal pool fairy shrimp (T) *Branchinecta lynchi*	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	No effect
Vernal pool fairy shrimp critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect
Gentner's fritillary (E) *Fritillaria gentneri*	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	No effect
Greene's tuctoria (E) *Tuctoria greenei*	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	No effect
Greene's tuctoria critical Habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect
Slender Orcutt grass (T) *Orcuttia tenuis*	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	2	No effect
Slender Orcutt grass critical habitat	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	4	No effect
Webber's ivesia (T) *Ivesia webberi*	N	N	N	D	N	N	N	N	D	N	N	N	N	N	N	N	N	NA	See detailed analysis below
Webber's ivesia critical habitat	N	N	N	D	N	N	N	N	D	N	N	N	N	N	N	N	N	NA	See detailed analysis below

Table 2. Brief description of habitat and range for species listed in table 1 above.

Species	Habitat Description and Range
Mammals	
Gray wolf (E) *Canis lupus*	Located throughout the northern hemisphere; listed as endangered in portions of Colorado, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and all or a portion of Elko County, Nevada, and Modoc and Siskiyou Counties, California. Habitat generalists that require ungulate prey. Suitable habitat is present in remote, Nevada action area lands administered by the BLM Bruneau Field Office.
Birds	
Western yellow-billed cuckoo (T) *Coccyzus americanus*	Requires large blocks of riparian woodlands in low to moderate elevation arid to semiarid landscapes. Historic breeding range in western North America is areas west of the crest of the Rocky Mountains in Canada and the United States, and portions of Mexico.
Western yellow-billed cuckoo proposed critical habitat	PCEs are 1) mixed willow-cottonwood or mesquite-thorn patches > 325 feet X 200 acres; 2) A prey base of large insect fauna and tree frogs in breeding and post-breeding dispersal areas; 3) dynamic riverine processes that allow riparian habitat to regenerate regularly. Proposed critical habitat does not overlap the action area.
Amphibians	
Oregon spotted frog (P-T) *Rana pretiosa*	Found from extreme southwestern British Columbia south through the Puget/Willamette Valley Trough, and in the Cascades Range, from south-central Washington at least to the Klamath Basin in Oregon. May be extirpated in California. Highly aquatic: inhabits emergent wetland habitats in forested landscapes. Breeds in shallow, often temporary, pools of water (seasonal lakes, marshes, meadows).
Oregon spotted frog proposed critical habitat	Portions of Washington and Oregon. PCEs: 1) Ephemeral or permanent bodies of freshwater for nonbreeding, rearing, and overwintering; 2) Ephemeral or permanent bodies of freshwater for movement corridors; 3) Dense vegetation and woody debris that provide refugia from predators. Proposed critical habitat does not overlap the action area.
Fishes	
Big Spring spinedace (T) *Lepidomeda millispinis pratensis*	Only found in Meadow Valley Wash, Lincoln County, Nevada.
Big Spring spinedace critical habitat	Fifty-one acres of critical habitat overlap GHMA in the Caliente Field Office.
Bull trout (T) *Salvelinus confluentus*	Found in cold-water streams. Requires stable flows and stream channels and complex forms of cover, including large woody debris, undercut banks, boulders, and pools.
Bull trout critical habitat	Located in portions of Idaho, Oregon, Montana, Washington, and Nevada; 31 acres (18 miles) of critical habitat overlap OHMA and 3 acres (3 miles) overlap PHMA on the Humboldt-Toiyabe National Forest; 1 acre of critical habitat overlaps OHMA and 1 acre overlaps PHMA in the Wells Field Office.
Clover Valley speckled dace (E) *Rhinichthys osculus oligoporus*	Occurs in Clover Valley Warm Springs, Bradish Springs, and Wright Spring in Clover Valley, Elko County, Nevada.

Species	Habitat Description and Range
Cui-ui (E) *Chasmistes cujus*	Endemic to Pyramid Lake, Nevada, and migrates up the tributary Truckee River to spawn. Currently, can access only the lower 12 miles of the Truckee River and only during the spawning season due to flow and passage issues.
Desert dace (T) *Eremichthys acros*	Restricted to thermal spring habitats in the Soldier Meadows area, western Humboldt County, northwestern Nevada (4,330 to 4,580 feet).
Desert dace (*Eremichthys acros*) critical habitat	Soldier Meadows thermal springs and associated outflows and riparian habitat. GIS analysis shows 874 acres of critical habitat overlap GHMA, 1,253 acres overlap OHMA, and 76 acres of PHMA overlap critical habitat on the Black Rock Field Office.
Hiko White River springfish (E) *Crenichthys baileyi grandis*	Occurs in Hiko Spring and Crystal Spring and its outflow, Pahranagat Valley, Lincoln County, Nevada, and has been introduced into Blue Link Spring in Mineral County, Nevada.
Hiko White River springfish critical habitat	Hiko Spring and Crystal Spring, Lincoln County, Nevada, and associated outflows and riparian habitat.
Independence Valley speckled dace (E) *Rhinichthys osculus*	Occurs only in Independence Valley in northeast Elko County, Nevada.
Lahontan cutthroat trout (T) *Oncorhynchus clarkii henshawi*	Inhabits both lakes and streams, but is an obligatory stream spawner. Requires well-vegetated and stable streambanks, silt-free stream bottoms with gravel/rubble substrate, cool water. Endemic to the Lahontan basin (northern Nevada, eastern California but currently occupies between 155 and 160 streams: 123 to 129 in the Lahontan basin and 32 to 34 outside the basin.
Lost River sucker (E) *Deltistes luxatus*	Upper Klamath Basin of Oregon and California; lake dwelling but spawns in tributary streams and springs.
Lost River sucker critical habitat	Six units: 1) Clear Lake and watershed, 2) Tule Lake, 3) Klamath River, 4) Upper Klamath Lake and watershed, 5) Williamson and 6) Sprague Rivers and Gerber Reservoir and watershed; 22 miles (506 acres) of critical habitat overlap GHMA and 536 acres overlap PHMA in the Alturas Field Office.
Modoc sucker (E) *Catostomus microps*	Inhabits primary and secondary streams in the Turner and Ash Creek sub-systems of the upper Pit River drainage in Modoc and Lassen Counties, California
Modoc sucker critical habitat	Includes Johnson Creek from the confluence with Rush Creek, Rush Creek from the gauging station on Highway 299 upstream to the Upper Rush Creek campground, Turner Creek from its confluence with the Pit River, Washington Creek from the confluence with Turner Creek, and Hulbert Creek from its confluence with Turner Creek; 6 miles of critical habitat overlap OHMA in the Alturas Field Office.
Pahrump poolfish (E) *Empetrichthys latos*	Pahrump Valley, southern Nye County, Nevada; marginal to planning area, extirpated from its natural habitat, now exists only as three introduced populations.
Railroad Valley springfish (T) *Crenichthys nevadae*	Thermal spring systems of Railroad Valley, Nye County, Nevada.
Railroad Valley springfish critical habitat	Big Warm, Little Warm, Big, North, Hay Corral, and Reynolds Springs; 55 acres of critical habitat overlap GHMA, 7 acres overlap OHMA in the Egan Field Office, and 284 acres of overlap OHMA on the Tonopah Field Office.

Species	Habitat Description and Range
Shortnose sucker (E) *Chasmistes brevirostris*	Upper Klamath Basin of Oregon and California; lake dwelling but spawns in tributary streams and springs
Shortnose sucker critical habitat	Six units: 1) Clear Lake and watershed, 2) Tule Lake, 3) Klamath River, 4) Upper Klamath Lake and watershed, 5) Williamson and 6) Sprague Rivers and Gerber Reservoir and watershed; 41 miles (519 acres) of critical habitat overlap GHMA, 20 miles (150 acres) overlap OHMA, and 536 acres overlap PHMA in the Alturas Field Office.
Warm Springs pupfish (E) *Cyrpinodon nevadensis pectoralis*	Found in six springs west of Devil's Hole, Ash Meadows, and Nye County, Nevada.
Warner sucker (T) *Catostomus warnerensis*	Endemic to the Warner Lake Basin in south-central Oregon, extreme northeastern California, and extreme northwestern Nevada; currently present in only a portion of the permanent lakes, ephemeral lakes, sloughs, canals and tributary streams in this basin. Uses deep waters with abundant food. Limited suitable habitat in the Surprise Field Office.
White River spinedace (E) *Lepidomeda albivalis*	Several populations have been extirpated. Persists only in the Flag Springs complex in the Nevada State Kirch Wildlife Management Area. Habitat in this cool, clear spring and its overflow includes sand and gravel substrate with some interspersed mud.
White River spinedace critical habitat	Includes Preston Big Spring and Lund Spring (White Pine County, Nevada) and Flag Springs (northeastern Nye County, Nevada); 24 acres of critical habitat overlap GHMA in the Egan Field Office and 5 acres overlap GHMA on the Schell Field Office.
White River springfish (E) *Crenichthys baileyi baileyi*	Found only in Ash Springs complex, Lincoln County, Nevada.
White River springfish critical habitat	Ash Spring source spring area and associated outflows and riparian vegetation.
Invertebrates	
Carson wandering skipper (E) *Pseudocopaeodeseunus obscurus*	Inhabits lowland grassland on alkaline substrates characterized by an elevation of less than 5,000 feet, requires *Distichlis spicata* (saltgrass) and nectar sources in open areas near springs or water. Found along the eastern edge of the Sierra Nevada in northern Nevada and California.
Vernal pool fairy shrimp (T) *Branchinecta lynchi*	Inhabits vernal pools and swales in the Central Valley of California and southwestern Oregon.
Vernal pool fairy shrimp critical habitat	Inhabits vernal pools and swales in the Central Valley of California and southwestern Oregon.
Plants	
Gentner's fritillary (E) *Fritillaria gentneri*	Most often occupies grassland and chaparral habitats in, or on the edges of, dry, open, mixed-species woodlands at elevations below 5,000 feet. Highly localized in about a 30-mile radius of Jacksonville, Oregon. The nearest designated GRSG habitat is over 75 miles southeast of Jacksonville.
Greene's tuctoria (E) *Tuctoria greenei*	Annual grass that grows in dried vernal pools mainly on the eastern side of the Sacramento and San Joaquin Valleys. Known occurrences are in Tulare County north to Shasta County, California. No occurrences or suitable habitats exist in designated GRSG habitat. The Shasta County site is over 13 miles west of the nearest designated GRSG habitat, on private and Lassen National Forest lands.

Species	Habitat Description and Range
Greene's tuctoria critical habitat	Designated critical habitat is in the outer boundary of the Alturas Field Office, but not on BLM-administered lands, and there is no overlap designated GRSG habitat. Designated GRSG habitat is over 13 miles from the nearest designated critical habitat, in Shasta County, California, on private and Lassen National Forest lands.
Slender Orcutt grass (T) *Orcuttia tenuis*	Annual grass that grows in dried vernal pools. Occurs from near Sacramento north to Modoc and Shasta Counties, California. Designated GRSG habitat is over 5 miles from the nearest known occurrence, in Lassen County, California, in the Lassen National Forest.
Slender Orcutt grass critical habitat	Designated GRSG habitat is over 5 miles from the nearest critical habitat for this species, in Lassen County, California, on the Lassen National Forest.
Webber's ivesia (T) *Ivesia webberi*	Occupies vernally moist, rocky, clay soils that shrink and swell on drying and wetting in open to sparsely vegetated areas of low sagebrush (USFWS 2014a). Known from Lassen, Plumas, Sierra, Washoe, and Douglas Counties in California and Nevada. Several occurrences (associated with designated critical habitat units) overlap GHMA and OHMA in the Eagle Lake and Sierra Front Field Offices.
Webber's ivesia critical habitat	Designated critical habitat is present in the Eagle Lake and Sierra Front Field Offices, and overlaps GHMA and OHMA in both; 397 acres are in GHMA and 495 acres are in OHMA.

SPECIES INFORMATION AND CRITICAL HABITAT

Plants

Webber's Ivesia (*Ivesia webberi*)

Habitat Description

Webber's ivesia is a perennial, tap-rooted, low spreading herb with bright yellow ball-like flower heads. This distinctive species is not likely to be confused with other similar species (Witham 2000). It occupies vernally moist, shallow, clayey soils with a rocky pavement-like surface. The specialized soils are well-developed, with an argillic horizon that shrinks and swells on drying and wetting. Habitats occur as small inclusions in a larger matrix of sagebrush habitats. It has been found only in relatively open plant associations, where competition for light and moisture with other species is low (NatureServe 2014). Sites are found on mid-elevation flats, benches, or terraces, with no colluvial accumulation from upslope. Generally, it occurs on mountain slopes above large valleys. The habitat supports a sparse to moderately dense vegetation, usually dominated or co-dominated by Webber's ivesia and low sagebrush (*Artemisia arbuscula*) or squirreltail grass, in association with a wide variety of usually dwarfed, cushion-like perennial herbs.

Status and Distribution

The USFWS listed Webber's ivesia as a threatened species, which became effective on July 3, 2014 (USFWS 2014a). The range of Webber's ivesia lies along the transition zone between the eastern edge of the northern Sierra Nevada and the mountain ranges just to the east of and parallel to the Sierra Nevada. It is known from five counties: Lassen, Plumas, and Sierra Counties, California, and Douglas and Washoe Counties, Nevada.

Nine of 16 known occurrences are in GHMA or OHMA in the Eagle Lake and Sierra Front Field Offices. There is no other known overlap with GRSG habitats. Field surveys sponsored in 1990 and 1991 by the Plumas, Tahoe, and Humboldt-Toiyabe National Forests relocated the type population and documented several new occurrences on the rim of Upper Long Valley on the California-Nevada border. Surveys conducted in 1997 and 1998 redocumented all of the known Nevada occurrences and substantiated other historic records, but no additional occurrences were found (Witham 2000).

The shallow claypan sites in the Surprise Field Office have been subject to many botanical surveys with no documented occurrences,[5] and suitable habitat is not likely to occur in the Surprise Field Office. Field surveys indicate that only a very small portion of potentially suitable habitat is actually occupied. Usually a site that looks suitable from a distance ends up being too xeric or lacks the shallow, clayey soils with a rocky surface pavement associated with this species (Witham 2000). Surveys focusing on about 3,955 acres of additional potential habitat in

[5]R. Farschon, Ecologist, BLM Surprise Field Office, Cedarville, California. E-mail correspondence with Arlene Kosic (BLM Wildlife Biologist), and Bruce Davidson (USFS Botanist) on September 16, 2014.

western Washoe County and in the Pine Nut Mountains of Douglas County, Nevada, have revealed no further populations of Webber's ivesia (Witham 2000). Washoe and Douglas Counties (Eagle Lake and Sierra Front Field Offices) have the most likely areas in GRSG habitats to have Webber's ivesia habitat.

A specimen collected on April 30, 1959 from Pyramid Lake, from a "desert area, very sandy hillside" is considered erroneous and likely was collected nearer to Reno on the same day (Witham 2000). In 1991, a focused field survey in the Pyramid Lake area found no potential habitat. Additionally, the described habitat of "desert area" and "very sandy hillside" is completely unlike any of the known populations of Webber's ivesia. Globally, the western rim of Upper Long Valley, Sierra County, California, remains the last unsurveyed area with highly suitable habitat (Witham 2000), and this area is outside the analysis area.

Life History

Generally, Webber's ivesia is a dominant or co-dominant component of a well-developed, climax dwarf perennial herb and shrub community, commonly occurring with low sagebrush (*Artemisia arbuscula*). Pollinators specific to Webber's ivesia have not been identified; however, most *Ivesia* species reproduce from seed with insect-mediated pollination occurring between flowers of the same or different plants (Witham 2000). Absence of the species from numerous apparently suitable sites provides circumstantial evidence that the species' population may have declined at least during prehistoric times, or that it may have limited ability to disperse and to establish new populations in unoccupied habitat (Witham 2000). Seed dispersal for this species is probably low to none. The seeds are relatively large and probably become lodged in the crevices in the rocky pavement-like soils very soon after being shed from the parent plant. This would partially explain the lack of apparent colonization of nearby seemingly suitable but unoccupied areas.

Threats

The primary threat to Webber's ivesia is the combined effects from the encroachment of nonnative, invasive plant species into its community and the modified fire regime resulting from this encroachment (USFWS 2014a). Nonnative invasive plants negatively affect Webber's ivesia through competition, displacement, and degradation of its habitat. In addition, these nonnative invasive species (mainly annual grasses), once established, contribute fuels that increase the frequency and likelihood of wildfire (USFWS 2014a).

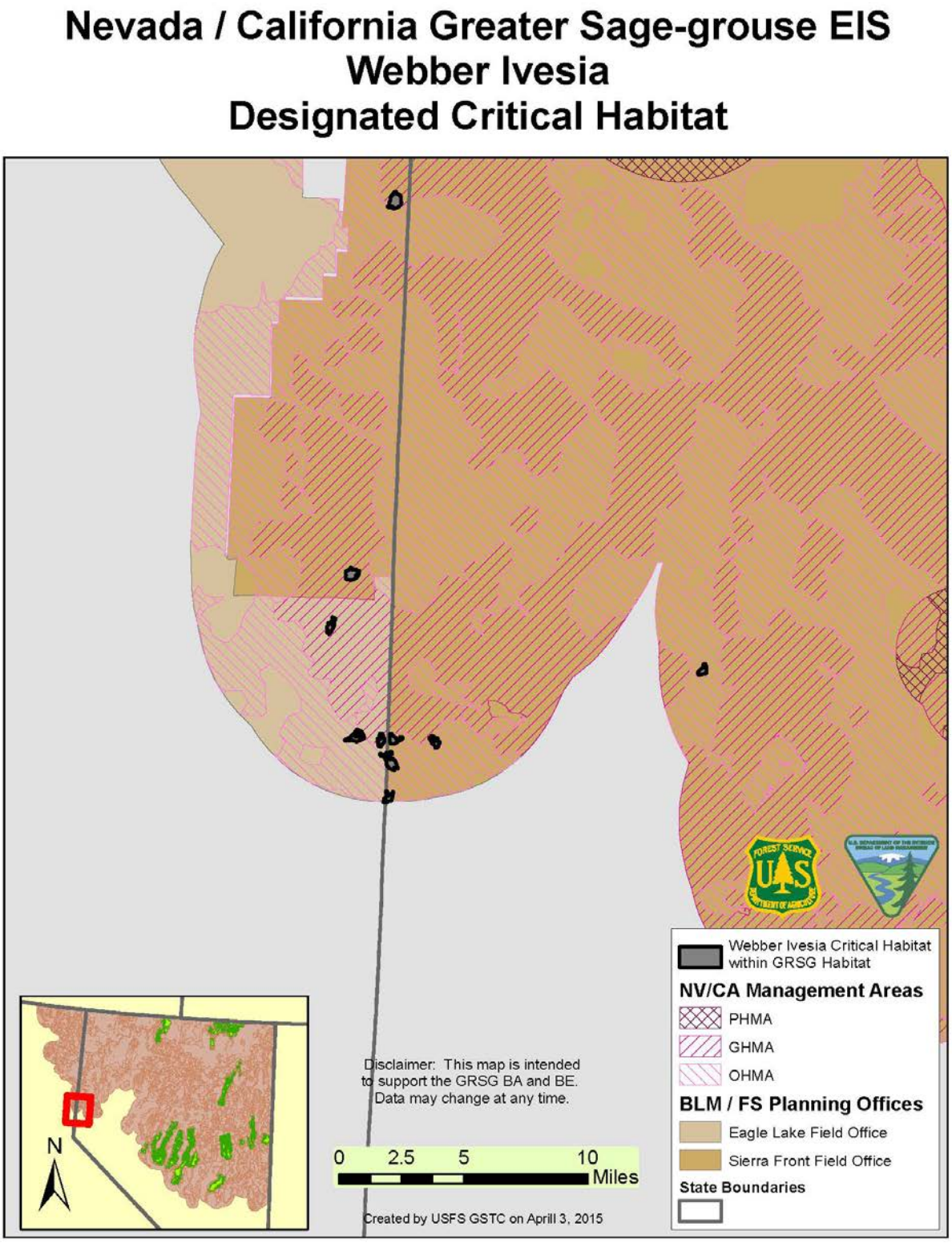
Webber's ivesia is also considered threatened by residential development (especially in the Reno area), road development and maintenance, land conversion to agricultural uses, and off road vehicle (ORV) use. It is also vulnerable to concentrated livestock trampling and fire suppression activities (NatureServe 2014; Witham 2000). It can tolerate some moderate disturbance, as it has been observed in some mildly disturbed sites; however, long-term survival depends on the continued availability of undisturbed mid-elevation benches or saddles, with shallow, very rocky pavement-like soils derived from andesite or similar volcanic material (NatureServe 2014).

Webber's Ivesia Designated Critical Habitat

Also effective on July 3, 2014, the USFWS (2014e) designated critical habitat Webber's ivesia. North of Reno, Nevada, 9 of the 16 designated critical habitat units are in GHMA or OHMA.

Critical habitat units 2, 3, and 4 are in areas mapped as GHMA, and units 6, 7a, 7b, 8, 9, 10, and 11 are mainly in OHMA. Figure 2 below shows the general location and extent of these critical habitat overlaps with GRSG habitats.

Figure 2. Webber's Ivesia designated critical habitat



Overlapping GRSG habitats in the Eagle Lake Field Office are 270 acres of designated critical habitat, including 107 acres of GHMA and 163 acres of OHMA; 622 acres of designated critical habitat overlap GRSG habitats in the Sierra Front Field Office, including 290 acres of GHMA and 332 acres of OHMA.

The PCEs of Webber's ivesia critical habitat are as follows (USFWS 2014e):

- Plant community
  - Open to sparsely vegetated areas composed of generally short-statured associated plant species
  - Presence of appropriate associated species that can include *Antennaria dimorpha*, *Artemisia arbuscula*, *Balsamorhiza hookeri*, *Elymus elymoides*, *Erigeron bloomeri*, *Lewisia rediviva*, *Poa secunda*, and *Viola beckwithii*
  - An intact assemblage of appropriate associated species to attract the floral visitors that may be acting as pollinators
- Topography
  - Flats, benches, or terraces that are generally above or next to large valleys; occupied sites vary from slightly concave to slightly convex or gently sloped (0 to 15°) and occur on all aspects
- Elevation
  - Elevations between 4,475 and 6,237 feet
- Suitable soils and hydrology
  - Vernally moist soils with an argillic horizon that shrink and swell on drying and wetting; these soil conditions are characteristic of known *Ivesia webberi* populations and are likely important in the maintenance of the seedbank and population recruitment
  - Suitable soils that can include Reno, a fine, smectitic, mesic Abruptic Xeric Argidurid; Xman, a clayey, smectitic, mesic, shallow Xeric Haplargid; Aldi, a clayey, smectitic, frigid Lithic Ultic Argixeroll; and Barshaad, a fine, smectitic, mesic Aridic Palexeroll

Threats to Webber's Ivesia's critical habitat are human-caused modifications from the introduction and spread of nonnative invasive species, including *Bromus tectorum*, *Poa bulbosa*, and *Taeniatherum caputmedusae*; modified wildfire regime; increased access and fragmentation of habitat by new roads and ORVs; agricultural, residential, and commercial development; and soil and seedbank disturbance by livestock (USFWS 2014f).

ANALYSIS OF EFFECTS OF THE PROPOSED ACTION BY SPECIES

Plants

Webber's Ivesia (*Ivesia webberi*)

Nine of 16 known occurrences are in GHMA or OHMA in the Eagle Lake and Sierra Front Field Offices. Additional suitable habitat may exist in GRSG habitats in the Eagle Lake and Sierra Front Field Offices.

Direct and Indirect Effects

Threats to Webber's ivesia on federal lands are modification of fire behavior in its habitat due to nonnative invasive plants, competition from nonnative invasive plants, road development, ORV use, concentrated livestock trampling, and fire suppression activities.

Nonnative invasive plants can negatively affect Webber's ivesia through competition, displacement, and degradation of its habitat. Invasive annual grasses can also contribute fuels that increase the frequency and likelihood of wildfire in its habitats. The proposed conservation measures include a focus on invasive species management, as follows:

Action VEG 3 states to "*utilize BLM habitat maps, habitat objectives, and concepts of resistance and resilience to prioritize habitat restoration projects… including restoration in areas affected by wildfire and the continuing invasive annual fire cycle to meet greater sage-grouse habitat objectives.*"

Action VEG-ISM 1 says to "*prevent the establishment of invasive species into uninvaded areas in PHMAs and GHMAs through properly managed grazing and by conducting systematic and strategic detection surveys, data collection, mapping of these areas, and engagement in early response efforts to contain and eradicate if invasion occurs*."

Action VEG-ISM 2 states to "*control the spread and introduction of Nevada Department of Agriculture and California Department of Food and Agriculture listed noxious weeds and undesirable nonnative plant species.*"

Action VEG-ISM 6 directs to "*assess invasive annual grass presence and distribution before implementing vegetation restoration projects to determine if treatments are required to treat invasive annual grasses*."

Action VEG-ISM 7 says to "*treat sites in PHMAs and GHMAs that contain invasive species infestations through an Integrated Pest Management (IPM) approach using fire, chemical, mechanical, and biological methods based on site potential in accordance with Fire and Invasive Assessment (FIAT) matrix.*"

Any increase in invasive species control as a result of the proposed LUPA may benefit Webber's ivesia habitat by reducing the spread and competition from invasive species. In addition, there is potential for adverse effects on Webber's ivesia individuals from herbicide application and other treatment methods if plants are present. The amount and location of possible increases in invasive species treatments due to the proposed LUPA is unknown, and the current proposed action does not authorize site-specific actions. Although impacts from invasive species treatments are possible from these actions, the extent of effects and likelihood of treatment occurrence in Webber's ivesia habitats are unknown; they are too speculative to quantify at this planning level. Future site-specific analysis of possible effects from invasive species treatments

would occur at the project level, including ESA Section 7 consultations if needed, when the details of such actions become available.

ORV use is a threat to Webber's ivesia because direct contact can damage or kill individuals; the associated soil disturbance can increase erosion and disturb the well-developed soil horizons that are a key component to its habitat. With this action, no additional travel or vehicle uses are proposed.

In this proposal, Action CTTM 2 states that "*in travel management plans that have been completed and are being implemented (e.g., Northeastern California plans), continue to limit motorized travel to designated routes in PHMAs and GHMAs. In areas where travel planning has not been completed, limit motorized travel to existing routes in PHMAs and GHMAs until subsequent implementation level travel planning is completed and a designated route system is established.*"

Thus, if any areas of occupied or suitable habitat for Webber's ivesia in PHMA or GHMA are currently open to ORVs, and travel management plans are not completed, vehicles would be restricted to existing routes. This would provide a small but contemporaneous beneficial effect on Webber's ivesia by reducing the likelihood of damage from ORVs.

With this action, no new site-specific road development, livestock uses, or fire suppression activities are proposed. The proposed conservation measures would only limit these uses for the benefit of GRSG. Several measures would change current grazing operations if they are not meeting GRSG habitat objectives. Examples are as follows:

Objective LG 1 states to "*manage permitted livestock grazing to maintain and/or enhance PHMAs and GHMAs to meet all GRSG life cycle requirements and habitat objectives, based on site potential*."

Action LG 1 states, "*When renewing term grazing permits or leases, or when revising or developing new allotment management plans in PHMAs and GHMAs, if not meeting, or making progress towards meeting Land Health Standards, as associated with not meeting GRSG habitat objectives, and grazing is a significant causal factor, adjust permits and take actions before the start of the next grazing season by implementing management strategies, including the addition of one or more of the following (not in priority order): season or timing of use; numbers of livestock; intensity of use; type of livestock; extended rest or temporary closure from grazing through BLM administrative actions; make allotment unavailable to grazing.*"

Action LG 7 says "*In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels, and livestock are identified as an influencing factor, reduce AUMs grazed the following year accordingly. AUMs cannot be applied to another pasture.*"

And Action LG 10 states, "*In any allotment where Land Health Standards were not met, and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives are met.*"

Changes in livestock grazing may occur as a result of this decision, depending on whether current management is meeting or making progress toward GRSG habitat objectives. Therefore, whether such modifications would take place is unknown and if so, when, where, or how modifications would occur. Beneficial effects from reduced grazing impacts are possible from these measures, but the extent of benefit and likelihood of occurrence are too speculative to quantify at this programmatic level.

There is the potential for future site-specific ground-disturbing actions to have additional indirect effects—those caused by the action but at a later time. However, at this programmatic planning level, these future project actions are currently unknown; it is not reasonably certain that they would occur, and any possible effects are too speculative to evaluate at this time.

All future site-specific projects would include an environmental analysis through the NEPA process and ESA Section 7 consultations. Potential adverse effects on Webber's ivesia would be avoided, minimized, or mitigated through site-specific analysis at the project level.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the action area are identified and their effects are added to the anticipated effects of the current proposal. The action area for the current proposal is limited to PHMA, GHMA, OHMA, and SFA on BLM-administered and National Forest system lands. No state, tribal, local, or private lands exist in the action area; only federal actions are expected. Therefore, no cumulative effects are expected.

Summary Determination of Effects on Webber's Ivesia

Adverse effects from the LUPAs are highly unlikely, due to the focus on protection and enhancement of GRSG habitats and because additional site-specific analysis and mitigation would occur at the project level. A potential beneficial effect on Webber's ivesia may result in PHMA/GHMA from Action CTTM 2, restricting vehicle use to existing routes.

The Nevada and Northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may affect, but would not likely adversely affect, Webber's ivesia. This is because the anticipated effects on occurrences and potentially suitable habitat that may occur in PHMA and GHMA in the Eagle Lake and Sierra Front Field Offices would be beneficial due to the reduced impacts from ORVs. In addition, any possible adverse effects from future ground-disturbing actions would likely be avoided because site-specific analysis would occur at the project level when the details of such actions become available. Because no suitable habitats are expected in PHMA, GHMA, OHMA, or SFA in the Alturas, Black Rock, Caliente, Egan, Humboldt River, Mt. Lewis, Schell, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or the Humboldt-Toiyabe National Forest, there would be no effects on Webber's ivesia in these areas.

Webber's Ivesia Designated Critical Habitat

Direct and Indirect Effects

Threats to Webber's Ivesia critical habitat are as follows (USFWS 2014f):

- Human-caused modifications from the introduction and spread of nonnative invasive species (Bromus tectorum, Poa bulbosa, and Taeniatherum caputmedusae)
- Modified wildfire regime
- Increased access and fragmentation of habitat by new roads and ORVs
- Agricultural, residential, and commercial development
- Soil and seedbank disturbance by livestock

Management activities that could ameliorate these threats include the following (USFWS 2014e):

- Treatment of nonnative, invasive plant species
- Minimization of ORV access and placement of new roads away from the species and its habitat
- Regulations or agreements to minimize the effects of development in areas where the species resides
- Minimization of livestock use or other disturbances that disturb the soil or seeds
- Minimization of habitat fragmentation

Of the four PCEs of Webber's ivesia critical habitat, topography, and elevation are site characteristics that would not be affected by the proposed LUPA. However, the plant community and soils and hydrology elements can be altered by management activities addressed in the proposed LUPA, including the spread of nonnative, invasive plant species, ORV use, livestock grazing, and surface development.

As described below, only beneficial effects are anticipated for Webber's ivesia critical habitat components.

Nonnative, invasive plant species can affect the plant communities in Webber's ivesia critical habitat through competition and displacement of appropriate associated species, including those plants that attract pollinators. Invasive annual grasses can also contribute fuels that increase the frequency and likelihood of wildfire in Webber's ivesia habitats. However, as described above for effects on Webber's ivesia, the proposed LUPAs include a focus on invasive species management.

Actions VEG 3, VEG-ISM 1, VEG-ISM 2, VEG-ISM 6, and VEG-ISM 7 are presented as substantial conservation measures that may benefit Webber's ivesia habitat by reducing the spread and competition from invasive species. In addition, there is potential for adverse effects

on Webber's ivesia critical habitat (associated species) from herbicide application and other treatments.

The amount and location of possible increases in invasive species treatments due to the proposed LUPA are unknown, and the current proposed action does not authorize site-specific actions. Beneficial and adverse impacts from invasive species treatments are possible from these actions; however, the extent of effects and likelihood of treatment in Webber's ivesia habitats are unknown and are too speculative to quantify at this planning level. Future site-specific analyses of possible effects from invasive species treatments would occur at the project level, including ESA Section 7 consultation if needed, when the details of such actions become available.

ORV use is a threat to Webber's ivesia critical habitat because direct contact can damage or kill associated species. The accompanying soil disturbance can increase erosion and disturb the well-developed argillic horizons that are important in maintaining the seedbank and population recruitment.

With this action, no additional travel or vehicle uses are proposed. In fact, Action CTTM 2 states that "*in travel management plans that have been completed and are being implemented (e.g., Northeastern California plans), continue to limit motorized travel to designated routes in PHMAs and GHMAs. In areas where travel planning has not been completed, limit motorized travel to existing routes in PHMAs and GHMAs until subsequent implementation level travel planning is completed and a designated route system is established.*"

Thus, if any areas of critical habitat for Webber's ivesia in PHMA or GHMA are currently open to ORV use and travel management plans are not completed, vehicles would be restricted to existing routes. This would have a small but contemporaneous beneficial effect on Webber's ivesia critical habitat by reducing the likelihood of damage from ORVs. The benefit from this conservation measure would be realized only in the critical habitat in GHMA (107 acres in the Eagle Lake Field Office and 290 acres in the Sierra Front Field Office). This is because this critical habitat does not exist in PHMA, and the ORV restriction does not apply to OHMA.

Livestock could disturb the argillic soil horizons by trampling designated critical habitats. Grazing can also affect the presence and composition of associated plant species because preferred forage species are generally consumed in greater quantities than those that are not preferred. The proposed LUPA does not include additional livestock uses; it would affect the currently authorized livestock grazing only if GRSG habitat objectives could not be met by current practices.

As described above for effects on Webber's ivesia, several conservation measures could direct changes to grazing operations: Objective LG 1 and Actions LG 1, LG 7, and LG 10. If triggered for implementation, these measures would only reduce the extent of livestock grazing.

However, changes in livestock grazing may not occur as a result of this decision, depending on whether current management is meeting or making progress toward GRSG habitat objectives. Therefore, whether such modifications would take place is unknown and if so, when, where, or how modifications would occur. Beneficial effects from reduced grazing impacts are possible

from these measures, but the extent of benefit and likelihood of occurrence are too speculative to quantify at this programmatic level.

The potential for additional surface development in GRSG habitats is also only expected to decrease as a result of the proposed LUPAs. It is unknown if the restrictions would actually prevent any future developments in Webber's ivesia designated critical habitat, of course, because the locations of future potential developments are unknown. Although beneficial effects are possible from proposed restrictions on additional surface development, the extent of benefit and likelihood of beneficial restrictions are too speculative to quantify at this programmatic level.

There is the potential for future site-specific ground-disturbing actions to have additional indirect effects—those caused by the action but at a later time. However, at this programmatic planning level, these future project actions are currently unknown; it is not reasonably certain that they would occur, and any possible effects are too speculative to evaluate at this time.

All future site-specific projects would include an environmental analysis through the NEPA process and ESA Section 7 consultations. Potential adverse effects on Webber's ivesia would be avoided, minimized, or mitigated through site-specific analysis at the project level.

Cumulative Effects

To evaluate cumulative effects, the future state, tribal, local, or private actions that are reasonably certain to occur in the action area are identified and their effects are added to the anticipated effects of the current proposal. The action area for the current proposal is limited to PHMA, GHMA, OHMA, and SFA on BLM-administered and National Forest system lands. No state, tribal, local, or private lands exist in the action area; only federal actions are expected. Therefore, no cumulative effects are expected.

Summary Determination of Effects on Webber's Ivesia

Adverse effects from the proposed LUPA are highly unlikely. This is due to the focus on protection and enhancement of GRSG habitats, and because additional site-specific analysis and mitigation would occur at the project level. Mostly beneficial effects may result from increased control treatments for nonnative, invasive species and the potential reductions in livestock grazing and surface development. The locations and extent of these actions are unknown, so any possible effects are too speculative to quantify at this programmatic level. Reducing damage to soils and vegetation by restricting vehicles to existing routes (Action CTTM 2) is likely to benefit Webber's ivesia designated critical habitat in GHMA where ORV use is currently allowed.

The Nevada and northeastern California Greater Sage-Grouse Land Use Plan Amendment and Environmental Impact Statement may affect, but would not likely adversely affect, Webber's ivesia designated critical habitat in GHMA in the Eagle Lake and Sierra Front Field Offices. This is because the anticipated effects on the PCEs would be beneficial due to reduced impacts from ORVs on 397 acres. In addition, any possible adverse effects from future ground-disturbing actions would likely be avoided because site-specific analysis would occur at the project level when the details of such actions become available.

There would be no effects on Webber's ivesia designated critical habitat in these areas. This is because no designated critical habitat exists in PHMA, GHMA, OHMA, or SFA in the Alturas, Black Rock, Caliente, Egan, Humboldt River, Mt. Lewis, Schell, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or the Humboldt-Toiyabe National Forest.

DETERMINATIONS OF EFFECTS SUMMARY BY SPECIES

Species	Status[6]	Determination[7]	Rationale
Gray wolf *Canis lupus*	E	NE	The gray wolf would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Caliente, Egan, Schell, Sierra Front, Stillwater, Surprise, Tonopah, or Jarbidge Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest are either outside the range of or are not known to contain suitable habitat for the gray wolf. Similar actions occurring in the Alturas, Eagle Lake, Wells, Black Rock, Humboldt River, Mt. Lewis, and Tuscarora Field Offices or in remote portions of the action area administered by the Bruneau Field Office would not affect the gray wolf or its habitat. This is because there is no evidence indicating the presence of gray wolf populations in or next to the action area. Moreover, none of the conservation measures proposed in the Nevada and Northeastern California GRSG LUPA/EIS would impact wolf-ungulate interactions or the potential for wolf-human interactions. In addition, site-specific NEPA analysis conducted at the project level would provide a determination of effects for gray wolf at that time.

[6] E = Endangered; T = Threatened; P-T = Proposed Threatened
[7] NE = No Effect (would not affect the species); NLJ = Not likely to jeopardize the continued existence of the species; NLAA = May affect, but is not likely to adversely affect; NLDAM = Not likely to result in destruction or adverse modification of proposed critical habitat

Species	Status[6]	Determination[7]	Rationale
Western yellow-billed cuckoo *Coccyzus americanus*	T	NE	The western yellow-billed cuckoo or its habitat would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Eagle Lake, Egan, Mt. Lewis, Schell, Surprise, or Tonopah Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest are either outside the range of or are not known to contain suitable habitat for the western yellow-billed cuckoo. Similar actions in the Black Rock, Caliente, Humboldt River, Sierra Front, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices would not affect the western yellow-billed cuckoo or its habitat. This is because it is unlikely that western yellow-billed cuckoos are breeding in the action area, and the LUPA/EIS contains no actions that would adversely impact riparian areas. Moreover, a site-specific analysis would be conducted at the project level and a determination of effects for the yellow-billed cuckoo would be made at that time.
Western yellow-billed cuckoo critical habitat	Proposed	NLDAM	The Nevada and Northeastern California GRSG LUPA/EIS is not likely to destroy or adversely modify yellow-billed cuckoo proposed critical habitat. This is because there is no overlap between yellow-billed cuckoo proposed critical habitat polygons and PHMA or GHMA in the portions of the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Jarbidge, Bruneau, or Wells Field Offices or in the Humboldt-Toiyabe National Forest occurring in the action area.
Oregon spotted frog *Rana pretiosa*	T	NE	The Oregon spotted frog or its habitat would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest are either outside the range of or are not known to contain suitable habitat for the Oregon spotted frog. Similar actions occurring in the Alturas Field Office or Surprise Field Office would not affect Oregon spotted frog or its habitat because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level; additional determinations of the effects on Oregon spotted frog would be made at that time (see Appendix A).
Oregon spotted frog critical habitat	Proposed	NLDAM	The Nevada and Northeastern California GRSG LUPA/EIS is not likely to destroy or adversely modify Oregon spotted frog proposed critical habitat. This is because there is no overlap between Oregon spotted frog proposed critical habitat polygons and PHMA or GHMA in action area of the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.

Species	Status[6]	Determination[7]	Rationale
Big Spring spinedace *Lepidomeda millispinis pratensis*	T	NE	The Big Spring spinedace would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest are either outside of the range of or are not known to contain suitable habitat for the Big Spring spinedace. Similar actions occurring in the Caliente Field Office would not affect Big Spring spinedace or its habitat. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analysis would occur at the project level. and additional determinations of effects for Big Spring spinedace would be made at that time (see Appendix A).
Big Spring spinedace critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Big Spring spinedace designated critical habitat. Although 50 acres of critical habitat overlap GHMA in the Caliente Field Office, there are no actions in this LUPA decision that would impact aquatic habitat or deplete water in these critical habitats. In addition, site-specific analysis would be conducted at the project level and the effects of Big Spring spinedace critical habitat would be determined at that time. Furthermore, Big Spring spinedace critical habitat does not overlap GRSG habitat on the Alturas, Black Rock, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or the Humboldt-Toiyabe National Forest.
Bull trout *Salvelinus confluentus*	T	NE	The bull trout would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Caliente, Eagle Lake, Egan, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, or Tonopah Field Offices. This is because these field offices do not contain suitable habitat for bull trout. Similar actions in the Black Rock, Humboldt River, Tuscarora, Wells, Jarbidge, or Bruneau Field Office or the Humboldt-Toiyabe National Forest would not affect bull trout. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level and any additional effects for bull trout would be determined at that time (see Appendix A).
Bull trout critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect bull trout designated critical habitat. Three miles of critical habitat overlap PHMA/SFA and 31 miles overlap OHMA (18 miles of which are in SFA) in the Humboldt-Toiyabe National Forest; one acre of critical habitat overlaps OHMA and one acre of critical habitat overlaps PHMA in the Wells Field Office. Nevertheless, there are no actions in this LUPA decision that would impact aquatic habitat or deplete water

Species	Status[6]	Determination[7]	Rationale
			in these critical habitats. In addition, site-specific analysis would be conducted at the project level and the effects for bull trout critical habitat would be determined at that time. Furthermore, there is no designated critical habitat for bull trout in the action area of the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Jarbidge, or Bruneau Field Offices.
Clover Valley speckled dace *Rhinichthys osculus oligoporus*	E	NE	The Clover Valley speckled dace would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for the species. Similar actions in the Tuscarora, Wells, or Jarbidge Field Offices would not affect the Clover Valley speckled dace. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for the Clover Valley speckled dace would be determined at that time (see Appendix A).
Cui-ui *Chasmistes cujus*	E	NE	The cui-ui would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for the cui-ui. Similar actions in the Sierra Front Field Office would not affect cui-ui because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level and additional determinations of effects for cui-ui would be made at that time (see Appendix A).
Desert dace *Eremichthys acros*	T	NE	The desert dace would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS or associated actions in the Alturas, Caliente, Eagle Lake, Egan, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for desert dace. Similar actions occurring in the Black Rock, Jarbidge, or Humboldt River Field Offices would not affect desert dace or its habitat because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and additional the effects for the desert dace would be determined at that time (see Appendix A).
Desert dace critical habitat	Designated		The desert dace's critical habitat would not be affected by the Nevada and

Species	Status[6]	Determination[7]	Rationale
			Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because the portion of the action area in these field offices and national forest does not contain critical habitat for desert dace. Similar actions in the Black Rock Field Office would not affect desert dace critical habitat because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. This is despite there being 874 acres of critical habitat that overlap GHMA, 1,253 acres of critical habitat that overlap OHMA, and 76 acres of critical habitat that overlap PHMA in the Black Rock Field Office. In addition, site-specific analysis would occur at the project level and additional determinations of effects for desert dace critical habitat would be made at that time (see Appendix A).
Hiko White River springfish *Crenichthys baileyi grandis*	E	NE	The Hiko White River springfish would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Surprise, Tonopah, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for desert dace. Similar actions in the Tuscarora Field Office would not affect Hiko White River springfish in the Stillwater Field Office because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and effects for Hiko White River springfish would be determined at that time (see Appendix A).
Hiko White River springfish critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Hiko White River springfish designated critical habitat. This is because there is no designated critical habitat in the action area or in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Independence Valley speckled dace *Rhinichthys osculus*	E	NE	The Independence Valley speckled dace would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for Independence Valley speckled dace. Similar actions in the Tuscarora, Wells, or Jarbidge Field Offices would not affect Independence Valley speckled dace. This is because there are no actions in this LUPA decision

Species	Status[6]	Determination[7]	Rationale
			that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for Independence Valley speckled dace would be determined at that time (see Appendix A).
Lahontan cutthroat trout *Oncorhynchus clarkii henshawi*	T	NE	The Lahontan cutthroat trout would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions on the Alturas, Caliente, Eagle Lake, Egan, Schell, Surprise, Tonopah or Bruneau Field Offices. This is because these field offices do not contain suitable habitat for Lahontan cutthroat trout. Similar actions in the Black Rock, Humboldt River, Mt. Lewis, Sierra Front, Stillwater, Tuscarora, Wells, or Jarbidge or in the Humboldt-Toiyabe National Forest would not affect Lahontan cutthroat trout. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for Lahontan cutthroat trout would be determined at that time (see Appendix A).
Lost River sucker *Deltistes luxatus*	E	NE	The Lost River sucker would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for the Lost River sucker. Similar actions in the Alturas Field would not affect Lost River sucker because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for Lost River sucker would be determined at that time (see Appendix A).
Lost River sucker critical habitat		NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Lost River sucker designated critical habitat in the Alturas Field Office because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. This is in spite of there being 22 miles (506 acres) of Lost River sucker critical habitat overlapping GHMA and 536 acres of critical habitat overlapping PHMA on the Alturas Field Office. In addition, site-specific analyses would occur at the project level, and any effects for Lost River sucker would be determined at that time (see Appendix A). There is no designated critical habitat for the Lost River sucker in the action area in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Modoc sucker *Catostomus microps*	E	NE	The Modoc sucker would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Black Rock, Caliente, Eagle Lake,

Species	Status[6]	Determination[7]	Rationale
			Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah, Tuscarora, Jarbidge, or Wells Field Offices or in the Humboldt-Toiyabe National Forest. This is because the portion of the action area overlapping these field offices and national forest does not contain suitable habitat for Modoc sucker. Similar actions in the Alturas Field Office would not affect Modoc sucker. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for Modoc sucker would be determined at that time (see Appendix A).
Modoc sucker critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Modoc sucker designated critical habitat in the Alturas Field Office because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. This is despite there being 6 miles of Modoc sucker critical habitat overlapping OHMA in the Alturas Field Office. In addition, site-specific analyses would occur at the project level, and the effects for Lost River sucker critical habitat would be determined at that time (see Appendix A). Furthermore, there is no designated critical habitat for the Modoc sucker in the action area in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Pahrump poolfish *Empetrichthys latos*	E	NE	The Pahrump poolfish would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest are either outside the range of or do not contain suitable habitat for the Pahrump poolfish.
Railroad Valley springfish *Crenichthys nevadae*	T	NE	The Railroad Valley springfish would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Humboldt River, Mt. Lewis, Sierra Front, Surprise, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for Railroad Valley springfish. Similar actions in the Egan Field Office, Schell Field Office, Stillwater Field Office, or Tonopah Field Office would not affect Railroad Valley springfish. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for Railroad Valley springfish would be determined at that time (see

Species	Status[6]	Determination[7]	Rationale
			Appendix A).
Railroad Valley springfish critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Railroad Valley springfish designated critical habitat in the Egan and Tonopah Field Offices. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. This is despite there being 55 acres of Railroad Valley springfish critical habitat overlapping GHMA, 7 acres of critical habitat overlapping OHMA on the Egan Field Office, and 284 acres of critical habitat overlapping OHMA in the Tonopah Field Office. In addition, site-specific analysis would occur at the project level, and the effects for Railroad Valley springfish critical habitat would be determined at that time (See Appendix A). Furthermore, there is no designated critical habitat for Railroad Valley springfish in the action area in the Alturas, Black Rock, Caliente, Eagle Lake, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Wells, Jarbidge or Bruneau Field Offices, or the Humboldt-Toiyabe National Forest.
Shortnose sucker *Chasmistes brevirostris*	E	NE	The shortnose sucker would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for shortnose sucker. Similar actions in the Alturas Field Office would not affect shortnose sucker because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for shortnose sucker would be determined at that time (see Appendix A).
Shortnose sucker critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect shortnose sucker designated critical habitat in the Alturas Field Office because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. This is despite there being 41 miles (519 acres) of shortnose sucker critical habitat overlapping GHMA, 20 miles (150 acres) of critical habitat overlapping OHMA, and 536 acres of critical habitat overlapping PHMA in the Alturas Field Office. In addition, site-specific analysis would occur at the project level and additional determinations of effects for shortnose sucker critical habitat would be made at that time (See Appendix A). Furthermore, there is no designated critical habitat for shortnose sucker in the action area in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Warm Springs pupfish *Cyrpinodon*	E	NE	The Warm Springs pupfish would not be affected by the Nevada and Northeastern

Species	Status[6]	Determination[7]	Rationale
nevadensis pectoralis			California GRSG LUPA/EIS and associated actions occurring in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest are either outside the range of or do not contain suitable habitat for the Warm Springs pupfish.
Warner sucker *Catostomus warnerensis*	T	NE	The Warner sucker would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Tonopah, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for Warner sucker. Similar actions in the Surprise Field Office would not affect Warner sucker because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for Warner sucker would be determined at that time (see Appendix A).
White River spinedace *Lepidomeda albivalis*	E	NE	The White River spinedace would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions on the Alturas, Black Rock, Caliente, Eagle Lake, Humboldt River, Mt. Lewis, Sierra Front, Stillwater, Surprise, Tonopah, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for White River spinedace. Similar actions in the Egan and Schell Field Offices would not affect White River spinedace because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for White River spinedace would be determined at that time (see Appendix A).
White River spinedace critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect White River spinedace designated critical habitat in the Egan and Schell Field offices. This is because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. This is despite there being 24 acres of White River spinedace critical habitat overlapping GHMA in the Egan Field Office and 5 acres of critical habitat overlapping GHMA in the Schell Field Office. In addition, site-specific analysis would occur at the project level; the effects for the White River spinedace critical habitat would be determined at that time (see Appendix A). Furthermore, there is no designated critical habitat for the White River spinedace in the action area in the Alturas, Black Rock, Caliente, Eagle Lake, Humboldt River, Mt. Lewis, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge

Species	Status[6]	Determination[7]	Rationale
			or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
White River springfish *Crenichthys baileyi baileyi*	E	NE	The White River springfish would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Surprise, Tonopah, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for White River springfish. Similar actions in the Stillwater Field Office would not affect White River springfish because there are no actions in this LUPA decision that would divert water to or otherwise impact aquatic habitat. In addition, site-specific analyses would occur at the project level, and any effects for White River springfish would be determined at that time (see Appendix A).
White River springfish critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect White River springfish designated critical habitat. This is because there is no designated critical habitat for White River springfish in the action area in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Carson wandering skipper *Pseudocopaeodeseunus obscurus*	E	NE	The Carson wandering skipper would not be affected by the Nevada and Northeastern California GRSG LUPA/EIS and associated actions in the Caliente, Egan, Mt. Lewis, Schell, Stillwater, Tuscarora, Wells, Jarbidge, and Bruneau Field Offices and in the Humboldt-Toiyabe National Forest. This is because these field offices and national forest do not contain suitable habitat for the Carson wandering skipper. Similar actions in the Sierra Front, Stillwater, Eagle Lake, Surprise Alturas, Black Rock, or Humboldt River Field Offices would not affect the Carson wandering skipper or its habitat. This is because there are no actions in this LUPA that would impact riparian or mesic habitat or cause water depletions to affect the vegetation around such habitat. In addition, site-specific analyses would occur at the project level, and any effects for Carson wandering skipper would be determined at that time (see Appendix A).
Vernal pool fairy shrimp *Branchinecta lynchi*	T	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect vernal pool fairy shrimp because it does not occur in the action area or in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbridge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Vernal pool fairy shrimp critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect vernal pool fairy shrimp designated critical habitat because there is no designated critical habitat for it in the action area or in the Alturas, Black Rock, Caliente, Eagle Lake,

Species	Status[6]	Determination[7]	Rationale
			Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbridge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.
Gentner's fritillary *Fritillaria gentneri*	E	NE	The range of Gentner's fritillary is limited to in about a 30-mile radius of Jacksonville, Oregon. Because PHMA, GHMA, OHMA, and SFA are at least 75 miles away, Gentner's fritillary is not suspected to occur in the action area, and therefore the Nevada and Northeastern California GRSG LUPA/EIS Statement would not affect Gentner's fritillary.
Greene's tuctoria *Tuctoria greenei*	E	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Greene's tuctoria because there are no occurrences or suitable habitat for it in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. There is no overlap between Greene's tuctoria occurrences or suitable habitat and PHMA, GHMA, OHMA, or SFA in the Alturas Field Office in the action area.
Greene's tuctoria critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect Greene's tuctoria designated critical habitat. This is because there is no designated critical habitat for it in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. There is no overlap between Greene's tuctoria critical habitat and PHMA, GHMA, OHMA, and SFA in the Alturas Field Office in the action area.
Slender Orcutt grass *Orcuttia tenuis*	T	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect slender orcutt grass because there are no occurrences or suitable habitat for it in the Black Rock, Caliente, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. There is no overlap between slender orcutt grass or suitable habitat and PHMA, GHMA, OHMA, or SFA in the Alturas or Eagle Lake Field Offices in the action area.
Slender Orcutt grass critical habitat	Designated	NE	The Nevada and Northeastern California GRSG LUPA/EIS would not affect slender orcutt grass designated critical habitat because there is no designated critical habitat for it in the Black Rock, Caliente, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. There is no overlap between slender orcutt grass critical habitat and PHMA, GHMA, OHMA, or SFA in the portions of the Alturas or Eagle Lake Field Offices occurring in the action area.
Webber's ivesia *Ivesia webberi*	T	NLAA	The Nevada and Northeastern California GRSG LUPA/EIS may affect, but would not likely adversely affect, Webber's ivesia. This is because the anticipated effects

Species	Status[6]	Determination[7]	Rationale
			on the species and potentially suitable habitat in PHMA, GHMA, OHMA, or SFA in the Eagle Lake and Sierra Front Field Offices would be beneficial, due to the reduced impacts from ORVs. In addition, any possible adverse effects from future ground-disturbing actions would likely be avoided. This is because site-specific analysis would occur at the project level when the details of such actions become available. Because no suitable habitat is suspected to occur in PHMA, GHMA, OHMA, or SFA in the Alturas, Black Rock, Caliente, Egan, Humboldt River, Mt. Lewis, Schell, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices, or the Humboldt-Toiyabe National Forest, there would be no effects on Webber's ivesia.
Webber's ivesia critical habitat	Designated	NLAA	The Nevada and Northeastern California GRSG LUPA/EIS may affect, but would not likely adversely affect, Webber's ivesia designated critical habitat in GHMA in the Eagle Lake and Sierra Front Field Offices. This is because the anticipated effects on the PCEs would be beneficial due to reduced impacts from ORVs on 397 acres. In addition, any possible adverse effects from future ground-disturbing actions would likely be avoided because site-specific analysis would occur at the project level when the details of such actions become available. There would be no effects on Webber's ivesia designated critical habitat in these areas. This is because no designated critical habitat exists in PHMA, GHMA, OHMA, or SFA in the Alturas, Black Rock, Caliente, Egan, Humboldt River, Mt. Lewis, Schell, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.

LITERATURE CITED

NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life. Version 7.1. NatureServe, Arlington, Virginia. Internet website: http://explorer.natureserve.org.

NNHD. 2014. Nevada Natural Heritage Program. Department of Conservaqtion and Natural Resources. Natural Heritage Database. Accessed 9/2014. http://heritage.nv.gov/

USFWS. 1998. Endangered Species Consultation Handbook. U. S. Fish and Wildlife Service and National Marine Fisheries Service

_____.2008. Programmatic Biological Opinion, Informal Consultation, and Technical Assistance for Implementation of Actions Proposed in the Ely Proposed Resource Management Plan, Lincoln, White Pine, and Portions of Nye Counties, Nevada. Nevada Fish and Wildlife Service, Las Vegas, Nevada.

_____. 2013a. Endangered and threatened wildlife and plants; Designation of Critical Habitat for the Oregon Spotted Frog; Proposed Rule. *Federal Register* (78)168:53538-53579. August 29, 2013.

_____. 2013b. Endangered and threatened wildlife and plants; proposed threatened status for the western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*); proposed rule. *Federal Register* (78)192:61622-61666. October 3, 2013.

_____. 2013c. Endangered and threatened wildlife and plants; removing the gray wolf (*Canis lupus*) from the list of endangered and threatened wildlife and maintaining protections for the Mexican Wolf (*Canis lupus baileyi*) by listing it as endangered. *Federal Register* (78)114:35664-35719. June 13, 2013.

_____. 2014a. Endangered and threatened wildlife and plants; threatened species status for *Ivesia webberi*. *Federal Register* Vol. 79, No. 106:31878-31883. June 3, 2014.

_____. 2014b. Endangered and threatened wildlife and plants; threatened species status for Oregon spotted frog. *Federal Register* Vol. 79, No. 168. August 29, 2014.

_____. 2014c. Endangered and threatened wildlife and plants; designation of critical habitat for the western distinct population segment of the yellow-billed cuckoo; proposed rule. *Federal Register* Vol. 79, No. 158:48548-48652. August 15, 2014.

_____. 2014d. Endangered and threatened wildlife and plants; determination of threatened status for the western distinct population segment of the yellow-billed cuckoo (*Coccyzus*

americanus); Final Rule. *Federal Register* Vol. 79, No. 192:59992-60038. October 3, 2014.

_____. 2014e. Endangered and threatened wildlife and plants; designation of critical habitat for *Ivesia webberi*; final rule. *Federal Register* Vol. 79, No. 106:32126-32155. June 3, 2014.

_____. 2014f. Species report for *Ivesia webberi* (Webber's ivesia). Nevada Fish and Wildlife Office, Las Vegas, Nevada. January 8, 2014. Pp. 22-32.

Witham, C. 2000. Current Knowledge and Conservation Status of *Ivesia webberii* Gray (Rosaceae), the Webber Ivesia, in Nevada. Status report prepared for the Nevada Natural Heritage Program and US Fish and Wildlife Service.

APPENDIX A: ADDITIONAL RATIONALE BEHIND NO EFFECT DETERMINATIONS FOR SELECT SPECIES OREGON GROUPS OF SPECIES IN TABLES 1 AND 2

Gray Wolf

Environmental baseline, proposed critical habitat, and threats

The gray wolf has been documented in the Alturas and Eagle Lake Field Offices. Based on anecdotal information alone, it is suspected to occur in the Wells Field Office. Suitable habitat is present on the Black Rock, Humboldt River, and Tuscarora Field Offices, and in remote, Nevada action area lands administered by the Bruneau Field Office. Suitable habitat may be present in the Mt. Lewis Field Office.

The gray wolf is listed as endangered in the California and Nevada, although critical habitat has not been proposed or designated for the species. On December 28, 2011, a 2 ½-year old male gray wolf, referred to as Oregon-7, entered California from northeast Oregon; however, the gray wolf uses areas primarily in northeastern Oregon. This dispersal behavior was typical of wolves the age of Oregon-7. Wolves historically inhabited California before extirpation. The last confirmed sighting in California, before Oregon-7, was in 1924. Oregon-7 traveled through several northern California counties, including Modoc and Lassen, where the Alturas and Eagle Lake BLM Field Offices are located, between December 2011 and April 2013, before returning to Oregon on April 23, 2013.

In June, the Oregon USFWS confirmed the existence of two gray wolf pups in the Cascade Mountains of southwestern Oregon. A month later, remote trail cameras captured Oregon-7, his mate, and the growing pups.

The USFWS has proposed removing the gray wolf from the threatened and endangered species list (USFWS 2013c).

Discussion and determination

The Nevada and Northeastern California GRSG LUPA/EIS would not affect the gray wolf. Key things to consider when evaluating effects on wolves are those on wolf populations, wolf-ungulate interactions, and the potential for wolf-human interactions. Recent wolf sightings in California are limited to dispersing individuals. No den or rendezvous sites indicating the presence of breeding pairs[8] or packs[9] have been identified to date in or near the action area. Therefore, there is no evidence indicating the presence of gray wolf populations in or next to the action area.

[8]An adult male and an adult female wolf that have produced at least two pups that survived to December 31 of the year of their birth, during the previous breeding season.

[9]A group of wolves, usually consisting of a male, female and their offspring from one or more generations. For purposes of monitoring, a pack may be defined as a group of four or more wolves traveling together in winter. Ongoing and future wolf research may refine this definition for monitoring purposes.

> The US Court of Appeals for the Tenth Circuit found that "by definition lone dispersers do not constitute a population or even part of a population, since they are not 'in common spatial arrangement' sufficient to interbreed with other members of a population" (Wyoming Farm Bureau Federation v. Babbitt, 199 F.3d 1224, 1234 [10th Cir. 2000]). The Court of Appeals for the Ninth Circuit held that, despite "sporadic sightings of isolated indigenous wolves in the release area [a gray wolf reintroduction site], lone wolves, or 'dispersers,' do not constitute a population" under the Endangered Species Act (US v. McKittrick, 142 F. 3d 1170, 1175 (9th Cir.), cert. denied, 525 US 1072[(1999]). Thus, the courts have upheld our interpretation that a "population" must include two or more breeding pairs (USFWS 2013c).

None of the conservation measures proposed in the Nevada and Northeastern California GRSG LUPA/EIS would impact wolf-ungulate interactions or the potential for wolf-human interactions. Because gray wolves are highly mobile and population expansion continues in Oregon and Idaho, there is potential for future occurrence of the species in the action area. In the event that future wolf distribution overlaps sage-grouse PHMA and GHMA in the action area, site-specific NEPA analysis conducted at the project level would provide a determination of effects for gray wolf at that time.

Western yellow-billed cuckoo and proposed critical habitat

Environmental baseline, proposed critical habitat, and threats

The western distinct population segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus*) was federally listed as threatened by the USFWS on October 3, 2014; the ruling became effective November 3, 2014 (USFWS 2014d). Critical habitat for the western DPS of the yellow-billed cuckoo was proposed on August 15, 2014 (USFWS 2014c); the Nevada and Northeastern California GRSG LUPA/EIS action area does not contain proposed critical habitat for the western yellow-billed cuckoo. The species requires large blocks of riparian woodlands in low to moderate elevation arid to semiarid landscapes.

The western yellow-billed cuckoo is not known in or suspected to be present in the following units in the action area: Alturas Field Office, Eagle Lake Field Office, Egan Field Office, Mt. Lewis Field Office, Schell Field Office, Surprise Field Office, and Tonopah Field Office and in the Humboldt-Toiyabe National Forest. The Stillwater Field Office includes portions of Mineral and Lyon Counties. There are no Nevada Department of Wildlife or Nevada Natural Heritage Program records of yellow-billed cuckoo sightings in Mineral County, and there is no known suitable habitat. Yellow-billed cuckoo has been documented on Bureau of Reclamation-administered land along the Carson River in Lyon County, Nevada, but there are no known occurrences or suitable habitat for BLM-administered lands in Lyon County.[10] The western yellow-billed cuckoo is not known in or suspected to be present in the Black Rock and Humboldt River Field Offices. However, gallery cottonwood forests may be present at high elevations.

[10]Chris Kula, Stillwater Field Office Wildlife Biologist, personal communication with Katherine Malengo (USFS Wildlife Biologist), August 18, 2014.

There is one documented sighting, on June 24, 1986, on the adjacent Sheldon National Wildlife Refuge.

The western yellow-billed cuckoo is documented in the Sierra Front Field Office. Based on the USFWS Proposed Rule, Nevada Natural Heritage Program data, and discussions with the Great Basin Bird Observatory, the only recent persistent sightings in the Sierra Front Field Office have been in the Lahontan Reservoir area.[11]

Suitable habitat for the yellow-billed cuckoo is present in the Tuscarora and Wells Field Offices (Elko District Office), but preferred cottonwood gallery habitat is absent. In the District Office, the species is considered a seasonal migrant. An accidental sighting (in ornamental trees near the office) is known from the adjacent Ruby National Wildlife Refuge, but there are no recorded observations in the Elko District Office.[12]

The yellow-billed cuckoo is suspected to be present in the Caliente Field Office. Based on information contained in the biological opinion for the 2008 Ely District Office RMP (USFWS 2008), western yellow-billed cuckoos are known to occur in Pahranagat Valley and along the Meadow Valley Wash in Lincoln County. Nesting has not been documented, but comprehensive surveys, particularly in Pahranagat Valley, are limited by inaccessibility to private lands where much of the habitat occurs. Yellow-billed cuckoos have been detected north of Elgin along the Meadow Valley Wash, on the Pahranagat National Wildlife Refuge, and on private lands north of the refuge in Pahranagat Valley.

The existing biological opinion contains the following proposed management actions that may benefit the western yellow-billed cuckoo:

VEG-23: Promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, in order to provide for stable water flow and bank stability.
VEG-24: Focus management actions on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat.
WL-1: Emphasize management of priority habitats for priority species.
WL-4: Mitigate all discretionary permitted activities that result in the loss of aquatic and priority wildlife habitats by improving 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis.
WL-16: When planning projects, consider migratory birds, as appropriate, to minimize take and limit impacts.
WL-17: Work with the Service, NDOW, and other partners (e.g., Great Basin Bird Observatory, Partners in Flight) to conduct breeding bird surveys to document the population status and trends of those migratory bird species of concern.

11Pilar Ziegler, Sierra Front Field Office Wildlife Biologist, personal communication with Katherine Malengo (USFS Wildlife Biologist), August 5, 2014.

[12]Cam Collins, Wells Field Office Wildlife Biologist, personal communication with Katherine Malengo (USFS Wildlife Biologist), August 31, 2014.

SS-2: Develop and implement an interagency inventory and monitoring program for species status plant and animal species.
SS-20: Limit livestock grazing in the Lower Meadow Valley Wash area of critical environmental concern (ACEC) through terms and conditions and/or season-of-use restrictions on grazing permits in accordance with a site-specific ACEC plan.
LR-2: Retain lands in ACECs.

Additional management recommendations for the western yellow-billed cuckoo in the biological opinion are the following:

1. Avoid the authorization of actions that would promote or contribute to declines in surface and ground water resources.
2. Avoid disposal of BLM-administered lands that contain riparian areas.
3. On completion of salt cedar removal projects in the Meadow Valley Wash, revegetate project sites with native riparian plant species to ensure no net loss of large woody riparian vegetation.

In the northern portion of Nevada administered by the Jarbidge Field Office, suitable habitat for the yellow-billed cuckoo is present on private land just north of the forest boundary on the Jarbidge River north of Jarbidge, Nevada. A single observation is reported from near Murphy Hot Springs, Idaho, just north of the action area, in late summer. Nesting is undocumented on BLM-administered lands in the action area; cottonwood gallery forests are very limited on BLM-administered lands.

It is unknown if there is suitable habitat for the yellow-billed cuckoo in the Bruneau Field Office, but it is expected to be absent. There is one documented sighting of a pair on Battle Creek on June 23, 1996; otherwise, the next nearest observations are along Snake River, which is not in Bruneau Field Office.

The primary threats to the yellow-billed cuckoo result from habitat destruction, modification, and degradation from dam construction and operations; water diversions; river flow management; stream channelization and stabilization; land conversion to agriculture; urban and transportation infrastructure; and increased incidence of wildfire (USFWS 2013b).

Discussion and Determination

The Nevada and Northeastern California GRSG LUPA/EIS decision would not affect the yellow-billed cuckoo or its proposed critical habitat; based on known habitat affinities and PCEs, it is unlikely that western yellow-billed cuckoos are breeding in the action area. In addition, the following BLM objectives and actions in the Proposed Plan are consistent with the proposed management actions in the biological opinion for the 2008 Ely District Office RMP (USFWS 2008):

- Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g., range, wildlife, and riparian).
- Manage riparian areas in PHMAs and GHMAs for vegetation composition and structure consistent with ecological site potential and to achieve GRSG habitat objectives.

- Manage upland habitat associated with riparian areas to promote cover relative to site potential to facilitate GRSG brood-rearing habitat.
- Manage to restore riparian function and meet GRSG habitat where riparian function has been compromised or lost.
- Inventory, monitor, and control invasive species in riparian and wet meadow areas in PHMAs and GHMAs.
- Design and implement vegetation treatments in PHMAs and GHMAs to restore, enhance, and maintain riparian areas.
- Consider an array of vegetation treatments to increase edge and expand mesic areas in PHMAs and GHMAs where riparian extent is limited by shrub encroachment.
- Manage lotic riparian habitats in conjunction with adjacent terraces and valley bottoms as natural fuel breaks to reduce size and frequency of wildfires in PHMAs and GHMAs.
- The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary before renewal, and (2) the processing of grazing permits/leases in SFAs followed by PHMAs outside of the SFAs. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. If results from a land health assessment indicate that GRSG habitat objectives are not met in SFAs, PHMAs and GHMAs, and grazing is a contributing factor, and until appropriate modifications are incorporated through the permit renewal process, implement management strategies that may include but are not limited to: Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows; Removing livestock in 3-7 days for the remainder of the grazing year once the allowable use levels are reached [In riparian areas and wet meadows the allowable percent utilization is 35 percent woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site].
- Allotments in SFAs, followed by those in PHMAs, and focusing on those containing riparian areas, including wet meadows, would be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.
- Grazing management strategies for riparian areas and wet meadows would, at a minimum, maintain or achieve Proper Functioning Condition (PFC) and promote GRSG brood-rearing habitat objectives in PHMAs and GHMAs.
- Existing water development projects would be modified to ensure riparian habitats in PHMAs and GHMAs are being maintained or improved in compliance with valid existing rights and in accordance with state water law.
- Salting and supplemental feeding locations, temporary or mobile watering, and new handling facilities (e.g., corrals and chutes) would be located at least 1 mile from riparian areas, springs, and meadows.
- Livestock ponds built in perennial channels that are negatively impacting riparian habitats, either directly or indirectly, would be removed unless riparian access is able to be controlled and negative impacts effectively mitigated (e.g.; water gap fence to pond); new ones would not be permitted to be built in these areas subject to valid existing rights. Before pond removal, offsite watering options would be examined and considered.

These objectives and actions would be expected to improve riparian habitat. Additionally, they would include Forest Service desired conditions and guidelines for riparian areas that would ensure the following:

- Sustain forbs in brood rearing habitat, wet meadows, and riparian areas
- Authorize vegetative treatment activities only in lentic riparian areas (i.e., seeps, springs, and wet meadows) in PHMA, GHMA, and SFA that maintain or improve conditions to meet GRSG desired conditions
- Restrict road construction in riparian areas and mesic meadows in PHMA and SFA

However, it is too speculative at this time to determine whether these types of improvements would actually be realized and the degree to which they could benefit the western yellow-billed cuckoo or its habitat.

Also recognized is that cuckoos have been found in habitat considered anomalous, and in order to make certain that these circumstances are appropriately recognized and considered, site-specific analysis would be conducted at the project level and the effects for the yellow-billed cuckoo and its proposed critical habitat would be determined at that time.

Oregon spotted frog and proposed critical habitat

Environmental Baseline, proposed critical habitat, and threats

The USFWS listed the Oregon spotted frog as a threatened species on September 29, 2014 (USFWS 2014b); it proposed critical habitat designation on August 29, 2013a (USFWS 2013). The Nevada and Northeastern California GRSG LUPA/EIS action area does not contain proposed critical habitat for the Oregon spotted frog. Threats to the species are loss of wetland habitat, changes in hydrology due to dam construction and human-related alterations of seasonal flooding, nonnative plant and animal species introduction, vegetation succession and encroachment, poor water quality, livestock grazing (in some circumstances), and residential and commercial development (USFWS 2014b). Livestock graze in Oregon spotted frog habitat, although the effects vary with the site conditions, livestock numbers, timing, and intensity. Livestock (primarily horses and cows) can trample adult frogs and egg masses when livestock are allowed in shallow water habitat when frogs are present. Livestock graze and trample emergent and riparian vegetation, compact soil in riparian and upland areas, and reduce bank stability, which increases sedimentation and pollutes water with urine and feces (USFWS 2014b).

The Alturas and Surprise Field Offices contain suitable habitat for the Oregon spotted frog; suitable habitat is not found in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Tuscarora, Tonopah, Wells, Jarbidge, and Bruneau Field Offices and the Humboldt-Toiyabe National Forest.

Discussion and Determination

The Oregon spotted frog and its proposed critical habitat would not be affected by this project. There are no actions in this LUPA decision that would impact aquatic habitat or deplete water in an action area that contains proposed critical habitat for the Oregon spotted frog. In addition, site-specific analysis would be conducted at the project level and a determination of effects for

Oregon spotted frog would be made at that time. Therefore, the Nevada and Northeastern California GRSG LUPA/EIS would not affect the Oregon spotted frog or its proposed critical habitat.

Fishes (Big Spring spinedace, bull trout, Clover Valley speckled dace, cui-ui, desert dace, Hiko White River springfish, Independence Valley speckled dace, Lahontan cutthroat trout, Lost River sucker, Modoc sucker, Pahrump poolfish, Railroad Valley springfish, shortnose sucker, Warm springs pupfish, Warner sucker, White River spinedace, White River springfish)

Environmental baseline, proposed critical habitat, and threats

Big Spring spinedace are not known in or suspected to be present in the Alturas, Black Rock, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Fifty-one acres of critical habitat overlap GHMA in the Caliente Field Office (Figure 1). Big Spring spinedace are suspected to occur in PHMA or GHMA in the Caliente Field Office, based on the proximity of known populations to PHMA and GHMA and overlap of Big Spring spinedace critical habitat with GHMA.

Bull trout have been documented in the Tuscarora, Wells, and Bruneau Field Offices and the Humboldt-Toiyabe National Forest. They are not known in or suspected to be present in the Alturas, Caliente, Eagle Lake, Egan, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, or Tonopah Field Offices. It is unknown if they occur in or suitable habitat is present in the Black Rock, Humboldt River, and Jarbidge Field Offices. Three miles of bull trout critical habitat overlap PHMA in the Humboldt-Toiyabe National Forest (Figure 2), all of which is in SFA (Figure 3). Thirty-one miles of critical habitat overlap OHMA in the Humboldt-Toiyabe National Forest (Figure 2), 18 miles of which are in SFA (Figure 3). One mile of bull trout critical habitat overlaps PHMA and 1 mile of critical habitat overlaps OHMA in the Wells Field Office (Figure 2).

Clover Valley speckled dace have been documented in the Tuscarora and Wells Field Offices. It is not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. It is unknown if they occur in or suitable habitat is present in the Jarbidge Field Office. Critical habitat has not been designated or proposed for the Clover Valley speckled dace.

Cui-ui have been documented in the Sierra Front Field Office. They are not known or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Critical habitat has not been designated or proposed for cui-ui.

Desert dace have been documented in the Black Rock Field Office and they are suspected to occur in the Jarbidge Field Office. They are not known or suspected to be present on the Alturas, Caliente, Eagle Lake, Egan, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. It is

unknown if they occur in or suitable habitat is present in the Humboldt River Field Office. There is no designated desert dace critical habitat occurring in the action area in the Alturas, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. GIS analysis shows 874 acres of critical habitat overlap GHMA, 1,253 acres of critical habitat overlap OHMA, and 76 acres of PHMA overlap critical habitat in the Black Rock Field Office (Figure 4).

Hiko White River springfish have been documented in the Stillwater Field Office. They are not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. There is no overlap of Hiko White River critical habitat with GRSG habitat in the BLM or Forest Service action area for the LUPA/EIS.

Independence Valley speckled dace have been documented in the Tuscarora and Wells Field Offices. They are not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tonopah, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. It is unknown if the species occurs in or suitable habitat for it is present in the Jarbidge Field Office. Critical habitat has not been designated or proposed for Independence Valley speckled dace.

Lahontan cutthroat trout dace have been documented in the Black Rock, Humboldt River, Mt. Lewis, Sierra Front, Stillwater, Tuscarora, Wells, and Jarbidge Field Offices and in the Humboldt-Toiyabe National Forest. They are not known in or suspected to be present in the Alturas, Caliente, Eagle Lake, Egan, Schell, Surprise, Tonopah, or Bruneau Field Offices. Critical habitat has not been designated or proposed for Lahontan cutthroat trout.

Lost River suckers have been documented in the Alturas Field Office. They are not known in or suspected to be present in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Twenty-two miles (506 acres) of critical habitat overlap GHMA and 536 acres of critical habitat overlap PHMA in the Alturas Field Office (Figure 5).

Modoc suckers have been documented in the Alturas Field Office. They are not known in or suspected to be present in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Six miles of Modoc sucker critical habitat overlap OHMA in the Alturas Field Office (Figure 6).

Pahrump poolfish are not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Critical habitat has not been designated or proposed for Pahrump poolfish.

Railroad Valley springfish have been documented in the Stillwater and Tonopah Field Offices and are suspected to occur in the Egan and Schell Field Offices. They are not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Humboldt River, Mt. Lewis, Sierra Front, Surprise, Tuscarora, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Fifty-five acres of Railroad Valley springfish critical habitat overlap GHMA; 7 acres of critical habitat overlap OHMA in the Egan Field Office (Figure 7); 284 acres of critical habitat overlap OHMA on the Tonopah Field Office (Figure 7).

Shortnose suckers have been documented in the Alturas Field Office. They are not known in or suspected to be present in the Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Forty-one miles (519 acres) of shortnose sucker critical habitat overlap GHMA, 20 miles (150 acres) of critical habitat overlap OHMA, and 536 acres of critical habitat overlap PHMA in the Alturas Field Office (Figure 8).

Warm Springs pupfish is not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Critical habitat has not been designated or proposed for Warm Springs pupfish.

Warner suckers have been documented in the Surprise Field Office. The species is not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Critical habitat has not been designated or proposed for the Warner sucker.

White River Spinedace are either documented in or are suspected to occur in the Egan and Schell Field Offices. They are not known or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Humboldt River, Mt. Lewis, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. Twenty-four acres of White River spinedace critical habitat overlap GHMA in the Egan Field Office and 5 acres of critical habitat overlap GHMA in the Schell Field Office (Figure 9).

White River springfish have been documented in the Stillwater Field Office. The species is not known in or suspected to be present in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest. There is no designated critical habitat for White River springfish in the action area or in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.

The primary threat to these species is habitat modification and degradation from water diversion. Secondary threats are competition and predation from exotic aquatic species and riparian habitat degradation from livestock grazing, timber harvest, and road construction.

Discussion and determination

Listed fish species would not be affected by this project. There are no actions in this LUPA decision that would impact aquatic habitat or deplete water. In addition, site-specific analysis would be conducted at the project level, and the effects for each of the listed fish species would be determined at that time. Therefore, the Nevada and Northeastern California GRSG LUPA/EIS would not affect the Big Spring spinedace, bull trout, Clover Valley speckled dace, cui-ui, desert dace, Hiko White River springfish, Independence Valley speckled dace, Lahontan cutthroat trout, Lost River sucker, Modoc sucker, Pahrump poolfish, Railroad Valley springfish, shortnose sucker, Warm Springs pupfish, Warner sucker, White River spinedace, White River springfish, or their habitat.

Big Spring spinedace, bull trout, desert dace, Hiko White River springfish, Lost River sucker, Modoc sucker, Railroad Valley springfish, shortnose sucker, White River spinedace and White River springfish critical habitats

Baseline information is found above in the fishes section for Big Spring spinedace, bull trout, desert dace, Hiko White River springfish, Lost River sucker, Modoc sucker, Railroad Valley springfish, shortnose sucker, White River spinedace, and White River springfish. The Nevada and Northeastern California GRSG LUPA/EIS would not affect critical habitat for Hiko White River springfish or White River springfish because there is no designated critical habitat for these species in the action area or in the Alturas, Black Rock, Caliente, Eagle Lake, Egan, Humboldt River, Mt. Lewis, Schell, Sierra Front, Stillwater, Surprise, Tuscarora, Tonopah, Wells, Jarbidge, or Bruneau Field Offices or in the Humboldt-Toiyabe National Forest.

GRSG habitats overlap critical habitats for Big Spring spinedace, bull trout, desert dace, Lost River sucker, Modoc sucker, Railroad Valley springfish, shortnose sucker, and White River spinedace; however, as noted above, none of the actions in this LUPA decision would impact aquatic habitat or deplete water in these critical habitats. In addition, site-specific analysis would be conducted at the project level, and the effects for critical habitat for each of the listed fish species would be determined at that time. Therefore, the Nevada and Northeastern California GRSG LUPA/EIS would not affect critical habitat for the Big Spring spinedace, bull trout, desert dace, Lost River sucker, Modoc sucker, Railroad Valley springfish, shortnose sucker, or White River spinedace.

Carson wandering skipper

Environmental baseline, proposed critical habitat, and threats

Carson wandering skipper has been recorded in the action area in the Sierra Front Field Office; the Stillwater, Eagle Lake, Surprise Field Offices in northwestern Nevada contain suitable habitat for this species as well. The Stillwater Field Office has an ACEC in Warm Springs Valley for this species, although it is not in GRSG habitat, either PHMA or GHMA. It is unknown whether the Carson wandering skipper or suitable habitat is present in the Alturas, Black Rock, or Humboldt River Field Offices. The Caliente, Egan, Mt. Lewis, Schell, Stillwater,

Tuscarora, Wells, Jarbidge, and Bruneau Field Offices and the Humboldt-Toiyabe National Forest do not contain suitable habitat for the Carson wandering skipper.

This species is known from only two populations, one in Washoe County, Nevada, and one in Lassen County, California. The species is found in lowland grassland habitats on alkaline substrates characterized by an elevation of less than 5,000 feet. Salt grass is its larval host plant, and it occurs where the water table is high enough to keep the roots saturated for most of the year. Indeed, suitable habitat is very likely related to the water table, requiring higher areas during wet years and lower areas during dry years. Available nectar is an important habitat element as well as the density of local conspecifics. Hot springs may be important habitat elements. A nectar source, such as *Thelypodium crispum*, that is tolerant of alkaline soils must be present or nearby (NNHD2014).

Threats are loss of suitably wet habitat to increasing human water demands, exotics, and possibly collecting. The sites where viable populations are still found are at risk because of livestock grazing, ORV use, encroaching development, gas and geothermal development, changes in the water table, pesticide drift, and nonnative plant invasion.

Discussion and determination

Carson wandering skipper would not be affected by this project. There are no actions in this Nevada and Northeastern California GRSG LUPA/EIS decision that would impact riparian or mesic habitat or deplete water to affect the vegetation around such habitat. In addition, site-specific analysis would be conducted at the project level, and the effects for the listed species would be determined at that time. Therefore, the Nevada and Northeastern California GRSG LUPA/EIS would not affect the Carson wandering skipper or its habitat.

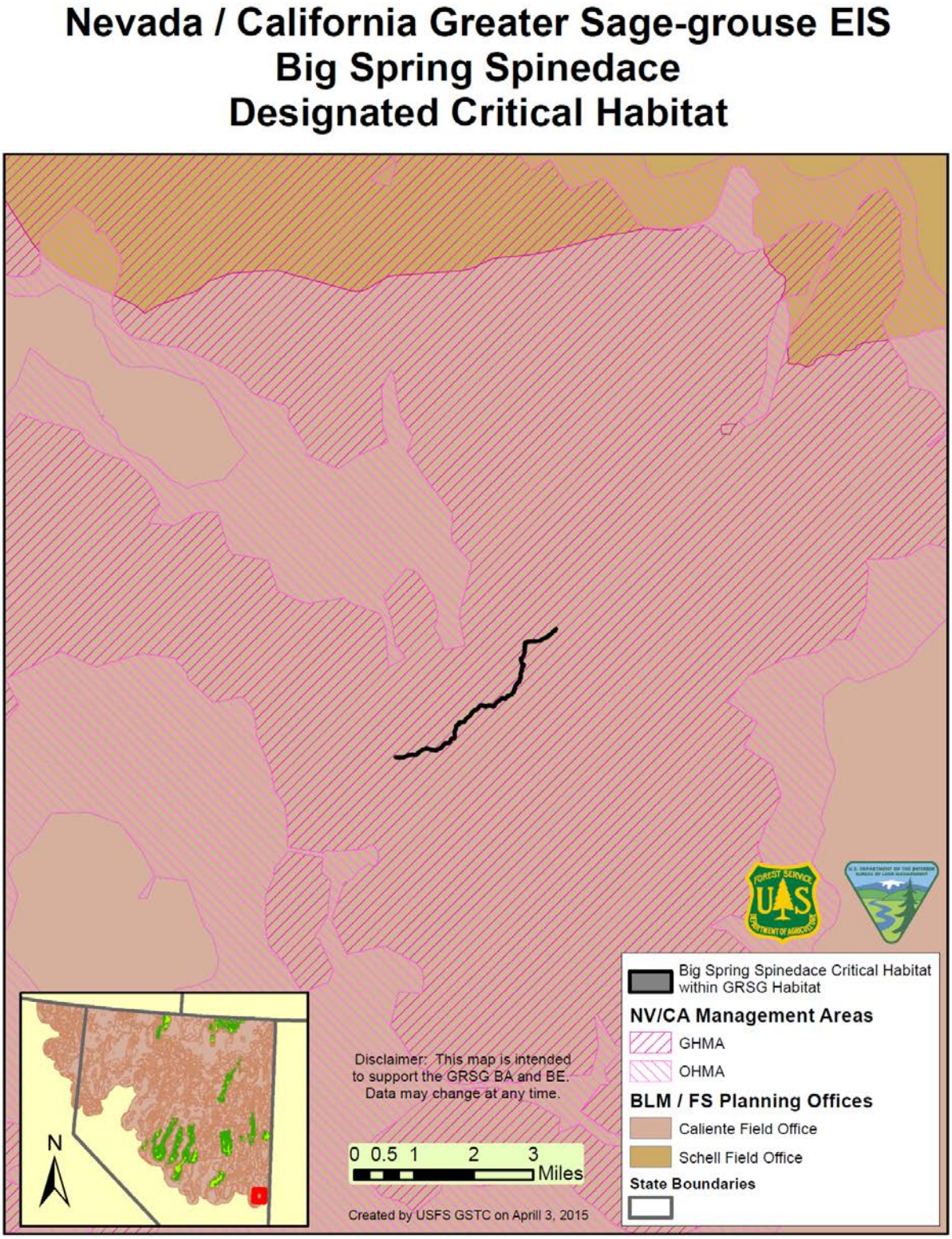


Figure 1. Big Spring spinedace designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

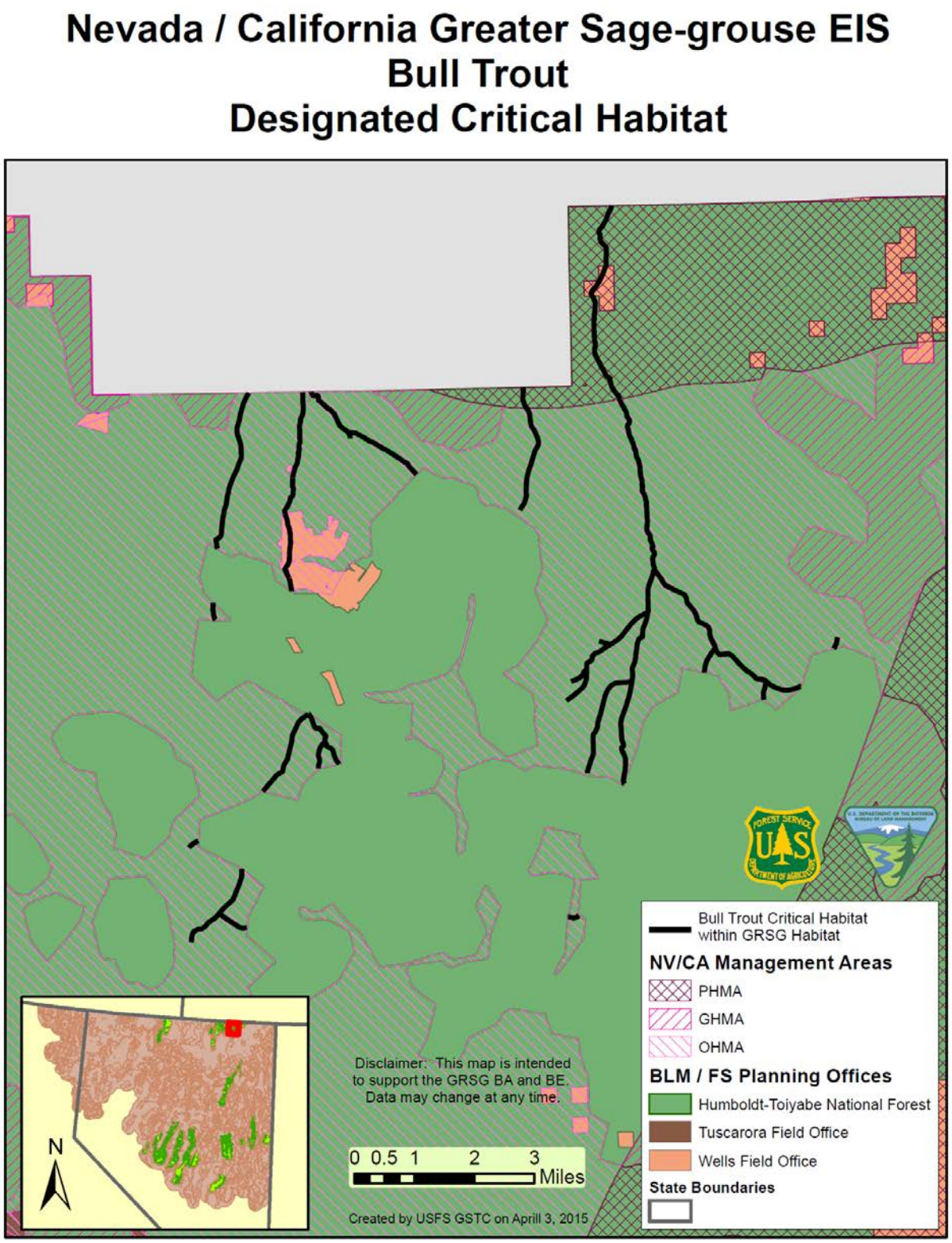


Figure 2. Bull trout designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

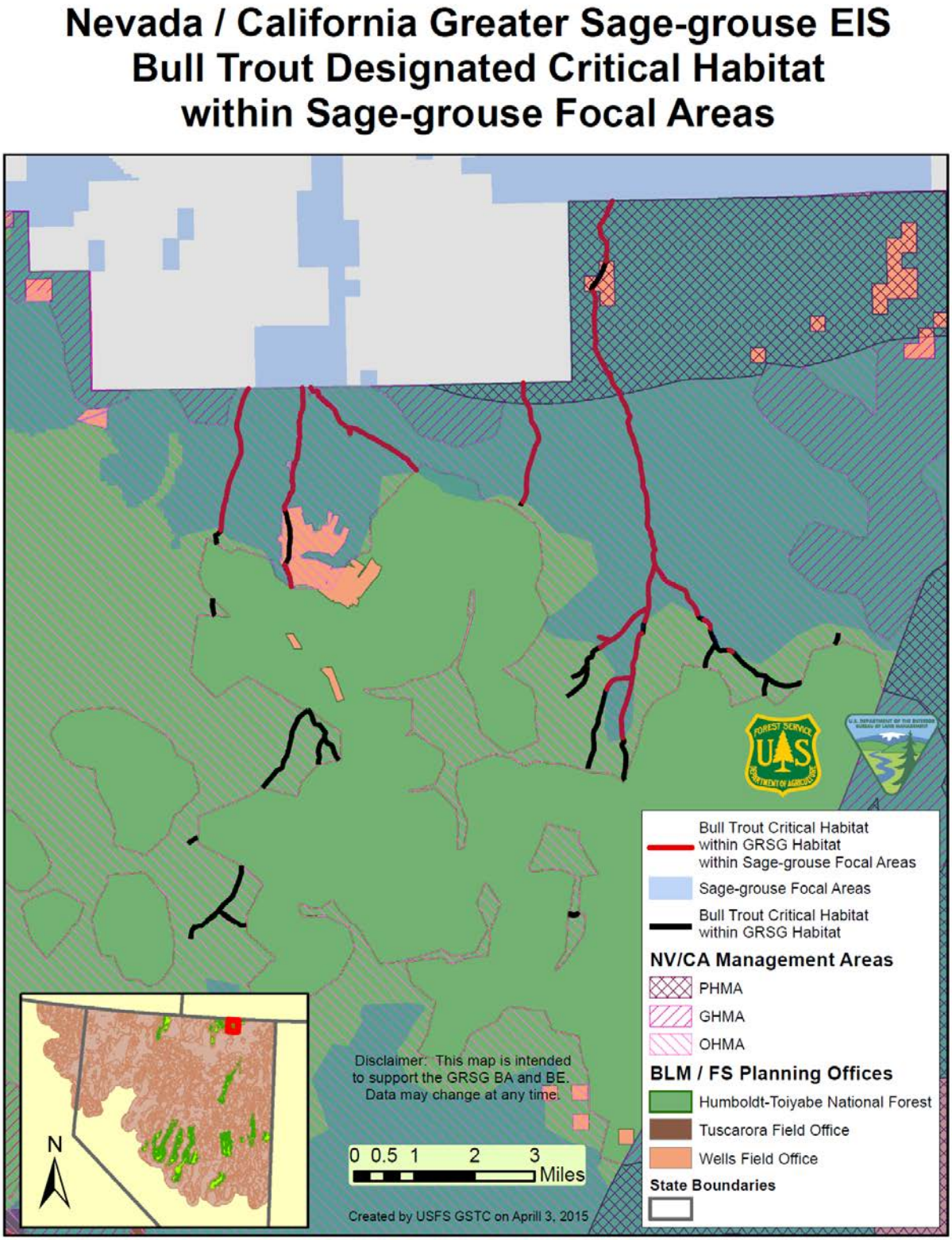


Figure 3. Bull trout designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

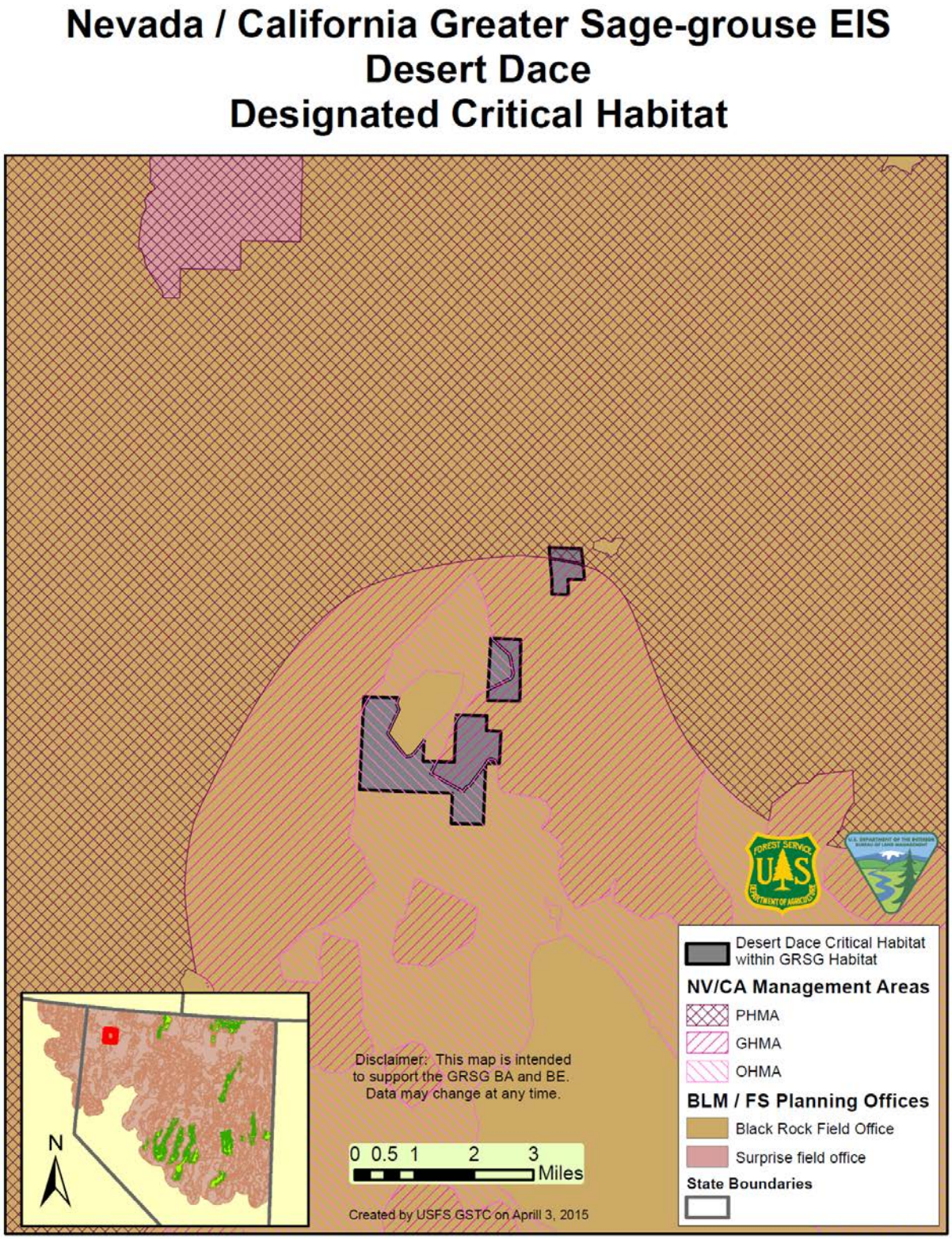


Figure 4. Desert dace designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

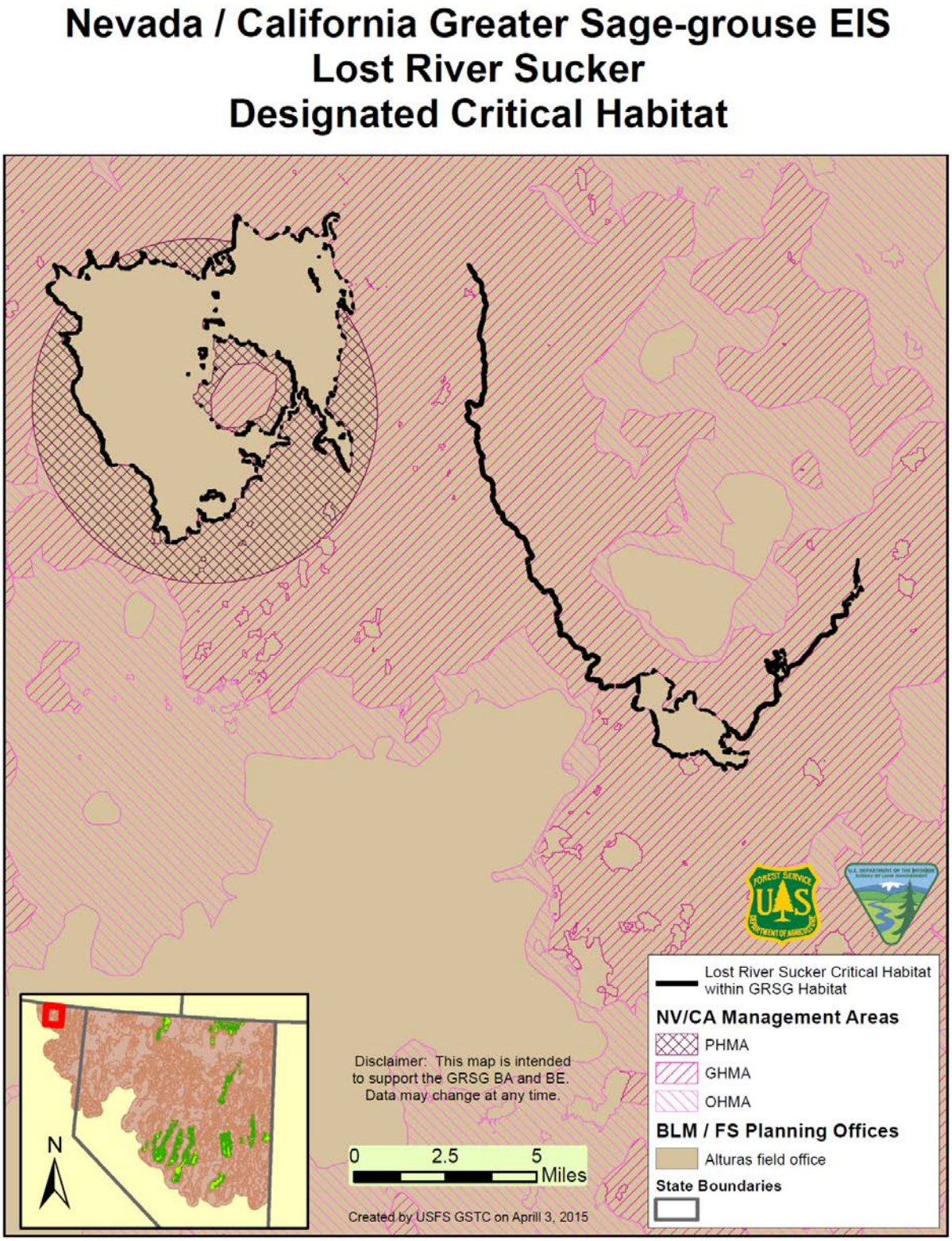


Figure 5. Lost River sucker designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

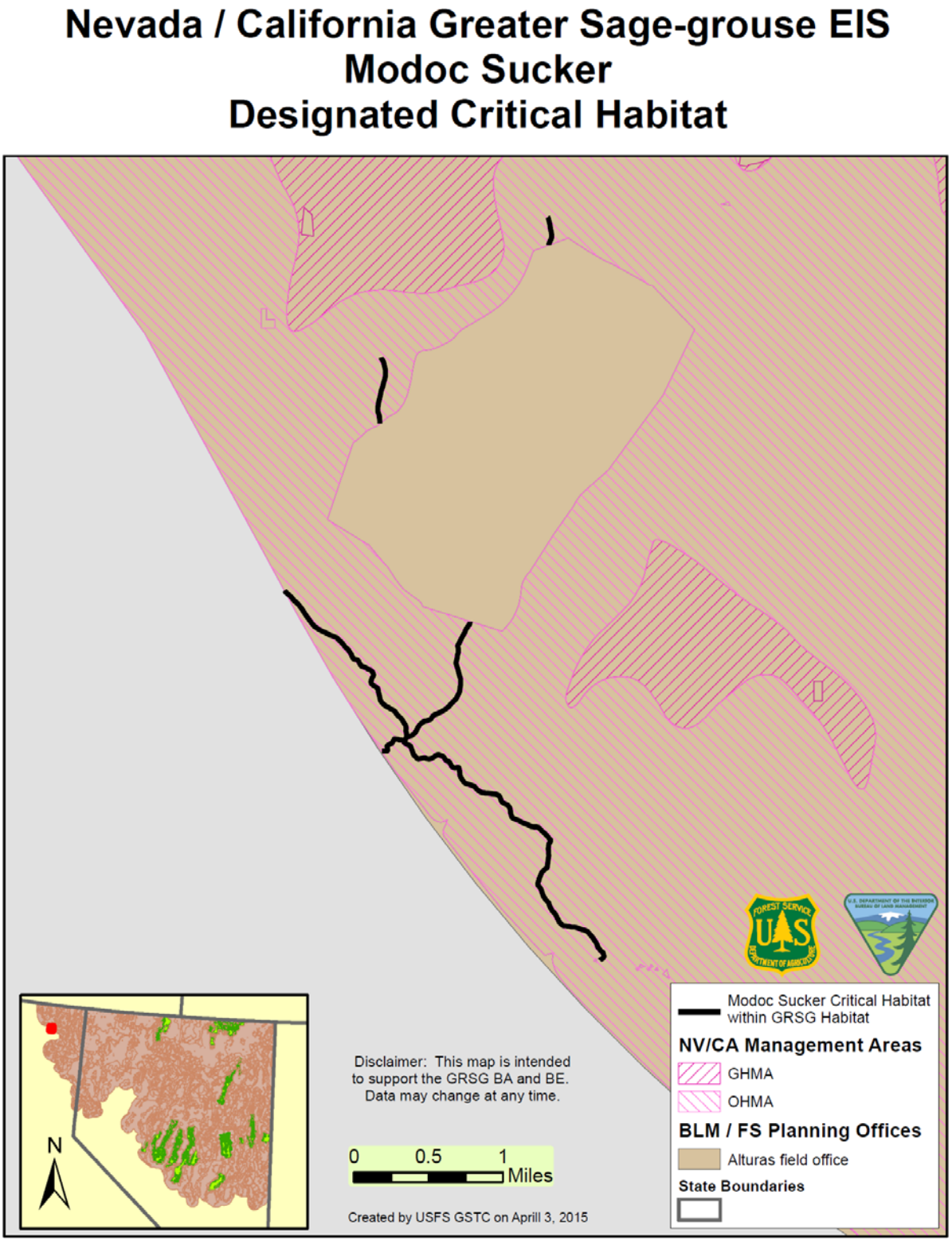


Figure 6. Modoc sucker designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

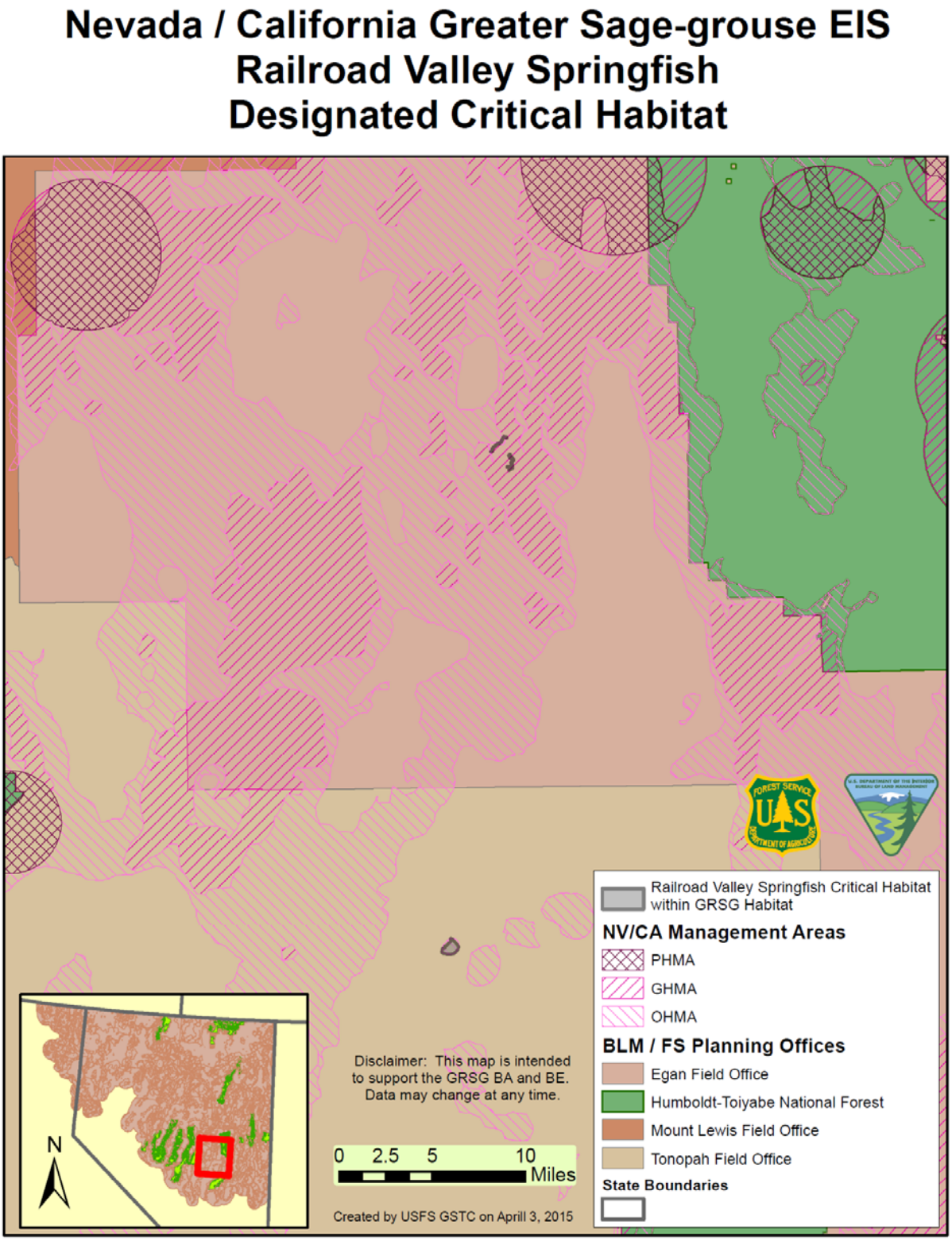


Figure 7. Railroad Valley springfish designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

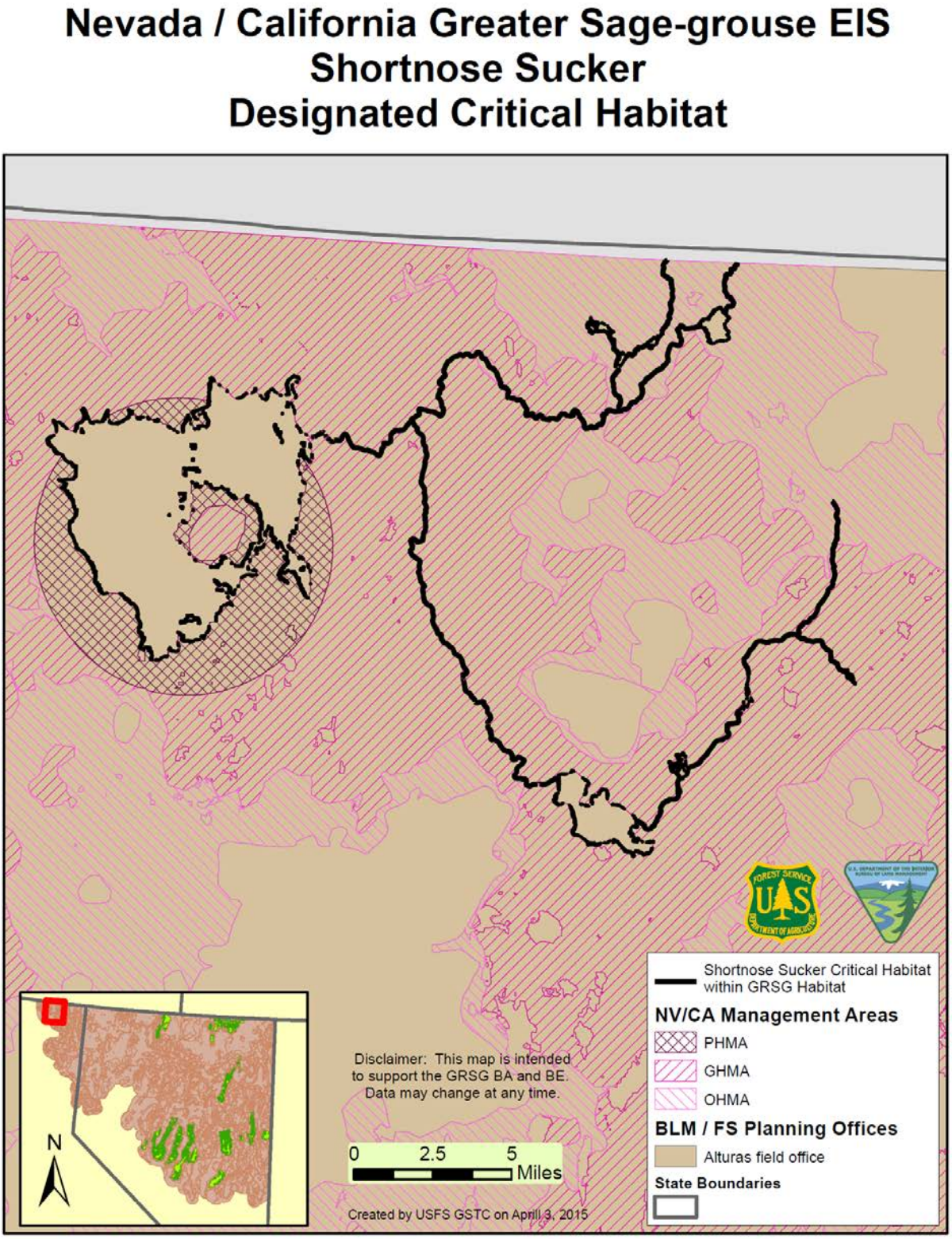


Figure 8. Shortnose sucker designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area.

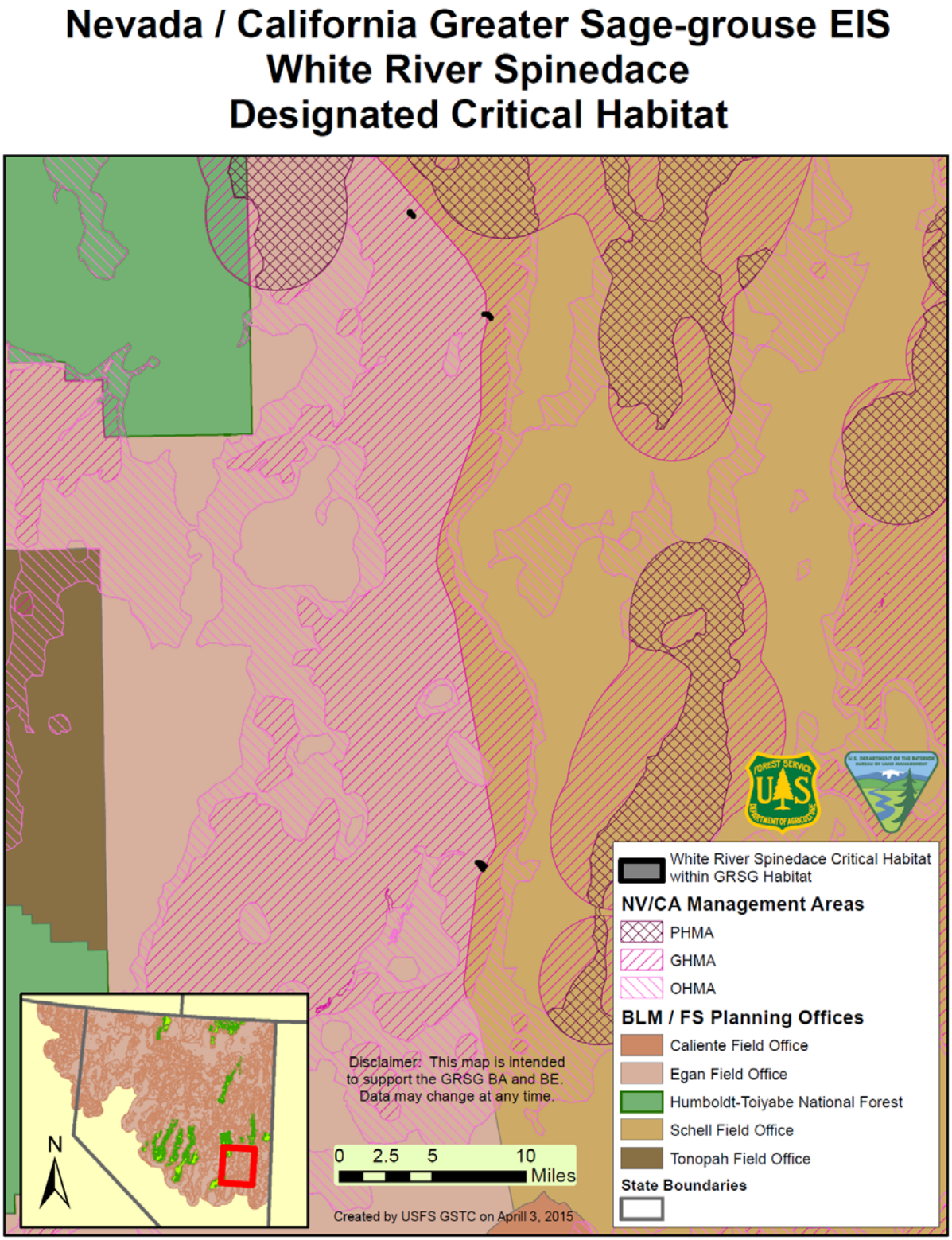


Figure 9. White River spinedace designated critical habitat with respect to Nevada and Northeastern California Greater Sage-Grouse LUPA and EIS action area

Appendix B: BLM Proposed Plan Amendment

BLM Proposed Plan Amendment

Greater Sage-Grouse

Goal SSS 1: Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners

Objective SSS 1: Manage land resource uses to meet GRSG habitat objectives, as described in **Table 2-2**. The habitat objectives would be used to evaluate management actions that are proposed in GRSG habitat. Managing for habitat objectives would ensure that habitat conditions are maintained if they are currently meeting objectives or if habitat conditions move toward these objectives in the event that current conditions do not meet these objectives.

The habitat objectives in Table 2-2 summarize the characteristics that research has found represent the seasonal habitat needs for Greater Sage-Grouse. The specific seasonal components identified in the Table were adjusted based on local science and monitoring data to define the range of characteristics used in this sub-region. Thus, the habitat objectives provide the broad vegetative conditions we strive to obtain across the landscape that indicate the seasonal habitats used by sage-grouse. These habitat indicators are consistent with the rangeland health indicators used by the BLM.

The habitat objectives will be part of the sage-grouse habitat assessment to be used during land health evaluations (see **Appendix** E). These habitat objectives are not obtainable on every acre within the designated GRSG habitat management areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table.

All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made towards meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a cause, the use will be adjusted by the response specified in the instrument that authorized the use.

Table 2-1
Proposed Habitat Objectives for GRSG

Attribute	Indicators	Desired Condition (Habitat Objectives)	Reference
GENERAL/LANDSCAPE-LEVEL			
All life stages	Rangeland health assessments	Meeting all standards[1]	
Cover (nesting)	Seasonal habitat needed	>65% of the landscape in sagebrush cover	Aldridge and Boyce 2007
	Annual grasses	<%5	Blomberg et al. 2012
Security (nesting)	Conifer encroachment	<3% phase I (>0 to <25% cover) No phase II (25 to 50% cover) No phase III (>50% cover)	Casazza et al. 2011 USGS (in prep A)
Cover and food (winter)	Conifer encroachment	<5% phase I (>0 to <25% cover) No phase II (25 to 50% cover) No phase III (>50%)	USGS (in prep A) USGS (in prep B)
	Sagebrush extent	>85% sagebrush land cover	USGS (in prep A) Doherty et al. 2008
LEK (Seasonal Use Period: March 1 to May 15)			
Cover	Availability of sagebrush cover	Has adjacent sagebrush cover	Blomberg et al. 2012 Connelly et al. 2000 Stiver et al. 2015
Security[2]	Pinyon or juniper cover	<3% landscape canopy cover within; .6 mile of leks	Connelly et al. 2000 (modified) Stiver et al. 2015 Baruch-Mordo et al. 2013
	Proximity of tall structures[3]	Use Manier et al. 2014-Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles	Coates et al. 2013 Manier et al. 2014
NESTING (Seasonal Use Period: April 1 to June 30)			
Cover	Sagebrush canopy cover	≥20%	Kolada et al. 2009a, 2009b
	Residual and live perennial grass cover	≥10% if shrub cover is <25%[4]	Coates et al. 2013 Coates and Delehanty 2010 Kolada et al. 2009a, 2009b
	Annual grass cover	<5%	Lockyer et al. (in press)

Table 2-1
Proposed Habitat Objectives for GRSG

Attribute	Indicators	Desired Condition (Habitat Objectives)	Reference
	Total shrub cover	≥30%	Coates and Delehanty 2010 Kolada et al. 2009a Lockyer et al. (in press)
	Perennial grass height	Provide overhead and lateral concealment from predators[7]	Connelly et al. 2000, 2003 Hagen et al. 2007; Stiver et al. 2015
Security[2]	Proximity of tall structures[3] (3 feet [1 meter] above shrub canopy)	Use Manier et al. 2014, Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles	Coates et al. 2013 Gibson et al. 2013 Manier et al. 2014
BROOD-REARING/SUMMER (Seasonal Use Period: May 15 to September 15; Early: May 15 to June 15; Late: June 15 to September 15)			
UPLAND HABITATS			
Cover	Sagebrush canopy cover	10 to 25%	Connelly et al. 2000
	Perennial grass canopy Cover and forbs	>15% combined perennial grass and forb canopy cover	Connelly et al. 2000 Hagen et al. 2007
	Deep rooted perennial bunchgrass	7 inches[5, 6]	Hagen et al. 2007
Cover and food	Perennial forb canopy cover	≥5% arid ≥15% mesic	Casazza et al. 2011 Lockyer et al. (in press)
RIPARIAN/MEADOW HABITATS			
Cover and food	Riparian areas/meadows	PFC	Dickard et al. 2015 Prichard et al. 1998, 1999 Stiver et al. 2015
Security	Upland and riparian perennial forb availability and understory species richness	• Preferred forbs are common with several species present[5] • High species richness (all plants)	Stiver et al. 2015
	Riparian area/meadow interspersion with adjacent sagebrush	Has adjacent sagebrush cover	Casazza et al. 2011 Stiver et al. 2015

Table 2-1
Proposed Habitat Objectives for GRSG

Attribute	Indicators	Desired Condition (Habitat Objectives)	Reference
WINTER (Seasonal Use Period: November 1 to February 28)			
Cover and Food	Sagebrush canopy cover	≥10% above snow depth	Connelly et al. 2000 USGS (in prep C)
	Sagebrush height	>9.8 inches above snow depth	Connelly et al. 2000 USGS (in prep C)

[1]Upland standards are based on indicators for canopy and ground cover, including litter, live vegetation, and rock, appropriate to the ecological potential of the site.
[2] Applicable to Phase I and Phase II pinyon and/or juniper.
[3] Does not include fences.
[4]In addition, if upland rangeland health standards are being met.
[5]Relative to ecological site potential.
[6] In drought years, 4-inch perennial bunchgrass height with greater than 20 percent measurements exceeding 5 inches in dry years.
[7] Specific height requirements needed to meet the objective will be set at the time of HAF assessments.

Objective SSS 2: Maintain or improve connectivity between, to, and in PHMAs and GHMAs to promote movement and genetic diversity for GRSG population persistence and expansion.

Objective SSS 3: Identify and implement GRSG conservation actions that can augment, enhance, or integrate program conservation measures established in agency and state land use and policy plans.

Objective SSS 4: In PHMAs and GHMAs, apply the concept of "avoid, minimize, and mitigate" for all human disturbance not already excluded or closed, so as to avoid adverse effects on GRSG and its habitat. The first priority would be to avoid new disturbance; where this is not feasible, the second priority would be to minimize and mitigate any new disturbance (**Appendix J**).

Action SSS 1: In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG habitat:[13]

- First priority—locate project/activity outside PHMAs and GHMAs
- Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate the surface-disturbing activities in non-habitat areas first, then in the least suitable habitat for GRSG

[13]The screening criteria would not be applicable to vegetation treatments being conducted to enhance GRSG habitat.

    - In non-habitat, ensure the project/activity would not create a barrier to movement or connectivity between seasonal habitats and populations

- Third priority—collocate the project/activity next to or in the footprint of existing infrastructure

Action SSS 2: In PHMAs, the following conditions would be met in order to minimize and mitigate any effects on GRSG and its habitat from the project/activity:[14]

- Manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of 1) biologically significant units (BSUs; total PHMA area associated with a GRSG population area) and 2) in a proposed project analysis area. See **Appendix F** (Disturbance Cap Guidance) for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area, as follows:
    - If the 3 percent human disturbance cap is exceeded on all lands (regardless of ownership) in PHMAs in any given BSU, then no further discrete human disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, and valid existing rights) will be permitted, by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap (see Nevada exception under SSS 2 a. 3. **Appendix F**).
    - If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights; see Nevada exception under SSS 2 a. 3. **Appendix F**).
    - For BLM land in the state of Nevada only, the following disturbance management protocol (DMP) is intended to provide for a 3 percent limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species.

[14]The conditions would not be applicable to vegetation treatments being conducted to enhance GRSG habitat, with the exceptions of seasonal restrictions and noise.

        - Such discretionary activities that would cause disturbances in excess of 3 percent at the project or BSU scale (see **Appendix F**) would be prohibited, unless a technical team described below determines that new or site-specific information indicates the project could be modified to result in a net conservation gain at the BSU level. Factors considered by the team will include GRSG abundance and trends, habitat amount and quality, extent of project disturbance, location and density of existing disturbance, project design options and other biological factors.
        - Any exceptions to the 3 percent disturbance limitation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the NDOW, the USFWS, and the BLM unanimously find that the proposed action satisfies the conditions stated in the above paragraph. Such finding shall initially be made by the technical team, which consists of a field biologist or other GRSG experts from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the BLM State Director, USFWS State Ecological Services Director and NDOW Director for final resolution. In the event their finding is not unanimous, the exception will not be granted (**Appendix F**).
    - For BLM land in the state of California only, subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.
- The new project/activity would not result in any of the adaptive management hard triggers being reached (see **Section 2.7.1**, Adaptive Management Plan in FEIS).

- The project/activity with associated mitigation would result in an overall net conservation gain to GRSG (see **Appendix I**).

  Actions that result in habitat loss and degradation are those identified as threats that contribute to GRSG disturbance, as identified by the USFWS in its 2010 listing decision (75 *Federal Register* 13910) and shown in **Table 2** in the attached Monitoring Framework (**Appendix E**).

- Authorized/permitted activities are implemented by adhering to the RDFs described in **Appendix D** for specific resources and the BMPs for locatable minerals. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:
  - A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
  - An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.
  - A specific RDF will provide no additional protection to GRSG or its habitat.
- In management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File-Report 2014-1239 (Manier et al. 2014), in accordance with **Appendix B**.
- Seasonal restrictions will be applied during the period specified below to manage discretionary surface-disturbing activities and uses on public lands to prevent disturbances to GRSG during seasonal life-cycle periods:
  - In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30
    - Lek—March 1 to May 15
    - Lek hourly restrictions—6 p.m. to 9 a.m.
    - Nesting—April 1 to June 30
  - Brood-rearing habitat from May 15 to September 15
    - Early—May 15 to June 15

        - Late—June 15 to September 15
    - Winter habitat from November 1 to February 28

    The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and CDFW, in order to better protect GRSG and its habitat.

- Authorizations and permits would limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks, from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See **Appendix K**, Summary of Noise-Monitoring Recommendations.

Action SSS-3: In GHMAs, the following conditions would be met in order to minimize and mitigate any effects on GRSG or its habitat from the project/activity:[15]

- New project/activity in GHMAs would not result in any of the adaptive management hard triggers being reached (see **Section 2.7.1**, Adaptive Management Plan, below).

- The project/activity with associated mitigation in GHMAs would result in an overall net conservation gain to GRSG (see **Appendix I**, Mitigation Framework).

- Actions that result in habitat loss and degradation are those identified as threats that contribute to GRSG disturbance, as identified by the USFWS in its 2010 listing decision (75 *Federal Register* 13910) and shown in **Table 2** in the attached Monitoring Framework (**Appendix E**).

- Authorized/permitted activities are implemented adhering to the RDFs described in **Appendix D** for specific resources and the BMPs for locatable minerals. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:

    - A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not

[15]The conditions would not be applicable to vegetation treatments being conducted to enhance GRSG habitat, with exceptions for seasonal restrictions and noise.

necessarily require that an RDF be varied or rendered inapplicable.

  - An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.
  - A specific RDF will provide no additional protection to GRSG or its habitat.

- In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File Report 2014-1239 (Manier et.al 2014]), in accordance with **Appendix B**.

- Seasonal restrictions would be applied during the period specified below to manage discretionary surface-disturbing activities and uses on public lands to prevent disturbing GRSG during seasonal life cycle periods, as follows:

  - In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30:
    - Lek—March 1 to May 15
    - Lek hourly restrictions—6 p.m. to 9 a.m.
    - Nesting—April 1 to June 30
  - Brood-rearing habitat from May 15 to September 15
    - Early—May 15 to June 15
    - Late—June 15 to Sept 15
  - Winter habitat from November 1 to February 28

  The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and CDFW, in order to better protect GRSG.

- Authorizations and permits would limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See **Appendix K**, Summary of Noise-Monitoring Recommendations.

Action SSS 4: In OHMAs, authorized/permitted activities are implemented adhering to the RDFs described in **Appendix D** for specific

resources and the BMPs for locatable minerals. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.
- A specific RDF will provide no additional protection to GRSG or its habitat.

Action SSS 5: Designate SFAs, as shown on **Figure 1-3** (2,797,400 acres). SFAs will be managed as PHMAs, with the following additional management:

- Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights
- Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing
- Prioritized for management and conservation actions in these areas, including review of livestock grazing permits/leases (see actions LG)

Action SSS 6: Cooperate with federal and state agencies, universities, and other organizations to establish and maintain a GRSG telemetry database.

Action SSS 7: Work with project proponents to limit project-related noise, seasonally or annually (see Actions SSS 2 and SSS 3), in GRSG habitat where it would be expected to reduce functionality of habitats that support associated GRSG populations. Support the establishment of ambient baseline noise levels for leks in PHMAs and GHMAs.

As additional noise-related research and information emerge, specific new limitations appropriate to the type of projects being considered would be evaluated and appropriate measures would be implemented where necessary to minimize the potential for noise impacts on GRSG populations.

Action SSS 8: For any surface-disturbing activities proposed in PHMAs and GHMAs, the proponent will hire a qualified biologist approved by the BLM to conduct surveys for GRSG breeding activity during the GRSG breeding season before project activities begin. The surveys must

encompass all suitable GRSG habitats within a minimum of 4 miles of the proposed activities. Surveys will be conducted following protocols established by state fish and wildlife agencies during planning operations and during project activities. GRSG seasonal habitat delineations will also be required within a minimum of 4 miles of project activities.

Action SSS 9a: In Nevada only, the BLM would consult with the Sagebrush Ecosystem Technical Team (SETT) for application of the "avoid, minimize, mitigate" process and the Conservation Credit System developed by the Nevada Natural Heritage Program and the SETT (2014a, 2014b) or other applicable mitigation system. This would be to ensure that a net conservation gain of GRSG habitat occurs due to human disturbances in PHMAs and GHMAs (see **Appendix L**) on all agency-authorized activities. The specifics of the coordination will be identified in a MOU between the agencies.

Action SSS 9b: In California only, the BLM would follow the BLM mitigation strategy outlined in **Appendix I**.

Action SSS 10: Site-specific NEPA analysis on use authorizations would include project level adaptive management responses to address changed conditions in GRSG habitat and population trends, when necessary or as new data becomes available (see **Section 2.7.1**, Adaptive Management Plan).

Action SSS 11: Design and construct fences consistent with BLM H-1741-1, Fencing Standards Manual (BLM 1990), and apply the Sage-Grouse Fence Collision Risk Tool to Reduce Bird Strikes (NRCS 2012). Bring existing fencing into compliance as opportunities arise.

Disease

Objective SSS-DIS 1: Coordinate with state agencies to monitor trends of diseases, such as West Nile virus, in the sub-region to determine if mitigation or additional RDFs need to be applied to use authorizations.

Action SSS-DIS 1: When developing or modifying water developments on BLM-administered lands in PHMAs, GHMAs, and OHMAs and in accordance with state water law and subject to valid existing rights, use applicable RDFs to mitigate potential impacts from West Nile virus. Bring existing water developments into compliance as opportunities arise.

Predation

Objective PR 1: Manage human uses on public lands to reduce the effects of predation on GRSG.

Action PR 1: Require authorizations to include stipulations and RDFs to reduce or eliminate opportunities to attract and provide nesting, cover, or perches for predators in PHMAs and GHMAs.

Action PR 2: Coordinate with other federal, state, county, and tribal governments and local working groups to reduce GRSG deaths due to predation where it is determined to be additive or is a limiting factor influencing GRSG populations.

Action PR 3: Reduce and eliminate artificial hunting perches and nesting surfaces for aerial predators (e.g., remove fences, nonworking fences, and power lines and install anti-perch devices on existing and new power lines).

Action PR 4: Manage landfills and transfer stations on public lands by reducing opportunities for predator feeding and nesting.

Vegetation Management

Sagebrush-steppe

Objective VEG 1: In all SFAs and PHMAs, the desired condition is to maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).

Objective VEG 2: On public lands, establish, maintain, and enhance a resistant and resilient sagebrush vegetative community and restore sagebrush vegetation communities to reduce GRSG habitat fragmentation and maintain or reestablish GRSG habitat connectivity over the long term (Chambers et al. 2014).

Objective VEG 3: Manage PHMAs and GHMAs for vegetation composition and structure, consistent with ecological site potential and to achieve GRSG habitat objectives (**Table 2-2**).

Action VEG 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action VEG 2: Incorporate GRSG habitat objectives (**Table 2-2**) in the design of habitat restoration projects and manage treated areas to meet GRSG habitat objectives.

Action VEG 3: Use BLM GRSG habitat maps, habitat objectives (**Table 2-2** for GRSG habitat objectives), ecological site potential, state and

transition models, and concepts of resistance and resilience (**Appendix G**) to prioritize habitat restoration projects, including those following wildfire, to address the most limiting GRSG habitat vegetation components and to connect seasonal ranges.

Habitat restoration includes the following:

- Restoring sagebrush canopy in PHMAs and GHMAs to meet GRSG habitat objectives (**Table 2-2**)
- Reestablishing perennial grasses and native forbs in PHMAs and GHMAs
- Reducing or removing pinyon or juniper in PHMAs and GHMAs to enhance seasonal range connectivity and to maintain sagebrush canopy and understory integrity
- Restore areas affected by wildfire and the continuing invasive annual fire cycle to meet GRSG habitat objectives (**Table 2-2**)
- Prioritize restoration in areas that have not crossed an ecological threshold

Action VEG 5: Plan vegetation treatments (including GRSG habitat treatments) in a landscape-scale context to address habitat fragmentation, effective patch size, invasive species presence, and intact sagebrush community protection, consistent with the GRSG habitat objectives identified in **Table 2-2**.

Action VEG 6: For Wyoming, mountain, and basin big sagebrush communities in PHMAs and GHMAs:

- Prioritize treatments that focus on enhancing, reestablishing, or maintaining the most limiting GRSG habitat component
- Reestablish sagebrush to meet GRSG habitat objectives (**Table 2-2**)
- Manage sagebrush communities to achieve age-class, structure, cover, and species composition objectives in GRSG habitat (**Table** 2-2)
- Restore herbaceous understory in brush-dominated areas to meet GRSG habitat objectives (**Table 2-2**)
- Treat areas with cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species (**Table 2-2**)

- Treat disturbed areas in accordance with FIAT (see **Appendix G**), including implementation-level assessments

Action VEG 7: Manage for establishment of sagebrush in unmaintained nonnative seedings (e.g., crested wheatgrass seedings) in or next to GRSG habitat to meet habitat objectives (**Table 2-2**).

Action VEG 8: In PHMAs and GHMAs, give preference to native seeds for restoration, based on availability, adaptation (ecological site potential), and probability of success. Where the probability of success or adapted seed availability is low, nonnative seeds may be used, as long as they support GRSG habitat objectives. Choose native plant species outlined in Ecological Site Descriptions (ESDs), where available, to revegetate sites. Emphasize use of local seed collected from intact stands or greenhouse cultivation. If the commercial supply of appropriate native seeds and plants is limited, work with the BLM Native Plant Materials Development Program or NRCS Plant Material Program. If currently available supplies are limited, use the materials that provide the greatest benefit for GRSG. In all cases, seed must be certified as weed free.

Action VEG 9: To increase seeding success and to ensure effective soil and seed contact, consider the use of specialized seed drills or other proven and effective methods that may become available based on new science.

Action VEG 10a: For Nevada BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas would be monitored both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved.

Action VEG 10b: For California BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas would be monitored both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved. Juniper treatments would be monitored in accordance with the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).

Action VEG 11: On public lands, where the attributes, quality, or lack of GRSG winter habitat has been identified as a limiting factor, emphasize vegetation treatments in known winter habitat to enhance quality or reduce wildfire risk around or in winter habitat.

Action VEG 12: In perennial grass, invasive annual grass, and conifer-invaded cover types, restore sagebrush steppe with local sagebrush seedings or planted seedlings where feasible.

Action VEG 13: Continue to coordinate with NDOW, CDFW, and NRCS for all development or habitat restoration proposals in PHMAs and GHMAs. Also, coordinate with the Nevada SETT, tribes, and local working groups on projects proposed in sagebrush ecosystems.

Conifer encroachment

Objective VEG-WD 1: In accordance with the vegetation dynamic development tool (VDDT; **Appendix M**), improve GRSG habitat by removing invading conifers in the number of acres shown in **Table 2-3** annually for the next 50 years.

Table 2-2
Acres to be Treated Annually for 50 Years

State	Mechanical Treatment[1]	Prescribed Fire[2]
Nevada	66,700	1,800
California[3]	3,200	900
Total	**69,900**	**2,700**

[1]Removal of conifers that have invaded sagebrush, generally phase one juniper that is 10 percent or less.
[2]Acres are those that are greater than 30 percent sagebrush canopy cover or invaded by 10 percent or greater conifer.
[3]BLM California-managed lands will be consistent with annual acres of treatment specified in the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).

Action VEG-WD 1: Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied GRSG habitats and near occupied leks and where juniper encroachment is phase 1 and phase 2. Use of site-specific analysis and tools like VDDT and FIAT (see **Appendices M** and **F**) will help refine the location for specific areas to be treated.

Action VEG-WD 2: Do not construct or create new roads (temporary or permanent), skid trails, or landings in phase I pinyon or juniper removal areas during project implementation for vegetation treatments. Administrative access, including off-road travel with heavy equipment and vehicles, would be allowed during implementation.

Action VEG-WD 3: Treat habitats in late phase II or phase III pinyon or juniper condition only, to create movement corridors, connect habitats, or reduce the potential for catastrophic fire (see **Table 2-2**).

Invasive Species

Objective VEG-ISM 1: Reduce the amount of GRSG habitat loss due to wide-spread wildfires and invasion by nonnative species.

Objective VEG-ISM 2: Control invasive species infestations in GRSG habitat already compromised by invasion.

Objective VEG-ISM 3: In accordance with the VDDT (**Appendix M**), improve GRSG habitat by treating annual grasses in the number of acres shown in **Table 2-4**.

Action VEG-ISM 1: Prevent the establishment of invasive species into uninvaded areas in PHMAs and GHMAs through properly managed grazing and by conducting systematic and strategic detection surveys, collecting data, mapping these areas, and engaging in early response to contain and eradicate invasion if it occurs.

Table 2-3
Acres to be Treated Annually for 50 Years

State	Grass Restoration[1]
Nevada	161,100
California	9,800
Total	**170,900**

[1]Acres presently dominated by annual grasses that could be improved by herbicide application or seeding of perennial vegetation

Action VEG-ISM 2: Control the spread and introduction of noxious weeds listed by the Nevada Department of Agriculture and California Department of Food and Agriculture (NAC 555.010, Classes A through C, inclusive and 3 CCR 4500, Noxious Weed Species Pest Rating A, B, C, and Q) and undesirable nonnative plant species (Gelbard and Belnap 2003; Bergquist et al. 2007). Work with federal, state, local, and tribal groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts, in detecting and treating nonnative species.

Action VEG-ISM 3: Where scientific support is lacking, carefully construct treatments to rigorously assess the value or detriment of untested methods to determine their value for future application to GRSG habitats.

Action VEG-ISM 4: The BLM would cooperate with other federal, state, tribal and local agencies along with academia in researching the development of biological control agents and deploying emerging technologies as they become available.

Action VEG-ISM 5: Monitor and adjust treatment sites and methods as needed to ensure effectiveness of efforts to prevent and control invasive species and restore GRSG habitat.

Action VEG-ISM 6: Assess invasive annual grass presence and distribution before implementing vegetation restoration projects to determine if treatments are required to treat invasive annual grasses.

Action VEG- ISM 7: Treat sites in PHMAs and GHMAs that contain invasive species infestations through an integrated pest management

(IPM) approach, using fire, chemical, mechanical, and biological (e.g., targeted grazing) methods, based on site potential and in accordance with FIAT (**Appendix G**).

Riparian and Wetlands Habitat

Objective VEG-RH 1: Manage riparian areas in PHMAs and GHMAs for vegetation composition and structure, consistent with ecological site potential and to achieve GRSG habitat objectives (**Table 2-2**).

Objective VEG-RH 2: Manage upland habitat associated with riparian areas to promote cover relative to site potential to facilitate brood-rearing habitat (**Table 2-2**).

Objective VEG-RH 3: Where riparian function has been compromised or lost, manage to restore riparian function and meet GRSG habitat objectives (**Table 2-2**).

Objective VEG-RH 4: In riparian and wet meadow areas, inventory, monitor, and control invasive species in PHMAs and GHMAs.

Action VEG-RH 1: Design and implement vegetation treatments in PHMAs and GHMAs to restore, enhance, and maintain riparian areas (**Table 2-2**).

Action VEG-RH 2: Consider an array of vegetation treatments to increase edge and expand mesic areas in PHMAs and GHMAs where riparian extent is limited by shrub encroachment (**Table 2-2**).

Action VEG-RH 3: Manage lotic riparian habitats in conjunction with adjacent terraces and valley bottoms as natural fuel breaks to reduce the size and frequency of wildfires in PHMAs and GHMAs.

Climate Change

Objective CC 1: Use the landscape approach and promote landscape-scale, ecosystem-based actions to enhance resiliency and sustainability of PHMAs and GHMAs to climate stress.

Objective CC 2: In PHMAs and GHMAs, manage risks of GRSG habitat degradation or loss from landscape stressors of drought, invasive species, and wildfire exacerbated by climate change to maintain existing GRSG populations and habitats.

Action CC 1: As climate change data become available through Rapid Ecoregional Assessments or other ecological studies, identify areas of unfragmented GRSG habitat and corridors that provide the life-cycle and genetic transfer needs for GRSG and adjust resource management practices, as needed.

Action CC 2: Cooperate with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.

Wildfire Management

Objective WFM 1: The safety of firefighters and the public is the highest priority. GRSG habitat would be prioritized commensurate with property values and other critical or sensitive habitats to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG.

Action WFM 1: Support the conservation of GRSG habitat objectives (**Table 2-2**) through appropriate wildfire management planning, coordination, staffing, resource allocations, training, equipment, and management oversight.

Action WFM 2: Prioritize fire operations and fuels management decisions in SFAs first, followed by PHMAs outside of SFAs in accordance with the implementation-level FIAT assessments, and then GHMAs for conservation and protection during fire operations and fuels management decision-making. When suppression resources are widely available, place maximum efforts on limiting fire growth in GHMAs as well.

Action WFM 3: BLM planning units (field offices and districts), in coordination with the USFWS and relevant state agencies, would annually review the GRSG landscape wildfire and invasive species habitat assessments. Where areas of large-scale fires, complete appropriate updates.

Action WFM 4: Compile relevant field office- and district-level information into the statewide GRSG Annual Operating Handbook for use by resource advisors, wildfire crews, and agency administrators. The handbook would contain GRSG maps (including habitat and fuels treatment maps) and lists of state and local GRSG resource advisors and their contact information, local guidance, and other relevant information for each field office and district, aggregated into a statewide document.

Action WFM 5: Coordinate and collaborate with federal, tribal, state, and local governments and associations sanctioned through either California or Nevada that meet fire standards for effective and efficient wildfire response.

Action WFM 6: Strengthen and improve interagency wildfire prevention statewide through targeted wildfire prevention messages, including providing education on GRSG habitat loss, updating interagency agreements, and conducting wildfire prevention workshops and demonstration projects.

Pre-Suppression

Objective WFM-PSU 1: Use pre-suppression efforts to reduce the size and impact of wildfires in SFAs, PHMAs, and GHMAs.

Action WFM-PSU 1: Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection, in accordance with FIAT (see **Appendix G,** USDI 2015) and further refined in the implementation-level FIAT assessments.

Action WFM-PSU 2: Create fire management plans to guide wildfire suppression in order to protect PHMAs and GHMAs.

Action WFM-PSU 3: Before the fire season, train GRSG resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve state wildlife agency experts in fire operations through the following:

- Instruction of resource advisors during preseason trainings
- Qualification as resource advisors
- Coordination with resource advisors before fire season
- Contribution to incident planning with information, such as habitat features or other key data useful in fire decision-making

Suppression

Objective WFM-SU 1: Use suppression to reduce the size and impact of wildfires in SFAs, PHMAs, and GHMAs.

Action WFM-SU 1: Provide local GRSG habitat maps to dispatch offices and extend attack incident commanders to prioritize wildfire suppression resources and design suppression tactics. Ensure GRSG habitat maps and suppression strategies are uploaded and updated in WFDSs.

Action WFM-SU 3: Assign a resource advisor with GRSG habitat expertise or with access to GRSG habitat expertise to all extended attack fires in or near SFAs, PHMAs, and GHMAs.

Action WFM-SU 4: In advance of critical fire weather, station additional federal fire suppression resources to optimize a quick and efficient response in SFAs, PHMAs, and GHMAs.

Action WFM-SU 5: During periods of multiple fires, ensure line officers prioritize decisions by coordinating with resource advisors.

Action WFM-SU 6: To the extent possible, locate wildfire suppression facilities (e.g., base camps, spike camps, drop points, staging areas, and

helicopter bases) in areas to avoid disturbing PHMAs and GHMAs. These include disturbed areas, grasslands, roads and trails, or in other areas with existing disturbance or minimal sagebrush cover.

Action WFM-SU 7: Adequately document fire operations (e.g., disturbance) in PHMAs and GHMAs for potential follow-up coordination and restoration.

Action WFM-SU 8: Use indirect attack tactics (including burn-out operations) when direct attack is not effective in stopping fires with the potential of becoming significantly larger due to fuel loading, weather conditions, and fire behavior. If firefighter and public safety appears to be threatened or compromised, use indirect attack tactics in suppression actions.

Action WFM-SU 9: Use retardant, mechanized equipment, and other available resources 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.

Action WFM-SU 10: Minimize unnecessary cross-country vehicle travel during fire operations in GRSG habitat.

Fuels Management

Objective WFM-HFM 1: Protect and enhance PHMAs and GHMAs and areas of connectivity that support GRSG populations, including large contiguous blocks of sagebrush, through fuels management.

Action WFM-HFM 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action WFM-HFM 2: In PHMAs and GHMAs, apply fuels treatments on a landscape level to modify fire behavior, intensity, complexity (fire patchiness), size, and effects in which fire management efforts are enhanced.

Action WFM-HFM 3: Establish and maintain fuel breaks to protect GRSG and its habitat to limit fire size and mitigate fire behavior to increase suppression effectiveness. When possible, establish fuel breaks next to roads or other previously disturbed areas.

Action WFM-HFM 4: Use a full range of fuels management strategies and tactics within acceptable risk levels across the range of GRSG habitat consistent with land use plan direction.

Action WFM-HFM 5: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:

- why alternative techniques were not selected as a viable option
- how GRSG goals and objectives would be met by its use
- how the COT report objectives would be addressed and met
- a risk assessment to address how potential threats to GRSG habitat would be minimized.

a) Allow prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect GRSG habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).

b) Allow prescribed fire in known winter range shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.

Action WFM-HFM 6: In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see **Appendix G**), develop a fuels management strategy for the BLM with large blocks of GRSG habitat. The strategy should include an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity. When developing this strategy, consider the risk of increased habitat fragmentation from a proposed action versus the risk of large-scale fragmentation posed by wildfires if the action were not taken.

Action WFM-HFM 7: Design fuels treatments through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as prescribed fire and chemical, biological (including targeted grazing), and mechanical treatments, are acceptable. Use green strips and fuel breaks, where appropriate, to protect seeding from subsequent fires.

Action WFM-HFM 8: In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see **Appendix G**), BLM Districts will identify treatment needs for wildfire and invasive species management. Ongoing treatment needs would be coordinated on state and regional scales and across jurisdictional boundaries for long-term conservation of GRSG and its habitat.

Action WFM-HFM 9: On project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and other treatment components. Control invasive vegetation post-treatment.

Action WFM-HFM 10: Design fuels treatments to protect sagebrush ecosystems, modify fire behavior, restore ecological function, and create landscape patterns that most benefit PHMAs and GHMAs and promote use by GRSG.

Action WFM-HFM 11: Train fuels treatment personnel on GRSG biology, habitat requirements, and identification of areas used locally.

Action WFM-HFM 12: Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize killing desirable perennial plant species and reduce risk of annual grass invasion) in PHMAs and GHMAs.

Action WFM-HFM 13: Ensure proposed sagebrush treatments are planned with interdisciplinary input from the BLM and coordinated with state fish and wildlife agencies to meet GRSG habitat objectives (**Table 2-2**).

Action WFM-HFM 14: Design vegetation treatments in areas of high fire frequency to facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to GRSG habitat.

Action WFM-HFM 15a: For Nevada BLM-administered lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved.

Action WFM-HFM 15b: For California BLM-managed lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved. Juniper treatments would be monitored in accordance with the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).

Post Fire Management

Objective WFM-PF 1: Retain, protect, and improve intact unburned sagebrush communities in burned areas.

Objective WFM-PF 2: Protect post-fire treatments in PHMAs and GHMAs from subsequent wildfires.

Action WFM-PF 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action WFM-PF 2: Prioritize post-fire treatments in PHMAs and GHMAs to maximize benefits to GRSG and its habitat. Focus post-fire treatments on replacing or reestablishing burned sagebrush habitat with the appropriate cover and structure to support GRSG habitat objectives (**Table 2-2**).

Action WFM-PF 3: Design and implement post-fire treatments in PHMAs and GHMAs that emphasize stabilizing, rehabilitating, and restoring sagebrush ecosystems damaged by wildfires, including controlling invasive species.

Action WFM-PF 4: Increase post-fire treatment activities in PHMAs and GHMAs through the use of integrated funding opportunities with other resource programs and partners.

Action WFM-PF 5: In post-fire rehabilitation plans in PHMAs and GHMAs, design revegetation projects to accomplish the following:

- Maintain and enhance unburned intact sagebrush communities when at risk from adjacent threats
- Stabilize soils
- Reestablish hydrologic function
- Maintain and enhance biological integrity
- Promote plant resiliency
- Limit expansion or dominance or invasive species
- Reestablish native species

Action WFM-PF 6: Following post-fire treatments, monitor and implement management actions in PHMAs and GHMAs that promote healthy perennial grass, shrub and forb communities, and lentic (slow-moving freshwater) and lotic (rapid freshwater) riparian habitats so as to further restoration and ensure long-term persistence of seeded or pre-burn native plants, in accordance with GRSG habitat objectives (**Table 2-2**).

Action WFM- PF 7: Evaluate the potential for sagebrush island plantings based on ESDs in large burn areas that may lack sufficient sagebrush seed sources in order to ensure the reestablishment of sagebrush in GRSG habitat.

Action WFM-PF 8: Monitor post-fire rehabilitation treatments on a multiple-year basis to ensure that project objectives are achieved.

Action WFM-PF 9: Use GRSG habitat objectives (**Table 2-2**) and emphasize the use of native plant species in post-fire rehabilitation (e.g. reseeding), recognizing that nonnative species may be necessary, depending on the availability of native seed and prevailing site conditions. Selected species should maintain site ecological function based on pre-burn conditions and anticipated threat of invasive and noxious weed establishment. Use ESDs and state and transition models if available.

Livestock Grazing

Objective LG 1: Manage permitted livestock grazing to maintain and/or enhance PHMAs and GHMAs to meet or make progress towards meeting all GRSG life-cycle requirements and habitat objectives (**Table 2-2**), based on site potential.

Action LG 1: When renewing term grazing permits or leases, or when revising or developing new allotment management plans within PHMAs and GHMAs, if not meeting, or making progress towards meeting land health standards, as associated with not meeting GRSG habitat objectives, and grazing is a significant causal factor, adjust permits and take actions prior to the start of the next grazing season by implementing management strategies, including the addition of one or more of the following (not in priority order):

- Season or timing of use
- Numbers of livestock (includes temporary nonuse or livestock removal)
- Intensity of use
- Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats)
- Extended rest or temporary closure from grazing through BLM administrative actions
- Make allotment unavailable to grazing

Action LG 2: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFAs

followed by PHMAs outside of the SFAs. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.

Action LG 3: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFAs and PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.

Action LG 4: Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (**Table 2-2**) are being met. The priority order for completing land health assessments in GRSG habitat is:

- Allotments containing SFAs that have never been evaluated;
- Allotments containing SFAs that have not been re-evaluated in 10 or more years;
- Allotments containing PHMAs that have never been evaluated;
- Allotments containing PHMAs that have not been re-evaluated in 10 or more years;
- Allotments containing GHMAs that have never been evaluated;
- Allotments containing GHMAs that have not been re-evaluated in 10 or more years.

Action LG 5: If results from a land health assessment indicate that GRSG habitat objectives (**Table 2-2**) are not met in SFAs, PHMAs, or GHMAs and grazing is a contributing factor, and until appropriate modifications (Action LG 1) are incorporated through the permit renewal process, implement management strategies that may include the following:

- Provide periods of rest or deferment during critical growth periods of key vegetation species
- Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (**Table 2-2**)
- Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the

breeding season (March 1 to June 30; Lek—March 1 to May 15, and Nesting—April 1 to June 30)

- Consider any temporary projects that could mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations;
- Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30
- Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30
- Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas
- Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows.
- Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached
    - In riparian areas and wet meadows the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site.
    - In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species.
    - In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.
    - In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.

Action LG 6: Appropriate allowable utilization levels will be defined through the grazing permit renewal process. At least one alternative in the NEPA process will consider the utilization levels identified in Action LG 5.

Action LG 7: In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels, and livestock are identified as an influencing factor, reduce AUMs grazed the following year accordingly. AUMs cannot be applied to another pasture.

Action LG 8: Within PHMAs and GHMAs, incorporate terms and conditions into grazing permits to meet GRSG habitat objectives (**Table**

2-2), specific terms and conditions would be based on rangeland health assessments (and subsequent monitoring data).

Action LG 9: When a transfer application is received for preference on an allotment within GRSG habitat, and a recent rangeland health determination is already completed and terms and conditions on the current permit reflect any necessary changes to benefit GRSG habitat: Transfer preference and renew permit as appropriate.

i. a recent rangeland health assessment is already completed, but permit has not been fully processed to modify terms and conditions to address any changes necessary to benefit GRSG habitat: review GRSG habitat conditions before approving grazing permit transfers. Where GRSG habitat objectives (**Table 2-2**) are not being met or making significant progress towards being met in an allotment and a significant causal factor was identified as livestock grazing, adjust the annual grazing authorization or operating instructions in accordance with the terms and conditions of the permit, or through 43 CFR 4110, as appropriate to address grazing conflicts prior to the next grazing season.

ii. a rangeland health assessment is not yet completed: in SFAs and PHMAs, review of GRSG habitat conditions is necessary before approving a grazing permit transfer. In GHMAs, review habitat conditions before approving grazing permit transfers when monitoring data or habitat assessment information is available. When data/assessment information indicates current livestock grazing is adversely impacting GRSG and its habitat, adjust the annual grazing authorization or operating instructions within the terms and conditions if possible, or through 43 CFR 4110 as necessary, of the existing grazing permit to address grazing conflicts prior to the next grazing season.

Action LG 10: In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (**Table 2-2**) are met.

Action LG 11: allotments within SFAs, followed by those within PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.

Action LG 12: Grazing management strategies for riparian areas and wet meadows would, at a minimum, maintain or achieve proper functioning

condition (PFC) and promote GRSG brood-rearing habitat objectives (**Table 2-2**) within PHMAs and GHMAs.

Action LG 13: For range improvement projects, review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action LG 14: Build or modify livestock exclosures so that they are large enough to provide hiding cover to GRSG and other wildlife and to reduce the possibility of wildlife collisions with fences (Christiansen 2009; Stevens 2011; NRCS 2012).

Action LG 15: Subject to valid existing rights, remove or modify water developments that are negatively impacting GRSG habitats.

Action LG 16: In accordance with state water law and subject to valid rights, ensure that any water developments (new or existing) do not remove more than 50 percent of water from any spring or other surface water source.

Action LG 17: Authorize new water developments for diversion from spring or seep source, in accordance with state water law and subject to valid existing rights only when PHMAs and GHMAs would benefit from or not be negatively impacted by the new development. This includes developing new water sources for livestock as part of a grazing management plan to improve GRSG habitat.

Action LG 18: Modify water development projects to ensure riparian habitats in PHMAs and GHMAs are being maintained or improved in compliance with valid existing rights and in accordance with state water law.

Action LG 19: Locate salting and supplemental feeding locations, temporary or mobile watering, and new handling facilities (e.g., corrals and chutes) at least 1 mile from riparian areas, springs, and meadows. The distance can be greater based on site-specific conditions.

Action LG 20: In PHMAs and GHMAs, remove livestock ponds built in perennial channels that are negatively impacting riparian habitats, either directly or indirectly, unless riparian access is able to be controlled and negative impacts effectively mitigated (e.g.; water gap fence to pond), and do not permit new ones to be built in these areas subject to valid existing rights. Prior to pond removal, offsite watering options would be examined and considered.

Action LG 21: In PHMA and GHMA, rest areas that have received vegetative treatments from livestock grazing until resource monitoring

data verifies the treatment objectives are being met and an appropriate grazing regime has been developed. Any livestock grazing temporary closures or other management changes for the purpose of a vegetation treatment would be done through the grazing decision, prior to treatment.

Action LG 22: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as grass banks and fire breaks.

Action LG 23: After grazing rest associated with vegetation treatments in PHMAs and GHMAs, monitor annually for a minimum of 5 years to ensure project objectives are being maintained.

Action LG 24: Fences should not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design).

Wild Horses and Burros

Action WHB 1: For WHB management activities (e.g., gathers), review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action WHB 2: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (**Table 2-2**).

Action WHB 3: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g., range, wildlife, and riparian). The priorities for conducting assessments are:

1. HMAs containing SFA;
2. HMAs containing PHMAs, which include riparian areas;
3. HMAs containing only GHMAs;
4. HMAs containing sagebrush habitat outside of PHMAs and GHMAs mapped habitat;
5. HMAs without GRSG habitat.

Action WHB 4: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd

health impacts. Place higher priority on herd areas not allocated as HMAs and occupied by wild horses and burros in SFAs, followed by PHMAs.

Action WHB 5: In SFAs and PHMAs outside SFAs, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting rangeland health standards, even if current AML is not being exceeded.

Action WHB 6: In SFAs and PHMAs outside of SFAs, monitor the effects of WHB use in relation to GRSG habitat objectives (**Table 2-2**) on an annual basis to help determine future management actions.

Action WHB 7: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives (**Table 2-2**) and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFAs and other PHMAs.

Action WHB 8: Consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives (**Table 2-2**) where HMAs overlap with GRSG habitat.

Action WHB 9: When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.

Action WHB 10: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program.

Lands and Realty Actions

Objective LR 1: Manage land use authorizations, including ROWs, leases, permits, and tenure adjustments, to maintain or enhance PHMAs and GHMAs and connectivity.

Land Tenure

Action LR-LT 1: Lands classified as PHMAs and GHMAs for GRSG will be retained in federal management, unless: (1) the agency can demonstrate that disposal of the lands will provide a net conservation gain to GRSG or (2) the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of the GRSG.

Action LR-LT 2: Where significant conservation actions could be achieved in PHMAs and GHMAs, seek to acquire lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore GRSG habitat.

Action LR-LT 3: Manage lands acquired by exchange, purchase or easement as either PHMAs or GHMAs, in consideration of surrounding habitat.

Withdrawals

Action LR-LW 1: Recommend SFAs for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights (see **Figure 1-3**).

Land Use Authorizations and Corridors

Industrial Solar

Action LR-IS 1: Designate PHMAs and GHMAs as ROW exclusion for utility-scale solar energy facilities (those that generate 20 megawatts or more).

Action LR-IS 2: In PHMAs and GHMAs, consider approving solar facilities on existing industrial infrastructure (e.g., a mine site) to generate power on-site. Review Objective SSS 4 and apply Actions SSS 1 through SSS 3 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply Action SSS 4.

Wind Energy Development

Action LR-WD 1: Designate PHMAs as ROW exclusion for utility-scale commercial wind energy facilities (those that generate 20 megawatts or more).

Action LR-WD 2: Within PHMAs, wind facilities associated with existing industrial infrastructure (e.g., a mine site) to provide on-site power generation could be considered for approval, subject to a net conservation gain. Apply Actions SSS 1 through SSS 2 when reviewing and analyzing projects/activities proposed within GRSG habitat.

Action LR-WD 3: Designate GHMAs as ROW avoidance for utility-scale commercial wind energy facilities (i.e., facilities that generate 20 megawatts or more). Review Objective SSS 4 and apply Actions SSS 1 through SSS 3 when reviewing and analyzing projects/activities proposed within GRSG habitat. In OHMAs apply Action SSS 4.

Corridors

Action LR LUA 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action LR LUA 2: Only utility corridors identified on **Figure 2-67** remain as designated corridors in PHMAs and GHMAs. All previously designated corridors in PHMAs and GHMAs not shown on the map that were designated through past land use planning efforts have been evaluated and undesignated.

Action LR LUA 3: On public lands, keep the designated corridors identified on **Figure 2-67** in PHMAs and GHMAs available to new uses, subject to a maximum corridor width of 3,500 feet, unless a narrow width is specified in an existing plan.

High-Voltage Transmission Lines and Major Pipeline ROWs

Action LR-LUA 4: PHMAs and GHMAs are designated as avoidance areas for high voltage transmission line ROWs (>100 kV), except for the transmission project specifically identified below. All authorizations in these areas, other than the excepted project, must comply with the conservation measures outlined in this proposed plan amendment, including the all of the requirements presented in Actions SSS 1 – SSS 4. The BLM is currently processing an application for the TransWest Express transmission line and the NEPA review for this project is well underway. The BLM is analyzing GRSG mitigation measures through the project's NEPA review process.

Action LR-LUA 5: PHMAs and GHMAs are designated as major pipeline (≥24-inch diameter) ROW avoidance areas. Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply Action SSS 4.

Action LR-LUA 6: Issue ROWs only after documenting that they would not adversely affect or disrupt GRSG habitat (independent of disturbance cap), except where such limitation would make accessing valid existing rights impracticable in PHMAs and GHMAs.

Minor ROWs, Permits, and Leases

Action LR-LUA 7: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action LR-LUA 8: Manage PHMAs as avoidance areas for other ROWs (including permits and leases). These do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above.

Action LR-LUA 9: Manage GHMAs as stipulated ROW open areas (including for permits and leases). These do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above.

Action LR-LUA 10: In PHMAs, bury new distribution power and communication lines in existing disturbed areas, unless it would not be technically feasible or the cost would prohibit the proponent from providing the service. Where burying transmission lines is not feasible, locate new transmission lines next to existing linear disturbances, when possible; additional mitigation would be required.

Action LR-LUA 11: When renewing or amending ROWs (including permits and leases), assess the impacts of ongoing use of the ROW on GRSGs and their habitat and minimize such impacts to the extent allowed by law.

Action LR-LUA 12: When renewing or amending ROWs that are undeveloped, work with ROW holders to bury or relocate authorized but undeveloped lines to minimize impacts on PHMAs, unless this would not be technically feasible or would be contrary to policy. Where burying transmission lines is not feasible, locate new transmission lines next to existing linear disturbances, when possible.

Action LR-LUA 13: In PHMAs and GHMAs where existing ROWs, permits, or leases are no longer in use, coordinate with the authorized holder to relinquish the authorization and reclaim the site by removing the infrastructure.

Action LR-LUA 14: Stipulate site relinquishment and reclamation in all new, amended or renewed ROWs, permits, and leases.

Action LR-LUA 15: When issuing new communication site management plans or amending existing plans, include GRSG habitat objectives (**Table 2-2**). Current authorizations would then be amended to reflect the updated communication site management plans.

Action LR-LUA 16: In PHMAs and GHMAs, site new linear features in designated corridors, as identified on **Figure 2-67**, or at a minimum, collocate with existing linear features. Construct new ROWs in designated corridors as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint.

Action LR-LUA 17: Manage landfills and transfer stations on public lands to eliminate opportunities to attract and provide nesting, cover, or perches for predators.

Action LR-LUA 18: Within 4 miles of active and pending leks in GRSG habitat, require ROW, permit, and lease holders to retrofit those portions of power lines and other utility structures with nesting and perch-deterring devices. Do this during the renewal and amendment process if adverse effects, such as increased nest predation, on GRSG populations have been documented. This requirement should be predicated on research and monitoring studies specific to power lines or other utility structures.

Action LR-LUA 19: In PHMAs and subject to valid existing rights, authorize new road ROWs only when necessary for public safety or administrative access, or if it would create no new surface disturbance.

Action LR-LUA 20: Do not manage existing federal and state road easements as PHMAs or GHMAs and exempt them from the management actions associated with PHMAs and GHMAs. Any new modification or adjustments outside of the existing easement would be subject to Actions SSS 1 through SSS 4.

Action LR-LUA 21: In PHMAs and GHMAs, address access to valid existing rights to provide the minimum access necessary to exercise the right and maintain or enhance PHMAs and GHMAs.

Fluid Minerals

Objective FM 1: priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMAs and GHMAs, that are subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).

Objective FM 2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps to guide development of such federal leases.

Unleased Fluid Minerals

Action UFM 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action UFM 2: Manage SFAs as NSO without waivers, exceptions, or modifications (see **Figure 1-3**).

Action UFM 3: In PHMAs outside of SFAs, no waivers or modifications to an oil and gas lease no-surface-occupancy stipulation will be granted. The Authorized Officer may grant an exception to an oil and gas lease no-surface-occupancy stipulation only where the proposed action:

i. Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or,

ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.

Exceptions based on conservation gain (ii) may only be considered in (a) PHMAs of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) Areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal oil and gas lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts (see **Appendix N**).

Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly.

Action UFM 4a: For BLM land in the state of Nevada only, in the portions of the PHMAs outside of SFAs, geothermal projects may be considered for authorization if all of the following conditions are met:

- A team comprised of BLM, FWS, and NDOW specialists advises the BLM State Director on appropriate mitigation measures for the project and its ancillary facilities, including lek buffer distances using the best available science;

- Mitigation actions are consistent with this Plan's mitigation strategy such as the Nevada Conservation Credit System, and;
- The footprint of the project is consistent with the disturbance management protocols identified in this plan (see Action SSS 2 and **Appendix F**)

Action UFM 4b: For BLM lands in California only, manage geothermal leasing in PHMAs in accordance with Action UFM 3 (see **Appendix N**).

Action UFM 5: In GHMAs, manage oil and gas and geothermal fluid minerals with moderate constraints, timing limitations, and controlled surface use stipulations (see **Appendix N**).

Action UFM 6: In PHMAs and GHMAs, allow only geophysical exploration that does not crush sagebrush or create new or additional surface disturbance. Examples of technologies that may meet this requirement are drilling methods using helicopters, articulated rubber-tired vehicles that leave no trace, and vibroseis geophysical operations on roads and bladed shoulders.

Action UFM 7: Prohibit surface shot methods in PHMAs.

Leased Federal Fluid Mineral Estate Actions

Action FM 1: Review Objective SSS 4, and to the extent allowed by law, apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action Lease FM 2: Use directional and horizontal drilling to reduce surface disturbance.

Action Lease FM 3: On leased federal fluid mineral estate, where no APD or geothermal drilling permit (GDP) has been issued, apply RDFs and other conditions of approval (COAs) that conserve GRSG. Manage existing fluid mineral leases through COAs applied at the time APD or GDP is approved.

Action Lease FM 4: On leased federal fluid mineral estate in PHMAs, complete master development plans for oil and gas in lieu of APD-by-APD, or operations/utilization plans for geothermal processing for all but exploration wells.

Action Lease FM 5: On leased, federal, fluid mineral estate in PHMAs, require a full reclamation bond specific to the site. Ensure bonds are sufficient for reclamation costs for full restoration. Base the reclamation costs on the assumption that BLM contractors would perform the work.

Action Lease FM 6: In PHMAs and GHMAs, place infrastructure in already disturbed locations to the extent feasible.

Action Lease FM 7: Locate new compressor stations outside PHMAs and GHMAs and design them to reduce noise that may be directed toward PHMAs and GHMAs (see Actions SSS 2 and SSS 3 and **Appendix K**).

Locatable Minerals

Action LOC 1: Review Objective SSS 4, and to the extent allowed by law, apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action LOC 2: Recommend for withdrawal SFAs under the General Mining Act of 1872, as amended, subject to valid existing rights (see **Figure 1-3**).

Action LOC 3: On public lands, manage disturbances associated with notice-level activity in GRSG habitat on a landscape basis to avoid segmenting a project. Do this by encouraging operators and claimants to consolidate exploration into a plan of operations to reduce the proliferation of mining notices, in accordance with 43 CFR, Part 3809.21(b).

Action LOC 4: Authorize locatable mineral development activity, in accordance with 43 CFR, Part 3809, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the "avoid, minimize and mitigate" process through an applicable mitigation system, such as the Nevada Conservation Credit System.

Action LOC 5: Close or mitigate abandoned mine sites in PHMAs and GHMAs to reduce GRSG predation by eliminating physical structures that could provide nesting opportunities and perching sites for predators.

Salable Minerals

Action SAL 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action SAL 2: PHMAs are closed to new mineral material sales.
However, these areas remain open to free use permits and the expansion of existing active pits only if the following criteria are met:

- The activity is within the biologically significant unit (BSU) and project area disturbance cap
- The activity is subject to the provisions set forth in the mitigation framework (**Appendix I**)

- All applicable required design features are applied; and
- If applicable, the activity is permissible under the specific sub-regional screening criteria (site location in ADPP where this screening process is present)

Action SAL 3: Manage GHMAs as open to existing and new mineral materials disposal sites.

Action SAL 4: Provide reasonable access and development opportunity to Federal Highway Administration, Nevada Department of Transportation (NDOT), California Department of Transportation (Caltrans), counties, tribes and the public for existing mineral material pits in PHMAs and GHMAs.

Nonenergy Leasable Minerals

Action NEL 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action NEL 2: Manage PHMAs as closed to new nonenergy leasable mineral leasing.

Action NEL 3: Consider expanding existing leases in PHMAs.

Action NEL 4: Manage GHMAs as open to new nonenergy leasable mineral leasing.

Mineral Split Estate

Action MSE 1: Review Objective SSS 4, and to the extent allowed by law, apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action MSE 2: Where the federal government owns the mineral estate in PHMAs and GHMAs, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.

Action MSE 3: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMAs and GHMAs, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.

Comprehensive Travel and Transportation Management

Objective CTTM 1: Prioritize and complete transportation planning in PHMAs and GHMAs that provides for reasonable access to public lands for administration and recreation and that minimizes proliferation of user-created routes (e.g., roads, primitive roads, and trails).

Action CTTM 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

Action CTTM 2: In travel management plans that have been completed and are being implemented (e.g., northeastern California plans), continue to limit motorized travel to designated routes in PHMAs and GHMAs. In areas where travel planning has not been completed, limit motorized travel to existing routes in PHMAs and GHMAs until subsequent implementation-level travel planning is completed and a designated route system is established.

Action CTTM 3: Allow the goals, objectives, and actions in relevant national OHV guidance to guide subsequent implementation-level travel planning efforts, as well as by the following:

- Identify, prioritize, and update annually a timeline to complete travel planning in all relevant planning areas to accelerate data collection, route evaluation and selection, and on-the-ground implementation, including signing, monitoring, and rehabilitation.
- Consult with interested user groups, federal, state, county, and local agencies, local landowners, and other parties to provide an opportunity for the public to express itself and have its views considered. Consequently, incorporate a public outreach plan to fully engage all interested stakeholders into future travel management plans.
- Among other route evaluation criteria developed in this plan amendment, incorporate criteria from 43 CFR, Part 8342.1, and specifically section (b), “areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.”
- Evaluate all routes to determine the purpose and need and the potential resource or user conflicts from motorized travel. Where resource or user conflicts outweigh the purpose and need for the route, consider closing the route or relocating it outside of PHMAs and GHMAs. Evaluate for administrative access only routes not required for public access or recreation against current administrative/agency purpose or need.

- Consider closing routes that are duplicative, parallel, or redundant.
- Consider seasonal restrictions (see Actions SSS 2 and SSS 3) on motorized travel use PHMAs and GHMAs where motorized vehicle use is a threat. Consider limiting over snow vehicles (OSVs) designed for use on a track or tracks or a ski or skis, while in use to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through February 28.
- Consider the need for restricting motorized vehicles, including their sound levels (Actions SSS 2 and SSS 3), speed and design (e.g., motorcycles, ATVs, and UTVs).
- Consider scheduling road maintenance to avoid disturbance during sensitive GRSG life-cycle periods to the extent practicable. Consider using time of day, seasonal, and noise restrictions (see Actions SSS 2 and SSS 3) to reduce impacts on GRSG seasonal habitat.
- In PHMAs and GHMAs, close to motorized travel those roads, primitive roads, and trails not designated in travel management plans until they can be restored.
- In PHMAs and GHMAs, prioritize restoring routes not designated in a travel management plan. Obliterate and seed roads, primitive roads, and trails not designated in travel management plans, with appropriate seed mixes and transplanted sagebrush when applicable. Use fire-resistant species as fuel breaks where appropriate. Seed must be certified weed free.

Action CTTM 4: In PHMAs and GHMAs, where new roads are necessary for public safety, administration, or public need, consider limiting route construction to realignments of existing routes where possible.

Action CTTM 5: In PHMAs and GHMAs, work with local governments to minimize upgrading existing routes that would change route category (e.g., road, primitive road, or trail) or capacity, unless the upgrade would maintain or enhance GRSG habitat, provide a fuel break to protect native vegetation, would be necessary for public safety, or would eliminate the need to construct a new road.

Action CTTM 6: In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR, Subpart 8364 (Closures and Restrictions), 43 CFR, Subpart 8351 (Designated National Area), 43 CFR, Subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties), and 43 CFR, Subpart 8341 (Conditions of Use).

Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts

and protect persons, property, and public lands and resources. where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.

Recreation and Visitor Services

Action REC 1: Review Objective SSS 4 and apply Actions SSS 1 through SSS 4 when analyzing projects and activities proposed in GRSG habitat.

Action REC 2: Allow special recreation permits in PHMAs and GHMAs only if their effects on GRSG and its habitat are neutral or result in a net conservation gain.

Action REC 3: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development would have a net conservation gain to GRSG and its habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.

Action REC 4: Develop trail mapping and educational campaigns in PHMAs and GHMAs to reduce recreational impacts on GRSG and their habitat, including the effects of cross-country travel.

Tribal Interests

Action TI 1: Do not restrict tribal access to view GRSG breeding behavior for a tribe's traditional lifeways.

Action TI 2: Do not prohibit tribal access to traditional locations for cultural practices in PHMAs and GHMAs.

Action TI 3: Do not prohibit tribal collection of seeds, vegetation, or medicinal plants related to traditional cultural practices in PHMAs and GHMAs.

Adaptive Management

Action AM-1: As site-specific GRSG data (habitat assessments, lek counts, telemetry, etc.) is collected, it will be included into future modeling

efforts using the "*Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California*" (Coates et al. 2014) to reflect the most up-to-date spatial representation of GRSG habitat management categories. Through plan maintenance or plan amendment, the updated modeling efforts will be adopted and appropriate allocation decisions and management actions will be applied to PHMA, GHMA, and OHMA. Future modeling efforts will utilize the same modeling methods (as described under *Methods and Results* in Coates et al. 2014) used to develop the current Nevada and Northeastern California Sub-regions' GRSG habitat management categories. The addition of site-specific GRSG data will allow for the refinement of the spatial representation of the GRSG habitat management categories.

Action AM 2: A BSU that has hit a soft trigger due to vegetation disturbance would be a priority for restoration treatments consistent with FIAT (**Appendix G**).

Action AM 3: Once a hard trigger has been reached, all responses in **Table 2-9** and **Table 2-10** would be implemented. This includes where soft triggers have been reached for both population and habitat.

Action AM 4: When a hard trigger is hit in a PAC that has multiple BSUs, including those that cross state lines, the WAFWA GRSG Conservation Team will convene to determine the cause, will put project level responses in place, as appropriate, and will discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs in the PAC and will invoke the appropriate plan response. Adopting any further actions at the plan level may require initiating a plan amendment process.

Action AM 5: Project-level authorizations that have the potential to affect GRSG or its habitat will include an adaptive management strategy that has been analyzed in the NEPA document. Once a soft trigger has been reached, project-specific adaptive management strategies would be implemented.

Action AM 6: Project authorizations (with the possible exception of short duration activities outside of seasonal GRSG habitats) would require that active and pending leks be monitored annually within 4 miles of disturbance until the use terminates and all disturbances have been restored. The proponent would fund the services of an independent qualified biologist approved by the BLM, in coordination with NDOW or CDFW.

Action AM 7: In making amendments to this plan, the BLM will coordinate with the FWS as BLM continues to meet its objective of

conserving, enhancing and restoring GRSG habitat by reducing, minimizing or eliminating threats to GRSG and its habitat.

Required Design Features

RDFs are meant for certain activities in all GRSG habitats. They establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be assessed at the project level until the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project or activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project or activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.
- A specific RDF will provide no additional protection to GRSG or its habitat.

The RDFs are presented in **Appendix D**.

Appendix C: Forest Service Proposed Plan Amendment

Forest Service Plan Components

Desired conditions - A description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but do not include completion dates. (36 CFR 219.7(e)(1)(i)) FSH 1909.12, Chapter 20)

Guideline – A constraint on project and activity decision making that allows for departure from its terms, so long as the purpose of the guideline is met. (§ 219.15(d)(3)). Guidelines are established to help achieve or maintain a desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. (36 CFR 219.7(e)(1)(iv); FSH 1909.12, Chapter 20)

Objective - A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets. (36 CFR 219.9(e)(1)(ii)) FSH 1909.12, Chapter 20)

Standard - A mandatory constraint on project and activity decision making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. (36 CFR 219.7(e)(1) (iii)) FSH 1909.12, Chapter 20)

General Greater Sage-grouse

GRSG-GEN-DC-001-Desired Condition – The landscape for greater sage-grouse encompasses large contiguous areas, approximately 6 to 62 square miles in area, to provide for multiple aspects of species life requirements. In these landscapes, a variety of sagebrush-community compositions exist, with variations in subspecies composition, co-dominant vegetation, shrub cover, herbaceous cover, and stand structure, to meet seasonal requirements for food, cover, and nesting for greater sage-grouse.

GRSG-GEN-DC-002-Desired Condition – Anthropogenic disturbance is focused in non-habitat areas outside of priority and general habitat management areas and sagebrush focal areas[16]. Disturbance in general habitat management areas is limited, and there is little to no disturbance in priority habitat management areas and sagebrush focal areas except for valid existing rights and existing authorized uses.

GRSG-GEN-DC-003-Desired Condition – In greater sage-grouse management areas, including all seasonal habitats, 70% of lands capable of producing sagebrush have 10 to 30% sagebrush canopy cover and less than 10% conifer canopy cover. In addition, in breeding and nesting

[16]Suitable greater sage-grouse habitat within polygons identified as priority or general habitat management areas. Areas of non-habitat within a polygon are not included as part of any priority or general habitat management areas. Sagebrush focal areas may include areas of non-habitat.

habitat, sufficient herbaceous vegetation structure and height provides overhead and lateral concealment for nesting and early brood rearing life stages. In brood rearing habitat, wet meadows and riparian areas sustain forbs with a rich diversity of perennial forb species relative to site potential. In winter habitat, sufficient sagebrush height and density provides food and cover for greater sage-grouse during this seasonal period. Specific desired conditions for greater sage-grouse based on seasonal habitat requirements are in tables 1a and 1b.

Table 1a. Seasonal Habitat Desired Conditions for Greater Sage-grouse (Ecoregion 342).

ATTRIBUTE	INDICATORS	DESIRED CONDTION
BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1 to June 30) Apply 4.0 miles from active leks. [4]		
Lek Security	Proximity of trees [5]	Trees to uncommon in 1.86 miles (3 km) of leks [6,7]
	Proximity of sagebrush to leks [6]	Adjacent protective sagebrush cover in 328 feet of lek [6]
Cover	Seasonal habitat extent [7]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [6,7,8]	>15%
	Sagebrush height [7] Arid sites [,6,7,9] Mesic sites [,6,7,10]	 > 12 inches >16 inches
	Predominant sagebrush shape [6]	>50% in spreading [11]
	Perennial grass cover [,6,7] Arid sites [7,9] Mesic sites [7,10]	 ≥10% ≥15%
	Perennial grass height [,6,7,8]	Provide overhead and lateral concealment from predators [7]
	Perennial forb canopy cover [,6,7,8] Arid sites [9] Mesic sites [10]	 ≥5%[,6,7] ≥10%[,6,7]
BROOD-REARING/SUMMER[1] (Seasonal Use Period May 15 to September 15)		
Cover	Seasonal habitat extent [7]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [6,7,8]	10 to 25%
	Sagebrush height [7,8]	> 16 inches
	Perennial grass canopy cover and forbs [6,7]	>15%
	Riparian areas/mesic meadows	Proper Functioning Condition [12]
	Upland and riparian perennial forb availability [5,6]	Preferred forbs are common with several preferred species present [13]
Security	Riparian Area/Meadow Interspersion with adjacent sagebrush	Has adjacent sagebrush cover[5, 6]
WINTER/FALL[1] (Seasonal Use Period September 1 to February 28)		
Cover and Food	Seasonal habitat extent[6,7,8]	>80% of the winter habitat
	Sagebrush canopy cover above snow [6,7,8]	>10%
	Sagebrush height above snow [6,7,8]	>10 inches [14]

[1]Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.
[2]Doherty, K. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. University of Montana. Missoula, MT.
[3]Holloran and Anderson. 2005. *Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats*. Condor 107:742-752.
[4]Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[5]Baruch-Mordo, S. J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. . 2013. *Saving sage-grouse from trees*: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.
[6]Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl, eds. 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.
[7]Connelly, J. M. A. Schroweder, A.R. Sands, and C.E. Braun.2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28 (4): 967-985.

ATTRIBUTE	INDICATORS	DESIRED CONDTION

[8] Connelly, J. K. Reese, and M. Schroder. 2003. *Monitoring of Greater sage-grouse habitats and populations*. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.
[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (HAF 2014).
[10] ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (HAF 2014).
[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (HAF 2014).
[12] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.
[13] Preferred forbs are listed in HAF Table III-2 (HAF 2014). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.
[14] The height of sagebrush remaining above the snow depth depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

Table 1b. Seasonal Habitat Desired Conditions for Greater Sage-grouse (Ecoregion 341).

ATTRIBUTE	INDICATOR	DESIRED CONDITION
GENERAL/LANDSCAPE-LEVEL		
Cover (Nesting)	Seasonal Habitat Needed	>65% of the landscape in sagebrush cover[1]
	Annual Grasses	< %5[3]
Security (Nesting)	Conifer encroachment	<3% phase I (>0% to <25% cover) No phase II (25 – 50% cover) No phase III (>50% cover)
Cover and Food (Winter)	Conifer encroachment	<5% phase I (>0% to <25% cover) No phase II (25 – 50% cover) No phase III (>50% cover)
	Sagebrush extent	>85% sagebrush land cover
LEK		
Cover	Availability of sagebrush cover	Has adjacent sagebrush cover[7,15]
Security [4]	Pinyon and/or Juniper cover	<3% landscape canopy cover in 1 km of leks[2]
	Proximity of tall structures (1 meter above shrub canopy)	None in 3 miles (5 kilometers)[16]
NESTING		
Cover	Sagebrush canopy cover	≥20%[11,12]
	Residual and live perennial grass cover	≥10% if shrub cover <25%[2,6,5]
	Annual grass cover [5]	<5%[13]
	Perennial grass height	Provide overhead and lateral concealment from predators[7]
	Total shrub cover	≥30%[5,11]
Security	Proximity of tall structure (1 meter above shrub canopy)	None in 3 miles[16]
BROOD-REARING/SUMMER		
Cover	Sagebrush canopy cover	10-25%[7]
	Perennial grass canopy cover and forbs	>15% combined perennial grass and forb canopy cover[7]
Cover and Food	Perennial forb canopy cover	≥5% arid (<10 inches precipitation) ≥15% mesic (> 10 inches or meadow system)
Food	Riparian Areas/Meadows	Proper Functioning Condition[15]
	Understory species richness (in the vicinity of riparian areas/meadows)	≥ 5% preferred forb species present[3,4]
Security	Riparian Area/Meadow Interspersion with adjacent sagebrush	Has adjacent sagebrush cover[7,15]
WINTER		
Cover and Food	Sagebrush canopy cover	≥10% above snow depth[7]
	Sagebrush height	>9.8 inches

ATTRIBUTE	INDICATOR	DESIRED CONDITION
		(25 centimeters) above snow depth[7]

[1]Aldridge, C. L.; Boyce, M. S. 2007. Linking occurrence and fitness to persistence: Habitat-based approach for endangered Greater Sage-Grouse. Ecological Applications, 17: 508 – 526.
[2]Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas, J. M. Kiesecker, M. J. Falkowski, C. a. Hagen, and K. P. Reese. 2013. Saving sage-grouse from the trees: a proactive solution to reducing a key threat to a candidate species. Biological Conservation 167:233–241.
[3]Blomberg, E.J., J.S. Sedinger, M.T. Atamian, and D.V. Nonne. 2012. Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations. Ecosphere 3(6):55.
[4]Casazza, M.L., P.S. Coates, C.T. Overton. 2011. Linking habitat selection to brood success in greater sagegrouse. In: Sandercock, MK, K Martin, G Segelbacher (eds.). Ecology, Conservation, and Management of Grouse. University of California Press. Pp. 151-167.
[5]Coates, P.S., and D.J. Delehanty. 2010. Nest predation of greater sage-grouse in relation to microhabitat factors and predators. Journal of Wildlife Management 74:240-248.
[6]Coates, P. S., M. L. Casazza, E. J. Blomberg, S. C. Gardner, S. P. Espinosa, J. L. Yee, L. Wiechman, and B. J. Halstead. 2013. Evaluating greater sage-grouse seasonal space use relative to leks: implications for surface use designations in sagebrush ecosystems. Journal of Wildlife Management 77: 1598–1609.
[7]Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.
8.Connelly, J.W., Reese, K.P., M.A. Schroeder. 2003. Monitoring of Greater Sage-Grouse Habitats and Populations. Station Bulletin 80.
[9]Doherty, K.E., Naugle, D.E., Walker, B.L., and J.M. Graham. 2008. Greater Sage-Grouse Winter Habitat Selection and Energy Development. Journal of Wildlife Management: 72(1):187-195. 2008.
[10]Hagen, C.A., Connelly, J.W. & Schroeder, M.A. 2007: A meta-analysis of greater sage-grouse (Centrocercus urophasianus) nesting and brood-rearing habitats. - Wildlife Biology: 13 (Suppl. 1): 42-50.
[11]Kolada, E.J., J.S. Sedinger, M.L. Casazza. 2009a. Nest site selection by greater sage-grouse in Mono County, California. Journal of Wildlife Management 73:1333-1340.
[12]Kolada, E.J., J.S Sedinger, M.L. Casazza. 2009b. Ecological factors influencing nest survival of greater sage-grouse in Mono County, California. Journal of Wildlife Management 73:1341-1347.
[13]Lockyer, Z., P.S. Coates, M.L. Casazza, S. Espinosa, D.L. Delehanty. In review. Linking nest site selection to nest survival in greater sage-grouse.
[14]Nevada Governor's Sage-grouse Conservation Team. 2010. Nevada energy and infrastructure development standards to conserve greater sage-grouse populations and their habitats. Pp 9-11.
[15]Stiver, S.J., E.T Rinkes, and D.E. Naugle. (in press). Sage-grouse Habitat Assessment Framework. U.S. Bureau of Land Management. Unpublished Report. U.S. Bureau of Land Management, Idaho State Office, Boise, Idaho.

GRSG-GEN-ST-001-Standard – In priority habitat management areas and sagebrush focal areas, do not issue new discretionary written authorizations unless all existing discrete anthropogenic disturbances cover less than 3% of the total greater sage-grouse habitat in the Biologically Significant Unit and the proposed project analysis area, regardless of ownership, and the new use will not cause exceedance of the 3% cap (Appendix Z – Disturbance Cap Guidance). Discretionary activities that might result in disturbance above 3% at the Biologically Significant Unit or proposed project analysis scale would be prohibited unless approved by the forest supervisor with concurrence from the regional forester after review of new or site-specific information that indicates the project could occur without significant impacts to greater sage-grouse or that the project could be modified to result in a net conservation gain at the Biologically Significant Unit scale.

GRSG-GEN-ST-002-Standard – In priority and general habitat management areas and sagebrush focal areas, only allow new authorized land uses if the residual impacts to greater sage-grouse or their habitats are fully offset by compensatory mitigation projects that provide a net conservation gain to the species, which will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Any compensatory mitigation will be durable, timely, and in addition to what would have resulted without the compensatory mitigation as addressed in the Mitigation Framework (Appendix X).

GRSG-GEN-GL-001-Guideline – During lekking (March 1 to May 15) surface disturbing and disruptive activities, including noise at 10 dB above ambient (not to exceed 20-24 dB) to lekking birds should be restricted from 6 pm to 9 am at a distance of 3.1 miles from the perimeter of an occupied lek.

GRSG-GEN-GL-002-Guideline – During breeding and nesting (March 1 to June 30), surface disturbing and disruptive activities to nesting birds should be restricted.

GRSG-GEN-GL-003-Guideline - In priority and general habitat management areas and sagebrush focal areas, conduct surveys during the breeding season during pre-planning operations. Use protocols such as those established by State Fish and Wildlife agencies. The surveys should encompass all suitable greater sage-grouse habitats in 4 miles of the proposed activities.

GRSG-GEN-GL-004-Guideline - When breeding and nesting habitat overlaps with other seasonal habitats, habitat should be managed for breeding and nesting desired habitat conditions.

GRSG-GEN-GL-005-Guideline – Development of tall structures in 3.0 miles from the perimeter of occupied leks, as determined by local conditions (such as vegetation or topography), with the potential to disrupt breeding or nesting by creating new perching/nesting opportunities for avian predators or by decreasing the use of an area, should be restricted in nesting habitat.

Adaptive Management

GRSG-AM-ST-001-Standard – If a hard trigger is reached, as described in Section 2.7.1, based on either population monitoring or habitat monitoring immediate action is necessary to stop a severe deviation from GRSG conservation objectives. The hard trigger responses are identified in Table 2-9 and Table 2-10 for both priority and general management areas.

GRSG-AM-ST-002-Standard – If a soft trigger is reached as described in Section 2.7.1, based on either population monitoring or habitat monitoring apply more conservative or restrictive implementation measures (e.g., extending seasonal restrictions for seasonal surface disturbing activities, modifying seasons of use for livestock grazing, and applying additional restrictions on discretionary activities) for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions.

Lands and Realty

Special Use Authorizations (non recreation)

GRSG-LR-SUA-O-001-Objective - In priority and general habitat management areas and sagebrush focal areas, retrofit existing tall structures (e.g., power poles, cellular towers) with perch deterrents or other anti-perching devices in 2 years of signing the Record of Decision.

GRSG-LR-SUA-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, restrict issuance of new lands special use authorizations that authorize infrastructure, such as high-voltage transmission lines, major pipelines, hydropower, distribution

lines, and cellular towers. Exceptions must be limited and based on rationale (e.g., monitoring, modeling, or best available science) that explicitly demonstrates that adverse impacts to greater sage-grouse will be avoided with the exception.

GRSG-LR-SUA-ST-002-Standard – In priority and general habitat management areas and sagebrush focal areas, do not authorize temporary lands special uses (i.e., facilities or activities) that result in loss of habitat or would have long-term (i.e., greater than 5 years) negative impact on greater sage-grouse or their habitats.

GRSG-LR-SUA-ST-003-Standard – In priority and general habitat management areas and sagebrush focal areas, require protective stipulations (e.g., noise, tall structure, guy wire removal, perch deterrent installation) when issuing new authorizations or during renewal, amendment, or reissuance of existing authorizations that authorize infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers).

GRSG-LR-SUA-ST-004-Standard – In priority and general habitat management areas and sagebrush focal areas, locate upgrades to existing transmission lines in the existing designated corridors unless an alternate route would benefit greater sage-grouse or their habitats.

GRSG-LR-SUA-ST-005-Standard - In priority and general habitat management areas and sagebrush focal areas, when a lands special use authorization is revoked or terminated, the authorization holder must remove overhead lines and other surface infrastructure in compliance with 36 CFR 251.60(i).

GRSG-LR-SUA-ST-006-Standard - In priority and general habitat management areas and sagebrush focal areas, if the potential long-term (greater than 5 years) impacts of mitigation (e.g., relocation or burying) to greater sage-grouse or their habitats are greater than the potential impacts from new lands special use authorizations, do not pursue the mitigation. If mitigation is not feasible or would result in short-term (less than 5 years) or long-term impacts, incorporate additional terms and conditions in the special use authorization for protection of greater sage-grouse or their habitats.

GRSG-LR-SUA-ST-007-Standard – In priority and general habitat management areas and sagebrush focal areas, co-locate new infrastructure (e.g., high-voltage transmission lines, major pipelines, roads, distribution lines, and cellular towers) in existing infrastructure to limit disturbance to the smallest footprint, or where it best limits impacts to greater sage-grouse or their habitats. When co-location of new infrastructure cannot be accomplished, locate it adjacent to existing infrastructure, roads, or already disturbed areas. New communication tower sites may be authorized for public safety.

GRSG-LR-SUA-GL-001-Guideline – In priority habitat management areas and sagebrush focal areas, outside of existing designated corridors, new transmission lines and pipelines should be buried to limit disturbance to the smallest footprint unless explicit rationale is provided that the

biological impacts to greater sage-grouse are being avoided. When new transmission lines and pipelines are not buried, locate them adjacent to existing transmission lines and pipelines.

Land Ownership Adjustments

GRSG-LR-LOA-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, prohibit land ownership adjustments unless the action results in a net conservation gain to greater sage-grouse or it will not directly or indirectly adversely impact greater sage-grouse conservation.

GRSG-LR-LOA-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas with minority Federal ownership, consider land ownership adjustments to achieve a landownership pattern (e.g., consolidation, reducing fragmentation) that supports improved greater sage-grouse population trends and habitats.

Land Withdrawal

GRSG-LR-LW-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas, utilize land withdrawals as a tool, where appropriate and subject to valid existing rights, to prevent activities that will be detrimental to greater sage-grouse or their habitats.

Wind and Solar

GRSG-WS-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, prohibit new solar utility-scale and/or commercial energy development except for on-site power generation associated with existing industrial infrastructure (e.g., mine site).

GRSG-WS-ST-002-Standard - In priority habitat management areas and sagebrush focal areas, prohibit new wind energy utility-scale and/or commercial development.

GRSG-WS-GL-001- Guideline – In general habitat management areas, new wind energy utility-scale and/or commercial development should be avoided. If development cannot be avoided due to existing authorize uses, adjacent developments, or split estate issues, then ensure that stipulations are incorporated into the authorization to protect greater sage-grouse and their habitats.

Greater Sage-grouse Habitat

GRSG-GRSG-DC-001-Desired Condition -Sagebrush vegetative communities provide contiguous habitat for greater sage grouse, which is resistant and resilient to disturbances such as fire and invasives. Appendix X - *Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: A strategic multi-scale approach* identifies the concepts of resistance and resilient.

GRSG-GRSGH-O-001-Objective – Every 10 years for the next 50 years, improve greater sage-grouse habitat by removing invading conifers and other undesirable species in the number of acres shown in table 2.

Table 2. Treatment Acres per Decade.[1]

ACRES			
FOREST	**MECHANICAL[2]**	**PRESCRIBED FIRE[3]**	**GRASS RESTORATION[4]**
Humboldt-Toiyabe Total	202000	0	43000
Population Area 15	200000	0	26000
Population Area 26	2000	0	17000

[1]These are estimates of treatments required to achieve and/or maintain desired habitat conditions over a period of ten years. There are many dynamic and highly variable disturbances that may happen over that period of time that could have a significant effect on the amount, type, and timing of treatment needed. Those disturbances are factored into the ten-year simulation using stochastic, not predictive, techniques. Probabilities of events such as large wildfires are used in the model to make the simulation as realistic as possible, given empirical data about such events in the past, but the results of the simulation cannot be used to predict the future occurrence of such events, including their timing, size, or location, which are essentially random.
[2]Removal of conifers that have invaded sagebrush including phase one juniper that is 10% or less and reducing sagebrush cover in areas over 30% canopy cover
[3]Acres are those that are greater than 30% sagebrush canopy cover and/or invaded by 10% or greater conifer.
[4]Acres presently dominated by annual grasses that could be improved by herbicide application and seeding of perennial vegetation.

GRSG-GRSGH-ST-001-Standard – Design habitat restoration projects to move towards desired conditions (table 1a or 1b) and incorporate the concepts outlined in Appendix X.

GRSG-GRSGH-GL-001-Guideline – Sagebrush removal in greater sage-grouse breeding and nesting and wintering habitats should be avoided unless necessary to support attainment of desired habitat conditions (table 1a or 1b).

GRSG-GRSGH-GL-002-Guideline – – When removing conifers that are encroaching into greater sage-grouse habitat, avoid persistent woodland (old growth relative to the site or more than 100 years old).

GRSG-GRSGH-GL-003-Guideline – In priority and general habitat management areas and sagebrush focal areas, actions and authorizations should include design features to limit the spread and effect of undesirable non-native plant species.

GRSG-GRSGH-GL-004-Guideline - To facilitate safe and effective fire management actions, in priority and general habitat management areas and sagebrush focal areas, fuels treatments should be designed to reduce the spread and intensity of wildfire in high-risk areas (i.e., areas of increased potential for ignition and in areas where there is a potential for wildfire that would be difficult for suppression resources to contain and control).

GRSG-GRSGH-GL-005-Guideline - In priority and general habitat management areas and sagebrush focal areas, native plant species should be used, when possible, to restore, enhance, or maintain desired habitat conditions (table 1a or 1b).

GRSG-GRSGH-GL-006-Guideline – In priority habitat management areas and sagebrush focal areas, vegetation treatment projects should only be conducted if they restore, enhance, or maintain desired habitat conditions (table 1a or 1b).

GRSG-GRSGH-GL-007-Guideline - Vegetative treatment activities in lentic riparian areas (i.e., seeps, springs, and wet meadows) in priority and general habitat management areas and

sagebrush focal areas, should only be authorized if they maintain or improve conditions to meet greater sage-grouse desired conditions (table 1a or 1b).

GRSG-GRSGH-GL-008-Guideline – When authorizing vegetation management treatments in priority, sagebrush focal, and general sage grouse habitat management areas, priority should be given to treatments in Phase I and early Phase II pinyon and/or juniper stands in areas with a sagebrush component. Pinyon-Juniper treatments in Phase I and Phase II condition should be designed to maintain or enhance sagebrush in the treatment areas. Treatments in late Phase II or Phase III condition should only be authorized to create movement corridors, connect habitats, or reduce the potential for catastrophic fire.

GRSG-GRSGH-GL-009-Guideline: In priority and general habitat management areas and sagebrush focal areas, treatment methodologies should be based on the treatment areas' resistance to annual invasive grasses and the resilience of native vegetation to respond after disturbance. Use mechanical treatments (i.e., do not use fire) in areas with relatively low resistance to annuals and treat areas in early- to mid-phase pinyon-juniper expansion.

Livestock Grazing

GRSG-LG-DC-001-Desired Condition – In priority and general habitat management areas and sagebrush focal areas, livestock grazing is managed to provide for adequate nesting, breeding, and winter vegetation cover (tables 1a and 1b).

GRSG-LG-ST-001-Standard – In priority, sagebrush focal, and general management areas, prohibit construction of water developments unless beneficial to greater sage-grouse habitat consistent with State approved water rights.

GRSG-LG-ST-002-Standard – When vertical embankments in water troughs or open water facilities pose a drowning risk to birds, wildlife escape ramps should be installed and maintained.

GRSG-LG-GL-001-Guideline - Grazing guidelines should be applied in each of the seasonal habitats in table 3. If values in table 3 guidelines cannot be achieved based upon a site-specific analysis using Ecological Site Descriptions, long-term ecological site capability analysis, or other similar analysis, adjust grazing management to move towards desired habitat conditions in table 1a or 1b consistent with the ecological site capability. Do not use drought and degraded habitat condition to adjust values. Grazing guidelines in table 3 would not apply to isolated parcels of National Forest System lands that have less than 200 acres of greater sage-grouse habitat.

Table 3. Grazing Guidelines for Greater Sage-grouse Seasonal Habitat.

Seasonal Habitat	Grazing Guidelines
Breeding and nesting [1] in 4 miles	Perennial grass height: [2]

of active or pending leks	When grazing occurs during breeding and nesting season (March 1 to June 30) manage for upland perennial grass height of 7 inches [3,4,5] When grazing occurs post breeding and nesting season (July 1 to September 1) manage for 4 inches of perennial grass height. [4,5,6]
Brood rearing and summer [1]	Retain an average stubble height of 4 inches for herbaceous riparian/mesic meadow vegetation. [5,7,8]
Winter/Fall [1]	≤35% use of sagebrush

[1] For descriptions of Seasonal Habitat and Seasonal Periods of greater sage-grouse see table 1a and 1b.
[2] Grass heights only apply in breeding and nesting habitat with ≥10% sagebrush cover to support nesting.
[3] Holloran, M. J., B. J. Heath, A. G. Lyon, S. J. Slater, J. L. Kuipers, and S. H. Anderson. 2005. Greater sage-grouse nesting habitat selection and success in Wyoming. Journal Wildlife Management 69:638-649.
[4] Average droop height, assuming current vegetation composition has the capability to achieve these heights. Heights will be measured at the end of the nesting period (Connelly, 2000).
[5] Hagen C., J.W. Connelly, and M.A. Schroeder. 2007. *A meta-analysis of greater sage-grouse Centrocercus urophasianus nesting and brood-rearing habitats.*
[6] Stubble height to be measured at the end of the growing season.
[7] Crawford , J.A., R.A. Olson. N.E. West, J.C. Mosley, M.A. Schroeder, T.D. Whitson, R.F. Miller, M.A. Gregg, and C.S. Boyd. 2004. Ecology and Management of sage-grouse and sage-grouse habitat. Journal of Range Management 57:2-19. "In riparian brood-rearing habitat, sage-grouse prefer the lower vegetation (5-15 cm (2-6 in) vs. 30-50 cm (12-20 in); Oakleaf 1971, Neel 1980, Klebenow 1982, Evans 1986) and succulent forb growth stimulated by moderate livestock grazing (Neel 1980, Evans 1986). "Moderate use equates to a 10-cm residual stubble height for most grasses and sedges."
Wildlife Biology 13(1): 42-50.
[8] Stubble height to be measured in the meadow areas used by greater sage-grouse for brood-rearing (not on the hydric greenline).

GRSG-LG-GL-002-Guideline – In priority, sagebrush focal, and general management areas, consider closure of grazing allotments, pastures, or portions of pastures, or managing the allotment as a forage reserve as opportunities arise under applicable regulations, where removal of livestock grazing would enhance the ability to achieve desired habitat conditions (table 1a or 1b).

GRSG-LG-GL-003-Guideline – Bedding sheep and locating camps in 2.0 miles from the perimeter of a lek during lekking (March 1 to May 15) should be restricted.

GRSG-LG-GL-004-Guideline – During breeding and nesting season (March 1 to June 30), trailing livestock through breeding and nesting habitat should be minimized. Specific routes should be identified, existing trails should be used, and stopovers on active leks should be restricted.

GRSG-LG-GL-005-Guideline – Fences should not be constructed or reconstructed in 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design).

GRSG-LG-GL-006-Guideline –New permanent livestock facilities (e.g., windmills, water tanks, corrals) should not be constructed in 1.2 miles from the perimeter of occupied leks.

Fire Management

GRSG-FM-ST-001-Standard– In priority and general habitat management areas and sagebrush focal areas, do not use prescribed fire, except for pile burning, in 12-inch or less precipitation zones unless necessary to facilitate site preparation for restoration of greater sage-grouse habitat consistent with desired conditions in table 1a or 1b.

GRSG-FM-ST-002-Standard – In priority and general habitat management areas and sagebrush focal areas, if it is necessary to use prescribed fire to facilitate site preparation for restoration of greater sage-grouse habitat consistent with desired conditions in table 1a or 1b, the associated NEPA analysis must identify how greater sage-grouse desired conditions would be met, why alternative techniques were not selected, and how potential threats to greater sage-grouse habitat would be minimized.

GRSG-FM-GL-001-Guideline – In wintering or breeding and nesting habitat, sagebrush removal or manipulation, including prescribed fire, should be restricted unless the removal strategically reduces the potential impacts from wildfire.

GRSG-FM-GL-002-Guideline – In priority and general habitat management areas and sagebrush focal areas, when reseeding in fuel breaks, fire resistant native plant species should be used if available, or consider using fire resistance nonnative species to meet resource objectives.

GRSG-FM-GL-003-Guideline – In priority and general habitat management areas and sagebrush focal areas, fuel treatments should be designed to restore, enhance, or maintain greater sage-grouse habitat.

GRSG-FM-GL-004-Guideline – Locating temporary wildfire suppression facilities (e.g., incident command posts, spike camps, helibases, mobile retardant plants) in priority and general habitat management areas and sagebrush focal areas should be restricted.

GRSG-FM-GL-005-Guideline - In priority and general habitat management areas and sagebrush focal areas, cross-country vehicle travel during fire operations should be restricted whenever safe and practical to do so, as determined by fireline leadership, incident commanders, etc.

GRSG-FM-GL-006-Guideline – In priority and general habitat management areas and sagebrush focal areas, burnout operation areas should be avoided by constructing direct fire lines, whenever safe and practical to do so, to improve suppression effectiveness and minimize loss of existing sagebrush habitat as determined by fireline leadership, incident commanders, etc.

GRSG-FM-GL-007-Guideline – In priority and general habitat management areas and sagebrush focal areas, prescribed fire prescriptions should minimize undesirable effects on vegetation and/or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of hydrophobicity).

GRSG-FM-GL-008-Guideline - In priority and general habitat management areas and sagebrush focal areas, roads and natural fuel breaks should be incorporated into fuel break design to improve effectiveness and minimize loss of existing sagebrush habitat.

GRSG-FM-GL-009-Guideline - In priority and general habitat management areas and sagebrush focal areas, all fire-associated vehicles and equipment should be power-washed before entering and exiting the area to minimize the introduction of undesirable invasive plant species.

GRSG-FM-GL-010-Guideline - Unit-specific greater sage-grouse fire management toolboxes containing maps, lists, contact information for qualified resource advisors, local guidance, and relevant information should be developed.

GRSG-FM-GL-011-Guideline – Localized maps of priority and general habitat management areas and sagebrush focal areas should be provided to dispatch officers and extended attack incident commanders to use when prioritizing wildfire suppression resources and designing suppression tactics.

GRSG-FM-GL-012-Guideline - In or near priority and general habitat management areas and sagebrush focal areas, a greater sage-grouse resource advisor should be assigned to all extended attack fires.

GRSG-FM-GL-013-Guideline – On critical fire weather days, available fire suppression resources should be pre-positioned to optimize a quick and efficient response into priority and general habitat management areas and sagebrush focal areas.

GRSG-FM-GL-014-Guideline - During periods of multiple fires, line officers should be involved in setting priorities to help protect priority and general habitat management areas and sagebrush focal areas.

GRSG-FM-GL-015-Guideline – In priority and general habitat management areas and sagebrush focal areas, consider using fire retardant and mechanized equipment only if it is likely to result in minimizing burned acreage.

GRSG-FM-GL-016-Guideline – In priority and general habitat management areas and sagebrush focal areas, to minimize sagebrush loss, mop-up should be conducted where the burned areas adjoin unburned islands, doglegs, or other habitat features, as safety and available allows.

Wild Horse and Burro

GRSG-HB-DC-001-Desired Condition – In priority and general habitat management areas, wild horse and burro populations are managed in established appropriate management levels to restore, enhance, or maintain greater sage-grouse desired habitat conditions (table 1a or 1b).

GRSG-HB-ST-001-Standard – In priority and general habitat, adjust established appropriate management levels if greater sage-grouse management standards are not met due to degradation that can be at least partially attributed to wild horse or burro populations.

GRSG-HB-ST-002-Standard - In priority and general management areas, remove wild horses and burros outside of a wild horse and burro territory.

GRSG-HB-GL-001-Guideline - In priority and general habitat, herd gathering should be prioritized when wild horse and burro populations exceed the upper limit of the established appropriate management level.

GRSG-HB-GL-002-Guideline - In priority and general habitat, wild horse and burro population levels should be managed at the lower limit of established appropriate management level ranges.

GRSG-HB-GL-003-Guideline – In priority and general habitat, consider removals or exclusion of wild horse or burros immediately following emergency situation (such as fire, floods, and drought).

Recreation

GRSG-R-DC-001-Desired Condition – In priority and general habitat management areas and sagebrush focal areas, existing and new recreation special use authorizations and expansion of special use authorizations restrict effects to greater sage-grouse and their habitats.

GRSG-R-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, do not authorize temporary recreation uses (i.e., facilities or activities) that result in loss of habitat or would have long-term (greater than 5 years) negative impacts on greater sage-grouse or their habitats.

GRSG-R-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas, terms and conditions that protect and/or restore greater sage-grouse habitat in the permit area should be included in new recreation special use authorizations. During renewal, amendment, or reauthorization, terms and conditions in existing permits and operating plans should be modified to protect and/or restore greater sage-grouse habitat.

GRSG-R-GL-002-Guideline – In priority and general habitat management areas and sagebrush focal areas, new recreational facilities or expansion of existing recreational facilities (e.g., roads, trails, campgrounds), including special use authorizations for facilities and activities, should not be approved unless the development results in a net conservation gain to greater sage-grouse and/or their habitats or the development is required for visitor safety.

GRSG-R-GL-003-Guideline - During breeding and nesting (March 1 to June 30), outfitter-guide activities in 0.25 mile from the perimeter of active leks should not be authorized.

Roads/Transportation

GRSG-RT-DC-001-Desired Condition - In priority and general habitat management areas and sagebrush focal areas, in the travel management system, greater sage-grouse experience minimal disturbance during breeding and nesting (March 1 to June 30) and wintering periods (November 1 to February 28).

GRSG-RT-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, prohibit new road or trail construction (does not apply to realignments for resource protection) except when necessary for administrative access, public safety, or to access valid existing rights. If necessary to construct new roads and trails for one of these purposes, construct them to the minimum standard, length, and number and avoid, minimize, and mitigate impacts.

GRSG-RT-ST-002-Standard – Prohibit road and trail maintenance activities in 2 miles from the perimeter of active leks during lekking (March 1 to May 15) from 6 pm to 9 am.

GRSG-RT-ST-003-Standard – In priority habitat management areas and sagebrush focal areas, prohibit public access on temporary energy development roads, unless consistent with all other terms and conditions included in the land use management plan.

GRSG-RT-GL-001-Guideline – In priority habitat management areas and sagebrush focal areas, new roads and road realignments should be designed and administered to reduce collisions with greater sage-grouse.

GRSG-RT-GL-002-Guideline – In priority habitat management areas and sagebrush focal areas, road construction in riparian areas and mesic meadows should be restricted. If not possible to restrict construction in riparian areas and mesic meadows, roads should be designed and constructed at right angles to ephemeral drainages and stream crossings, unless topography prevents doing so.

GRSG-RT-GL-003-Guideline – In priority and general habitat management areas and sagebrush focal areas, when decommissioning roads and unauthorized routes, restoration activity should be designed to move habitat towards desired conditions (table 1a or 1b).

GRSG-RT-GL-004-Guideline – In priority and general habitat management areas and sagebrush focal areas, dust abatement terms and conditions should be included in road use permits when dust has the potential to impact greater sage-grouse.

GRSG-RT-GL-005-Guideline - In priority and general habitat management areas and sagebrush focal areas, road and road-way maintenance activities should be designed and implemented to reduce the risk of vehicle or human-caused wildfires and the spread of invasive plants. Such activities include but are not limited to the removal or mowing of vegetation a car-width off the edge of roads; use of weed-free earth-moving equipment, gravel, fill, or other

materials; and blading or pulling roadsides and ditches that are infested with noxious weeds only if required for public safety or protection of the roadway.

GRSG-RT-GL-006-Guideline - In priority and general habitat management areas and sagebrush focal areas, during breeding and nesting (March 1 to June 30), consider seasonal road closures on motorized travel routes with high traffic volume, speeds, or noise levels.

GRSG-RT-GL-007-Guideline – In priority and general habitat management areas and sagebrush focal areas, from November 1 to February 28, consider limiting over-snow motorized vehicles in wintering areas.

Minerals

Fluid Minerals – Unleased

GRSG-M-FMUL-ST-001-Standard - In priority habitat management areas and sagebrush focal areas, any new oil and gas leases must include a no surface occupancy stipulation. There will be no waivers or modifications. An exception could be granted by the authorized officer with unanimous concurrence from a team of agency greater sage-grouse experts from the Fish and Wildlife Service, Forest Service, and State wildlife agency if:

- There would be no direct, indirect, or cumulative effects to greater sage-grouse or their habitats or
- Granting the exception provides an alternative to a similar action occurring on a nearby parcel and
- The exception provides a clear net conservation gain to greater sage-grouse.

GRSG-M-FMUL-ST-002-Standard – In general habitat management areas, any new leases must include appropriate controlled surface use and timing limitation stipulations to protect sage-grouse and their habitat.

GRSG-M-FMUL-ST-003-Standard – In sagebrush focal habitat management areas, there will be no surface occupancy and no waivers, exceptions, or modifications for fluid mineral leasing.

GRSG-M-FMUL-ST-004-Standard – In priority habitat management areas outside of sagebrush focal areas, proposed geothermal projects may be considered if:

- A team of agency greater sage-grouse experts from the Fish and Wildlife Service, Forest Service, Bureau of Land Management, and State wildlife agency advises on project-mitigation measures, including lek buffer distances, using the best available science;
- Mitigation actions are consistent with the Mitigation Strategy; and
- The footprint of the project is consistent with the disturbance protocols identified in GRSG-GEN-ST-001.

GRSG-M-FMUL-ST-005-Standard – In priority and general habitat management areas and sagebrush focal areas, when analyzing leasing of fluid mineral resources, prioritize development

in non-habitat areas first and then in the least suitable habitat for greater sage-grouse, subject to valid existing rights, law, and regulations.

GRSG-M-FMUL-ST-006-Standard - In priority and general habitat management areas and sagebrush focal areas, only allow geophysical exploration and similar type of exploratory operations that are consistent with vegetation objectives in table 1a or 1b, achieve a net conservation gain, and include appropriate seasonal restrictions.

Fluid Minerals – Leased

GRSG-M-FML-ST-001-Standard – In priority habitat management areas and sagebrush focal areas, when approving the Surface Use Plan of Operation portion of the Application for Permit to Drill on existing leases that are not yet developed, require that leaseholders avoid and minimize surface disturbing and disruptive activities consistent with the rights granted in the lease.

GRSG-M-FML-ST-002-Standard – In priority and general habitat management areas and sagebrush focal areas, when facilities are no longer needed or leases are relinquished, require reclamation plans to include terms and conditions to restore habitat to desired conditions as described in table 1a or 1b.

GRSG-M-FML-ST-003-Standard – In priority and general habitat management areas and sagebrush focal areas, authorize new transmission line corridors, transmission line right-of-ways, transmission line construction, or transmission line-facility construction associated with fluid mineral leases with stipulations necessary to protect greater sage-grouse and their habitats, consistent with the terms and conditions of the permit.

GRSG-M-FML-ST-004-Standard – Locate compressor stations on portions of a lease that are non-habitat and are not used by greater sage-grouse, and if there would be no direct, indirect, or cumulative effects on sage-grouse or their habitat. If this is not possible, work with the operator to use mufflers, sound insulation, or other features to reduce noise.

GRSG-M-FML-ST-005-Standard – In priority and general habitat management areas and sagebrush focal areas, when authorizing development of fluid mineral resources, prioritize development in non-habitat areas first and then in the least suitable habitat for greater sage-grouse, subject to valid existing rights, law, and regulations.

GRSG-M-FML-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas, operators should be encouraged to reduce disturbance to greater sage-grouse habitat. At the time of approval of the Surface Use Plan of Operation portion of the Application for Permit to Drill, terms and conditions should be included to reduce disturbance to greater sage-grouse habitat, where appropriate and feasible and consistent with the rights granted to the lessee.

GRSG-M-FML-GL-002-Guideline – On Federal leases in priority and general habitat management areas and sagebrush focal areas, when surface occupancy cannot be restrict due to

valid existing rights or development requirements, disturbance and surface occupancy should be limited to areas least harmful to greater sage-grouse based on vegetation, topography, or other habitat features.

GRSG-M-FML-GL-003-Guideline - In priority and general habitat management areas and sagebrush focal areas, where the federal government owns the surface and the mineral estate is in non-federal ownership coordinate with the mineral estate owner/lessee to apply appropriate stipulations, conditions of approval, conservation measures and required design features to the appropriate surface management instruments to the maximum extent permissible under existing authorities.

GRSG-M-FML-GL-004-Guideline - Where the federal government owns the surface and the mineral estate is in non-federal ownership in priority and general habitat management areas and sagebrush focal areas, coordinate with the mineral estate owner/lessee to apply appropriate stipulations, conditions of approval, conservation measures and required design features to the appropriate surface management instruments to the maximum extent permissible under existing authorities.

Fluid Minerals – Operations

GRSG-M-FMO-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, prohibit employee camps.

GRSG-M-FMO-ST-002-Standard – In priority and general habitat management areas and sagebrush focal areas, when feasible, do not locate tanks or other structures that may be used as raptor perches. If this is not feasible, use perch deterrents.

GRSG-M-FMO-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas, closed-loop systems should be used for drilling operations with no reserve pits, where feasible.

GRSG-M-FMO-GL-002-Guideline – In priority and general habitat management areas and sagebrush focal areas, during drilling operations, soil compaction should be minimized and soil structure should be maintained using the best available techniques to improve vegetation reestablishment.

GRSG-M-FMO-GL-003-Guideline – In priority and general habitat management areas and sagebrush focal areas, dams, impoundments and ponds for mineral development should be constructed to reduce potential for West Nile virus. Examples of methods to accomplish this include:

- Increase the depth of ponds to accommodate a greater volume of water than is discharged.
- Build steep shorelines (greater than 2 feet) to reduce shallow water and aquatic vegetation around the perimeter of impoundments to reduce breeding habitat for mosquitoes.

- Maintain the water level below that of rooted aquatic and upland vegetation. Restrict flooding terrestrial vegetation in flat terrain or low-lying areas.
- Construct dams or impoundments that restrict down-slope seepage or overflow by digging ponds in flat areas rather than damming natural draws for effluent water storage or lining constructed ponds in areas where seepage is anticipated.
- Line the channel where discharge water flows into the pond with crushed rock or use a horizontal pipe to discharge inflow directly into existing open water.
- Line the overflow spillway with crushed rock and construct the spillway with steep sides.
- Fence pond sites to restrict access by livestock and other wild ungulates.
- Remove or re-inject produced water.
- Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
-

- **GRSG-M-FMO-GL-004-Guideline** – In priority and general habitat management areas and sagebrush focal areas to keep habitat disturbance at a minimum, a phased development approach should be applied to fluid mineral operations, wherever possible, consistent with the rights granted under the lease. Disturbed areas should be reclaimed as soon as they are no longer needed for mineral operations.

Locatable Minerals

GRSG-M-LM-ST-001-Standard – In priority and general habitat management areas and sagebrush focal areas, approve Plans of Operation with mitigation to protect greater sage-grouse and their habitats consistent with the rights of the mining claimant as granted by the General Mining Act of 1872, as amended.

GRSG-M-LM-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas to keep habitat disturbance at a minimum, a phased development approach should be applied to operations consistent with the rights granted under the General Mining Act of 1872, as amended. Disturbed areas should be reclaimed as soon as they are no longer needed for mineral operations.

GRSG-M-LM-GL-002-Guideline - In priority and general habitat management areas and sagebrush focal areas, abandoned mine sites should be closed or mitigated, subject to valid or existing rights, to reduce predation of greater sage-grouse by eliminating tall structures that could provide nesting opportunities and perching sites for predators.

Non-energy Leasable Minerals

GRSG-M-NEL-GL-001-Guideline – In priority and general habitat management areas and sagebrush focal areas, at the time of issuance of prospecting permits, exploration licenses and leases, or readjustment of leases, the Forest Service should provide recommendations to the Bureau of Land Management for the protection of greater sage-grouse and their habitats.

GRSG-M-NEL-GL-002-Guideline - In priority, sagebrush focal, and general habitat, the Forest Service should recommend to the Bureau of Land Management that expansion or readjustment of existing leases avoid, minimize, or mitigate the effects to greater sage-grouse and their habitat.

Mineral Materials

GRSG-M-MM-ST-001-Standard – In priority and sagebrush focal management areas, prohibit new mineral material disposal or development.

GRSG-M-MM-ST-002-Standard – In priority habitat management areas and sagebrush focal areas, free-use mineral material collection permits may be issued and expansion of existing active pits may be allowed, except from March 1 to May 15 between 6 pm and 9 am in 2 miles from the perimeter of occupied leks, if doing so is in the Biologically Significant Unit and does not exceed the disturbance cap.

GRSG-M-MM-ST-003-Standard - In priority and general habitat management areas and sagebrush focal areas, any permit for existing mineral material operations must include appropriate requirements for operation and reclamation of the site to restore, enhance, or maintain desired habitat conditions (table 1a or 1b).

Predation

GRSG-P-DC-001-Desired Condition - Anthropogenic uses on public lands are managed to reduce the effects of predation on greater sage-grouse.

Glossary of Terms as Used in this Plan

Active lek - Any lek that has been attended by male greater sage-grouse during the most recent strutting season.

Adjacent – Installation of new improvements (e.g., equipment or facilities) parallel, near, or next to existing improvements.

Administrative access - Access for resource management and administrative purposes such as fire suppression, cadastral surveys, permit compliance, law enforcement, and military in the performance of their official duty, or other access needed to manage National Forest System lands or uses.

Ambient (noise level) - Sometimes called background noise level, reference sound level, or room noise level is the background sound pressure level at a given location, normally specified as a reference level to study a new intrusive sound source.

Anthropogenic disturbances – Human-created features including but are not limited to paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells and associated facilities, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, grazing-related facilities and structures, and mines.

Authorize use - An activity (i.e., resource use) occurring on the public lands that is either explicitly or implicitly recognized and legalized by law or regulation. The term may refer to activities occurring on the public lands for which the Forest Service has issued a formal authorization document (e.g., livestock grazing permit, special use authorization, approved plan of operation, etc.). Formal authorized uses can involve both commercial and noncommercial activity, facility placement, or event. These authorized uses are often spatially or temporally limited. Unless constrained or bounded by statute, regulation, or an approved land use plan decision, legal activities involving public enjoyment and use of the public lands (e.g., hiking, camping, hunting, etc.) require no formal Forest Service authorization.

Biologically significant unit - A geographical/spatial area in greater sage-grouse habitat that contains relevant and important habitats that is used as the basis for comparative calculations to support evaluation of changes to habitat. A biologically significant unit or subset of the unit is used in the calculation of the anthropogenic disturbance threshold and in the adaptive management habitat trigger.

Co-locate - Installation of new improvements (e.g., equipment or facilities) on or in existing improvements.

Communication tower site - Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, broadcast translator) and non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, passive reflector).

Compensatory mitigation - Compensating for the residual impact of a certain action or parts of an action by replacing or providing substitute resources or environments.

Compensatory mitigation projects – The restoration, creation, enhancement, and/or preservation of impacted resources, such as on-the-ground actions to improve and/or protect habitats (e.g. chemical vegetation treatments, land acquisitions, conservation easements).

Disruptive activities - Land resource uses/activities that are likely to alter the behavior, displace, or cause excessive stress to greater sage-grouse populations occurring at a specific location and/or time. Actions that alter behavior or cause the displacement of individuals such that reproductive success is negatively affected, or an individual's physiological ability to cope with environmental stress is compromised.

Distribution line - An electrical utility line with a capacity of less than 100kV or a natural gas, hydrogen, or water pipeline less than 24" in diameter.

Diversity (species) – The number, distribution, and geographic ranges of plant and animal species including focal species and species-at-risk.

Durable (protective and ecological) - The administrative, legal, and financial assurances that secure and protect the conservation status of a compensatory mitigation site, and the ecological benefits of a compensatory mitigation project, for at least as long as the associated impacts persist.

Enhance - The improvement of habitat by increasing missing or modifying unsatisfactory components and/or attributes of the plant community to meet greater sage-grouse objectives.

Exception - A case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites in the leasehold to which the restrictive criteria apply. The authorized officer (any employee of the Forest Service to whom has been delegated the authority to perform the duties described in the applicable Forest Service manual or handbook) may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of greater sage-grouse.

Feasible – see technically/economically feasible.

Fluid minerals - Oil, gas, coal bed natural gas, and geothermal resources.

General habitat management areas - Areas identified by the Forest Service, in coordination with respective state wildlife agencies, as those areas outside of priority habitat management areas and sagebrush focal areas and occupied by greater sage-grouse seasonally or year-round.

Habitat - An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle.

Hard triggers - Thresholds indicating that immediate action is necessary to stop a severe deviation from sage grouse conservation objectives set forth in the land and resources management plan.

High-voltage transmission line – An electrical power line that is 100 kilovolts or larger.

Holder – An individual or entity that holds a valid special use authorization.

Impact - The effect, influence, alteration, or imprint caused by an action.

Indicators - Factors that describe resource condition and change and can help the BLM and the Forest Service determine trends over time.

Isolated parcel - An individual parcel of land that may share a corner, but does not have a common border with another parcel.

Invasive species (invasives plant species, invasives) - An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The species must cause, or be likely to cause, harm, and be exotic to the ecosystem it has infested before considered invasive.

Landscape – A distinct association of land types that exhibit a unique combination of local climate, landform, topography, geomorphic process, surficial geology, soil, biota, and human influences. Landscapes are generally of a size that the eye can comprehend in a single view.

Lease – A type of special use authorization (usually granted for uses other than linear rights-of-way) that is used when substantial capital investment is required and when conveyance of a conditional and transferable interest in National Forest System lands is necessary or desirable to serve or facilitate authorized long-term uses, and that may be revocable and compensable according to its terms.

Leasable minerals - Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources such as oil, natural gas, coal, and geothermal, and some non-energy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lessee - A person or entity authorized to use and occupy National Forest System land under a specific instrument identified as a lease. Forest special use leases are limited to authorize certain wireless communication uses. Leases are also used for certain mineral leasable activities.

Lek - A courtship display area attended by male greater sage-grouse in or adjacent to sagebrush dominated habitat. For management purposes, leks with less than five males observed strutting should be confirmed active for 2 years to meet the definition of a lek (Connelly et al 2000, Connelly et al. 2003, 2004).

Locatable minerals - Mineral disposable under the General Mining Act of 1872, as amended, that was not excepted in later legislation. They include hardrock, placer, industrial minerals, and uncommon varieties of rock found on public domain lands.

Major pipeline – A pipeline that is 24 inches or more in outside-pipe diameter (Mineral Leasing Act of 1920 30 U.S.C. § 181; 36 CFR 251.54(f)(1)).

Mineral - Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground. Under Federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

Mineral materials - Common varieties of mineral materials such as soil, sand and gravel, stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws but that can be acquired under the Materials Act of 1947, as amended.

Minimization mitigation - Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

Mitigation - Specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action, minimizing the impact by limiting the degree of magnitude of the action and its implementation, rectifying the impact by repairing, rehabilitation, or restoring the affected environment, reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and compensating for the impact by replacing or providing substitute resources or environments.

Modification (oil and gas) – A fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites in the leasehold to which the restrictive criteria applied.

Native plant species - Species that were located on the land before European settlement, and consequently are in balance with ecosystems because they have well developed parasites, predators, and pollinators.

No surface occupancy (NSO) - Use or occupancy of the land surface for fluid mineral exploration or development prohibited to protect identified resource values. The NSO stipulation

includes stipulations that may be worded as “No Surface Use/Occupancy,” “No Surface Disturbance,” “Conditional NSO,” or “Surface Disturbance or Surface Occupancy Restriction (by location).”

Occupied lek - A lek that has been active during at least one strutting season in the prior 10 years.

Opportunity (allotment closure) - A suitable or favorable time to abolish or close an allotment because of nonuse violations, term permit waivers where the permit is waived back to the government, resource protection, or permit actions resulting in cancellation of the permit.

Permit — A special use authorization that provides permission, without conveying an interest in land, to occupy and use National Forest System land or facilities for specified purposes, and which is both revocable and terminable.

Persistent woodlands – Long-lived pinyon-juniper woodlands that typically have sparse understories and occur on poor substrates in the assessment area.

Plan of Operation - A Plan of Operation is required for all mining activity conducted under the General Mining Act of 1872, as amended, if the proposed operations will likely cause significant disturbance of surface resources. The Plan of Operation describes the type of operations proposed and how they would be conducted, the type and standard of existing and proposed roads or access routes, the means of transportation to be used, the period during which the proposed activity will take place, and measures to be taken to meet the requirements for environmental protection (36 CR 228.4).

Prescribed fire - Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist and NEPA requirements, where applicable, must be met before ignition.

Priority habitat management areas - Areas identified by the Forest Service, in coordination with respective state wildlife agencies, as having the highest conservation value to maintaining sustainable greater sage-grouse populations. These areas include breeding, late brood-rearing and winter concentration areas.

Prohibit – To forbid (something) by law, rule, or other authority; no authorizations will be issued.

Reclamation plans – Plans that guide the suite of actions taken in an area affected by human disturbance, the outcome of which is intended to change the condition of the disturbed area to meet pre-determined objectives and/or make it acceptable for certain defined resources (e.g., wildlife habitat, grazing, ecosystem function, etc.).

Residual impacts - Impacts from an implementation-level decision that remain after applying avoidance and minimization mitigation; also referred to as unavoidable impacts.

Restoration - Implementation of a set of actions that promotes plant community diversity and structure that allows plant communities to be more resilient to disturbance and invasive species over the long term. The long-term goal is to create functional, high quality habitat that is occupied by greater sage-grouse. Short-term goal may be to restore the landform, soils and hydrology and increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

Restrict – To put a limit on; keep under control; to limit someone's actions or movement, or to limit the amount, size, etc., of something.

Right-of-way - Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project or facility passing over, upon, under or through such land.

Road or trail – A road or trail wholly or partly in or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

Sagebrush focal areas – Areas identified by the U.S. Fish and Wildlife Service that represent recognized "strongholds" for greater sage-grouse and are considered most vital to the species persistence and therefore, have the strongest levels of protection.

Soft triggers - An intermediate threshold indicating that management changes are needed at the implementation level to address habitat or population losses.

Special use authorization - A written permit, term permit, lease, or easement that authorizes use or occupancy of National Forest System lands and specifies the terms and conditions under which the use or occupancy may occur.

Stipulation (general) - A term or condition in an agreement, contract, or written authorization.

Stipulation (oil and gas) - A provision that modifies standard lease rights and is attached to and made a part of the lease.

Surface disturbing and disruptive activities - Actions that alter the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other public land values. Examples of surface disturbing activities may include operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; maintenance activities, and several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either restricted or prohibited.

Surface uses - Activities that may be present on the surface or near-surface (e.g., pipelines) of public lands. When administered as a use restriction (e.g., no surface occupancy), this phrase prohibits all but specified resource uses and activities in a certain area to protect particular sensitive resource values and property. This designation typically applies to small acreage sensitive resource sites (e.g., plant community study exclosure, etc.), and/or administrative sites (e.g., government ware-yard, etc.) where only authorized, agency personnel are admitted.

Tall structures – A wide array of infrastructure (e.g., poles that support lights, telephone and electrical distribution, communication towers, meteorological towers, high-tension transmission towers, and wind turbines) that have the potential to disrupt lekking or nesting birds by creating new perching/nesting opportunities and/or decreasing the use of an area. A determination as to whether something is considered a tall structure would be based on local conditions such as vegetation or topography.

Technically/economically feasible - Actions that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. It is the Forest Service's sole responsibility to determine what actions are technically and economically feasible. The Forest Service will consider whether implementation of the proposed action is likely given past and current practice and technology; this consideration does not necessarily require a cost-benefit analysis or speculation about an applicant's costs and profit.

Temporary special use permit – A type of permit that terminates in 1 year or less after the approval date. All other provisions applicable to permits apply fully to temporary permits. Temporary special use permits are issued for seasonal or short-duration uses involving minimal improvement and investment.

Term permit – An authorization to occupy and use National Forest System land, other than rights-of-way for a specified period that is both revocable and compensable according to its terms.

Timely - The conservation benefits from compensatory mitigation accruing as early as possible or before impacts have begun.

Transmission line - An electrical utility line with a capacity greater than or equal to 100kV or a natural gas, hydrogen, or water pipeline greater than or equal to 24" in diameter.

Travel management system – Planned and authorized roads, trails, and areas for motor vehicle use on National Forest System lands that are managed in a controlled, sustained manner.

Utility-scale and/or commercial energy development – A project that is capable of producing 20 or more megawatts of electricity for distribution to customers through the electricity-transmission-grid system.

Valid existing rights - Documented, legal rights, or interests in the land, which allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, and easements. Such rights may have been reserved, acquired, granted or otherwise authorized under various statutes of law.

Vegetation treatment - Management practices that are designed to maintain current vegetation structure or change the vegetation structure to a different stage of development. Vegetation treatment methods may include managed fire, prescribed fire, chemical, mechanical, and seeding.

Waiver (oil and gas) - Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere in the leasehold.

West Nile virus - A virus that is found in temperate and tropical regions of the world and most commonly transmitted by mosquitoes. West Nile virus can cause flu-like symptoms in humans and can be lethal to birds, including greater sage-grouse.

Wildfire suppression - An appropriate management response to wildfire, escaped wildland fire use or prescribed fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.