Bureau of Land Management

Preliminary Environmental Assessment

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Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada

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Acronyms

Acronym or Abbreviation	Expanded Text
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AIM	Assessment, Inventory and Monitoring
AMP	Area Management Plan
ARMPA	Approved Resource Management Plan Amendment(s)
ARPA	Archaeological Resources Protection Act
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
BSSG	Bi-State Sage-Grouse
Ca	Calcium
CCD	Carson City District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIAA	Cumulative Impact Analysis Area
Co	Cobalt
Cr	Chromium
Cu	Copper
CWD	Chronic Wasting Disease
CX	Categorical Exclusion
DNA	Determination of NEPA Adequacy
DOI	Department of Interior
DPS	Distinct Population Segment
DR	Decision Record
DRG	Disturbance Response Groups
EA	Environmental Assessment

Acronym or Abbreviation	Expanded Text
EIS	Environmental Impact Statement
EJ	Environmental Justice
ELU	Equivalent Livestock Unit
EO	Executive Order
EPA	Environmental Protection Agency
ES&R	Emergency Stabilization and Rehabilitation
ESA	Endangered Species Act
ESD	ecological site descriptions
Fe	Iron
FEIS	Final Environmental Impact Statement
FIAT	Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment
FLPMA	Federal Lands Policy and Management Act
FONSI	Finding of No Significant Impact
FUP	Federal Use Permit
GDP	Gross Domestic Product
GG	Great Group
GHMA	General Habitat Management Area
GIS	Geographic Information Systems
GOV	Government
GRSG	Greater Sage-Grouse
H	Handbook
HA	Herd Area
HMA	Herd Management Area
HUD	Housing and Urban Development
I	Iodine
IB	Information Bulletin
IDT	Interdisciplinary Team
IM	Instruction Memorandum
INT	Intermountain Research Station
K	Potassium
K_w	K factor

Acronym or Abbreviation	Expanded Text
LHA	Land Health Assessment
LHS	Land Health Standards
LUP	Land Use Plan
LUPA	Land Use Plan Amendment
LWC	Lands with Wilderness Characteristics
MA	Management Area
MBTA	Migratory Bird Treaty Act
Mg	Magnesium
MIM	Multiple Indicator Monitoring
MLRA	Major Land Resource Area
Mn	Manganese
Mo	Molybdenum
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MS	Manual (BLM)
Na	Sodium
NAC	Nevada Administrative Code
NCA	National Conservation Area
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NGO	Non-government Organization
NHPA	National Historic Preservation Act
NI	No Impact
Ni	Nickel
NP	Not Present
NPA	National Programmatic Agreement
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRMP	Natural Resource Management Plan
NRS	Nevada Revised Statutes
NV	Nevada
NVSO	Nevada State Office
OHMA	Other Habitat Management Area
OHV	Off-highway Vehicle

Acronym or Abbreviation	Expanded Text
P	Phosphorus
PFC	Proper Functioning Condition
PHMA	Priority Habitat Management Area
PI	Potential Impact
PMU	Population Management Unit
Protocol Agreement	BLM Nevada-Nevada SHPO Protocol Agreement
PRPA	Paleontological Resources Protection Act
RAC	Resource Advisory Council
RAS	Rangeland Administration System
RAWS	Remote Automatic Weather Station
RDF	Required Design Feature
RIPS	Range Improvement Project System
RMP	Resource Management Plan(s)
ROD	Record of Decision
S	Sulfur
SANE	Stewardship Alliance of Northeast Elko County
Se	Selenium
SHPO	State Historic Preservation Officer
SMART	Specific, Measurable, Achievable, Related/Relevant, and Trackable/Time-specific
SO	Secretarial Order
SOP	Standard Operating Procedure
SPP	Species
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
SS	Sensitive Species
STM	State and Transition Model
T&E	Threatened & Endangered
TEC	Threatened, Endangered or Candidate Species
TES	Threatened, Endangered, & Sensitive
U.S.	United States

Acronym or Abbreviation	Expanded Text
UNR	University of Nevada, Reno
USC	U.S. Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

Acronym or Abbreviation	Expanded Text
USGS	United States Geological Survey
USPS	United State Postal Service
VRM	Visual Resource Management
WHBO	Wild Horse and Burro
WO	Washington Office
WSA	Wilderness Study Area
Zn	Zinc

1 INTRODUCTION

1.1 HOW TO READ THIS DOCUMENT AND EXECUTIVE SUMMARY

This document is intended to not only be an analysis of the impacts and disclosure of the environmental consequences, but also a useful tool for planning and implementing targeted and prescribed grazing treatments within the identified analysis area. The purpose of these treatments would be to reduce fuel loads from invasive annual grass species in order to address increased wildfire risk and diminished ecological integrity. The primary goals of the targeted and prescribed grazing treatments under this EA are to manipulate rangeland vegetation. Consequently, any livestock production goals will come secondary. See the proposed action and Appendix C and D for a complete description of the specifics for targeted and prescribed grazing treatments. This assessment is broken up into seven main sections:

- Section 1: Background information and purpose and need;
- Section 2: Proposed action with descriptions of the three action alternatives and no action alternative;
- Section 3: Affected environment and environmental consequences for each alternative;
- Section 4: All consultation and coordination that occurred to date on this project;
- Section 5: List of BLM Interdisciplinary Team (IDT) members and other preparers of this analysis;
- Section 6: List of literature cited within the document; and
- Section 7: Additional information regarding the proposed action, the complete environmental consequences, maps of the analysis area, as well as all documentation that directly support the analysis.

Ecological sites within the analysis area have been sorted into groups called Disturbance Response Groups (DRGs) based on their response to natural or human-induced disturbances. This sorting process utilized local knowledge, soil mapping data and published literature on soils, plant ecology, plant response to various disturbances, disturbance history of the area, and any other important attributes (Stringham et al. 2016). Ecological sites within each DRG respond similarly to disturbance and reach the same state or end-point although the rate of adjustment may vary by site (Stringham et al. 2019).

For this project, these DRGs were then combined into larger landscape units called Great Groups, first through comparing dominant vegetation type and second by determining if the vegetation community within each ecological site had the potential for developing into an annual state. Annual states are added to the state and transition model (STM) for each ecological site if at least one site visit to that ecological site was determined to be dominated by invasive annual grasses. For a further explanation of how the landscape was simplified into ecologically significant units (Great Groups), please refer to the section titled Background Information and General Setting.

Because it is recognized that all mapping efforts have acceptable margins of error, projects may be proposed and implemented under this analysis in ecological sites represented by Great Groups identified in Appendix B but are not shown on specific locations on the maps found in this document (Appendix A). These ecological sites would be determined in pre-project planning. A complete list of the Great Groups that make up this analysis area can be found in Appendix B.

Alternatives were developed based on seasonality and annual lifecycle requirements of key perennial species and invasive annual grasses. This was done in order to utilize selected alternatives as tools for management based on site specific monitoring. Future projects implemented under this EA could quickly look at the potential impacts or concerns relative to the Great Groups, as well as any concerns identified due to the action alternatives as part of the planning process.

Each of the action alternatives were analyzed and quantified by the 22 individual Great Groups. For the purposes of this EA, a summary table (Table 28) was created to show which issues had variances of impacts from Great Group A for each alternative and grazing treatment. This summary of impacts considers of all RDFs and required monitoring. The summary table is followed by a discussion and disclosure of impacts within Great Group A for each alternative. Complete discussion and analysis of all 22 Great Groups per action alternative can be found in Appendix T, along with impact matrices for each Great Group, alternative and grazing treatment.

A qualitative characterization of the intensity of impacts has been used within this analysis to define the impact to each resource. Intensity of impacts are influenced by differences between Great Groups, but are analyzed at a project level. Impacts are not always negative, for example the impacts to Fire and Fuels correlate to overall benefits to fuels management. The use of these terms should not be confused with BLM's determination of whether there are significant impacts, which determination will be made by BLM following completion of the EA process. The following are the impact intensities used:

- Low: Effects would be apparent, measurable, small, localized, and contained within the individual project area.
- Moderate: Effects would be apparent and measurable over a portion of the individual project area.
- High: Effects would be highly noticeable and measurable over a large portion of the individual project area.

There are certain terms which are useful while reading or using this document. These terms have been defined or described as they occur in this document. Impact indicators and thresholds, as well as temporal scales, were variable and dependent upon the issues discussed. These parameters were determined by best available science, available GIS data, and professional opinion.

1.2 Background Information

Increased frequency and extent of wildfires have caused large-scale impacts to Great Basin ecosystems throughout Nevada. Although fire in the Great Basin is not new disturbance, fire characteristics have changed over the past five decades partially due to the invasion of annual grasses (i.e. cheatgrass or *Bromus tectorum*) (Perryman et al. 2018). In 2018, it was estimated that over five million acres of land throughout the Intermountain West contain greater than 15 percent cheatgrass cover and these lands are twice as likely to burn than those with low abundance of cheatgrass (Bradley et al. 2018). Fire probability increases rapidly even on lands with low cheatgrass cover (<15 percent) (Bradley et al. 2018). See Predicted Fire Behavior

Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications. Fires that burn through these lands alter ecological resources that in turn favor the dominance and spread of invasive annual grasses and preclude recovery of native perennial grasses. Cheatgrass is able to maintain advantage over native perennial grasses in part because it is a prolific seeder that germinates, produces seed and dries out before fire season in the summer (Stringham et al. 2019). Dried annual grasses create fine fuels that ignite easily and carry fire throughout large landscapes (Diamond et al. 2009, Taylor 2006). After wildfire, annual seeds from the seedbank take advantage of the available resources on newly burned landscapes where native vegetation has sustained fire damage and mortality (Diamond et al. 2009, Perryman et al. 2018). This perpetuating cycle of wildfire and annual grass invasion doesn't allow for slower growing species, such as native perennial grasses and native shrubs like sagebrush (*Artemisia sp.*), to recover and/or reestablish back into the system. The loss of native vegetation is not only degrading Great Basin ecosystems but also decreasing habitat for native wildlife that rely on these ecosystems such as the Greater Sage-Grouse (*Centrocercus urophasianus*) and increasing risk to human life and property posed by wildfire (Bruegger et al. 2016, Freese et al. 2013).

In order to effectively address this problem, land management strategies have shifted in an attempt to not only sustain native plant communities but also to actively address cheatgrass and other invasive annual grasses through fuels management (Perryman et al. 2018). Methods to reduce fine fuel loads from cheatgrass and other invasive grasses include prescribed fire, herbicide and mechanical treatments, livestock grazing, and seeding of desirable species. While all of these methods have various benefits, trade-offs and risks, livestock grazing may be a low risk and cost-effective tool that can be used across large landscapes (Nader et al. 2007). Specifically, targeted and prescribed grazing treatments optimize timing, frequency, intensity and selectivity of livestock grazing to target specific plant species and manage vegetation at large scales (Bailey et al. 2019). While traditional livestock grazing and targeted/prescribed grazing treatments share a similar long-term goal of sustaining healthy ecosystems, the goals and priorities of targeted and prescribed grazing treatments differ in that grazing is used to manage vegetation, not for livestock production. Studies have shown that targeted and prescribed livestock grazing treatments on cheatgrass-dominated[1] landscapes in different seasons have provided various benefits in decreasing fine fuel loads and manipulating fire characteristics. Targeted grazing treatments applied during seed development in the early spring have been shown to reduce cheatgrass cover and fire spread (Diamond et al. 2009, Taylor 2006). While treatments that occur during the fall and winter have been shown to not only reduce germination of cheatgrass the following year but also reduce the cheatgrass seedbank with repeated consecutive treatments (Perryman et al. 2020).

The fundamental differences that exist between the phenology of annual and perennial grasses allow managers to target annual grasses by integrating knowledge of livestock foraging behavior and nutrition into grazing treatments (Bailey et al. 2019). Although timing can vary annually, cheatgrass is the most palatable and nutritious to livestock prior to seed development in the early spring when native perennial grasses haven't yet entered their growing season (Ganskopp and Bohnert 2001, Smith et al. 2012). Additionally, dormant perennial grasses are tolerant to grazing during the fall and winter when cheatgrass may be germinating with fall precipitation. These phenological differences can be used to time targeted and prescribed grazing treatments that effectively impact invasive annual grasses without causing extensive damage to the native vegetation community.

[1] For the purpose of this EA, dominated is defined as the degree to which a taxon is more numerous than its competitors in an ecological community, or makes up more of the biomass.

Targeted and prescribed grazing treatments need to be carefully designed to treat site-specific conditions in order to achieve fuel management objectives and prevent long term negative impacts to other resources (Bruegger et al. 2016). Operators can manipulate livestock impacts by managing the stocking rates, grazing frequency, livestock distribution, species of livestock, and the season and timing of grazing. Grazing can be focused or redirected by the use of supplements/attractants, temporary fencing, water developments, and herding. These livestock management tools can increase direct impacts to invasive annual grasses when they are the most vulnerable to defoliation during the early spring and increase indirect impacts by reducing "safe sites" for seed germination through litter removal during the fall (Bailey et al. 2019, Perryman et al. 2020).

In an attempt to address increased wildfire risk exacerbated by fine fuel loads, the Nevada State Office of the Bureau of Land Management (BLM) has prepared this Environmental Assessment (EA) to evaluate options to utilize targeted and prescribed livestock grazing to reduce residual fuel loads from invasive annual grasses. The analysis area includes land administered by five BLM Districts; Battle Mountain, Carson City, Elko, Ely and Winnemucca. An overview map of the Great Groups and the Mapsets for issues within the entire analysis area can be found in Appendix A.

The analysis area includes the sagebrush steppe and sagebrush semi-desert areas in the Great Basin, part of the Western Range and Irrigated Region of Nevada. Major Land Resource Areas (MLRAs) in the analysis area include portions that occur in the following Nevada MLRAs: 23 – Malheur High Plateau, 24 – Humboldt Area, 25 – Owyhee High Plateau, 26 – Carson Basin and Mountains, 27 – Fallon-Lovelock Area, 28A – Great Salt Lake Area, and 28B – Central Nevada Basin and Range. Within these MLRAs are pre-existing ecological sites that are determined through the correlation to soil survey map units. Historically, ecological sites have been used by public land management agencies as tools for large-scale management planning, but they typically occur at scales too small for landscape-scale decision making. However, recognizing the utility of ecological sites and the associated state-and-transition model (STM) for decision support, the Bureau of Land Management in Nevada partnered with Nevada NRCS and the University of Nevada, Reno (UNR) with the goal of providing a mechanism for utilizing STMs for decision support at scales larger than the individual ecological site. Ecological sites within each MLRA were sorted into groups called Disturbance Response Groups (DRGs) based on their response to natural or human-induced disturbances. This sorting process utilized local knowledge, soil mapping data and published literature on soils, plant ecology, plant response to various disturbances, disturbance history of the area, and any other important attributes (Stringham et al. 2016). Ecological sites within each DRG respond similarly to disturbance and reach the same state or end-point although the rate of adjustment may vary by site (Stringham et al. 2019). It was then determined that further upscaling of DRGs into larger landscape units called Great Groups, that may cross MLRA boundaries, was needed to answer specific management questions at scales larger than the MLRAs.

For this project, DRGs were upscaled to Great Groups, first through comparing dominant vegetation type and second by determining if the vegetation community within each ecological site had the potential for developing into an annual state. Annual states are added to the STM for each ecological site if at least one site visit to that ecological site was determined to be dominated by invasive annual grasses. It is important to note that not all areas within a Great Group have significant amounts of invasive annual grasses but that the ecological sites within each Great Group are known to be susceptible to degrading into an annual state. A discussion of the methodologies and assumptions can be found in Section 3. A complete list of Great Groups and associated STMs that are a part of this analysis area can be found in Appendix B.

1.3 Need For Action

The need for this action is based on the objective to efficiently implement consistent actions on the ground in a strategic and effective manner for invasive annual grass treatments. This would minimize habitat loss and degradation due to the increased fire frequency and size of wildland fires from the proliferation of annual grasses in the Great Basin. Invasive annual grasses, primarily cheatgrass, contribute to altered fire regime conditions that intensify wildland fire frequency, duration, and size. These increases in invasive annual grasses have decreased the integrity of ecological functions and services. There is a desire to manage BLM-administered lands in a manner that maintains and improves the ecological health of these lands and supports and sustains appropriate land uses and habitats. Livestock grazing treatments have been shown to reduce invasive annual grass fuel loading and can reduce competition between native perennial species. This can be an effective tool for managing the risk of wildland fire as well as promoting native species.

1.4 Purpose Of The Action

The purpose of this project is to provide options for management of invasive annual grasses that intensify wildland fire behavior and diminish ecological integrity through the use, in areas where these practices would be most effective and appropriate, of targeted and prescribed livestock grazing in the Great Basin Ecoregions of Nevada. This purpose is supported by Secretarial Order 3372, *Reducing Wildfire Risks on Department of Interior Land through Active Management* (Department of the Interior 2019); and Secretarial Order 3336, *Rangeland Fire Prevention, Management, and Restoration* (Department of the Interior 2015) which ordered to identify and develop effective tools and practices to reduce frequency and extent of wildland fires that threaten property, ecological function and wildlife habitats across much of the west (both issued under the authority of Section 2 of Reorganization Plan No. 3 of 1950 (64 Stat.1262), as amended).

1.5 Decision(s) To Be Made

To determine whether to authorize targeted and/or prescribed grazing for five BLM District Offices where corresponding Great Groups and other factors make these appropriate methods for reducing the risk and severity of wildfires. This analysis would allow future proposed targeted and prescribed grazing treatments or projects on BLM-administered lands in Nevada that are within the analysis area and meet the identified purpose and need to be authorized under a more streamlined process that would include a Determination of NEPA Adequacy (DNA) or other appropriate project-specific NEPA compliance. Required design features for each alternative and parameter, and appropriate reviews or clearances would be completed before a project is implemented on BLM-administered lands.

1.6 CONFORMANCE

Implementation of the Proposed Action and all alternatives is consistent with the applicable federal and State statutes, regulations (as amended), Secretarial Orders, Department of Interior and BLM policies, and to the maximum extent possible, county ordinances and other plans listed below and found in Appendix G. Federal policies include BLM Manuals, Handbooks (H), Instruction Memorandum (IM) [Washington Office (WO) and Nevada State Office (NVSO)]. Compliance with applicable statute, regulation, and policy includes the completion of procedural requirements, including consultation, coordination, and cooperation with stakeholders, interested publics, and compliance with NEPA. The proposed action alternatives are also consistent with Secretarial Order 3372, *Reducing Wildfire Risks on Department of Interior Land through Active Management* (Department of the Interior 2019); and Secretarial Order 3336, *Rangeland Fire Prevention, Management, and Restoration* (Department of the Interior 2015) which ordered to identify and develop effective tools and practices to reduce frequency and extent of wildland fires that threaten property, ecological function and wildlife habitats across much of the west (both issued under the authority of Section 2 of Reorganization Plan No. 3 of 1950 (64 Stat.1262), as amended).

Implementation of the Proposed Action is also consistent with 43 Code of Federal Regulation, Subchapter D—RANGE MANAGEMENT (4000), Group 4100 Grazing Administration, Part 4100-Grazing Administration Exclusive of Alaska, and specifically the following subparts:

§ 4130.1–1 Filing applications

Applications for grazing permits or leases (active use and nonuse), free-use grazing permits and other grazing authorizations shall be filed with the authorized officer at the local Bureau of Land Management office having jurisdiction over the public lands involved.

§ 4130.5 Free-use grazing permits.

(b) The authorized officer may also authorize free use under the following circumstances:

(1) The primary objective of authorized grazing use or conservation use is the management of vegetation to meet resource objectives other than the production of livestock forage and such use is in conformance with the requirements of this part;

(2) The primary purpose of grazing use is for scientific research or administrative studies; or

(3) The primary purpose of grazing use is the control of noxious weeds.

§ 4190.1 Effect of wildfire management decisions

(a) Notwithstanding the provisions of 43 CFR 4.21(a)(1), when BLM determines that vegetation, soil, or other resources on the public lands are at substantial risk of wildfire due to drought, fuels buildup, or other reasons, or at immediate risk of erosion or other damage due to wildfire, BLM may make a rangeland wildfire management decision effective immediately or on a date established in the decision. Wildfire management includes but is not limited to:

(1) Fuel reduction or fuel treatment such as prescribed burns and mechanical, chemical, and biological thinning methods (with or without removal of thinned materials); and

(2) Projects to stabilize and rehabilitate lands affected by wildfire. (b) The Interior Board of Land Appeals would issue a decision on the merits of an appeal of a wildfire management decision under paragraph (a) of this section within the time limits prescribed in 43 CFR 4.416.

The analysis area includes lands administered by five BLM Districts: Battle Mountain, Carson City, Elko, Ely and Winnemucca. Fuel management methods and grazing treatments identified in the Proposed Action are consistent with the recommendations, guidance, and methods identified in BLM plans, decisions, and other pertinent laws, regulations, policies, and guidance. The complete list, including a review of consistency with local planning efforts, has been identified in Appendix G. A summary of the primary BLM planning documents is listed below.

- Carson City Field Office Consolidated RMP (2001)
- Black Rock Desert High Rock Canyon NCA Approved RMP and ROD (2004)
- Elko RMP and Final Environmental Impact Statement (1986a)
- Ely District RMP (2008)
- Shoshone-Eureka RMP (1986b) as amended (1987)
- Tonopah RMP (1997)
- Wells RMP (1985)
- Winnemucca District RMP (2015b)
- Nevada and Northeastern California Greater Sage-Grouse Record of Decision and Approved Resource Management Plan (as amended) (2019)[2]
- Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (2015a)
- Final Programmatic Environmental Impact Statement for Fuel Breaks in the Great Basin (2020a)

1.7 Scoping

1.7.1 Internal Scoping

Internal discussion with a team of BLM specialists began on May 5, 2019, and May 29, 2019, respectively with a series of IDT meetings. The team identified 22 initial issues as needing additional consideration for inclusion within the EA. Invitations were extended to numerous federal, state, and county agencies offering cooperating agency status and inclusion on the IDT. Eight invitees signed a Memorandum of Understanding with the BLM to participate on the IDT as a cooperating agency. Meetings were held in April and May to discuss and work through concerns, and all cooperating agencies had opportunity for a preliminary review of the

[2] Western Watersheds Project et al. vs. Janice Schneider et al, No. 1:2016cv0083-Document 189 (D. Idaho 2019)

document. All comments submitted were considered, discussed and addressed. See Section 4 for additional information on all entities that were consulted and coordinated with.

1.7.2 External Scoping

A notification of the public scoping period for the proposed Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada was posted on ePlanning and the BLM's website on July 12 and July 19, 2019, respectively inviting the public to participate in the development of this EA. In addition, Interested Public lists from each District were gathered and members on the list were contacted by USPS mail with a letter announcing the project, including meeting dates and a contact address to send comment letters. The scoping comment period was open from July 22 to August 21, 2019. Four public scoping meetings were held in July 2019 in Reno, Elko, Ely and Winnemucca. A second scoping period from February 13 to March 2, 2020, was opened when one District realized a field office was missed from the initial list. There were 240 scoping comments in total received from organizations, agencies and individuals.

The BLM also invited the following tribes during this same timeframe, via formal letter, to engage in government-to-government consultation on the targeted grazing effort: Duckwater Shoshone Tribe, Ely Shoshone Tribe, Fort McDermitt Tribe, Lovelock Paiute Tribe, Fallon Paiute-Shoshone Tribe, Pyramid Lake Paiute Tribe, Reno-Sparks Indian Colony, Duck Valley Shoshone-Paiute Tribe, Summit Lake Paiute Tribe, Te-Moak Tribe of Western Shoshone, Walker River Paiute Tribe, Washoe Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe. The BLM did not receive any comments or requests to engage in consultation on the targeted grazing effort from any tribal government or individual. There have been no other responses at this time.

Section 4 outlines the complete list of all agencies (federal, state and county) and interested parties that were contacted. Below is a summarized list of substantive comments and concerns that were considered when writing this EA.

Permittee Comments/Concerns:

- That each permittee be able to participate (and approve) targeted grazing treatments on his/her permitted allotment(s), especially with shared allotments.
- That each permittee be able to participate in targeted grazing treatments as he/she desires without threat of another operator encroaching upon his/her permitted grazing allotment.
- That the permittee (if he/she chooses) be able to allow other operators to participate in targeted grazing treatments on their permitted allotment.
- That each permittee be able to develop their own plan for grazing treatments with the appropriate BLM range staff's input and authorized officer approval.
- That permittees that participate in targeted grazing treatments not be held liable for undesirable results as long as the BLM approved targeted grazing treatment plan was followed.
- That permittees be allowed to draft their own targeted grazing plans that BLM would approve prior to implementation.

Livestock Management/Grazing Comments/Concerns:

- Ensuring use of the most effective grazing animal (i.e. sheep and goats to remove noxious weeds), and not restricting the class of livestock to those specifically named in an authorized permit.
- The extensive herding costs that would be incurred by these treatments.
- The ability to use targeted grazing immediately after a fire to deter the establishment of annual grasses.
- The ability to change restrictions on minerals and supplements for better dispersal of animals.
- No AUM fee for targeted grazing treatments due to supplemental costs needed to carry out treatment plan.
- Successful grazing treatments will often require increased stock densities with livestock numbers that exceed those allowed under term permits.
- The EA needs to include analysis to facilitate use of special infrastructure (i.e. temporary fencing, watering facilities, salt/supplement delivery).
- The re-entry for grazing (e.g., spring and fall grazing in the same year) may be required to reduce cheatgrass density and yield.
- Concern with the use of stubble height, utilization, and dates of use in targeted grazing treatment outcomes.
- Targeted grazing should be allowed to occur directly after a wildfire to target annual grasses and aid in rangeland restoration efforts.
- Temporary livestock holding facilities should be allowable temporary range improvements under targeted grazing projects (e.g. temporary corrals and loading/unloading chutes for transport and animal husbandry).
- Importance of targeted grazing projects adjacent to activities or land uses that have increased chances of ignition (i.e. main roadways and military testing sites).
- Targeted grazing should be limited to degraded rangeland with little or no native perennial plant cover.

Management Plan Comments/Concerns:

- Defining a standard that assesses whether an allotment has a significant amount of annual grasses that would justify a targeted grazing treatment.
- Use of state and transition modeling to determine the appropriate season of use and utilization level for a targeted grazing treatment, resource conditions and anticipated responses to proposed treatment actions.
- The proposed EA should complement and benefit the preferred alternative in the Final Programmatic EIS (PEIS) for Fuel Breaks in the Great Basin by utilizing targeted grazing as a maintenance tool.
- Involvement of other stakeholders (i.e. NDOW) in creation of targeted grazing treatments and coordination with other plans, policies, and proposals in place through different state and county agencies.

- The EA should include evaluations of pre- and post-treatment monitoring requirements to help establish site-specific treatment objectives, determine treatment successes and failures, and safeguard against unintended consequences.
- Determination of the responsible party to complete the effectiveness monitoring.
- The monitoring protocols and sampling intensity must be sufficient to provide useful information to guide management decisions, without being too onerous, costly, and/or time consuming.
- None of the action alternatives analyzed under the proposed EA should be identified as a preferred alternative because all of them may be appropriate in specific situations but may not be appropriate in others.
- Efficient review by the agency is important so an operator can turn out livestock within narrow time windows.
- Must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate cumulative impacts analysis about how these projects are thought to have impacted the environment.

Vegetation Comments/Concerns:

- Damage to native grasses caused by grazing during boot stage.
- Hard dates for grazing treatments oversimplify complex processes of plant growth and lead to less successful outcomes.
- Consideration for special status plants.
- The impact of livestock spread of noxious weeds in their guts, coats, and hooves into areas free of weeds.

Soil Comments/Concerns:

- Impacts on soil compaction, shearing, and erosion, especially with different seasons of use.
- Impacts and monitoring of soil biological crust.

Wildlife Comments/Concerns:

- Impacts to native trout, migratory birds, sagebrush-obligate wildlife species, rodents and small mammals, bighorn sheep and other wildlife species and their habitat.
- Special consideration to avoiding sage grouse reproduction season.

Water Resource Comments/Concerns:

- Avoid damaging riparian and other hydrologic systems.

Cheatgrass Comments/Concerns:

- Consideration for the ability of cheatgrass to germinate in all seasons.
- Removal of litter plays a huge role in reducing cheatgrass germination.

1.8 Issue Statements

1.8.1 Environmental Justice

- Will temporary, short-term, and/or long-term reductions in plant materials and/or the presence of livestock have impacts to locations, activities, and/or plant materials that have been traditionally, socially, or culturally used by Environmental Justice (EJ) populations within the planning area and cause disproportionate adverse impacts to one or more of those populations?

1.8.2 Fire and Fuels

- How do targeted and prescribed grazing treatments impact fuel bed characteristics including fuel bed depth, fine fuel loading, and fine fuel continuity?
- How would altering fuel bed characteristics impact fire behavior (flame length, rate of spread, intensity, and return cycle)?

1.8.3 Greater Sage-Grouse

- How would targeted and prescribed grazing treatments impact GRSG life cycle requirements (seasonal cover, security, forage) including lekking, nesting, and brood-rearing requirements in the short-term and the long-term?
- How would changes in habitat quality or quantity resulting from targeted or prescribed grazing treatments impact GRSG?

1.8.4 Lands with Wilderness Characteristics (LWCs)

- How would prescribed and targeted grazing treatments impact Lands with Wilderness Characteristics (LWCs) and their wilderness characteristics?

1.8.5 Livestock and Range

- How would targeted and prescribed livestock grazing treatments impact currently permitted livestock grazing management?

1.8.6 Noxious Weeds

- How would targeted and prescribed grazing treatments impact the colonization, spread, and distribution of noxious weeds during different seasons of use?

1.8.7 Recreation and Travel Management

- How many miles of authorized off-route travel would be needed for targeted and prescribed grazing treatments, and would the use of these routes for grazing treatments also encourage the public to use these same routes?
- Would the creation of fuel breaks from targeted grazing treatments be used as off-route travel paths by the public?
- Would the increase in travel on existing routes for targeted or prescribed grazing actions require more maintenance or those routes or require a change in management?

1.8.8 Riparian and Wetlands

- How would targeted or prescribed grazing treatments impact riparian/wetland habitat and water quality?
- How would prescribed winter grazing impact riparian/wetland attributes?

1.8.9 Socioeconomics

- Will planned treatments cause temporary, short-term, and/or long-term positive or negative impacts to wildlife, recreation, grazing, and/or other resources that generate direct, indirect, or induced social and/or economic impacts in the form of market and/or non-market ecosystem services that serve the needs and interests of the public?

1.8.10 Soils

- How would targeted or prescribed grazing treatments impact soil stability and wind/water soil erosion?
- How would different seasons of use with targeted or prescribed grazing treatments result in different impacts to soil attributes?
- How would targeted and prescribed grazing treatments impact biological soil crust?
- How would decreased fire intensity, size, and frequency impact biological soil crust?

1.8.11 Vegetation Including Threatened, Endangered, and Sensitive Species

- How would targeted and prescribed grazing treatments impact mixed native plant communities and/or sensitive plant species?
- How would prescribed grazing treatments impact invasive annual grass density in mixed native plant communities?
- How would mixed native plant communities and/or sensitive plant species be impacted by decreased fire intensity, size, and frequency?

1.8.12 Wild Horse and Burro

- How would temporary fencing infrastructure or increased travel on roads impact seasonal movement in core areas, Herd Management Areas and Herd Areas, or gather activities?
- How would the increased or new concentrations of livestock influence wild horses and burros in and around Herd Management Areas related to access or use of water or vegetation/forage resources?

1.8.13 Wildlife Including Threatened, Endangered and Sensitive Species

- How would targeted and prescribed grazing treatments impact wildlife and TES species' life cycle requirements in the short-term and the long-term?
- How would changes in habitat quality or quantity resulting from targeted or prescribed grazing treatments impact wildlife and TES species?
- How would targeted or prescribed grazing treatments affect migration patterns?
- What is the risk of domestic livestock-wildlife disease transmission?

2 Proposed Action and Alternatives

2.1 Proposed Action

The Nevada State Office of the BLM is evaluating selected ecological sites in the Great Basin within applicable BLM Nevada districts for options to utilize targeted and prescribed livestock grazing treatments. These treatments would be used as tools on BLM-administered lands in future proposed projects to reduce fuel loads from invasive annual grass species in order to address increased wildfire risk and diminished ecological integrity. These treatments are not for a primary goal of livestock production. This action would allow future management options to be implemented on the ground in a strategic, consistent and efficient manner. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives. A summary of each grazing treatment can be found below, with specifics and comparisons of targeted and prescribed grazing treatments found in Appendix C. Required monitoring and required design features are part of this proposed action. Because it is recognized that all mapping efforts have acceptable margins of error, projects may be proposed and implemented under this analysis in ecological sites represented by Great Groups identified in Appendix B but are not shown on specific locations on the maps found in this document (Appendix A).

2.1.1 Targeted Grazing

Targeted grazing is defined as the purposeful application of a specific species of livestock at a determined season, duration and intensity to accomplish defined vegetation or landscape objectives (Launchbaugh and Walker 2006). Specifically, for this action, targeted grazing requires the use of livestock at a high intensity over a relatively short duration to remove fine fuels according to specific fuels management objectives, with the overall goal of reducing potential fire size and frequency or modifying invasive annual dominated areas (annual or seeded states). Targeted grazing may be implemented as a stand-alone treatment or in concert with other treatments, such as green strips or other seeding efforts, and may occur more than once a year for the life of the project. Targeted grazing may also be used post-fire if appropriate. Targeted grazing may require temporary infrastructure for implementation such as water haul sites, temporary water pipelines, temporary fencing, and salt, mineral, or protein supplementation. Targeted grazing also considers the following:

- Similar to a fuel break in form and function, this linear treatment is intended to remove the fuel load in areas already dominated by annual grasses in order to modify fire behavior.
- These projects follow clearly defined fuels objectives in order to protect ecological characteristics adjacent to the targeted grazing treatment, and are not intended to enhance ecological integrity on the location they are conducted.
- Projects would not be used in areas that include resources such as riparian areas.
- Depending on the site location and area characteristics, and in order to ensure treatment objectives are attained, physical separation from the larger pasture/area may be required.
- Targeted grazing projects would not be planned in Special Management Areas such as Wilderness and Wilderness Study Areas (WSAs).

2.1.2 Prescribed Grazing

Prescribed grazing for this action, would require that the primary objective of grazing use is the management of vegetation to meet resource objectives other than the production of livestock forage, such as prescribed grazing to manipulate vegetation composition and structure or increase, re-establish, or stabilize desired vegetation communities. Timing, duration, and frequency of grazing are controlled based on project planning and monitoring. Prescribed grazing would focus on the reduction of invasive annual grasses or the maintenance of a current desired vegetative state where invasive annual grasses are present but not at levels to highly influence ecological function. Prescribed grazing post fire would be restricted to sites that have sufficient vegetative regrowth to determine the current ecological state a site is in. Prescribed grazing would also:

- Have an objective of promoting, enhancing, and/or sustaining ecological integrity on the treatment site, which is aimed at using seasonality and amount of use to promote growth or persistence of the desirable vegetation, while decreasing fine fuels from invasive annual grasses.
- May be done on a pasture or allotment-wide context, if appropriate, and will likely not be done in concert with the regularly scheduled grazing in an area.
- A permittee may need to take voluntary temporary non-use (43 CFR 4130.2(g) on permitted grazing in order to implement a prescribed grazing treatment. This temporary non-use could exceed 3 years in duration depending on individual project planning and effectiveness shown through monitoring. Taking this temporary non-use on permitted grazing for the implementation of a grazing treatment would not result in the loss or termination of the authorized grazing permit, and would not make forage available under 43 CFR 4130.2(h).
- Other resources which may require special management considerations or protections, (such as riparian areas, T&E habitats, etc.) may be included in prescribed grazing treatment areas, and will have pre- and post-treatment monitoring requirements combined with site specific adaptive management (where necessary), to avoid and mitigate potential impacts.
- Pre- and post-treatment monitoring requirements, and associated thresholds and responses, are required for all treatments to ensure any potential resource damage is mitigated.

2.2 Required Design Features

Required design features (RDFs) have been identified to reduce or eliminate adverse effects to environmental and human resources from the proposed action and are part of all action alternatives. These are based on guidance in BLM manuals and handbooks, regulations, and standard BLM and industry practices, and to ensure conformance with all applicable RMPs and other guiding documents. Effects described in this EA are dependent on the mandatory application of the RDFs. The complete list of project RDFs can be found in Appendix D.

2.3 Required Monitoring

A minimum amount of data is required for all targeted and prescribed grazing projects. There are minimum data requirements for every project during the project planning/pre-implementation phase which are designed to ensure that there is a baseline site condition established with which to build an effective project with proper objectives. Not only will the baseline data directly inform project design and objectives, it will be directly compared to the post-implementation monitoring data to track project success and to ensure resource degradation does not occur. Thresholds and responses are defined for the parameters monitored, and will determine project management adjustments or terminations. In addition to quantitative data, all project implementers will be required to keep a project log detailing their daily interaction and observation with the project. This log will be required to be submitted to the BLM upon project completion.

All monitoring would include:

- Any livestock herding proposed as part of the project design will require a specification of herding frequency and will require the submittal of a herding log to BLM. The herding log will specify what days herding was conducted, number of people conducting herding, number of animals moved, and general description of where they were moved from and to.
- Compliance monitoring will also occur to ensure project is being implemented per approved project design. This also includes confirmation of temporary infrastructure instillation, as well as removal post-treatment.
- All approved projects must include a cooperative monitoring plan and agreement. The cooperative monitoring plans must describe the objectives and desired outcomes to be monitored. They must also include monitoring methods and protocols; monitoring locations; a schedule for collecting data; the responsible party for data collection and storage; an evaluation schedule; and a description of the anticipated use of those data (e.g., in-project adjustment, project completion, etc.)
- A meeting between the project participant and the BLM is required for each project upon completion where the project successes and challenges will be discussed and all data either party has will be shared at that time. This meeting will be documented and summarized as part of the monitoring record.

All monitoring will be completed cooperatively by the operator and the BLM. Required implementation of project monitoring can be found in Appendix E and are summarized below.

2.3.1 Implementation and Effectiveness Monitoring

To document actions and to help establish cause and effect relationships when evaluating trend, implementation monitoring should be done periodically for ongoing. Baseline data are only collected once, and future data collected at the same transect is compared to the baseline data. Long-term effectiveness monitoring should generally be completed at intervals appropriate to evaluate the achievement of objectives (3-5 years). See Table 32 Pre-Implementation/ Project Planning for all Action Alternatives and Table 33 Post-Implementation Monitoring for all Action Alternatives in Appendix E. To determine the current phenology of a site, the following six-class scheme to classify grass plant phenology at the time the targeted or prescribed grazing treatment is applied would be used (Schroeder and Johnson 2019):

1. Vegetative = new spring foliar growth evident;

2. Jointing = from boot, culm elongation, to seed head fully formed;
3. Anthesis = flowering and pollination;
4. Seed Ripe = from seeds firm to dispersal;
5. Dormant/Dead = growth senesced; and
6. Fall regrowth.

Phenology should be recorded for invasive annual grasses (i.e., cheatgrass) and for dominant perennial grass species encountered including, but not limited to Sandberg bluegrass (*Poa secunda*), squirreltail (*Elymus elymoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), and crested wheatgrass (*Agropyron cristatum*).

Riparian monitoring is only required in prescribed grazing treatments (since targeted grazing treatments are designed to exclude riparian resources.) Although, riparian monitoring would be conducted on riparian areas that are inadvertently impacted by targeted grazing treatments with challenges of maintaining livestock locations/temporary fences/etc. Pre and post monitoring requirements can be found in Appendix E.

2.3.2 Thresholds and Responses Monitoring

Prior to meeting the final thresholds, there is opportunity to adapt and adjust projects as defined in individual project plans. At the project level, these interim thresholds, and suite of available responses, for project adaptation will be established in the cooperative monitoring agreement and decision based on project objectives. Individual plan development will be reviewed to ensure compliance with NEPA. All thresholds and responses monitoring are directly tied to the treatment objectives, which would define if seasonal re-entry, non-use in other portions of the year, or other treatments would be needed. See Table 36 Thresholds and Responses Monitoring in Appendix E.

2.4 ALTERNATIVES

Four alternatives have been analyzed in this EA as part of the proposed action: three Action Alternatives and a No Action Alternative. All three of the Action Alternatives authorized through a Decision Record would be tools available for BLM managers to use under explicit guidelines for grazing treatments on site-specific projects that conform to the criteria established in the proposed action. As such, each individual project would select the preferred alternative that would be used based on the site-specific ecological state and project objectives. All alternatives would be separate and independent of current or existing grazing programs and would be authorized outside the terms and conditions of existing grazing permits. The alternatives constitute different methods of using targeted grazing or prescribed grazing treatments as part of the proposed action. All Action Alternatives have been developed based on seasonality and annual lifecycle requirements of key perennial species and invasive annual grasses. Implementation of each of the alternatives within the proposed project may alter or affect the current availability of forage within an area, however, monitoring, in conjunction with project design—including agreed upon non-use for whatever portion of a grazing permit is needed to make the treatment objectives attainable for implementation by the permittee—would determine if and how that would impact any annual grazing within the site-specific analysis area.

2.4.1 Action Alternative A: Early Spring Grazing Prior to Native Perennial Growth

Targeted and prescribed grazing actions will be implemented when cheatgrass is actively growing and perennial vegetation has not come out of dormancy. This alternative would remove fine fuels prior to the fire season, while concurrently reducing the cheatgrass seedbank.

2.4.2 Action Alternative B: Native Perennial Growing Season Grazing

Targeted and prescribed grazing actions would be implemented during native perennial vegetation growing season. This alternative would focus on treatments that reduce cheatgrass, while ensuring that ecological health for native perennial components is maintained on project location for prescribed grazing and adjacent to project location for targeted grazing.

2.4.3 Action Alternative C: Native Perennial Dormant Season Grazing

Targeted and prescribed grazing actions would be implemented when native perennial vegetation is dormant. This alternative would reduce fine fuel cover, reduce litter accumulation, and thereby reduce annual grass germination rates and seed bed accumulation and transfer.

2.4.4 No Action Alternative

Under the No Action Alternative, targeted and prescribed grazing methods, techniques, and programs as a fuel reduction tool for the identified BLM Nevada offices would only be implemented on a project-by-project basis specific to each field office. A unified, efficient, and comprehensive approach across all field offices, with a focus on reducing residual fuel loads from invasive annual grass species, would not be implemented. Managers would continue to be limited in their ability to implement a greater degree of adaptive management to take advantage of seasonal variations or changes.

2.5 Alternatives Considered but Eliminated From Detailed Analysis

Additional alternatives or combinations of alternatives were provided from internal discussions within the BLM, suggestions from cooperating agencies, and from public scoping. All suggested alternatives were evaluated on how they met the purpose and need, if they were economically and/or technically feasible, and if they provided additional benefits in terms of addressing impacts when compared with alternatives already being analyzed in detail.

A myriad of other treatments, such as seeding or vegetation manipulation, in combination with grazing treatments was considered, along with expanding these treatments for the management of other vegetative species or for “wolfy” perennials[3]. These combinations of treatments, along with the focus of the treatments were given serious consideration, but were dismissed from further analysis in this document to maintain the focus on the purpose and need.

Different ways of presenting the alternatives with associated components were considered, such as livestock kinds or dates of use, but it was determined that because of the focus on invasive annual grasses and the phenology of those species, that the alternatives should be considered instead by seasonal variations that affect plant growth. Further consideration was given to whether those seasonal variations and phenology should be combined into one alternative or split into multiple alternatives. Because of the desire to provide a range of targeted

[3] Perennials that have excessive standing leached residues which make them of very low nutritional quality and palatability for both wildlife and livestock. Presence of “wolfy” perennials can impede access by all species to other palatable vegetation (Severson 1990).

and prescribed grazing options based on management objectives, it was determined that each seasonal variation should have its own alternative.

An alternative that included a quarantine or isolation for livestock after grazing on cheatgrass was dismissed from further analysis because of the lack of economic and technical feasibility of isolating animals used in invasive annual grass treatments, when invasive annuals are so widespread and other authorized activities occurring within the analysis area do not have those same restrictions. However, if warranted, isolation is feasible for livestock if used in grazing treatments where noxious weeds are present. An RDF addressing this situation can be found in Appendix D and is included as part of this proposed action.[4]

A alternative was suggested that focused on a combination of activities, such as removing invasive species and reseeding affected areas with native grasses, shrubs and forbs, along with rest from livestock use for a minimum of two years until restoration objectives have been met for habitat that is degraded by invasive annual grasses, and/or following fires. . This alternative was dismissed from further analysis because these options currently exist for invasive annual grass management and it did not meet the purpose and need of providing additional options and flexibility.

Options to consider targeted grazing as part of the allotment-specific NEPA analyses required before issuing term (10-year) grazing permits was also considered, but dismissed because it did not meet the purpose and need of providing treatment options and flexibility consistently over a larger land management area, separate and distinct from individual grazing permits. This option would not be feasible nor efficient in terms of BLM staff resources and time availability nor provide any additional results above and beyond the other alternatives analyzed. This EA does not prohibit future permit renewals from including site specific projects and analysis.

2.6 Connected Actions

Connected actions associated with the proposed actions are the authorization of temporary range improvement projects (RIPs) such as water-haul locations, temporary pipelines and temporary fencing, specifically for the implementation of targeted and prescribed grazing treatments. Water-haul sites can include tanks, temporary off-route access, and above-ground temporary pipelines. Fencing would include electric wire or other materials that could effectively contain livestock. Where already present, permanent RIPs will be used with agreement of current authorized permitted users of that allotment, and if related to water use, the livestock owner, operator, or lessee would need to ensure compliance with Division of Water Resources and Nevada Water Law with appropriate water rights. A complete list of all currently existing RIPs associated with allotments managed by BLM Nevada can be found in Appendix F. Temporary RIPs would be placed on existing disturbance or hardened sites where possible to minimize impacts. Existing roads and travel routes would be used to access these sites unless roads or travel routes are not present. In the rare situation where existing travel routes are not present, temporary off-route travel may be approved as part of the project design. Any damage or disturbance would be required to be restored after use. Required design features as part of this proposed action would apply to all associated temporary RIPs implemented because of these treatments.

[4] Livestock used for targeted or prescribed grazing treatments located in previously identified noxious weed areas may be subject to an isolation period dependent upon seasonality of treatment and noxious weed species present.

Additional actions include mineral/attractant sites that would be placed to provide additional nutrients for livestock used in these treatments or to attract livestock into areas to either reduce or avoid impacts or to increase utilization of localized invasive annual grasses. Mineral/attractant sites typically include temporary tubs, tanks or small structures that hold loose or hardened material for livestock consumption.

3 Affected Environment and Environmental Consequences

Section 3 outlines the issues, general setting of the proposed Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada, assumptions used in analyzing each issue, the area of analysis for each resource, and the environmental consequences. The interdisciplinary team has identified and analyzed all impact-causing elements from actions described in the proposed Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada. An impact-causing element is a specific component of the proposed action that could present a potential impact to any resource or use. Identification of these issues requiring analysis was accomplished through internal reviews and discussion, coordination with cooperating agencies, and through public scoping and are summarized in Appendix H, Issues and Supplemental Authorities.

Supplemental Authorities and Other Relevant Resources are resources or resource uses that are subject to requirements specified in statute, regulation, or executive order, and considered in all EAs (BLM H-1790-1, Appendix 1). An initial analysis was performed for all Supplemental Authorities and Other Relevant Resources as well as identified resource issues within the analysis area boundary. Where resources were determined to be present and potentially impacted (PI) by the alternatives, those were carried forward for analysis (Section 3.3). Where resources are present, but not determined to be impacted (NI), or would not require a detailed level of analysis or resources are determined not to be present (NP), a rationale for not considering them further was provided in Appendix H.

Analyzing the eliminated issues is not necessary to make a reasoned choice between the alternatives (Sections 2.4 through 2.5) and would not provide information necessary to respond to the purpose and need for the BLM's action (Section 1.2 and 1.3). Issue statements (Section 3.1) were considered for all PI and NI issues. The temporal limits and significant thresholds are identified by resource/issue in Section 3.2. Mapsets of issues overlaid (where practical) with the analysis area can be found in Appendix A.

3.1 Analysis Methodology

3.1.1 General Setting

The larger geographic area covers BLM-administered lands in the Carson City, Winnemucca, Battle Mountain, Elko, and Ely BLM Districts, and covers two ecoregions (Northern Basin and Range & Central Basin and Range) that contain a variety of landscapes ranging from salt desert shrublands and sagebrush steppe ecotypes, to riparian communities and pinyon/juniper woodlands. These lands are located throughout Nevada in Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, Washoe and White Pine Counties. The analysis area within this larger geographic area is defined by Great Groups based on dominant vegetation and disturbance responses that could be directly impacted by grazing, fire, or other similar response to disturbance. Elevations in this analysis area range from 3,386 to 10,243 feet. These BLM-administered lands support a variety of uses including year-round wildlife habitat, recreational opportunities, energy and mineral development, and livestock grazing.

Ecological site descriptions (ESDs) are reports that provide detailed information about a particular kind of land, or distinctive ecological site. [5] Within each ESD, state and transition models (STMs) depict the ecological dynamics of a site.[6] States are stable, long term ecological conditions that are produced on a site due to the interactions of the biotic, physical, and disturbance factors. States are usually composed of several plant community phases, which vary based on species composition and production. States found within the STMs associated with the Great Groups in the analysis area are reference states, current potential states, shrub states, tree states, annual states, and seeded states. All states except for the reference state have the presence of invasive annual grasses. Expression of community phases can be, and often is, dynamic on a particular ecological site location due to the interaction of all ecological factors. This interaction of ecological factors resulting in different plant community phases is termed community pathways. Ecological sites will also display multiple states, with the change from one state to another being non-reversible without significant management inputs. ESDs provide land managers the information needed for evaluating the land as to suitability for various land-uses, capability to respond to different management activities or disturbance processes, and ability to sustain productivity over the long term.

Historically, ecological sites have not been widely used by public land management agencies as tools for management planning because they typically occur at scales too small for landscape-scale decision making. However, recognizing the utility of ecological sites and the associated state-and-transition model (STM) for decision support, the Bureau of Land Management in Nevada partnered with Nevada NRCS and the University of Nevada, Reno (UNR) with the goal of providing a mechanism for utilizing STMs for decision support at scales larger than the individual ecological site. Ecological sites within each MLRA have been sorted into groups called Disturbance Response Groups (DRGs) based on their response to natural or human-induced disturbances. This sorting process utilized local knowledge, soil mapping data and published literature on soils, plant ecology, plant response to various disturbances, disturbance history of the area, and any other important attributes (Stringham et al. 2016). Ecological sites within each DRG respond similarly to disturbance and reach the same state or end-point although the rate of adjustment may vary by site (Stringham et al. 2019).

These DRGs were then combined into larger landscape units called Great Groups, first through comparing dominant vegetation type and second by determining if the vegetation community within each ecological site had the potential for developing into an annual state. Annual states are added to the STM for each ecological site if at least one site visit to that ecological site was determined to be dominated by invasive annual grasses. It is important to note that not all areas within a Great Group have significant amounts of invasive annual grasses but that the ecological sites within each Great Group are known to be susceptible to degrading into an Annual State. A complete list of Great Groups, with associated STMs and ESDs that are a part of this analysis area can be found in Appendix B. Because it is recognized that all mapping efforts have acceptable margins of error, projects may be proposed and implemented under this

[5] https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/

[6] https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1068392

analysis in ecological sites represented by Great Groups identified in Appendix B but are not shown on specific locations on the maps found in this document (Appendix A).

Impact indicators and thresholds, as well as temporal scales, were variable and dependent upon the issues discussed. These parameters were determined by best available science, available GIS data, and professional opinion.

3.1.2 General Analysis Assumptions and Guidelines

- Targeted grazing projects would occur in ecologically-degraded areas where annual grasses, i.e. cheatgrass, dominate the site or sites that are in a seeded state.
- Prescribed grazing projects would occur in areas where annual grasses, i.e. cheatgrass, are present either as a dominant component or as a component that contributes to fire risk and where a fuel break is not the desired objective.
- Baseline surveys, implementation and effectiveness monitoring would be conducted for each project. All projects will include a monitoring plan for determining if project/treatment objectives were met.
- Reduction of annual grass biomass in pounds/acre will be used as a metric measured before and after treatment. This metric is cited to reduce fuel and fire indicators in the following articles:(Diamond et al. 2009, Strand and Launchbaugh 2013). Stubble height can be used as a surrogate for this metric and was used as treatment objective in the Targeted Grazing Fuel Breaks EA (BLM 2016a).
- Desired perennial components and biological soil crust will be identified for each project and compared to Great Groups.
- General phenology, characteristics and nutritive values of cheatgrass found in Appendix I will be used as the modal[7] for this analysis.
- Noxious weeds are identified by Nevada Revised Statutes (NRS) and the Nevada Administrative Code (NAC) and defined as “any species of plant which is, or is likely to be, detrimental or destructive and difficult to control or eradicate” (NRS 555.005). The Nevada Noxious Weed list can be found in NAC 555.010 and Appendix M.
- The BLM would continue to treat noxious weeds on public land, as stipulated in other BLM permits and authorizations.
- On a project-by-project basis, it is assumed that treatments can be designed so as to avoid adverse impacts to designated critical habitat for wildlife.
- Any infrastructure needed for a targeted or prescribed grazing project can be located in an area that would not cause adverse effects to cultural or historical properties. The expense of mitigating a culturally significant site in order to place project-specific infrastructure would be more costly than simply moving the infrastructure to an alternative location.
- There would be no impacts to tribal resources, as tribal governments would have brought forward any concerns in response to the invitation to engage in government-to-government consultation.

[7] Defined as relating to, or characteristic of mode or manner.

- Any direct, adverse impacts to dispersed recreation within the analysis area can be offset through utilizing signage alerting recreationists to the use of dogs (herding or guardian) and presence of grazing livestock.
- On a project-specific basis, areas of high-density recreation can be effectively mitigated, either through signage, coordination, or a combination of the two.
- The fuel breaks, as a result of targeted grazing have a "higher and better purpose" in protecting the visuals of the larger landscape from fire scars. The improved or protected vegetative integrity as a result of prescribed grazing will improve the visual character of the landscape.
- Creation of new routes could and likely would promote additional travel on that route.
- Targeted and prescribed grazing projects would consider current use of an area by wild horse and burros.
- Analysis for Socioeconomics and Environmental Justice will be determined by geographic location and seasonal grazing, rather than by Great Groups.
- Grazing has varied impacts to riparian areas based on season-of-use and level of livestock management.
- Fire impacts to riparian systems, adjacent to riparian systems, or upstream of riparian systems could cause impacts to riparian areas and can result in increased sedimentation and erosion.
- Participation in targeted and prescribed grazing is voluntary and up to the authorized permittee(s). Several situations may result:
    - A permittee may be able and willing to conduct the entire grazing treatment themselves with their own livestock.
    - A permittee may be able and willing to conduct the treatment, but may need to include other livestock with their own in order to get enough livestock for a successful treatment. In this case the livestock to be included would be defined in the project plan, and the brands included would be noted at that time. The person/permittee initiating the project would take responsibility for the management of all the brands included in project design for the duration of the project. Once the project had ended, only the permittee's branded livestock could remain for any 'regular' permitted grazing that may occur.
    - A permittee may be willing to have the treatment occur on their permitted allotment, but may be unable to provide the treatment themselves. If the permittee of record is willing to have someone else provide the treatment, they may approach someone else, or they may provide authorization (written documentation) to BLM to approach someone else. These agreements would need to be agreed to in writing and signed by all participating parties and the authorized officer.
    - A permittee may have no ability/desire to conduct a treatment, and may be unwilling to have another operator conduct the treatment on their permitted allotment. BLM will not force prescribed or targeted grazing treatments without the permittee's consent.

  - In areas where no current livestock grazing permit exists, an application process will be implemented and followed. An application selection process would be implemented and followed.

- With regard to livestock species, targeted and prescribed grazing treatments are not for livestock production. However, animal health is a concern and mineral or protein supplements could be used. As such, the appropriate species would be selected for the vegetation. Specific characteristics of each livestock species considered can be found in Appendix J.
- Established objectives for riparian systems would be used including no greater impacts to riparian/wetland than allowed in 10-year permit.
- Projects would be designed to adhere to all applicable required design features, best management practices, and standard operating procedures unless a site-specific assessment and modification are completed and suggested by a local biologist to benefit wildlife or vegetative species or create no adverse impacts. Any modification would be submitted to the NVSO for specialist review/approval.
- Great Groups are reflective of the disturbance response to multiple soil types within multiple ecological site descriptions.
- Depending on the site, soil biotic crusts may not be well established and therefore would not be used or measured as a method of impacts.
- Certain project areas will need a weed management treatment and/or seeding to combat establishment of invasive annual grasses.
- Baseline surveys and ongoing monitoring would be conducted for each project. All projects will include a monitoring plan for determining if project/treatment objectives were met.
- All projects will have defined SMART objectives [Specific, Measurable, Achievable, Related/Relevant, Trackable/Time-specific; See Nevada Rangeland Monitoring Handbook (3rd, 2018)].

3.1.3 Direct, Indirect and Cumulative Impacts

A direct impact is caused by the action and occurs at the same time or place. An indirect impact is caused by the action but occurs later in time or is further removed in distance, but is reasonably foreseeable. A cumulative impact, as defined by the Council of Environmental Quality (CEQ), is an impact on the environment resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Past and present actions and reasonably foreseeable future actions with the potential to contribute to cumulative effects for each resource within the affected boundaries are discussed. Short-term impacts are those impacts that occur within five years of the action, and long-term impacts are those impacts that occur greater than five years after the action occurred. The CEQ established implementing regulations for NEPA requiring that a federal agency identify relevant information that may be incomplete or unavailable for evaluating reasonably foreseeable significant adverse impacts in an EIS (40 CFR, Part 1502.22). Knowledge and information are, and will always be, incomplete, especially with complex ecosystems and various scales. The BLM has used the best available information and knowledge relevant to the proposed action in the development of this assessment. A complete list of cumulative impacts considered for this EA can be found in Appendix K, Table 45.

A qualitative characterization of the intensity of impacts has been used within this analysis to define the intensity of impact to each resource. Intensity of impacts are influenced by differences between Great Groups, but are analyzed at a project level. Impacts are not always negative, for example the impacts to Fire and Fuels correlate to overall benefits to fuels management. The use of these terms should not be confused with BLM's determination of whether there are significant impacts, which determination will be made by BLM following completion of the EA process. The following are the impact intensities used:

- Low: Effects would be apparent, measurable, small, localized, and contained within the individual project area.
- Moderate: Effects would be apparent and measurable over a portion of the individual project area.
- High: Effects would be highly noticeable and measurable over a large portion of the individual project area.

3.2 Affected Environment

3.2.1 Environmental Justice

Table 1 Environmental Justice Impact Indicator and Assumptions

Environmental Justice	
Impact Indicator:	Disproportionate adverse impacts to one or more Environmental Justice populations in or near treatment areas, such as; changes in access to resource and resource uses, which could potentially limit ability for traditional, subsistence, cultural, or economic use thereby affecting the social and economic well-being of environmental justice populations. Factors that measure the effects of different resource management practices and whether or not there is a change (and how big the change is) from current conditions. • Population trends • Demographics • Employment by job sector • Personal income • Ethnic and racial makeup of the area • Extent of recreational use (including hunting and fishing, birdwatching, visitor days, as well as motorized and non-motorized recreational use) • Livestock grazing as measured in animal unit months, and • Rights-of-way and other land use management
Significance Threshold:	• Any individuals included as a resource characteristic (above) are negatively economically affected by proposed projects
Temporal Limits:	• Duration of project implementation

Executive Order 12898 directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The order also directs each agency to develop a strategy for implementing environmental justice. The order is also intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation.

According to the CEQ guidance, minority and low income communities can be identified where (a) the minority/low income population of the affected area exceeds 50 percent or (b) the minority/low income population percentage in the affected area is meaningfully greater than the minority/low income population percentages in the general population or other appropriate unit of the geographic analysis. Information is obtained from the EPA “EJ View” Web site, which presented 2010 Census population data and 2010 American Community Survey data on poverty at the time it was accessed, shows 1.7 in Eureka County to 40.8 percent in Mineral County of the population within the planning area is minority. The population percent considered below the poverty line ranges from 7.2 in Storey County to 21.2 percent in Mineral County (EPA 2020). The potential for Environmental Justice communities within the planning area is low. However, to the extent that a particular racial or low-income group would rely on ranching on BLM-administered lands as a sole or primary source of income, that group could be disproportionately affected by decisions on grazing permits.

A Socioeconomic Baseline Report (BLM 2020b) provides more detail on the demographics of the counties in this analysis area related to environmental justice. Due to the size of the area, further site-specific analysis, such as that conducted for site-specific NEPA analysis for implementation actions, would be required to further define potential populations for consideration.

3.2.2 Fire and Fuels

Table 2 Fire and Fuels Impact Indicator and Assumptions

Fire and Fuels	
Impact Indicator:	For both targeted and prescribed grazing treatments, the following will act as impact indicators: • Changes in wildfire behavior from targeted and prescribed grazing treatments.
Significance Threshold:	• A flame length of less than four feet* • A fire intensity of less than 100 Btu/ft/s*
Temporal Limits:	• Throughout project implementation, extending into the future via resultant impacts to vegetation communities and altered state of ecological sites (i.e., transitions through ecological pathways/thresholds).
*Flame length and fire intensity from Charts for Interpreting Wildland Fire Behavior Characteristics - General Technical Report INT-131 (Andrews and Rothermel 1982).	

Fire has always been an integral natural process in rangeland ecosystems, including those within the analysis area. A variety of human-caused changes, chiefly annual grasses invasion and livestock grazing, have altered fuel composition within the analysis area and, in turn, fire behavior (Knick and Rotenberry 1997, Strand and Launchbaugh 2013). Fine-textured annual grasses such as cheatgrass cure earlier in the season compared with perennial grasses, which has caused the fire season to begin earlier in the year compared to historic conditions. In addition, annual grass establishment also promotes shortened fire return intervals because they increase fuel continuity as well as the likelihood of fire ignition and spread (Balch et al. 2013). Overall, these factors have generally resulted in larger fires occurring at shorter return intervals.

Figure 1 depicts the total acres burned from wildfires between 1960 and 2018 within the analysis area. Acres burned by natural-caused wildfires increased steadily between the 1980s and 2000s and then decreased during the 2010s, although 2019 data are not included. Acres burned by human-caused wildfires in the analysis area stayed reasonably steady between the 1980s and 2000s; however, totals between 2010 and 2018 increased sharply.

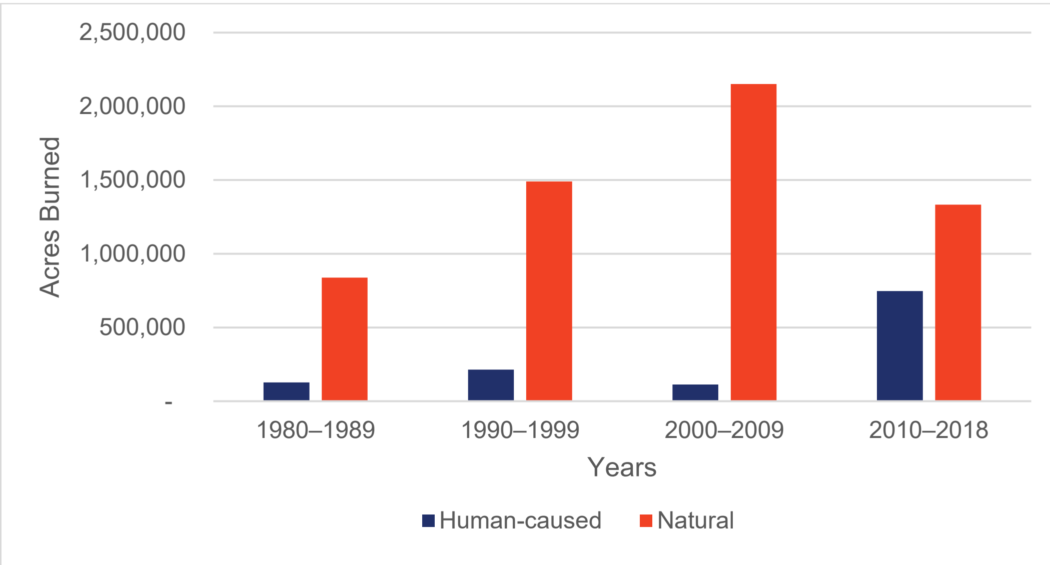

Figure 1 Total Acres Burned within the Analysis Area by Decade (BLM 2018)

A fire regime describes the patterns of fire occurrences, frequency, size, and severity in a given area or ecosystem. Fire regimes are classified into fire regime groups, which are based on both frequency and severity (National Wildfire Coordinating Group 2019). Table 3 defines the five fire regime groups and shows the acres of each across the analysis area. Historically, the analysis area contained all five fire regime groups, with the vast majority of the analysis area falling into Groups III, IV, and V. While fire severity varies between these three groups, Groups III, IV, and V (a combined 97 percent of the analysis area) are each characterized by fire return intervals of at least 35 years.

Table 3 Fire Response Groups within the Analysis Area (LANDFIRE 2010)

Fire Regime Group	Frequency	Severity	Acres
I	<= 35 Year Fire Return Interval	Low and Mixed Severity	206,750
II	<= 35 Year Fire Return Interval	Replacement Severity	115,346
III	35–200 Year Fire Return Interval	Low and Mixed Severity	8,466,547
IV	35–200 Year Fire Return Interval	Replacement Severity	8,433,190
V	> 200 Year Fire Return Interval	Any Severity	6,934,795
Barren	N/A	N/A	2,199
Sparsely Vegetated	N/A	N/A	137,166
Water	N/A	N/A	230,549
Total	N/A	N/A	24,526,542

Current fuel conditions within the analysis area can also be described using fuel models. Wildland fuels, both naturally occurring and manipulated, have been grouped into standard fuel models, which can be used to predict fire behavior. Scott and Burgan's (2005b) standard fuel models were used here to characterize current fuel conditions. As shown in Table 4, fuel types SH5, GS2, GR2, and SH1 are most prominent, accounting for approximately 79 percent of the total analysis area. SH5 fuel types typically have very high spread rates and flame lengths. In contrast, SH1 fuels have very low spread rates and flame lengths. GS2 fuels are characterized by high spread rates and moderate flame lengths. Refer to Great Group narratives in Appendix B for more detailed information regarding the fire ecology of each Great Group within the analysis area.

Table 4 Fuel Models within the Analysis Area (LANDFIRE 2014)

Fuel Type	Description	Acres
GR1	Short, Sparse Dry Climate Grass	1,826,995
GR2	Low Load, Dry Climate Grass	4,480,773
GR3	Low Load, Very Coarse, Humid Climate Grass	338
GR4	Moderate Load, Dry Climate Grass	1,059
GS1	Low Load, Dry Climate Grass-Shrub	1,836,188
GS2	Moderate Load, Dry Climate Grass-Shrub	5,805,099
NB1	Urban/Developed	47,560
NB3	Agricultural	2,598
NB8	Open Water	7,180
NB9	Bare Ground	408,401
SH1	Low Load Dry Climate Shrub	2,641,438
SH2	Moderate Load Dry Climate Shrub	676,805
SH3	Moderate Load, Humid Climate Shrub	9,436
SH4	Low Load, Humid Climate Timber-Shrub	502
SH5	High Load, Dry Climate Shrub	6,478,346
SH6	Low Load, Humid Climate Shrub	3,305
SH7	Very High Load, Dry Climate Shrub	118,031
TL1	Low Load Compact Conifer Litter	1,364
TL2	Low Load Broadleaf Litter	682
TL3	Moderate Load Conifer Litter	147,750
TL4	Small downed logs	12
TL5	High Load Conifer Litter	538
TL6	Moderate Load Broadleaf Litter	227
TL7	Large Downed Logs	3
TL8	Long-Needle Litter	304
TL9	Very High Load Broadleaf Litter	675
TU1	Low Load Dry Climate Timber-Grass-Shrub	20,156
TU2	Moderate Load, Humid Climate Timber-Shrub	4,078
TU5	Very High Load, Dry Climate Timber-Shrub	6,698
Total	N/A	24,526,542

An analysis was completed to capture how invasive annual grasses influenced fuel model rankings. Predicted Fire Behavior classes were considered to be extreme in areas with a high to very high fuel model ranking and an invasive annual grass cover of greater than 15 percent. Lands that have higher than 15 percent cheatgrass cover are twice as likely to burn as those with low abundance of fine fuels, and fire probability increases rapidly even at low cheatgrass cover (1–5 percent) (Bradley et al. 2018). Predicted Fire Behavior classes are based on Scott and Bergan's (2005) assigned fuel models and their associated rates of spread and flame lengths. The high to very high Predicted Fire Behavior class represents fuel models with a rate of spread of 20-150 chains/hour or a flame length of 8-25 feet (Scott and Burgan 2005a). See Predicted Fire Behavior Mapset in Appendix A.

3.2.3 Greater Sage-Grouse

Table 5 Greater Sage-Grouse Impact Indicator and Assumptions

Greater Sage-Grouse	
Impact Indicator:	For both targeted and prescribed grazing: • Greater Sage-Grouse (GRSG) habitat • GRSG population size
Significance Threshold:	For both targeted and prescribed grazing, failure to adhere to general or site-specific BMPs resulting in: • Decrease in GRSG population size • Significant loss or degradation of GRSG habitat
Temporal Limits:	• Duration of the implementation of the proposed action (short-term) and indirect impacts due to successful implementation of the proposed action (long-term)

The Greater Sage-Grouse (*Centrocercus urophasianus*) is gallinaceous upland bird found in Nevada's sagebrush-dominant habitats, ranging from foothills to plains and mountain slopes. A sagebrush-obligate, the Greater Sage-Grouse depends on sagebrush for both forage as well as nesting and cover. The grouse will also feed on nearby leaves, blossoms, and buds of other plants as well as some insects. This particular species is also well-known for their elaborate courtship displays during late winter and spring, in which the males occupy open areas known as "leks" that act as arenas for displaying males. While in a lek, the males will strut to demonstrate their fitness and create unique, bubbling sounds using air sacs found on their chest.

After mating rituals end, female grouse care for the young, nesting in upland sagebrush habitat during early summer and rearing broods in areas with plentiful foraging throughout the summer (BLM 2019). Often, the hens will seek out moist habitats in which food is concentrated and cover is plentiful, such as ephemeral wet meadows, riparian zones, or irrigated fields (BLM 2019). Once young are sufficiently grown and winter approaches, Greater Sage-Grouse will shift to areas where sagebrush is abundant, as it is their primary source of food during the winter months. Table 6 shows the seasonal and annual habitats within the analysis area. Natural predators of this grouse include corvids and badgers (Coates and Delehanty 2010) as well as raptors, coyotes, and other carnivorous animals (Lockyer et al. 2013).

Table 6 Greater Sage-Grouse Seasonal and Annual Habitat within the Analysis Area

Season	**Habitat Suitability**	**Other**	**Great Groups**	**Total**
Spring	Not Covered	97	1,575,164	1,575,261
	High	10,662,399	7,885,015	18,547,414
	Moderate	2,048,452	2,422,035	4,470,487

Season	Habitat Suitability	Other	Great Groups	Total
	Low	3,816,775	4,735,639	8,552,414
	Non	12,771,458	7,908,705	20,680,163
	Total	**29,299,180**	**24,526,559**	**53,825,739**
Summer	Not Covered	107	1,575,164	1,575,272
	High	8,600,281	5,275,736	13,876,016
	Moderate	2,925,059	2,633,683	5,558,742
	Low	6,264,710	7,194,876	13,459,585
	Non	11,509,023	7,847,100	19,356,124
	Total	**29,299,180**	**24,526,559**	**53,825,739**
Winter	Not Covered	47	1,575,164	1,575,211
	High	5,726,809	6,559,092	12,285,901
	Moderate	3,377,453	4,442,813	7,820,266
	Low	5,545,998	5,140,565	10,686,563
	Non	14,648,873	6,808,924	21,457,798
	Total	**29,299,180**	**24,526,559**	**53,825,739**
Annual	Not Covered	42	1,575,164	1,575,207
	High	8,811,329	7,991,357	16,802,685
	Moderate	2,668,889	3,128,158	5,797,047
	Low	3,466,553	4,104,931	7,571,485
	Non	14,352,366	7,726,948	22,079,314
	Total	**29,299,180**	**24,526,559**	**53,825,739**

Historically, Greater Sage-Grouse were abundant across Nevada, however habitat loss due to development, fire, invasive plants, and other factors have been identified as primary threats (Sagebrush Ecosystem Council 2018). As invasive annual grasses invade previously sagebrush-dominated regions, fire frequency and intensity has increased, leading to widespread loss of functional sagebrush communities, which sustain numerous life cycle requirements of the Greater Sage-Grouse (Connelly et al. 2004, Crawford et al. 2004, Riginos et al. 2019) . Declining Greater Sage-Grouse numbers reflect the widespread decrease in quality sagebrush habitat upon which they rely (Coates et al. 2016b). Greater Sage-Grouse are considered an “umbrella” species because they share common habitat requirements with a host of other sagebrush-obligates, so impacts to Greater Sage-Grouse can be extrapolated to a wider variety of species within the shrub-steppe community (Copeland et al. 2014).Within the analysis area, some of current sage-grouse habitat has been impacted from changing fire regimes and cheatgrass encroachment and would meet the criteria for implementing targeted or prescribed grazing treatments (Crawford et al. 2004).

As a result of declining habitat and population size, petitions to list the Greater Sage-Grouse under the Endangered Species Act (ESA) have been made, with the USFWS finding in 2010 that their listing was warranted but precluded due to other higher priority species listing actions. Federal agencies, states, stakeholders, and organizations continue to work steadily to conserve and protect the habitat of the Greater Sage-Grouse, utilizing proactive strategies to avoid listing and to safeguard this iconic bird and the sagebrush communities it represents. As of 2015, the

U.S. Fish and Wildlife Service (USFWS) determined that listing the Greater Sage-Grouse under the ESA was not warranted, due to conservation efforts and new information regarding the species' status, threats, and regulatory mechanisms. However, the Greater Sage-Grouse is still considered a Sensitive Species.

Bi-State Sage-Grouse

The Bi-State Sage-Grouse is a genetically distinct population segment (DPS) located along the diagonal border between Nevada and California. Previously referred to as the Mono Basin population of sage grouse, two petitions have been made to list the Bi-State DPS as threatened or endangered under the ESA. In 2006, both of these petitions were found not to warrant listing. After a reconsideration of this finding, the USFWS determined that listing the DPS was warranted but precluded by higher priority listing actions and added the DPS to a candidate species list. In 2013, the USFWS proposed listing the DPS as threatened under the ESA. After implementation of various land use plan amendments and conservation actions such as the 2012 Bi-State Action Plan, the proposed listing was withdrawn for the Bi-State Sage-Grouse DPS in 2015. In 2018, this decision was challenged, vacating the 2015 withdrawal. As of March 2020, the USFWS has withdrawn the 2013 proposed rule to list the Bi-State DPS, upholding the 2015 decision. Today, this DPS still faces threats such as habitat loss and fragmentation, in part due to impacts from changing fire regimes associated with cheatgrass (Bi-State Technical Advisory Committee Nevada Califronia 2012). Bi-State Sage-Grouse habitat within the analysis area is displayed within Appendix A (Bi-State Sage-Grouse Habitat Categories Mapset) and Appendix O, Table 56.

The analysis area for the Greater Sage-Grouse and the Bi-State Sage-Grouse includes the entire analysis area, with relevant required design features focused on identified management areas (PHMAs, GHMAs, OHMAs) for Greater Sage-Grouse and identified habitat types for Bi-State Sage-Grouse. See Appendix A (Greater Sage-Grouse 2019 ARMPA Habitat Management Areas Mapset, Greater Sage-Grouse 2015 ARMPA Habitat Management Areas Mapset and the Bi-State Sage-Grouse Habitat Categories Mapset) and Appendix O for identified habitat for both Greater Sage-Grouse and Bi State Sage-Grouse. Table 7 shows the acres of management areas within the analysis area (USGS).

Table 7 Greater Sage-Grouse Management Areas within the Analysis Area

Habitat	Other	Great Groups	Total
Not Covered	43	1,575,164	1,575,207
General Habitat Management Area (GHMA)	6,075,639	4,415,794	10,491,433
Priority Habitat Management Area (PHMA)	5,983,748	7,169,991	13,153,740
Other Habitat Management Area (OHMA)	4,771,514	4,874,822	9,646,336
Non-habitat	12,468,235	6,490,788	18,959,023
Total	**29,299,180**	**24,526,559**	**53,825,739**

3.2.4 Lands with Wilderness Characteristics

Table 8 Lands with Wilderness Characteristics Impact Indicator and Assumptions

Lands with Wilderness Characteristics	
Impact Indicator:	For both targeted and prescribed grazing treatments, area (%) of LWCs impacted; meaning impairment of wilderness suitability, which must be disclosed if it occurs.
Significance Threshold:	For both targeted and prescribed grazing treatments: • Any degradation of wilderness characteristics within an LWC due to the proposed action would require disclosure.
Temporal Limits:	Duration of project implementation, indirect effects extending into the future after the proposed action is concluded

Lands with Wilderness Characteristics (LWCs)[8] are BLM-administrated lands which contain wilderness characteristics, as defined in section 2(c) of the Wilderness Act of 1964 and incorporated in The Federal Land Management Policy Act of 1976 (FLPMA), of sufficient size, naturalness, and outstanding opportunities for solitude or unconfined recreation. They may also possess supplemental values such as ecological, geological, or other features of scientific, educational, scenic, or historical value. The BLM is required by Section 201 of the FLPMA to maintain an inventory on a continuing basis of all public lands and their resources and other values, which includes wilderness characteristics. It also provides that the preparation and maintenance of the inventory shall not, of itself, change or prevent change of the management or use of public lands.

LWCs within the analysis area are under no specific directives to manage the land to maintain wilderness characteristics. Of the LWCs identified within the analysis area, only the Winnemucca RMP specifically directs that LWCs be managed “primarily for other multiple use while maintaining the areas wilderness characteristics and applying appropriate measures at the project level after the appropriate level site-specific NEPA analysis.”

3.2.5 Livestock and Range

Table 9 Livestock and Range Impact Indicator and Assumptions

Livestock and Range	
Impact Indicator:	For prescribed grazing treatments, adverse impacts to features of the existing authorized permit (season of use, AUMs, etc.) that lead to permanent negative modification due to treatment.
Significance Threshold:	For prescribed grazing treatments, permanent negative modification to an existing authorized permit due to treatment.
Temporal Limits:	Throughout project implementation, extending into the future through impacts to existing authorized permit

The area of analysis for livestock grazing and range includes all BLM-administered lands that allow livestock grazing within Carson City, Winnemucca, Battle Mountain, Elko, and Ely BLM Districts. The area for analysis also includes 375,716 acres of land outside of currently permitted grazing allotments that may be utilized for treatments when invasive annual grass management may be needed.

[8] Wilderness areas and WSAs not a component of the affected environment for LWCs. Please see Appendix H for additional information regarding Wilderness and WSAs.

Within the analysis area, the BLM manages 24,152,851 acres of allotments (Table 10). Some of these allotments are overlapped by all or a portion of six stock driveways: North Steptoe Trail, Warm Springs Trail, Jakes Unit Trail, Preston Lund Trail, Shoshone Unit Trail and the White River Trail. There are also 19 allotments where acreage and boundary discrepancies exist, usually in the form of incongruent allotment boundaries and small areas of overlap. These data discrepancies are minor and do not change the overall analysis or quantification of impacts within these allotments. Information regarding the allotments considered in the analysis can be found in Appendix L and shown on the BLM Grazing Allotments Mapset in Appendix A. Livestock use from cattle, horses, sheep and goats varies throughout allotments. Specific information regarding these species can be found in Appendix J.

Available forage in grazing allotments is allocated based on expected pounds per acre of herbaceous biomass for a given area. The amount an average cow and calf pair, one horse or five goats/sheep consume in a typical one-month period is estimated and referred to as an Animal Unit Month (AUM). Grazing permits are issued based on the expected AUMs that the allotment can support without damaging soil or vegetation resources. Temporary range improvement projects (RIPs) will be utilized if existing RIPs do not currently exist in appropriate locations for the site-specific projects. Appendix F contains existing range improvements within Nevada.

Table 10 Acres of Allotments within Great Groups

Great Group	Total Acres	Great Group	Total Acres
A	499,989	FF	447,737
AA	237,450	G	5,862,054
B	68,676	GG	2,492,320
BB	71,618	H	2,873,907
C	762,345	I	1,016,786
CC	4,609,714	II	811,034
D	342,236	J	1,189,032
DD	70,761	JJ	259,945
E	146	K	1,053,278
EE	512,054	KK	353,477
F	537,503	L	80,789
		Grand Total	24,152,851

3.2.6 Noxious Weeds

Table 11 Noxious Weeds Impact Indicator and Assumptions

Noxious Weeds	
Impact Indicator:	For both targeted and prescribed grazing treatments, the following will act as impact indicators: • An increase in noxious weed populations sizes from targeted or prescribed grazing actions within the analysis area.
Significance Threshold:	Infestation size (acres)
Temporal Limits:	Throughout project implementation, extending into the future through impacts

The area of analysis for noxious weeds is located within site-specific projects within the Great Groups. Noxious weeds the identified by Nevada Revised Statutes (NRS) and the Nevada Administrative Code (NAC) and defined as "any species of plant which is, or is likely to be, detrimental or destructive and difficult to control or eradicate" (NRS 555.005). The Nevada Noxious Weed list can be found in NAC 555.010 and Appendix M. Weed Control Districts established through NRS 555 may promulgate regulations, with the approval of the State Quarantine Officer, listing additional noxious weed to be controlled it the respective district boundary. Many official weed control districts have been formed within the analysis area and any other noxious weeds requiring control, in addition to the State list, are included in NAC 555. Noxious weeds thrive in recently disturbed landscapes with significant bare ground due to the lack of competition and availability of resources. Livestock can facilitate the spread of noxious weed by carrying seeds to new locations in their hair and digestive system (Davidson et al. 2006). The BLM is required by federal law to manage noxious weeds and actions will be taken to prevent their spread by livestock during the proposed grazing treatments. A noxious weed inventory, including patch-size mapping, will be conducted prior to each treatment as well as ongoing monitoring and a post-treatment inventory to determine if noxious weeds are spreading. If noxious weeds are found, they would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

3.2.7 Recreation and Travel Management

Table 12 Recreation and Travel Impact Indicator and Assumptions

Recreation and Travel Management	
Impact Indicator:	For both targeted and prescribed grazing treatments, the following will act as impact indicators: • Mileage of existing routes in analysis area and miles of potential new temporary routes.
Significance Threshold:	• Impacts to existing routes • New routes authorized to install temporary infrastructure in areas where routes are not currently established could initiate a pathway that more people would continue to use. • Increase in travel on existing routes requiring more routes to be analyzed in Travel Management Plans or closed by Recreation Staff or creating a case or controversy regarding ownership of existing routes or rights of way (e.g. county roads).
Temporal Limits:	Long term

Recreation on off-highway roads, trails, and travel paths on public land is a popular activity in Nevada. There is an extensive network of roads and trails that traverse public land in the Proposed Action area[9]. These roads and trails are used for many types of uses such as hunting, off-highway vehicles (OHV), wildlife watching, livestock grazing, camping, mining, etc. They

[9] Definitions used in this analysis:
- Existing Route: A route (road, primitive road or trail), either user created or professionally constructed, that exists on the ground but has not been through the travel planning process.
- Designated Route: A route, either user created or professionally constructed, that has been through the BLM travel planning process and has been formally designated as open for public use. Designated routes may have use mode or time restrictions.
- Off Route Travel Prior to Completing Travel Planning: Any vehicular travel off of an existing route.
- Off Route Travel After Completing Travel Planning: Any vehicular (and in some cases mtn bike) travel off of a designated route.
- Authorized Administrative Use. Authorization, as part of the project, to drive off route to complete a grazing treatment. The public is not authorized to drive off route as part of this authorization.

range in width, surface material, use level, and state. The BLM in general, and BLM Nevada in particular, are in the process of developing comprehensive travel plans for all BLM-administered lands. Most of BLM Nevada does not yet have these travel plans, with the goal of increasing the number of plans in Nevada by 2022 and beyond. These travel plans would consider the effects of travel on all resources, including grazing. The BLM strives to maintain an extensive network of trails and travel paths, while staying consistent with other management goals including fire management, grazing, and resource management. An estimated 51,050 miles of these trails and travel paths are within Great Groups; see Appendix N for the miles of trails and travel paths within the analysis area, and the BLM Roads Mapset for an overview of roads within the analysis area.

3.2.8 Riparian and Wetlands

Table 13 Riparian and Wetlands Impact Indicator and Assumptions

Riparian and Wetlands	
Impact Indicator:	Change (degradation or improvement) in riparian/wetland objectives (Proper Functioning Condition-Lentic and Lotic) and EPA/State water quality standards from targeted or prescribed grazing treatments.
Significance Threshold:	• Downward trend of riparian functioning condition due to grazing treatments. • Water quality does not meet EPA/State standards due to grazing treatments
Temporal Limits:	Throughout project implementation, extending into the future through impacts to riparian and wetlands.

Nevada is the driest state in the nation and contains few discharges to surface waters of the state. Estimates suggest Nevada has lost (i.e., converted to another type of land cover or use) approximately 52 percent of its historic wetland acreage (Nevada Natural Heritage Program 2016). Losses are primarily attributed to the diversion of streamflow for agricultural, municipal, and industrial uses; filling and draining wetlands for development; and stream channel erosion and modification.

Although wetlands and riparian areas cover a relatively small amount of land in Nevada, the benefits of these ecosystems are indispensable. Wetlands provide important habitat for the state's wildlife and aquatic species, many of which are wetland or spring dependent. Wetlands also provide numerous ecosystem services to Nevada's citizens, including: water supply and purification, regulation of floods, ground water recharge, soil formation, nutrient cycling, and recreational opportunities and tourism.

Riparian areas are highly favored by livestock, which has led to disturbance of this habitat type in many areas. Where site potential allows, vegetation may develop multiple canopies, including trees, shrubs, grasses, forbs, sedges, and rushes. This complex vegetation structure is a goal of riparian management, as it can provide exceptionally valuable habitat for a wide array of wildlife species. In addition to vegetation structure, riparian system health is based on geology, geomorphology, fluvial processes, soil, and hydrologic characteristics. Proper Functioning Condition (PFC) is a tool designed to assess if the physical elements (abiotic and biotic) are in working order relative to an area’s capability and potential. When these physical elements are in working order, then characteristics develop that provide habitat for wildlife and other uses. Functionality comes first, then desired conditions are achieved (USFS et al. 2015).

Currently, as much as 40 percent of Nevada’s riparian areas are considered non-functional or functioning at risk (BLM 2015b). Declines in native woody riparian species have been documented throughout the West and Great Basin. The extent to which woody riparian vegetation has been reduced from its former distribution in the planning area is not known though it has been attributed to extensive livestock grazing (past and present), wild horse use, water developments that divert water, and invasive weeds (BLM 2008).

The analysis area contains mostly ephemeral and intermittent stream systems. Intermittent streams have flowing water only during the wet season (spring snow melt) and are normally dry during hot summer months but may still support riparian vegetation.

The analysis area also has numerous ephemeral streams which flow briefly during and for a short time after periods of rainfall within the immediate vicinity. They are typically shallow, are normally dry for most of the year, lack green riparian vegetation/zones, and are mostly covered with upland plants (i.e., sagebrush, perennial grasses). As such, PFC assessment and monitoring is not designed for this type of stream system.

The analysis area contains 1,712 miles of perennial stream systems and 11,459 miles of intermittent stream systems which would need to be managed more intensively than ephemeral systems (93,737 miles). In addition, there are 200,282 acres of lentic wetlands. It is important to recognize that the drought cycle can result in exacerbated impacts to these systems. The Perennial Waters and Riparian Areas Mapset can be found in Appendix A.

3.2.9 Socioeconomics

Table 14 Socioeconomics Impact Indicator and Assumptions

Socioeconomics	
Impact Indicator:	Changes in market and/or non-market ecosystem services provided within the planning area that occur as a result of treatments, changes in management or infrastructure, and/or changes in permitted activities under the proposed plan. Factors that measure the effects of different resource management practices and whether or not there is a change (and how big the change is) from current conditions. • Population trends • Demographics • Employment by job sector • Personal income • Local economy cashflow • Ethnic and racial makeup of the area • Extent of recreational use (including hunting and fishing, birdwatching, visitor days, as well as motorized and non-motorized recreational use) • Livestock grazing as measured in animal unit months (AUMs), and • Energy development and production • Extraction of minerals • ROWs and other land use management
Significance Threshold:	Any individuals included as a resource characteristic (above) are negatively economically affected by proposed projects
Temporal Limits:	Duration of project implementation

The analysis area consists of the Battle Mountain, Carson City, Elko, Ely, and Winnemucca BLM Districts. The area includes over 24 million acres within 16 counties with a total of 772,389 residents. Washoe County is by far the largest of the counties in terms of population size. In

2010, Washoe County had 435,195 residents, while Esmeralda and Eureka Counties had just 802 and 2,041 residents, respectively (U.S. Department of Commerce 2010).

An examination of employment trends of the combined counties reveal that the employment base is heavily concentrated in the Government/Government enterprises sector. In 2018, Government employment (Government/Government enterprises-11.7 percent and State/Local Government-9.9 percent) represented nearly 22 percent of the counties' total employment base (U.S. Bureau of Economic Analysis 2018). Although smaller, the accommodation/food services industry was also an important contributor to the counties' employment base. This sector represented 10.8 percent of the county's employment in 2018. The smallest sectors in employment include utilities, military, educational services, forestry and fishing sector; and the managerial and information sectors. Each of these sectors represented less than 2 percent of the counties' employment base, and in total, the six sectors accounted for less than 4 percent of the Counties' total employment (U.S. Bureau of Economic Analysis 2018). The Gross Domestic Product (GDP) for all counties in 2018 was $42.1 million dollars (Table 15).

Table 15 Socioeconomic Trends in the Analysis Area

County	Population	Area (Sq. Miles)	Median Household Annual Income	Percent Poverty	Percent Unemployment Rate	Gross Domestic Product 2018 (US Dollars)
Carson City	55,274	144.66	$52,034	11.3	4.7	3,240,155
Churchill	24,877	4,930.46	$51,514	11.4	3.9	1,038,391
Douglas	46,997	709.72	62,503	7.2	4.3	2,354,292
Elko	48,818	17,179.83	77,209	8.3	3.3	2,647,073
Esmeralda	783	3,581.88	40,000	14.4	4.8	88,757
Eureka	1,987	4,175.68	77,625	9.5	2.7	1,602,010
Humboldt	16,528	9,640,76	70,373	11.9	3.4	1,203,099
Lander	5,775	5,490.11	93,583	11.2	3.7	905,873
Lincoln	5,345	10,633.20	56,414	13.4	4.5	182,133
Lyon	51,980	2,001.19	55,493	10.5	5.4	1,428,585
Mineral	4,772	3,782.54	41,163	21.1	5.5	228,422
Nye	43,946	18,181.92	45,711	15.2	5.7	1,609,430
Pershing	6,753	6,036.56	50,846	18.3	4.1	363,785
Storey	4,010	262.92	62,284	7.6	4.4	1,485,373
Washoe	421,407	6,302.37	61,155	10.4	3.6	22,976,437
White Pine	10,030	8,875.65	62,993	13.3	3.7	705,080

The average median household income is $60,056 annually. The average percentage of residents living under the poverty line is 12.2 percent, with percentages ranging from 7.2 in Douglas County to 21.1 in Mineral County. The average unemployment rate is 4.2 percent.

The average age of the population is 38.3 years. Demographics for the analysis area (Table 16) consist of; 70.3 percent White, 2.3 percent Black, 2.7 percent American Indian/Eskimo, 4.3 percent Asian, 0.7 percent Hawaiian/Polynesian, and 19.8 percent Hispanic (U.S. Department of Commerce 2010).

Table 16 Demographics for the Analysis Area

County	White	Black	American Indian/Eskimo	Asian	Hawaiian/ Polynesian	Hispanic
Carson City	40,094	1,198	1,566	1,502	211	12,171
Churchill	19,710	542	1,325	957	124	3,219

County	White	Black	American Indian/Eskimo	Asian	Hawaiian/ Polynesian	Hispanic
Douglas	40,157	343	1,225	1,078	182	5,377
Elko	34,505	449	2,726	653	114	11,451
Esmeralda	627	2	45	6	2	120
Eureka	1,686	6	57	24	0	268
Humboldt	11,656	119	775	160	30	4,150
Lander	4,316	25	246	28	3	1,270
Lincoln	4,783	132	98	54	34	345
Lyon	41,967	662	1,743	1,057	282	7,977
Mineral	3,414	235	755	78	9	479
Nye	35,708	1,127	1,105	909	297	6,181
Pershing	4,711	265	254	112	22	1,549
Storey	3,605	51	103	87	17	233
Washoe	287,902	11,971	8,553	26,376	3,669	96,724
White Pine	7,814	422	489	118	35	1,376
Analysis Area Total Populations	**542,655**	**17,549**	**21,065**	**33,199**	**5,031**	**152,890**
Analysis Area Percentage	**70.3%**	**2.3%**	**2.7%**	**4.3%**	**0.7%**	**19.8%**

Historically and presently, agriculture plays an integral role in shaping the character of the counties within the analysis area. The oldest continuing industry in the area, livestock ranching has proven a foundational component of both custom and culture, especially in rural communities. In contract to “boom and bust” industries, such as mining and oil/gas extraction, agriculture provides a consistent economic base for local economies including county revenues to provide public services. Despite being a relatively low employment contributor (1.3 percent), agriculture and livestock grazing have traditionally played a key role in the analysis area and continue to be economically important today. In addition to jobs and revenue, agriculture provides important natural resource services such as open space. Open space offers landscapes, lifestyles, and wildlife habitat that can have immeasurable value to both residents and visitors. Open space is particularly important because it determines the character of the landscapes surrounding a community.

BLM management actions have the potential to influence agriculture due to the purchase of farmland and through management practices influencing livestock grazing practices on public lands. Grazing permit fees vary, depending on the location and the estimated average value of replacement forage. The formula used for calculating the grazing fee was established by Congress in the 1978 Public Rangelands Improvement Act and has remained in use under Executive Order 12548. Under that order, the grazing fee cannot fall below $1.35 per AUM, and any increase or decrease cannot exceed 25 percent of the previous year’s level. The current grazing fee is $1.35 per animal AUM for public lands administered by the BLM. In the past decade (2010-2020), fees ranged between $1.35 and $2.11, with an average of $1.50/AUM. Fifty percent of the collected grazing fees deposited into the U.S. Treasury are returned to the Range Betterment Fund for range improvement projects. Portions of collected fees are also returned to the states for use in the counties where the fees were generated (BLM 2020b).

3.2.10 Soils

Table 17 Soils Impact Indicator and Assumptions

Soils	
Impact Indicator:	• Long term increases in erosion, bare ground, and compaction from targeted and prescribed grazing treatments. • Reduction of biological soil crusts from targeted and prescribed grazing treatments to a level that increases soil erosion.
Significance Threshold:	• Groundcover attributes influenced by livestock grazing treatments, including litter and live vegetation, are appropriate to the site. Long-term erosion is not occurring. • Any decrease or damage to existing biological soil crust will trigger adaptive management to avoid unintended consequences.
Temporal Limits:	Throughout project implementation, extending into future via resultant impacts to soil.

Surface soil erosion is a key factor in arid and semiarid systems. Disturbance events such as wildfire, road development, and inappropriate grazing practices are known to amplify runoff and erosion by decreasing cover of runoff-reducing plants and directly disturbing surface soils. Extensive bare ground on degraded rangelands promotes runoff and soil erosion (Pierson et al. 2011), as do many invasive plants (Davies et al. 2011).

A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion. The soils assigned to group one are the most susceptible to wind erosion, and those assigned to group eight are the least susceptible (USDA NRCS 2020b). As shown in Table 18, the majority of the analysis area (82 percent) is moderately susceptible to wind erosion.

Table 18 Potential for Erosion by Wind (USDA NRCS 2020b)

Erosion Susceptibility	Wind Erodibility Group	Acres	Percent of Analysis Area
None	Not assigned	20,365	<1%
Low	8	3,393,175	14%
Moderate	3 to 7	20,064,857	82%
High	1 and 2	1,055,391	4%

The K factor (K_W) is used to quantify a soil's susceptibility to erosion by water. K factors range from 0.02 (least erodible) to 0.64 (most erodible). Several soil properties influence K factors, including texture, organic matter content, structure, and saturated hydraulic conductivity. Soils with a high clay content typically have low K factors, while coarse-textured have high K factors (USDA NRCS 2020a). In this analysis, the K factor characterizes the soil to a depth of 25 cm and includes rock fragments. As shown in Table 19, the analysis area contains a variety of low, moderate, and high-water erosion susceptibility. The Soil Erodibility Mapset in Appendix A shows areas with high wind and water erosion susceptibility.

Table 19 Potential for Erosion by Water (USDA NRCS 2020b)

Erosion Susceptibility	Kw Range	Acres	Percent of Analysis Area
None	No Kw	89	<1%
Low	0.02 to 0.19	8,793,852	36%
Moderate	0.20 to 0.40	9,946,450	41%
High	0.41 to 0.69	5,793,398	24%

Biological soil crusts consist of cyanobacteria, green algae, lichens, and mosses and perform many functions in arid and semi-arid lands. These crusts retain soil moisture, reduce the establishment of annual weeds, reduce erosion, fix atmospheric nitrogen, and contribute to soil organic matter (BLM and USGS 2001). When left intact, these crusts are not vulnerable to wind erosion; however, once disturbed by foot, vehicles, or livestock, their integrity is compromised, leaving them susceptible to erosion (Belnap and Gillette 1998). Wildfire also disturbs biological soil crusts; however, damage to and recovery of biological soil crusts are dependent upon a variety of factors, including fire intensity, fire frequency, and plant composition (BLM and USGS 2001). While biological soil crusts are present within the analysis area, data reflecting the number of acres of biological soil crusts is not available (BLM 2020a).

The analysis area is composed of many DRGs and corresponding ecological sites with soil descriptions. For a detailed description of each Great Group, refer to the Great Group Narratives in Appendix B.

3.2.11 Vegetation Including Threatened, Endangered, and Sensitive Species

Table 20 Vegetation Including Threatened, Endangered, and Sensitive Species Impact Indicator and Assumptions

Vegetation Including TES	
Impact Indicator:	For prescribed grazing, adverse impacts to existing key perennial vegetation from grazing treatments to a level that increases soil erosion and/or decreases the long-term key perennial vegetation component of a site.
Significance Threshold:	For prescribed grazing, long-term decrease or damage to existing key perennial vegetation that increases soil erosion or results in a further degraded vegetative state.
Temporal Limits:	Throughout project implementation, extending into future via resultant impacts to vegetation communities and altered ecological trajectories.

The area of analysis for vegetation (including T&E species and Sensitive Plant Species) includes all areas within the Great Groups. For this project, Great Groups were created by comparing dominant vegetation type and determining if the vegetation community within each ecological site had the potential for developing into an annual state. The current state and potential of the ecological site and vegetative phenology on ground will be determined prior to project implementation and will tailor grazing treatments. Table 21 lists the Great Groups, their prevalence throughout the analysis area (%) and the potential dominant vegetation found within each group. Shrublands are mapped as the most prevalent vegetation community throughout the analysis area (98 percent). Great Basin shrublands are characterized by long-lived shrubs and deep-rooted perennial bunchgrasses that are often vulnerable to disturbance partially due to the variability of resource availability (i.e. soil moisture and nutrients) among years (Stringham et al. 2019). Low resource availability can cause damage and often mortality to native vegetation resulting in decreased competition to invasive annual grasses. Invasibility of shrublands increases with decreasing elevation as resource abundance becomes scarcer (Stringham et al. 2019). It has been estimated that over 200,000 acres within the analysis area had over15 percent cheatgrass cover in 2018 (Boyte and Wylie 2018). These lands may be twice as likely to burn as those with lower abundance of fine fuels (Bradley et al. 2018).The project area also contained over 3 million acres of 2 percent cheatgrass cover in 2018 (Boyte and Wylie 2018). Although 2 percent cover may not seem like much, relatively small amounts of cheatgrass can increase fire probability on a landscape and puts the system at risk of entering into a further degraded state (Bradley et al. 2018). Cheatgrass seeds can survive in dormancy for 2-5 years and can dominate sites after fire even with previously low cheatgrass cover

(Davies et al. 2009, Diamond et al. 2012, Harmon et al. 2020) . Therefore, even areas with low cheatgrass cover may be considered for grazing treatments.

Table 21 Great Groups, their Prevalence within the Analysis Area (%), and the Potential Dominant Vegetation Found within Each Group as Defined in Great Group Narratives (Appendix B: Great Groups)

Great Group ID	Great Group Prevalence (%)	Potential Dominant Vegetation
A	2%	Big sagebrush, black greasewood, basin wildrye, Indian ricegrass & thickspike wheatgrass
AA	1%	Black greasewood & basin wildrye
B	<1%	Basin big sagebrush or mountain big sagebrush & basin wildrye
BB	<1%	Basin big sagebrush & basin wildrye
C	3%	Shadscale & Indian ricegrass
CC	19%	Shadscale & spiny hopsage or bud sagebrush & Indian ricegrass &/or squirreltail
D	1%	Winterfat & Indian ricegrass
DD	<1%	Winterfat, Indian ricegrass & squirreltail
E	<1%	Big sagebrush, spiny hopsage, Indian ricegrass, basin wildrye, thickspike wheatgrass, & needleandthread
EE	2%	Indian ricegrass, Wyoming big sagebrush, basin big sagebrush, black greasewood, & spiny hopsage
F	3%	Lahontan sagebrush, low sagebrush, or early sagebrush, bluebunch wheatgrass, & Thurber's needlegrass
FF	2%	Lahontan sagebrush, low sagebrush, or early sagebrush, bluebunch wheatgrass & Thurber's needlegrass
G	25%	Wyoming big sagebrush, bluebunch wheatgrass & Thurber's needlegrass
GG	10%	Wyoming big sagebrush & bluebunch wheatgrass, Indian ricegrass, needleandthread, or Thurber's needlegrass
H	12%	Black sagebrush, Indian ricegrass & needleandthread
I	4%	Black sagebrush & bluebunch wheatgrass
II	3%	Black or Lahontan sagebrush & Idaho fescue, Thurber's needlegrass, Indian ricegrass or bluebunch wheatgrass
J	5%	Low, early or black sagebrush & bluebunch wheatgrass
JJ	1%	Low sagebrush & Idaho fescue or Thurber's needlegrass
K	4%	Mountain big sagebrush, antelope bitterbrush, bluebunch wheatgrass, Thurber needlegrass, Indian ricegrass, squirreltail, & muttongrass
KK	1%	Mountain big or threetip sagebrush, & Idaho fescue, bluebunch wheatgrass, or mountain brome
L	<1%	Western juniper &/or Utah juniper, mountain big sagebrush, bluebunch wheatgrass, & Thurber's needlegrass
Total	**100%**	

Special consideration federally listed T&E plant species and BLM-listed Sensitive Plant Species will be taken into account when designing grazing treatments. Currently, there is one T&E plant species, Webber's ivesia (*Ivesia webberi*), with designated critical habitat within the analysis area (see Designated Critical Habitat and Lahontan cutthroat trout Distribution Mapset in Appendix A). Habitat overlap of Webber's ivesia with the analysis area is described in Table 57 of Appendix P. There are also two other federal listed plant species (steamboat buckwheat

(*Eriogonum ovalifolium var. williamsiae*) and Ute-ladies' tresses orchid (*Spiranthes diluvialis*)) and several Sensitive Plant Species designated by the Nevada State BLM Director that could occur within the analysis area. All federally listed and sensitive plant species found within the BLM districts of the analysis area can be found in Appendix Q. These species occupy a range of habitats that may overlap with the Great Groups and actions would be taken to prevent adverse effects on these species according to BLM policy.

3.2.12 Wild Horse and Burro

Table 22 Wild Horse and Burro Impact Indicator and Assumptions

Wild Horse and Burro	
Impact Indicator:	Impact to forage for wild horses and burros remaining after a treatment.
Significance Threshold:	Long-term impact to available forage used by wild horses and burros in Herd Management Areas and Herd Areas.
Temporal Limits:	Throughout project implementation, extending into future via resultant impacts to wild horses and burros.

The BLM created the Wild Horse and Burro Program to implement the Wild-Free Roaming Horses and Burros Act, passed by Congress in 1971. Broadly, the law declares wild horses and burros to be "living symbols of the historic and pioneer spirit of the West" and stipulates that the BLM and the U.S. Forest Service have the responsibility to manage and protect herds in their respective jurisdictions within areas where wild horses and burros were found roaming in 1971.

Recent studies have shown that the diet of wild horses consists primarily of grasses, including invasive annual grasses like cheatgrass (King and Schoenecker 2019, King et al. 2019). Little research has been conducted on the diet of wild burros in the Great Basin but a synthesis review of wild burro research in the Mojave Desert of southern Nevada showed that these animals eat grasses, forbs and shrubs depending on the time of year, including invasive annual grasses such a red brome (*Bromus rubens*) (Abella 2008). The BLM is mandated to manage wild horses and burros, their habitat and other activities in a way that maintains the free-roaming behavior of these animals.

Herd Areas (HA) are areas of public land that were designated as such and identified as habitat used by wild horses and burros at the time the Wild Free-Roaming Horses and Burros Act. In the state of Nevada, there are a total of 22,900,539 acres of HA land. There are 10,197,912 acres of HA that overlap with Great Groups.

Herd Management Areas (HMAs) are areas within HA where wild horses and burros are maintained over the long term and are designated through the land use plan (LUP) process for the maintenance of herds. In the state of Nevada, there are 15,513,419 acres of land within HAs that are split into 83 individually designated HMAs. The combined appropriate management level for all HMAs in the state is 12,811 animals. There are 7,486,630 acres of HMA that overlap with Great Groups. The acres of each individual HMA per Great Group are listed in Appendix R (Table 59) and the HMAs can be seen on the Wild Horse and Burro Designations Mapset in Appendix A.

3.2.13 Wildlife Including Threatened and Endangered Species

Table 23 Wildlife Including Threatened and Endangered Species Impact Indicator and Assumptions

Wildlife Including TES	
Impact Indicator:	For both targeted and prescribed grazing: • Potential population-level response of general wildlife species to changes in the quality and/or quantity of general wildlife habitat from implementing targeted and prescribed grazing in the analysis area. • Significant alteration to designated critical habitat • Decreasing TES-species population size
Significance Threshold:	For both targeted and prescribed grazing: • Failure to adhere to general or site-specific required design features that leads to an overall reduction in habitat quality or quantity that would reasonably be expected to have detrimental population-level effects.
Temporal Limits:	Throughout project implementation, extending into future via resultant impacts to wildlife habitat and populations

Wildlife habitat within the analysis area varies widely, consistent with the mosaic of ecological communities represented by the Great Groups included within the analysis area. Specifically, eligible areas for the proposed action are ecologically degraded to some extent by the presence of invasive annual grasses. Areas eligible for prescribed grazing could be in any vegetative state but likely have cheatgrass up to some extent that puts the site at risk of further degradation, whereas areas eligible for targeted grazing are dominated by cheatgrass. Furthermore, where cheatgrass dominates; endemic fire regimes have shifted, resulting in increased fire size and intensity. Degraded native plant communities cannot compete with fire-adapted invasive annual grasses, and as a result, cheatgrass propagates and dominates quickly after fire, leaving native vegetation with no opportunity to recolonize successfully. Stemming from this pattern, wildlife habitat is increasingly degraded as native vegetation communities are outcompeted by cheatgrass resulting in decreased structure, cover, forage, and overall habitat quality for wildlife species (Freeman et al. 2014, Vollmer and Vollmer 2006). Wildlife associated with shrub-steppe habitat is particularly threatened by loss of habitat due to invasive annual grasses and wildfire. Wildlife outside of the shrub-steppe is also at risk of habitat loss due to increasing fire and invasive grasses propagated from adjacent habitat types.

The analysis of wildlife includes big game species, migratory birds, fisheries, general wildlife, and special status species with potential to occur within the analysis area. Big game species, as defined by the Nevada Department of Wildlife, have been analyzed with additional detail due to their unique social, economic, cultural, and ecological value. This emphasis reflects similar approaches followed by the BLM within preceding land use management plans. Other wildlife species have been grouped and analyzed by habitat associations rather than on a species-level. This approach allows the analysis to focus on identifying potential impacts that would result in population-level responses to changes in quality and/or quantity of general wildlife habitat due to the proposed action (Table 23). Potential impacts to streams and waterbodies that may support fish are analyzed for impacts to all fish species.

Big Game

Big game species within the analysis area include: pronghorn (*Antilocapra americana*), elk (*Cervus elaphus*), bighorn sheep (*Ovis canadensis*), mule deer (*Odocoileus hemionus*), and mountain lion (*Felis concolor*). These species utilize the analysis area as seasonal and annual range, with associated migration corridors throughout such ranges.

Pronghorn

Pronghorn are ungulates associated primarily with low sagebrush (*Artemisia arbuscula*) and northern desert shrub communities in wide open, rolling landscapes. Both males and females have distinct black, pronged horns, though in some cases females lack them entirely. They primarily eat forbs and browse plants, with sagebrush comprising up to 80 percent of their diet during winter, though their ability to eat a variety of plants adds to their adaptability across habitats (BLM 2017b). Primary threats to pronghorn include habitat loss and occasional predation. According to NDOW, Nevada's pronghorn population is currently increasing.

GIS data from the Nevada BLM identified pronghorn habitat within the analysis area as shown in Table 24 (NDOW 2017d).

Table 24 Pronghorn habitat within the Analysis Area

Habitat Type	Other	Great Groups	Total
Not Antelope Habitat	16,848,018	4,862,206	21,710,224
Agricultural	170,451	126,709	297,161
Crucial Summer	1,062,852	705,331	1,768,183
Crucial Winter	1,022,145	1,270,284	2,292,428
Crucial Year-round	117,361	121,488	238,849
Limited Use	278,546	573,780	852,325
Summer Range	3,798,276	4,805,644	8,603,920
Winter Range	684,218	1,342,040	2,026,258
Year-round	13,225,956	10,762,228	23,988,184
Total	**37,207,822**	**24,569,709**	**61,777,531**

Elk

Elk are large ungulates found within higher elevations throughout the analysis area. During winter months, they are known to migrate to lower elevations, where forage is more readily available. Their diet shifts seasonally, eating primarily grasses and forbs in the summer and shifting to drier grasses, shrubs, and tree components to subsist during harsher winter months.

The analysis area contains both seasonal and annual habitat. GIS data from the Nevada BLM identified elk habitat within the analysis area as shown in Table 25 (NDOW 2017b).

Table 25 Elk Habitat within the Analysis Area

Habitat Type	Other	Great Groups	Total
Not Elk Habitat	27,908,820	16,654,395	44,563,215
Agricultural	10,290	32,441	42,731
Crucial Summer	1,199,094	327,678	1,526,772
Crucial Winter	399,883	560,697	960,580
Limited Use	1,455,302	2,449,757	3,905,059
Summer Range	1,536,445	663,404	2,199,849
Transition Range	74,345	34,897	109,242
Winter Range	600,836	539,633	1,140,469

Habitat Type	Other	Great Groups	Total
Year-round	4,022,806	3,306,807	7,329,613
Total	**37,207,822**	**24,569,709**	**61,777,531**

Mule Deer

Mule deer are cervids with characteristically large ears, branching antlers, and black-tipped tails, which are narrower than in white-tailed deer. Mule deer follow a similar spatial use pattern as elk, residing in higher elevations during summer but moving to lower elevations during winter to maximize browsing of forbs and shrubs. As habitat generalists, mule deer are distributed across the analysis area in a variety of habitat types ranging from riparian areas to shrubland, though areas with sagebrush and antelope bitterbrush (*Purshia tridentata*) have been determined to provide common habitat.

Current threats to mule deer populations include habitat loss stemming from drought, fire, habitat fragmentation, and degradation of habitat. Drought and predators such as mountain lions and coyotes also place stress upon populations, though predation often benefits population vigor by removing unfit individuals and preventing population irruptions which can lead to a reduction of a given habitat's carrying capacity (Ripple and Beschta 2006). Winter can also prove a stressful time for mule deer, and areas critical for overwinter survival do exist within the analysis area, supplying mule deer with sufficient forage to sustain them through scarce winter months.

GIS data from the Nevada BLM identified mule deer habitat within the analysis area as shown in Table 26 (NDOW 2017c).

Table 26 Mule Deer Habitat within the Analysis Area

Habitat Type	Other	Great Groups	Total
Not Mule Deer Habitat	13,452,989	10,325,111	23,778,101
Agricultural	1,425,955	578,821	2,004,776
Crucial Summer	1,766,649	713,077	2,479,726
Crucial Winter	2,342,096	2,606,968	4,949,063
Fawning Range	688	N/A	688
Limited Use	2,759,923	3,142,249	5,902,172
Summer Range	3,527,173	1,439,907	4,967,080
Transition Range	559,306	547,157	1,106,463
Winter Range	4,212,931	2,844,812	7,057,743
Year-round	7,160,112	2,371,607	9,531,720
Total	**37,207,822**	**24,569,709**	61,777,531

Bighorn Sheep

Nevada maintains three subpopulations of bighorn sheep; desert bighorn sheep (*Ovis canadensis nelsoni*), Sierra-Nevada bighorn sheep (*Ovis canadensis sierrae*), and Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*). Bighorn sheep are ungulates that subsist primarily upon grasses, forbs, shrubs, and occasionally cacti. Both rams and ewes have the characteristic curling horns which give them their name, though rams' horns are bigger and more curved. A hardy animal, they inhabit Nevada's steep and rocky mountainous regions, which affords them protection from predators and limits competition with other herbivores.

However, the arid nature of these regions makes access to freestanding water a critical resource for the sheep. In some cases, water developments are needed in habitat that are deemed deficient in water. Bighorn sheep rarely migrate and are well-adapted to harsh winter conditions.

Over time, numbers of bighorn sheep have declined due to overharvesting, habitat loss, competition, and disease. However, after the adoption of conservation measures, population trends have been positive, though challenges do still exist. A significant threat that bighorn sheep face is pneumonia, a disease which is transmitted from domestic sheep and goats to wild sheep populations (Kamath et al. 2019). This disease has been a key contributor to the historical declines and widespread extirpations of bighorn sheep in the West, and it continues to hinder populations today (Cassirer et al. 2013, Cassirer and Sinclair 2007, Manlove et al. 2017). The Bighorn Sheep Mapset in Appendix A shows habitat with in the analysis area.

The analysis area contains both seasonal and annual habitat. GIS data from the Nevada BLM identified bighorn sheep habitat within the analysis area as is shown in Table 27 (NDOW 2017a).

Table 27 Bighorn Sheep Habitat within the Analysis Area

Habitat Type	Other	Great Groups	Total
Not Bighorn Sheep Habitat	29,888,243	22,358,970	52,247,214
Agricultural	966	Not available	966
Crucial Summer	28,513	41,714	70,227
Crucial Winter	22,902	10,277	33,180
Lambing	25,864	58,781	84,645
Limited Use	437,009	6,044	443,053
Summer Range	165,568	151	165,719
Winter Range	372,764	12,229	384,993
Year-round	6,265,993	2,081,541	8,347,534
Total	**37,207,822**	**24,569,709**	**61,777,531**

Mountain Lion

The mountain lion (*Felis concolor*) is a carnivorous felid whose habitat ranges from desert and chaparral to subalpine mountainous regions. In Nevada, mountain lions primarily follow large mule deer herds, but tend to prefer more isolated, mountainous areas, where humans are scarce. Common habitat in Nevada includes pinyon pine (*Pinus monophylla*), juniper (*Juniperus* sp.), mountain mahogany (*Cercocarpus ledifolius),* ponderosa pine (*Pinus ponderosa*), and mountain brush. A solitary hunter, the mountain lion subsists on a variety of mammals, including bighorn sheep, mule deer, elk, and small mammals. Grass is also consumed as a digestive aid that may reduce parasites. According to NDOW, Nevada populations are healthy and stable but threats do exist such as other predators, vehicle-strikes, and disease. The NDOW does not currently have distribution and habitat data for mountain lions.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, protects migratory birds and gives the USFWS statutory authority and responsibility for enforcing the act (50 CFR 10.13). In 2001, Executive Order (EO) 13186 was issued and directed departments and agencies to take certain actions to further implement the MBTA. In pursuance, the BLM signed a Memorandum of

Understanding with the USFWS in 2010 in order to promote the conservation of migratory bird populations.

Across the analysis area, eligible sites support lower diversity of avian species than the previous intact vegetation communities maintained. Though some species may not be currently utilizing potential project sites, those discussed here are representative of species associated with the desired plant communities represented by the 22 Great Groups that comprise the analysis area. Of the many migratory birds represented, a subset is also a Sensitive Species and/or a federally listed species; a list of these can be found in Appendix S, Table 60.

Fisheries

The analysis area in general contains a majority of ephemeral and intermittent streams. Flows are influenced primarily by periods of rainfall during the wet season but often run dry during summer months. Perennial streams are less common but do exist throughout the analysis area. Lakes and reservoirs are scattered throughout the state and typically hold water throughout the year, though levels may rise and fall with precipitation. Due to the dynamic nature of these water bodies, streams that sustain fish populations are in the minority, with most fish concentrated in areas where water is consistently available, such as in perennial streams and lakes. However, some aquatic systems become isolated from adjoining waterbodies, leading to a variety of unique subspecies of fish endemic to Nevada. Altogether, species in the analysis area vary widely with geography, from isolated desert springs to man-made reservoirs, including trout, poolfishes, and bass. Many of Nevada’s fishes are vulnerable to threats such as non-native fish introductions, aquatic animals, and habitat alterations such as water diversions or depletions. Increased fire intensity and frequency has also been linked to fish kills associated with loss of riparian vegetation and increased sediment loading post-fire (Bozek and Young 1994). These effects can also lead to higher stream temperatures, decreased oxygen concentration, and decreased stream flow, which have negative impacts for aquatic life, including fishes (Keane et al. 2002, Neary et al. 2005). The majority of Nevada’s fishes are currently threatened, endangered, or considered a Sensitive Species (Appendix P and Appendix Q).

General Wildlife

The analysis area is host to a wide variety of other wildlife including birds, reptiles, amphibians, small mammals, insects, and pollinators. Species assemblages vary in accordance with vegetation communities, though overlap often occurs according to life cycle requirements of the species.

Predators present include black bears *(Ursus americanus californiensis)*, coyotes (*Canis latrans*), and red fox (*Vulpes vulpes*). Both black bears and coyotes can be considered generalists, eating both other animals as well as plants, insects, and carrion. Red foxes are also common across the area and are known to adapt to a variety of habitats, feeding on small mammals, reptiles, birds, insects, and even vegetation.

In addition to migratory birds, many avian species make Nevada their home, from Clark’s Nutcrackers (*Nucifraga columbiana*) and Mountain Chickadees (*Poecile gambeli*) within the mountains to sagebrush-obligates such as Ferruginous Hawks (*Buteo regalis*), Loggerhead Shrikes (*Lanius ludovicianus*), and Brewer’s Sparrows (*Spizella breweri*) of the sagebrush sea. Across the analysis area, avian species utilize different habitats for foraging, mating, nesting, and brood-rearing. Current threats to avian species generally include habitat loss and fragmentation in addition to natural predators and human influence.

Reptiles thrive across Nevada’s landscape, with 56 recognized species including turtles, snakes, and lizards. These ectothermic animals are well-adapted for life in hot and arid locales, utilizing burrows or other microclimates to regulate their temperature as well as the ability to store water in specialized tissues in some species. Small mammals upon which certain reptiles and other predators rely upon include gophers, rabbits, and ground squirrels. These small mammals typically dwell underground or within the undergrowth, utilizing vegetation communities for cover, food, and other life cycle requirements, feeding upon forage, insects, and other small mammals. Amphibians in Nevada are closely associated with riparian areas and, similar to fishes, are distributed variable where water sources are sufficient, contributing to a number of unique subpopulations and endemic varieties of amphibians. These characteristics make amphibians vulnerable to stochastic disturbance events such as wildfire, which can effectively destroy or degrade suitable habitat, thus potentially impacting isolated communities of amphibians and other riparian associated species.

This variety of wildlife in Nevada is inherently linked to the presence of vegetation communities that provide life cycle requirements needed to survive. However, many plants must also rely upon certain wildlife species that perform pollinating services such as bats, birds, and insects. In Nevada, 23 bat species such as the little brown bat (*Myotis lucifugus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) can be found roosting in caves, trees, talus, and mines, emerging at dusk to feed upon nectar and insects (Nevada Bat Working Group 2006). Pollinating insects and birds are more active during the day and include bees, ants, butterflies, moths, flies, beetles, and hummingbirds. Pollinators worldwide and in Nevada have declined steeply due to habitat loss, disease, parasites, and pesticide use. Dependent on flowering plant diversity and adequate breeding sites, pollinators are imperiled by the increasing encroachment of invasive annual grasses and the destruction of habitat by associated changes in fire regimes within the analysis area (USDA 2013).

Special Status Species

Special Status Species discussed in this section includes species listed as threatened or endangered under the Endangered Species Act (ESA) by the USFWS as well as Sensitive Species (Appendix P and Appendix Q). A list of all special status species and their general habitat descriptions within Nevada can be found in Appendix Q and is current as of 2017 (BLM 2017a). Designated critical habitat for federally listed species is organized according to Great Group within Appendix P.

As there are 245 Special Status species potentially present within the analysis area, they have been listed within Appendix Q rather than discussed in detail within this section. Potential impacts to special status species are described by associated habitat types, with species linked to shrub-steppe habitat potentially benefitting the most as the proposed action would reduce habitat loss and fragmentation. Many special status species that occupy unique habitats such as cliffsides, talus slopes, and salt flats are unlikely to be impacted by the proposed action, though indirect impacts could occur through cascading effects throughout the trophic levels of a given community. A comparison of the RDFs mandated as part of the alternatives for this projects has been reviewed for identified benefits to special status wildlife species (Table 58 Appendix P). Other species associated with riparian areas and other habitats also face indirect risks to important habitat due to altered fire regimes as a result of invasive annual grasses.

Outside of riparian zones, the Mojave Desert tortoise *(Gopherus agassizii)* is a federally listed, threatened species. This species faces a multitude of threats including habitat loss and fragmentation, disease, and direct mortality from wildfire and humans. Invasive annual grasses and associated shifting fire regimes are likely to negatively impact this species through reductions in life cycle requirements such as cover, incubation sites, and decreased food resources (Esque et al. 2006, Esque et al. 2003). Though present within Nevada, it has been determined that no identified habitat is present within the analysis area, thus dismissing this species from analysis. Special status birds in the analysis area include the Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*), which are also protected under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). Both eagles are considered Nevada Sensitive Species (see Table 60 in Appendix S). These species primarily utilize the analysis area for foraging purposes, and Bald Eagles are typically associated with nearby waterbodies as well.

Many special status species within the analysis area depend upon shrubland habitat often dominated by sagebrush for cover, nesting areas, and foraging opportunities. Threats to many of Nevada's special status birds, mammals, and reptiles can be linked to the loss of sagebrush communities in addition to general habitat loss and degradation. Species associated with shrubland and shrub steppe habitats would be expected to benefit the most from successful reduction of invasive annual grasses which have created widespread departures from the natural fire regime, resulting in the degradation and destruction of valuable sagebrush habitat.

Alternately, riparian obligates or aquatic wildlife such as certain bird species, amphibians, and fishes face substantial threats due to loss and degradation of suitable riparian and aquatic habitats. Avian species commonly found in riparian zones utilize the thick cover associated for life cycle requirements such as nesting areas, cover, and foraging. Amphibians are particularly vulnerable to loss of riparian habitat due to their dispersal limitations and need to remain close to a water source to avoid desiccation. The dynamic nature of Nevada's water supply also presents challenges for amphibians, prompting them to adapt to rapidly reproduce and forage when water is plentiful, with some species spending months in burrows awaiting the next rain.

Within sustaining waterbodies, special status fishes vary, representative of the unique variety of Nevada's waterbodies, from isolated pools to alpine streams. Many of Nevada's special status fishes are isolated to specific desert springs or watersheds due to the changeable nature of water systems in Nevada, leaving them vulnerable to habitat loss or degradation due to development, water scarcity, or increased erosion. The Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi)* is one such fish with special significance to various stakeholders who value the species for sport and as an indicator of ecological health. Currently, this fish is listed as threatened, but with no designated critical habitat. The Lahontan cutthroat trout distribution mapset within Appendix A details documented reaches within the analysis area where Lahontan cutthroat trout occur.

An analysis of how relevant project RDFs are pertinent to special status wildlife species can be found in Appendix P.

Disease Transmission Risks

As mentioned previously, certain overlap between grazing livestock and large ungulates warrants consideration of possible risks of disease transmission. In addition to pneumonia, bighorn sheep in Nevada also face sinus tumors, the cause of which is unknown, but they appear to be associated with pathogenic bacteria in the upper respiratory system (Fox et al. 2015). Current disease concerns facing wildlife also include potential chronic wasting disease (CWD) within cervids such as deer, elk, and moose. Chronic wasting disease has not been found in Nevada, and preventative measures have been implemented to limit potential introductions. If found, CWD would not be expected to impact livestock (Williams et al. 2018). Certain avian species are also susceptible to West Nile Virus, a mosquito-borne virus that can affect birds, humans, and horses, though transmission is unlikely to occur in livestock. However, the proposed action will not increase breeding habitat for mosquitos and is not expected to increase the prevalence of this disease. Out of the potential livestock overlaps possible under the proposed action, that of domestic sheep and bighorn sheep is the cause for the most concern, and required design features will ensure that effective separation distances are maintained between the two. Domestic goats may also carry the disease, and overlap with bighorn sheep is not recommended (Schommer and Woolever 2008). Though other diseases may be transmitted between livestock and wildlife, their transmission potential is low.

3.3 Environmental Consequences

3.3.1 No Action Alternative

3.3.1.1 Environmental Justice

Under the No Action Alternative, the proposed targeted and prescribed grazing would not occur. Current management for livestock grazing practices would continue as permitted within Carson City, Winnemucca, Battle Mountain, Elko, and Ely Districts. As such, effects on Environmental Justice populations would remain static.

3.3.1.2 Fire and Fuels

Under the No Action Alternative, the proposed targeted and prescribed grazing treatments would not occur. Current management for livestock grazing practices would continue as permitted within Carson City, Winnemucca, Battle Mountain, Elko, and Ely Districts. Projects utilizing targeted or prescribed grazing in invasive annual grass management would only occur intermittently and on such a scale that overall invasive annual grass management would be limited. As such, the No Action Alternative would not modify fuel bed characteristics (i.e. fuel bed depth, fine fuel loading, and fine fuel continuity) and, in turn, fire behavior. Continued spread of invasive annual grasses would be expected to contribute to fire with the potential for extreme behavior, including high flame lengths and intensities. Large fires occurring at short intervals, in comparison to historic conditions, would be expected to continue across the analysis area.

3.3.1.3 Greater Sage-Grouse

Under the No Action Alternative, chronic wildfire effects would continue to degrade Greater Sage-Grouse habitat, resulting in long-term decreases in population size. No direct impacts would occur as a result of the No Action Alternative. The intertwined effects of encroaching invasive annual grasses and the associated increases to fire intensity, size, and frequency will continue to degrade intact, suitable habitat for Greater Sage-Grouse (Coates et al. 2016b). As habitat is lost, suitable habitat would become increasingly fragmented and isolated. Additional threats to Greater Sage-Grouse, including predation and loss or degradation of habitat due to other factors, will likely compound the effects of invasive grasses and wildfire, leaving the Greater Sage-Grouse increasingly vulnerable (Hanser et al. 2018, USFWS 2013). As encroaching invasive annual grasses and changing fire regimes has been characterized as the primary threat to Greater Sage-Grouse, the No Action Alternative would perpetuate the continued decline of Greater Sage-Grouse across Nevada. Cumulatively, these impacts would further perpetuate the decline of Greater Sage-Grouse across the state due to widespread habitat loss and fragmentation due to invasive annual grasses and changing fire regimes.

Bi-State Sage-Grouse

The Bi-State Sage-Grouse faces the same myriad of threats as the Greater Sage-Grouse, and without the implementation of the proposed action, this distinct population segment can be expected to become increasingly vulnerable as suitable habitat is lost and degraded. Given the smaller size of the Bi-State Sage-Grouse population, the preservation of genetic connectivity and variation warrants consideration and leaves this distinct population segment increasingly threatened by habitat loss and degradation in addition to other threats (Davis et al. 2015, Oyler-McCance et al. 2014).

3.3.1.4 Lands with Wilderness Characteristics

Under the No Action Alternative, LWCs would continue to be impacted by changing fire regimes due to the invasion of annual grasses, and wilderness characteristics would continue to be degraded. This degradation is rooted in the loss of intact vegetation communities due to encroaching invasive grasses and the subsequent increased fire size, intensity, and frequency. With these changes, naturalness of the impacted LWCs will be affected as the native plant communities and endemic fire regimes are altered. Also, opportunities for primitive and unconfined recreation and solitude could be degraded as the impacts of widespread wildfire and invasive annual grasses result in diminished access, safety, air quality and enjoyment in affected areas. Cumulatively, impacts to LWCs and certain wilderness characteristics could be substantial as the continued degradation of the landscape occurs due to the spread of invasive annual grasses and associated increased impacts from wildfire.

3.3.1.5 Livestock and Range

Under the No Action Alternative, the proposed targeted and prescribed grazing treatments would not occur unless permitted on a more intermittent basis; therefore, livestock grazing would continue to occur under parameters outlined in current grazing authorizations. Without the implementation of grazing treatments that allow managers to take advantage of seasonal variations in annual grass growth, these grasses would continue to produce unmanageable fuel loads that would carry large and frequent wildfires across the analysis area. These wildfires force operators to relocate livestock while resting burned allotments and transition native perennial vegetation communities to annual grasslands, that may be less valuable for livestock grazing.

3.3.1.6 Noxious Weeds

Under the No Action Alternative, the proposed targeted and prescribed grazing treatments would not occur; therefore, noxious weeds would continue to be controlled under current weed management programs within the BLM Districts. Without the implementation of grazing treatments that allow managers to take advantage of seasonal variations in annual grass growth, these grasses would continue to produce unmanageable fuel loads that would carry large and frequent wildfires across the analysis area. Like invasive annual grasses, noxious weeds thrive in recently burned landscapes due to the lack of competition and availability of resources. It is probable that noxious weeds would continue to spread at current or increased rates if these large-scale wildfires continue to burn landscapes around already invaded areas. This would require the BLM to allocate more time and funding in an attempt to decrease populations and control further spread.

3.3.1.7 Recreation and Travel Management

Under the No Action Alternative, the grazing methods would be implemented on a more intermittent basis specific to each field office. There would be no change from the baseline situation, and any new temporary or permanent roads and associated impacts created by grazing treatments would be analyzed in a project-specific review.

3.3.1.8 Riparian and Wetlands

Under the No Action Alternative, the proposed targeted and prescribed grazing would not occur. Current management for livestock grazing practices would continue as permitted within Carson City, Winnemucca, Battle Mountain, Elko, and Ely BLM Districts. Livestock grazing is expected to continue under current grazing authorizations.

Fuel breaks through targeted grazing would not be constructed to reduce the scale and impacts of wildfire within the analysis area. Large wildfires would continue to occur, potentially affecting functionality of riparian areas by removing vegetation cover and exposing soils to erosion, increasing the potential for sediments to be transported into water resources. Furthermore, fire suppression can result in soil disturbance from vehicles and equipment such as fire engines and dozers. Impacts include removal of vegetation and disturbance to soils increasing erosion potential and impacts on water. Use of retardant may impact water directly. Impacts include reduced water quality and possible oxygen depletion.

3.3.1.9 Socioeconomics

Under the No Action Alternative, the proposed targeted and prescribed grazing would not occur. Current management for livestock grazing practices would continue as permitted within Carson City, Winnemucca, Battle Mountain, Elko, and Ely BLM Districts. Livestock grazing on public lands would continue, ensuring that tax revenues from livestock sales, jobs, income, and ranching-related expenditures in the local economy would continue and that livestock grazing receipts would be returned to the counties within the analysis area.

Large wildfires would continue to occur, potentially affecting surrounding economies. Resting burned areas from livestock grazing would have short-term effects by increasing operational costs for ranchers. These costs include finding alternative range to graze or buying hay to feed livestock. Increased costs would have short-term impacts, depending on length of time that the closures are in effect. Economic impacts would include loss of tax revenue from livestock sales and a reduction in the purchase of supplies.

3.3.1.10 Soils

Under the No Action Alternative, the proposed targeted and prescribed grazing treatments would not occur. Current management for livestock grazing would continue as permitted within Carson City, Winnemucca, Battle Mountain, Elko, and Ely BLM Districts. Projects utilizing targeted or prescribed grazing in invasive annual grass management would only occur more intermittently and on such a small scale that overall invasive annual grass management would be limited. As such, soils would not be altered by targeted or prescribed livestock grazing treatments. Given that there would be no treatments to modify fuel beds through reduction of invasive annual grasses, large fires may continue to occur, leading to the removal of protective vegetation and damage to biological soil crusts. This would leave soils highly susceptible to erosion by wind and water.

3.3.1.11 Vegetation Including Threatened, Endangered, and Sensitive Species

Under the No Action Alternative, the proposed targeted and prescribed grazing treatments would not occur; therefore, vegetation within the analysis area would not be affected by livestock grazing outside of existing grazing authorizations. However, without the implementation of grazing treatments that focus on invasive annual grasses and that allow managers to take advantage of seasonal variations in annual grass growth, these grasses would continue to produce unmanageable fuel loads that would carry large and frequent wildfires across the analysis area. These wildfires have proven to be detrimental to the ecologic integrity of the Great Basin Ecoregions in Nevada by replacing native perennial vegetation communities with invasive annual grasslands. These annual grasslands would continue to promote frequent wildfires that decrease plant diversity in neighboring vegetation communities and lead to detrimental effects on other important resources such as wildlife habitat, livestock grazing, and watershed function.

3.3.1.12 Wild Horse and Burro

Under the No Action Alternative, the proposed targeted and prescribed grazing treatments would not occur unless permitted on an intermittent basis. Wild horses and burros would continue to graze as they currently do. However, without the implementation of grazing treatments that focus on invasive annual grasses, the spread of these grasses would continue to produce unmanageable fuel loads that would carry large and frequent wildfires across the analysis area. These wildfires would reduce forage for wild horses and burros because native vegetation species may not recover and/or reestablish before the next wildfire. Additionally, annual grasslands produce forage that are only palatable and nutritious for a short period of time in the early spring, and overall provide less forage for wild horses and burros when compared to native vegetation.

3.3.1.13 Wildlife Including Threatened, Endangered and Sensitive Species

Under the No Action Alternative, loss and degradation of wildlife habitat due to increasing invasive annual grasses and resultant increased fire intensity, size, and frequency could be expected to continue. Specifically, wildlife associated with shrub-steppe habitat would experience the greatest loss and degradation of habitat. Without the options of utilizing targeted and prescribed grazing treatments in areas degraded by invasive annual grasses, continued spread would be expected, resulting in further shifts from the endemic fire regime. Active wildfires may kill or injure a broad range of wildlife species, which are not adapted to withstand these large and intense fires that move quickly across the landscape. As these wildfires persist, long-term impacts to the landscape may occur as invasive annual grasses perpetuate and thrive in response to the changing fire regime, resulting in a loss of desirable vegetation communities. With the loss of these communities, native wildlife will also lose life cycle requirements such as forage, security, and cover that is associated with the vegetation that comprises suitable habitat for each species. As habitat is lost, fragmentation will increase concurrently, further compromising wildlife within the affected area. With increases in invasive annual grasses, some grassland-associated species could increase in abundance; however, those same species could be negatively impacted by the decrease in shrubs and other plant species, as a cheatgrass-dominated state does not provide all necessary life cycle requirements to support a diverse community of plant and animal species. Overall, reduced species diversity and abundance would be expected to occur under the No Action Alternative.

Big Game

Under the No Action Alternative, big game species would be expected to experience further loss and degradation of habitat due to invasive annual grasses and changing fire regimes. Particularly, mule deer would be negatively impacted by this alternative, with previous reductions in carrying capacity linked to habitat loss from wildfire and invasive annual grasses (Wasley 2004). Though big game species such as deer, elk, bighorn sheep, and pronghorn may graze invasive annual grasses in early spring, continued increases of the grasses across big game habitat would have negative consequences as desirable plant communities decreased (Kohl et al. 2012).

Migratory Birds

Under the No Action Alternative, certain migratory bird populations would be expected to decline or shift their range according to remaining suitable habitat. As desirable vegetation communities are lost or degraded due to changing fire regimes and invasive annual grasses, migratory bird species would likewise lose suitable habitat that fulfills various life cycle requirements. Specifically, as shrub-steppe habitat is eliminated due to invasive annual grasses and chronic wildfire impacts, associated prey species for migratory birds would likewise be reduced, with negative impacts for both populations. Also, nesting and brood-rearing habitat would be lost as shrub-steppe communities are converted to annual grasslands. Reduction in structural diversity would have ramifications for certain migratory bird species, even grassland species which may be expected to thrive in the converted habitat. A small proportion of migratory bird species could benefit from this alternative, though many grassland species have been shown to prefer native grassland habitat types over cheatgrass-dominated areas (Earnst and Holmes 2012). The few species that may be supported by cheatgrass habitat is dwarfed by the higher diversity of migratory birds that intact, desirable vegetation communities can offer. Overall, the diversity of migratory birds would continue to decrease in areas converted by invasive annual grasses and shifting fire regimes due to a lack of structural diversity and associated reductions in available niches for both migratory birds and the food sources upon which they rely. Cumulatively, migratory birds would be expected to have decreased abundance and diversity within the analysis area under the No Action Alternative as they would need to relocate to areas with more suitable habitat as remaining habitat becomes increasingly degraded. As populations shifted, it's likely that new ranges would experience increased density, creating competition and ultimately smaller populations overall. This trend would continue as the cycle of invasive annual grasses and wildfire continued to impact the landscape, prompting migratory birds to find suitable habitat elsewhere.

Fisheries

Under the No Action Alternative, fishable streams and other waterbodies would be expected to experience negative consequences from increased fire size, intensity, and frequency as a result of changing fire regimes due to invasive annual grasses. Through indirect impacts such as reduced riparian vegetation, increased stream temperatures, and increased sediment loading, fisheries could be subjected to hypoxia and influxes of toxic ash and sediment. Long-term impacts to fisheries following fire could include degraded spawning substrates and rearing areas due to sedimentation, loss of pool habitat, continued hypoxia, and decreased food availability (Rinne 1996). Impacts to fisheries would ultimately depend on quantity of post-fire runoff, fire size and severity, stream size, and proximity to the wildfire event. However, given the dynamic nature of Nevada's waterbodies and the precarious position of many fishes within the state, the changing fire regime could result in exacerbated consequences to fisheries as fire becomes increasingly prevalent.

Special Status Species

Federally Listed Species

A majority of the federally listed wildlife species in Nevada are either fishes, or closely-associated with riparian areas (Appendix P). Under the No Action Alternative, the same issues facing fisheries at large would also apply to the special status species within Nevada, with rippling effects up the food chain to impact other special status riparian wildlife as well. Notably, many special status fishes are located in just one river, stream, or pool, which leaves them vulnerable to stochastic events, such as a wildfire. With the changing fire regimes due to invasive annual grasses, the probability of wildfire increases, thus increasingly threatening these threatened and endangered fish species. Wildfires have been shown to locally extirpate fish populations due to increased pH, sedimentation, temperature, and associated toxicity within additional sediments. Given these impacts on fisheries as a whole, other federally listed species would experience negative impacts to their food supply. Nesting and brood-rearing habitat along riparian areas would also continue to be degraded due to wildfire, further impacting riparian wildlife that are federally listed. Similar impacts can be expected for listed amphibians, which would experience habitat loss both within the waterbody as well as within adjacent riparian habitat, leaving them vulnerable. Overall, Nevada’s federally listed species would experience negative impacts from increased wildfire across their limited and sensitive habitat due to indirect effects stemming from wildland fire nearby or within riparian areas.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout is a federally listed threatened species and is vulnerable to negative impacts from increased fire size, intensity, and frequency perpetuated by invasive annual grasses. The Lahontan cutthroat trout has been shown to respond negatively to wildfire, which can result in short and long term decreases in thermally-suitable habitat as riparian vegetation is removed and sedimentation loading increases post-fire(Schulz et al. 2017). Under the No Action Alternative, both occupied and potential habitat of this listed species would continue to be degraded. Other threats to this species include habitat fragmentation, climate change, migration barriers, local extirpations, and negative interaction with non-native fishes (Lahontan Cutthroat Trout Initiative 2010). With the added threat of habitat degradation, loss, and local extirpations due to wildfire, cumulative impacts to this species under the No Action Alternative could be substantial, resulting in decreases in the total population size as well as an intensified impact of current threats.

Sensitive Species

Sensitive Species vary widely in associated habitat type across Nevada (NV Special Status Species List Appendix Q). Under the No Action Alternative, sensitive species associated with shrub-steppe and other shrub-dominated habitat types would be increasingly impacted by shifting fire regimes perpetuated by invasive annual grasses. Other Sensitive Species could also experience negative indirect impacts such as riparian-associated species which would experience negative consequences from post-fire impacts rather than direct loss of habitat due to fire and invasive annual grasses. Other indirect impacts could include reductions in suitable habitat for prey species of Sensitive Species, which could result in cascading effects throughout the trophic levels of the community. Moreover, without action, habitat impacted by changing fire regimes and invasive annual grasses would continue to be lost and degraded, which would have negative impacts upon Sensitive Species that rely upon intact habitat to supply life cycle requirements.

Cumulative Effects

Past actions across the analysis area including mining, recreation, improper grazing, and fire have created swaths of disturbed vegetation as well as vectors for the spread of invasive annual grasses. With the introduction and spread of these invasive plants, fire regimes shifted, with fires increasing across the landscape in size, frequency, and intensity, creating a self-sustaining endpoint of invasive annual grasses. These annual states, in turn, cannot support a high diversity of wildlife species as they consist of relatively low nutritional value and does not provide much structural diversity or cover. As a result, many species associated with the shrub-steppe have declined as important habitat is degraded, fragmented, or lost. Additional stressors to wildlife within the analysis area includes disease, overharvesting, competition with livestock, climate change, and development. All of these actions can contribute to population-level impacts and habitat loss and fragmentation and highlight the important of reducing widespread habitat loss due to the cycle of invasive annual grasses and shifting fire regimes.

3.3.2 Action Alternatives

Each of the action alternatives were analyzed and quantified by the 22 individual Great Groups. It was found during analysis that even though the overlap between the issue and the Great Groups varied, the direct, indirect, and cumulative impacts did not fluctuate greatly between Great Groups, either in the type of impacts or the intensity. Great Group A for each action alternative and grazing treatment therefore discloses all direct, indirect and cumulative impacts for each issue under each alternative. For the purposes of this EA, the following summary table (Table 28) shows which issues had variances of impacts from Great Group A. The summary table is followed by a discussion and disclosure of impacts within Great Group A for each action alternative and grazing treatment. Complete discussion and analysis of all 22 Great Groups per action alternative can be found in Appendix T. Impact level only changes if stated, and all issues impacts are compared to Great Group A. A qualitative characterization of the intensity of impacts has been used within this analysis to define the intensity of impact to each resource. Intensity of impacts are influenced by differences between Great Groups, but are analyzed at a project level. Impacts are not always negative, for example the impacts to Fire and Fuels correlate to overall benefits to fuels management. The use of these terms should not be confused with BLM's determination of whether there are significant impacts, which determination will be made by BLM following completion of the EA process. The intensity of impacts for this analysis are:

- Low: Effects would be apparent, measurable, small, localized, and contained within the individual project area.
- Moderate: Effects would be apparent and measurable over a portion of the individual project area.
- High: Effects would be highly noticeable and measurable over a large portion of the individual project area.

Table 28 Summary of All Impacts and Benefits that Vary from Great Group A by Issue

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
Action Alternative A: Early Spring Grazing Prior to Native Perennial Growth													
Targeted													
A	Low impact. BLM must determine EJ population presence near project area and follow procedures according to Executive Order 12898 during site specific NEPA compliance.	Moderate to high impacts. Benefits to fire behavior from modifying fine fuels.	Low impacts. Benefit to habitat.	Moderate to low impacts. Benefits to long-term solitude, naturalness, and primitive and unconfined recreation.	Low impacts. Benefit of flexibility and timing based on phenology. Benefit of additional areas for grazing, improvement of range condition and reduced risk of large wildfire. Impacts of increased workload and costs.	Low impacts. Benefit of increased monitoring, reporting, and data sharing of infestations	Moderate impacts. Benefit of reduced fire behavior and corresponding impacts to travel corridors.	Low to no impacts. Benefits of preventing or reducing impacts of large fires.	Low impacts. This action is voluntary and benefits would be seen to communities from reduced fire intensity or size. Impacts of increased workload and costs from management for grazing treatments.	Low to moderate impacts depending on erosion susceptibility. Benefits of reduced fire impacts to soils. Benefits of reduced erosion from invasive annual reductions.	Low impacts. Benefits in reduced impacts from large fires.	Low impacts. Benefits from modified fire behavior that would protect forage sources.	Low impacts. Benefits from modified fire behavior that would have reduced impacts on habitats.
AA	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
B	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
BB	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
C	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
CC	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented within these sites may require additional monitoring or project planning.	Greater impact than A if there is damage or utilization of palatable shrubs. Benefits in reduced impacts from large fires	Same as A	Greater impact than A if there is damage or utilization of palatable shrubs. Benefits from modified fire behavior that would have reduced impacts on habitats
D	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as A	Same as A
DD	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC
E	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
EE	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
F	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC
FF	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC
G	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
GG	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
H	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
I	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
II	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC
J	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as A	Same as A
JJ	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
K	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
KK	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
L	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
Prescribed													
A	Low impacts BLM must determine EJ population presence near project area according to Executive Order 12898.	Moderate to high impacts depending on vegetative dominance. Benefits to fire behavior from modifying fine fuels	Low impacts. Benefit to habitat.	Low impacts. Benefits to long-term solitude, naturalness, and primitive and unconfined recreation.	Moderate impacts. Benefit of maintained or increased forage and native component. Benefit of flexibility and timing based on phenology. Benefit of additional areas for grazing, improvement of range condition and reduced risk of large wildfire. Impacts of increased workload and costs.	Low impacts. Benefit of increased monitoring, reporting and data sharing of infestations	Low impacts. Benefit of reduced fire behavior and correspondin g impacts to travel corridors.	Low impacts. Intensity of impacts would be higher for treatments outside of allotments. Benefits of preventing or reducing impacts of large fires.	Low impacts. This action is voluntary and benefits would be seen to communities from reduced fire intensity or size. Impacts of increased workload and costs from managemen t for grazing treatments.	Low to moderate impacts depending on erosion susceptibility. Intensity of impacts would be higher for treatments outside of allotments. Benefits of reduced fire impacts to soils. Benefits of reduced erosion from invasive annual reductions.	Low impacts. Intensity of impacts would be higher for treatments outside of allotments. Benefits in reduced impacts from large fires.	Low impacts. Benefits from modified fire behavior that would protect forage sources.	Low impacts. Benefits from modified fire behavior that would have reduced impacts on habitats
AA	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
B	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impacts than A	Same as A	Same as A	Same as A	Same as A	Same as A
BB	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
C	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impact than A if there is damage or utilization of palatable shrubs. Benefits in reduced impacts from large fires.	Same as A	Greater impact than A if there is damage or utilization of palatable shrubs. Benefits from modified fire behavior that would have reduced impacts on habitats.

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
CC	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented within these sites may require additional monitoring or project planning.	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented within these sites may require additional monitoring or project planning.	Same as C	Same as A	Same as C
D	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC	Same as C	Same as A	Same as C
DD	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as C	Same as A	Same as C
E	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as C	Same as A	Same as C
EE	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as C	Same as A	Same as C
F	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A This Great Group includes a tree state, which can be triggered by grazing management that favors tree establishment.	Same as C	Same as A	Same as C

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
FF	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as C	Same as A	Same as C
G	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as A	Same as A	Same as A
GG	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
H	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as C	Same as A	Same as C
I	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as C	Same as A	Same as C
II	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as C	Same as A	Same as C
J	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC	Same as C	Same as A	Same as C
JJ	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as C	Same as A	Same as C
K	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as C	Same as A	Same as C
KK	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as A	Same as A	Same as A
L	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as F	Same as A	Same as A	Same as A
Action Alternative B: Native Perennial Growing Season Grazing													
Targeted													

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
A	Low impacts. BLM must determine EJ population presence near project area according to Executive Order 12898.	Moderate impacts. Benefits to fire behavior from modifying fine fuel.	Low impacts.	Moderate to low impacts. Benefits to long-term solitude, naturalness, and primitive and unconfined recreation.	Moderate to high impacts. Benefit of additional areas for grazing, improvement of range condition and reduced risk of large wildfire. Impacts of increased workload and costs.	Low impacts. Benefit of increased monitoring, reporting and data sharing of infestations.	Low to moderate impacts. Benefit of reduced fire behavior and corresponding impacts to travel corridors.	Low to no impacts. Benefits of preventing or reducing impacts of large fires.	Low impacts. This action is voluntary and benefits would be seen to communities from reduced fire intensity or size. Impacts of increased workload and costs from management for grazing treatments.	Low to moderate impacts depending on erosion susceptibility. Intensity of impacts would be higher for treatments outside of allotments. Benefits of reduced fire impacts to soils. Benefits of reduced erosion from invasive annual reductions.	Low impacts to vegetation. Benefits in reduced impacts from large fires.	Low impacts. Benefits from modified fire behavior that would protect forage sources.	Low impacts. Benefits from modified fire behavior that would have reduced impacts on habitats.
AA	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
B	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
BB	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
C	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
CC	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented may require additional monitoring or project planning.	Same as A	Same as A	Same as A
D	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as A	Same as A
DD	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
E	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
EE	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
F	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
FF	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
G	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
GG	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
H	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
I	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
II	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
J	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC	Same as A	Same as A	Same as A
JJ	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
K	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
KK	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
L	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
Prescribed													
A	Low impacts BLM must determine EJ population presence near project area according to Executive Order 12898.	Low to moderate impacts dependent on annual grass density in perennial systems. Some benefits to fire behavior from modifying fine fuels	Low impacts.	Low impacts. Benefits to long-term solitude, naturalness, and primitive and unconfined recreation.	Low to moderate impacts. Benefit of additional areas for grazing, improvement of range condition and reduced risk of large wildfire. Impacts of increased workload and costs.	Low impacts. Benefit of increased monitoring, reporting and data sharing of infestations.	Low impacts. Benefit of reduced fire behavior and corresponding impacts to travel corridors.	Low to moderate impacts. Intensity of impacts would be higher for treatments outside of allotments. Benefits of preventing or reducing impacts of large fires.	Low impacts. This action is voluntary and benefits would be seen to communities from reduced fire intensity or size. Impacts of increased workload and costs from management for grazing treatments.	Low to moderate impacts depending on erosion susceptibility. Intensity of impacts would be higher for treatments outside of allotments. Benefits of reduced fire impacts to soils. Benefits of reduced erosion from invasive annual reductions.	Variable impacts depending on if treatment occurs before or after the boot stage for perennial grasses present or the palatability of shrubs. Benefits in reduced impacts from large fires	Low impacts. Benefits from modified fire behavior that would protect forage sources.	Low to moderate impacts dependent on shrub or perennial grasses present. Benefits from modified fire behavior that would have reduced impacts on habitats.
AA	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
B	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater Impact than A	Same as A	Same as A	Same as A	Same as A	Same as A
BB	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater Impact than A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
C	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater Impact than A	Same as A	Same as A	Same as A	Same as A	Same as A
CC	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented may require additional monitoring or project planning.	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented may require additional monitoring or project planning.	Same as A	Same as A	Same as A
D	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC	Same as A	Same as A	Same as A
DD	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
E	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
EE	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
F	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
FF	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
G	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
GG	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
H	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
I	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
II	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
J	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as CC	Same as A	Same as A	Same as A
JJ	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
K	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
KK	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
L	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
Action Alternative C: Native Perennial Dormant Season Grazing													
Targeted													
A	Low impacts. BLM must determine EJ population presence near project area according to Executive Order 12898.	Moderate to high impacts. Benefits to fire behavior from modifying fine fuels.	Low impacts.	Moderate to low impacts. Benefits to long-term solitude, naturalness, and primitive and unconfined recreation.	Low to moderate impacts. Benefit of flexibility and timing based on phenology. Benefit of additional areas for grazing, improvement of range condition and reduced risk of large wildfire. Impacts of increased workload and costs.	Low impacts. Benefit of increased monitoring, reporting and data sharing of infestations.	Low impacts. Benefit of reduced fire behavior and corresponding impacts to travel corridors.	Low to no impacts. Benefits of preventing or reducing impacts of large fires.	Low impacts. This action is voluntary. Benefits would be seen to communities from reduced fire intensity or size. Impacts of increased workload and costs from management for grazing treatments.	Low to moderate impacts. Intensity of impacts would be higher for treatments outside of allotments. Benefits of reduced fire impacts to soils. Benefits of reduced erosion from invasive annual reductions.	Low impacts. Benefits in reduced impacts from large fires.	Low impacts. Benefits from modified fire behavior that would protect forage sources.	Low impacts. Benefits from modified fire behavior that would have reduced impacts on habitats.
AA	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
B	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
BB	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
C	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
CC	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Greater impact than A if there has been repeated fires and/or excessive soil disturbance. Projects implemented may require additional monitoring or project planning.	Same as A	Same as A	Same as A
D	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as A	Same as A
DD	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
E	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
EE	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
F	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
FF	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
G	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
GG	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
H	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
I	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
II	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
J	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as CC	Same as A	Same as A	Same as A
JJ	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
K	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
KK	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
L	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
Prescribed													
A	Low impacts. BLM must determine EJ population presence near project area according to Executive Order 12898.	Moderate to high impacts. Benefits to fire behavior from modifying fine fuels	Low to moderate impacts depending on shrub component.	Low impacts. Benefits to long-term solitude, naturalness, and primitive and unconfined recreation.	Moderate impacts. Benefit of flexibility and timing based on phenology. Benefit of additional areas for grazing, improvement of range condition and reduced risk of large wildfire. Impacts of increased workload and costs.	Low impacts. Benefit of increased monitoring, reporting and data sharing of infestations.	Low impacts. Benefit of reduced fire behavior and correspondin g impacts to travel corridors.	Low impacts. Intensity of impacts would be higher for treatments outside of allotments. Benefits of preventing or reducing impacts of large fires	Low impacts. This action is voluntary and benefits would be seen to communities from reduced fire intensity or size. Impacts of increased workload and costs from managemen t for grazing treatments.	Low impacts. Intensity of impacts would be higher for treatments outside of allotments. Benefits of reduced fire impacts to soils. Benefits of reduced erosion from invasive annual reductions.	Low to moderate impacts depending on utilization of shrubs. Benefits in reduced impacts from large fires.	Low impacts. Benefits from modified fire behavior that would protect forage sources.	Low to moderate impacts depending on utilization of shrubs. Benefits from modified fire behavior that would have reduced impacts on habitats.
AA	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
B	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
BB	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
C	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
CC	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
D	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

Great Group	Environ. Justice	Fire and Fuels	Greater Sage-Grouse	LWCs	Livestock and Range	Noxious Weeds	Recreation and Travel Mgt.	Riparian and Wetlands	Socio-economics	Soils	Vegetation including TES	Wild Horse and Burro	Wildlife including TES
DD	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
E	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
EE	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
F	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
FF	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
G	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
GG	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
H	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
I	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
II	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
J	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
JJ	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
K	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
KK	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A
L	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A	Same as A

3.3.2.1 Action Alternative A: Early Spring Grazing Prior to Native Perennial Growth

3.3.2.1.1 Great Group A

Targeted Grazing: Environmental Justice

When designing a geographically specific targeted grazing treatment, the BLM must determine if any potentially affected minority populations and low-income populations are present and disclose any disproportionate adverse impacts. The BLM will follow guidelines outlined in Executive Order 12898, on a project-by-project basis. It is possible that disproportionate effects to one or more EJ populations could occur. These impacts could potentially be either adverse or beneficial, depending on the specific project setting and the specific actions being implemented. Implemented grazing treatments for fuels reduction would provide additional stability and jobs to many individuals that fall within these populations. If grazing authorizations were impacted, that would have direct impacts on EJ populations. Impacts to EJ populations would be similar to impacts described in the socioeconomics section.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Targeted Grazing: Fire and Fuels

Targeted grazing treatments can be used as tools to reduce fine fuel loads, and thereby fire behavior, particularly in areas already dominated by annual grasses. However, several physical and environmental conditions dictate the level to which grazing affects fire behavior, including ambient temperature, wind speed, humidity, fuel composition, fuel continuity, spatial distribution, and topography (Strand and Launchbaugh 2013). Grazing season and intensity are also very important factors.

Fire rarely occurs in this Great Group, generally in years with above average production. Due to their sparse understories and bare soil in intershrub spaces, black greasewood-saltbush (*Sarcobatus vermiculates*-*Atriplex* sp.) communities historically were somewhat resistant to fire (Paysen et al. 2000, Young 1983). The presence of invasive grasses, however, promotes fire where historically it had been infrequent. The invasion of cheatgrass, which is fine-textured, flammable, and early maturing, shortens fire return intervals (Balch et al. 2013, Brooks et al. 2004, Stewart and Hull 1949), increases fuel continuity (Peters and Bunting 1994), and increases the likelihood of fire ignition and spread (Balch et al. 2013, Bunting et al. 1987, Link et al. 2006). See Predicted Fire Behavior Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications.

Targeted grazing at the most susceptible phenological stage (boot stage) can reduce cheatgrass biomass, subsequent regrowth, and seed input (Vallentine and Stevens 1994), resulting in reduced flame length and rate of spread (Diamond et al. 2009). As such, direct impacts in this Great Group include the reduction of fuel bed depth, fine fuel loading, and fine fuel continuity. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would impact livestock behavior and concentration, thus impacting their modifications to the fuel characteristics listed above. Indirect impacts include decreased germination of invasive annual species due to a reduced residual litter layer; and reduced flame length, rate of spread, and fire intensity.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect fire and fuels within this Great Group include fire suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Cumulatively with these impacts, early season targeted grazing activities would reduce the prevalence of invasive annual grasses and modify fire behavior such that fire suppression efforts are more effective. Targeted grazing treatments would be implemented to tie into other fuel breaks or disturbance to increase the effectiveness of these treatments on a larger scale to modify fire behavior.

Targeted Grazing: Greater Sage-Grouse

Greater Sage-Grouse are expected to indirectly benefit from targeted grazing treatments, as it would conserve and/or increase suitable habitat by disrupting the positive cycle of invasive annual grasses and changing fire regimes. In early spring, Greater Sage-Grouse are undergoing important life cycle processes, primarily that of lekking and nesting, though brood-rearing can also overlap during this time. To ensure the protection of these processes and Greater Sage-Grouse populations, targeted grazing will be prohibited in areas that contain active or potential leks from March 1 through May 15, in mapped nesting habitat from April 1 through June 30, and in mapped brood-rearing habitat from May 15 through September 15. The only situation under which targeted grazing may be allowed within specified mapped Greater Sage-Grouse habitat, is if a site-specific assessment indicates that the area is not suitable habitat or there are effective separation barriers between the planned treatment and the identified, occupied Greater Sage-Grouse habitat. Acreages of seasonal Greater Sage-Grouse habitat within each Great Group is shown in Appendix A (Greater Sage-Grouse 2019 ARMPA Habitat Management Areas Mapset, Greater Sage-Grouse 2015 ARMPA Habitat Management Areas Mapset and the Bi-State Sage-Grouse Habitat Categories Mapset) and Appendix O (Table 50, Table 51, Table 52, Table 53, Table 54, Table 55, Table 56).

Given these timing restrictions, no occupied lekking, nesting, or brood-rearing habitat would experience direct impacts from the proposed action. Additionally, on a project-by-project basis, conditions of identified seasonal habitats will be assessed on the ground in order to avoid disruption of critical and seasonal life stages. Eligible areas for the proposed action may overlap with designated Greater Sage-Grouse habitat, but the basis of eligibility ensures that the habitat is already of low or no value to Greater Sage-Grouse due to the dominance of invasive annual grasses and lack of crucial life cycle requirements. Overall, by removing invasive annual grasses through targeted grazing, Greater Sage-Grouse would be expected to benefit indirectly. As the invasive annual grasses' seedbanks and overall fuel loading are decreased, potential wildfire effects within the area would be reduced, thus reducing the potential for habitat loss or degradation through fire prompted by invasive annual grasses. Also, the creation of fuel breaks by targeted grazing would limit the spread of wildfire into adjacent, suitable Greater Sage-Grouse habitat. By disrupting the positive feedback loop of invasive annual grasses and fire, suitable Greater Sage-Grouse habitat would be conserved. Long-term restoration of Greater Sage-Grouse habitat may be possible as invasive annual grasses are reduced from the landscape, leaving potential habitat for desirable plant communities to occupy.

Infrastructure associated with the proposed action includes the construction of supplement and/or attractant sites, water sites, and fencing, as needed. As the proposed action will not take place within occupied lekking, nesting, or brood-rearing habitat during the early spring season, this infrastructure is not expected to have any direct impacts to Greater Sage-Grouse. Indirect impacts associated with infrastructure may include increases in Greater Sage-Grouse predators such as ravens, which have been associated with livestock presence as well as associated infrastructure, which they utilize as perches to increase their field of vision (Coates et al. 2016a). Fence collisions have also been shown to be a cause of mortality for Greater Sage-Grouse, and would be a direct impact, though the likelihood of this occurring is low and would not be expected as infrastructure will not be constructed near occupied Greater Sage-Grouse habitat under this alternative (Christiansen 2009). Drowning within water developments could also be a risk for Greater Sage-Grouse, but required design features ensure that ramps will be present within troughs to minimize potential impacts.

Bi-State Sage-Grouse

The Bi-State Sage-Grouse is expected to experience similar direct and indirect impacts as Greater Sage-Grouse under Action Alternative A for targeted grazing.

Cumulative Effects

Altogether, cumulative impacts to Greater Sage-Grouse and the Bi-State Sage-Grouse under Action Alternative A are expected to be positive as an increasing number of fuel breaks would further limit potential impacts from wildfire such as degraded intact sagebrush habitat. Past actions have resulted in widespread disturbances, which invasive annual grasses have capitalized upon and subsequently, have altered the native fire regime. These actions include mining, grazing, energy development, recreational use, vegetation developments, and land conversions. All of these actions are expected to continue into the future, which highlights the importance of protocols for mitigating the potential spread of invasive annual grasses as a result of these disturbances. Combined with the proposed action, the impacts of past, present, and future actions that create disturbances can be mitigated to some extent by reducing the spread of invasive annual grasses and their associated disruptions to the endemic fire regime. Altogether, these cumulative impacts will help to buffer threats to Greater Sage-Grouse habitat.

Targeted Grazing: Lands with Wilderness Characteristics

Under Action Alternative A, targeted grazing is expected to have short-term negative impacts to certain wilderness characteristics. Primarily, the presence of livestock and the resultant fuel break created by targeted grazing could impact the wilderness characteristics of apparent naturalness as well as outstanding opportunities for solitude or primitive and unconfined recreation. As grazing is an allowable activity within LWCs, the presence of livestock is not expected to significantly degrade recreation opportunities or apparent naturalness.

Apparent naturalness may be impacted due to the swath of land which will be visible after targeted grazing. In areas with high value (VRM I-III), fuel breaks could be designed to have curved and flowing edges rather than straight edges, though this is not required within LWCs unless land-use plans provide specific management directives to do so. Regardless, the short-term degradation of apparent naturalness is offset by the fact that eligible areas for targeted grazing would already be degraded by a dominance of invasive annual grasses, which is also a degradation of apparent naturalness within the area. Furthermore, long-term positive impacts upon apparent naturalness throughout LWCs would occur as a result of the successful implementation of targeted grazing to create fuel breaks. Fuel breaks will help to limit the impacts of wildfire on the landscape, which is spurred by the presence of invasive annual grasses. By interrupting this positive feedback loop, apparent naturalness would be conserved as desirable plant communities are protected from increasing fire size, intensity, and frequency. Additionally, the spread of invasive annual grasses would be hindered by the creation of fuel breaks, further conserving areas with apparent naturalness. The greater amount of landscape within LWCs that is positively impacted by targeted grazing will outweigh the acreage of fuel breaks.

Outstanding opportunities for solitude or primitive and unconfined recreation may also be minimally impacted by targeted grazing within LWCs. Targeted grazing and associated infrastructure may impact recreation and solitude by creating barriers, namely through fencing and the presence of livestock, in the landscape, though the impacts of infrastructure are not expected to limit or hinder opportunities to successfully recreate within any LWCs. Primitive and unconfined recreation would primarily be impacted through short-term barriers affecting recreation such as infrastructure or herding to facilitate the proposed action, though the impact would be expected to be minimal. As for solitude, this wilderness characteristic could be degraded by both the presence of livestock and associated infrastructure as well as the sight of the denuded swath of vegetation after targeted vegetation. These components could reduce the overall sense of solitude across the landscape, by reminding the recreationist of the modern world. However, this impact would be minimal and project-specific. Long-term positive impacts to solitude would occur as targeted grazing and fuel breaks help to conserve intact, desirable plant communities.

Cumulative Effects

Cumulative impacts from disturbances such as mining, recreation, improper grazing, development, and others have assisted the spread of invasive annual grasses, and combined, these all pose a threat to wilderness characteristics that may or may not be present within LWCs. With increased development of fuel breaks through targeted grazing, positive impacts to certain wilderness characteristics within LWCs could occur as the spread of invasive annual grasses and associated shifting fire regimes is reduced. However, the continued disturbance resulting from ongoing activities such as development and mining could continue to spread invasive annual grasses in the area, which would have negative impacts to wilderness characteristics such as apparent naturalness.

Targeted Grazing: Livestock and Range

Great Group A contains 499,989 acres of land within permitted grazing allotments. The complete list of allotments that bisect Great Group A can be found in Appendix L. As described in the Required Design Features, permittee participation in targeted grazing treatments is voluntary and the objectives of the treatment may temporarily interfere with features of the regular grazing permit (i.e. location, timing, duration, livestock kind, etc.) until the project is completed and suspended. Short-term non-use of AUMs of the regular grazing permit will vary on a project-by-project basis and may extend until desired treatment affects are seen or be required prior to project implementation. but the options to use livestock in this season to target invasive annual grasses to create a fuel break can provide overall benefits to the existing allotment.

Due to the goals of grazing treatments under this EA being vegetative, with any livestock production goals coming secondarily, the methods of managing livestock to accomplish targeted grazing would differ greatly from livestock management under regular grazing permits. The workload for livestock management would increase to ensure project objectives are met. Increased workload would include monitoring, frequent herding and movement of water and other resources. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to protect sensitive plant areas or areas that develop saturated soils with snowmelt during this season. All costs associated with livestock management are expected to increase during targeted grazing treatments and will be incurred by the operators. This includes costs associated with water movement, supplements, additional herding and any other livestock management tools. Direct impacts to livestock would include initial stress from concentration and frequent herding received throughout the treatment but operators would use low stress livestock handling techniques to prevent adverse effects.

Areas chosen for targeted grazing treatments would be in an Annual State or Seeded State likely dominated by invasive annual grasses, most likely cheatgrass. Although cheatgrass can provide nutritious forage in the early spring, palatability is reduced as it matures and production fluctuates year to year due to variable soil moisture compared to perennial grasses that access soil moisture deep in the profile. Therefore, supplements and/or attractants may be used to ensure livestock health and complete project objectives. Vegetation production would be evaluated prior to project implementation to determine amount of livestock required to achieve treatment objectives and other project design features that address site-specific conditions. In addition, reevaluation of production would occur to account for annual variations needed to maintain the fuel break. There would likely be some impacts to existing perennial vegetation and saturated soils from livestock trampling and trailing but monitoring and adaptive management would occur to prevent damage Certain ecological sites within this Great Group may contain halogeton within an Annual State. This plant can be toxic to livestock, especially sheep, if eaten in large quantities. Inventory and monitoring of this plant on treatment areas will take place to ensure livestock health.

Great Group A contains 547 acres of land outside of grazing allotments. These areas can be viewed on BLM Grazing Allotments Mapset in Appendix A. There would be no direct impacts to the existing allotments that surround these areas but the producers may benefit from the addition of land available for vegetation treatments by livestock. All considerations for temporary livestock improvements, increased workload, associated costs, and livestock health in these project areas would be similar to those stated above.

Once treatment objectives are met, livestock grazing would cease on the treatment areas until regrowth of cheatgrass or other invasive annual grasses necessitates re-treatment and/or maintenance of fuel breaks. Repeat treatments within the year may be needed depending upon regrowth of cheatgrass from precipitation events that initiate growth later in the year.

The successful creation of fuel breaks from targeted grazing treatments could indirectly affect fire regimes over time by decreasing fire size, intensity and frequency. Less frequent fires and decreased spread and competition from invasive annual grasses would help to improve the ecologic integrity and resiliency of the vegetation communities in surrounding grazing allotments. This improved ecologic integrity would increase the stability and sustainability of resources for livestock grazing as well as potentially increase the sustainable forage base of those allotments in the long term. Lack of competition from invasive annual grasses and a change in grazing management could also cause unintended dominance of other species (i.e. bur buttercup, mustards, etc.) that may be harder to manage and/or harmful to livestock. The BLM would be required to monitor for these conditions and would apply adaptive management procedures to ensure the shift to dominance of undesirable species does not occur on project areas.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to targeted grazing within this Great Group would have minimal impacts overall because of the current state that targeted grazing would be implemented in. Existing grazing allotments, while impacted by large wildfires, timber and mining actions, would also have increased benefits and protection in areas where these fuel breaks were implemented. Cumulative additions of other grazing treatments and fuel breaks within an area would increase the effectiveness and decrease the loss of native vegetation.

Targeted Grazing: Noxious Weeds

Noxious weeds may be identified in areas chosen for targeted grazing treatments. Livestock used for treatments located in previously identified noxious weed areas may be subject to an isolation period depending on noxious weed species present. Although, due to seasonality of this alternative, noxious weeds in a treatment area may not have developed seed yet and isolation may be unnecessary. Despite this, it is possible that weed seeds from previous years may attach to livestock hair and skin and could be transported to other locations within or outside of the treatment area. It is also possible that noxious weeds from surrounding infestations and/or the site's seedbank could invade treatment areas due to the lack of competition from invasive annual grasses or increased bare ground in specific areas due to livestock concentrations. Temporary range improvements (i.e. fencing, water troughs, etc.) could also serve as vectors of noxious weeds due to increased potential for bare ground and increased impacts to vegetation immediately surrounding those locations. As discussed in the RDFs, inventory and monitoring of noxious weeds will take place before, during and after treatment to prevent colonization and control further spread. Sites found to have noxious weeds would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

Other actions taken to prevent the spread of noxious weeds are further outlined in each BLM district noxious weed management plan and other RDFs required to be implemented with each alternative.

The successful creation of fuel breaks from targeted grazing treatments could indirectly affect fire regimes over time by decreasing fire size, intensity and frequency. Less frequent fires and decreased spread and competition from invasive annual grasses may help to improve the ecologic integrity and resiliency of the surrounding vegetation communities and prevent further spread of noxious weeds due to the lack of disturbance that typically helps propagate weed colonization.

Cumulative Effects

When considering the spread of noxious weeds, targeted grazing and other disturbance-causing actions (i.e. mining and timber) may cumulatively have moderate impacts at site-specific locations. During the site-specific project planning phase, other actions at that location would be identified and appropriate measures would be taken to minimize impact by grazing treatments. Despite these potential impacts, there would be minimal impacts overall within this Great Group due to increased benefits and protection in areas where fuel breaks are implemented. Cumulative additions of other fuel breaks within an area would increase the effectiveness even further. While there is potential for noxious weed populations to expand within specific areas, the BLM would be required to monitor, report and share data between multiple parties which would increase the ability to manage existing populations better.

Targeted Grazing: Recreation and Travel Management

Within Great Group A, there are 1,168 miles of roads available for use. The miles of temporary new roads, trails, and travel paths that could be created from implementing targeted fuel breaks is unknown. Permanent roads will not be constructed for temporary infrastructure or access to the project. If existing routes or roads are not present to provide access to these sites, temporary off-route travel may be approved as part of the project. If this route becomes a common travel path for other users, signs, barriers or forms of blocking the off-route access would be implemented.

Targeted grazing would create long, linear features. Existing roads and disturbed sites would be used, but temporary roads could be created off the authorized routes, extending their length. This would likely increase the use of unauthorized routes. Use of these fuel breaks as roads could be dangerous for both the recreationist or any wildlife or livestock they encounter on the fuel break. This could be mitigated by using fencing and signage for fuel breaks that intersect an authorized travel route perpendicularly, to prevent users from going on an unauthorized route.

Seasonal differences such as moisture levels can increase damage to permanent roads or widen travel paths. Because Alternative A would focus on the spring season, when moisture levels are typically higher, increased damage due to unauthorized road use could increase. The BLM would work closely with the grazing permittee to ensure routes are not being used for unauthorized purposes.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to targeted grazing within this Great Group would have minimal impacts overall because other uses would not create temporary routes and any permanent routes would require BLM approval and measures to reduce any environmental effects. Cumulative additions of other fuel breaks within an area could increase temporary routes but would also require fencing and signage to discourage unauthorized use, and rehabilitation to eliminate use once the route is no longer in use.

Targeted Grazing: Riparian and Wetlands

Targeted grazing will not be permitted within riparian areas and therefore would not directly impact riparian areas. Targeted grazing treatments near or adjacent to riparian areas within pastures must have effective separation. RDFs require monitoring of effectiveness of the separation, and modify or suspend treatment if not effective (See Riparian Monitoring in Table 34 and Table 35 in Appendix E). Fuel breaks created by adjacent targeted grazing treatments would indirectly have beneficial impacts by preventing catastrophic fires that could spread to and damage adjacent riparian and wetland areas.

Targeted Grazing: Socioeconomics

Direct and indirect impacts from proposed management activities related to targeted grazing would be site-specific and limited, contributing minimally to the overall regional economy, but directly affecting the operator and potentially the local communities. The methods of managing livestock to accomplish targeted grazing objectives would differ greatly from livestock management under regular grazing permits. Using targeted grazing under this assessment for reducing fuel loads from invasive annual grass species is a voluntary action for operators, and would provide flexibility and stability for management, as well as options for addressing increased wildfire risk and diminished ecological integrity. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives, but would not offset the increased costs and workload needed to meet those objectives.

The workload and costs for livestock management would increase for the operator to ensure the project meets objectives. Increased workload and costs would include monitoring, frequent herding or transport of livestock to other areas, labor, equipment, trucking and fuel costs, water and supplement hauling, and fencing. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Hauling of livestock may increase between sites or treatments and dependent on monitoring. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to protect sensitive plant areas or areas that develop saturated soils with snowmelt during this season. This increased workload would also affect area roads with potential increases in localized traffic and maintenance and services used to support potentially increased labor needs.

Targeted grazing would directly impact fire severity and size (see fire and fuels analysis), which would directly and indirectly impact local communities. While fires may temporarily increase the economic influx to a community from support services for fighting wildfires, this does not offset the long-term impacts to both social and economic services in an area post fire. Impacts post-fire include increased costs for rehabilitation, temporary loss of access, reduction and shift in recreation and tourism, impacts to wildlife and activities that are dependent on wildlife (i.e. fishing and hunting), loss of forage for livestock, wildlife or wild horses, or temporary loss of authorized permits for livestock operators. Wildfires can also increase the likelihood for the spread of invasive or noxious weeds. A study analyzing the cost of fire management of native ecosystems (expected to burn every 60 to 110 years) versus cheatgrass ecosystem (expected to burn every 3 to 5 years) concluded that cheatgrass fires cost an average of 24 times the amount as native vegetation fueled fires (Suhr-Pierce 2020).

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Targeted Grazing: Soils

Early season targeted grazing would reduce vegetation cover and, due to hoof action, disturb the soil surface horizon. Short-term, direct effects to soils within treatment areas include an increase in soil temperature, dryness, compaction, and erosion potential. Areas where targeted grazing is implemented would be susceptible to these effects for as long as the treatment is continued and would likely already have experienced soil erosion due to invasions by invasive annual grasses. Cattle could cause increased soil compaction (Tate et al. 2004), particularly in flat areas, where they prefer to graze (Walker et al. 2006). Sheep and goats, instead, often graze on steep slopes (Walker et al. 2006). Although several factors contribute to a location's susceptibility to erosional forces, steep slopes are generally at increased risk to water erosion in comparison to low-gradient areas (BLM 2011). Soils that develop saturated conditions with snowmelt in the spring are susceptible to "pugging" where animal hooves breakthrough the unstable soil surface and cause localized compaction. These localized compactions can have negative impacts on soil structure and plant productivity (Menneer et al. 2005).

Current wind and water erodibility data were considered when evaluating impacts to soil resources of each Great Group. Refer to Table 18 for a list of wind erodibility groups associated with each wind erosion susceptibility class (i.e., low, moderate, or high). Refer to Table 19 for a list of K factor ranges associated with each water erosion susceptibility class. Of all lands within Great Group A, 96 percent are moderately susceptible to wind erosion, and 82 percent are highly susceptible to water erosion. While the impacts to soils (listed above) are present during any form of livestock grazing, they would be more pronounced in areas of moderate to high erosion susceptibility. See the Soil Erodibility Mapset in Appendix A.

The direct impacts to soils from treatments outside of existing allotments would be the same as those considered under existing allotments, although the level of impact may be higher since a new disturbance would be introduced to these areas. Impacts from targeted grazing done outside of existing allotments would be in addition to those which are observed during normally permitted use and, in comparison, would likely be more confined, intense, and of a shorter duration. While the potential exists for disturbance of intact biological soil crusts and subsequent erosion, only areas that would benefit from targeted grazing would be considered for treatment. It is unlikely that biological soil crusts would be present in areas considered for targeted grazing due to competition from annual grasses. In addition, monitoring of these sites would occur and result in treatment modifications or suspension if thresholds were met to ensure damage does not occur. All considerations for biological soil crusts and erosion potential would remain the same as those under projects on existing allotments.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect soil resources within this Great Group include wildfire and associated suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Impacts from past, present, and reasonably foreseeable actions and conditions include the disturbance of biological soil crusts and increased soil erosion. While targeted grazing also has the potential to cause these impacts in confined areas and over a specified duration, required design features and project monitoring would be in place to limit these impacts. Over the long term, targeted grazing would indirectly help to minimize erosion of unburned soils within the Great Group by reducing fine fuel loads and preventing adverse impacts of extreme fire behavior. As perennial grasses replace annual grasses, erosion potential would decrease, resulting in increased infiltration and moisture retention.

Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing my lead to further soil compaction, soil erosion, and disturbance of biological soil crusts if placed out of existing disturbed areas. However, in a community already dominated by invasive annual grasses, these processes likely have already begun.

Targeted Grazing: Vegetation Including Threatened, Endangered, and Sensitive Species

Areas chosen for targeted grazing treatments would be in an annual state or seeded state dominated by invasive annual grasses, most likely cheatgrass. Cheatgrass is a winter annual grass but it can germinate in response to precipitation events in the fall, winter or spring and reach maturity in 45 days (Clinton et al. 2010). The intent of the treatment would be to create linear fuel breaks by grazing the invasive annual grasses prior to seed development in order to reduce their production and recruitment. Black greasewood and sagebrush may be minor components on these sites but are not preferentially grazed by livestock and would likely not be damaged during treatment. Few native perennial grasses, such as basin wildrye (*Leymus cinereus*), Indian ricegrass (*Achnatherum hymenoides*) & thickspike wheatgrass (*Elymus lanceolatus*), may still be present on these sites but grazing impacts on these species are not of concern due to the intent of creating a fuel break. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would cause some disturbance and decrease vegetative cover but due to the lack of desired species present, this is not a concern. Range improvements could serve as vectors for noxious weeds. These sites would be monitored and treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation. It is unlikely that biological soil crusts would be present in areas considered for targeted grazing due to competition from annual grasses but if they are present, monitoring would occur to prevent damage. It is also unlikely that T&E species or sensitive plant species would be present in areas chosen for targeted grazing due to the ecological condition of annual states, but if they are determined to be present during baseline surveys, the treatment would not be authorized until site-specific consultation with USFWS is completed. Sensitive species would be managed according to BLM Manual Section 6840 (Special Status Species Management), which directs the agency to implement measures to conserve these species and their habitats to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA.

Some areas considered for treatment may not fall within currently permitted BLM allotments and would be utilized by controlled livestock grazing for the first time. The direct impacts to the invasive annual grasses and the other vegetation on these project sites would be the same as those considered for vegetation in the existing allotments although the level of impact may be higher since a new disturbance would be added to these areas. Despite this, only areas that would benefit from targeted grazing would be considered for treatment and monitoring of these sites, with appropriate responses, will occur to ensure prevention of damage.

The successful creation of fuel breaks from targeted grazing treatments could indirectly affect fire regimes over time by decreasing fire size, intensity and frequency. Less frequent fires and decreased spread and competition from annual grasses may help to improve the ecologic integrity of surrounding vegetation communities. Lack of competition from invasive annual grasses and a change in grazing management could also cause unintended dominance of other species (i.e. bur buttercup, mustards, etc.) that may be harder to manage and/or be harmful to the ecologic integrity of the vegetation community. The BLM would be required to monitor for these conditions and would apply adaptive management procedures to ensure the dominance of harmful species does not occur on project areas.

Cumulatively, other disturbance causing actions and projects in addition to targeted grazing within this Great Group would have minimal impacts overall because of the current vegetative state that targeted grazing would be implemented in. Native vegetation, while impacted by large wildfires, timber and mining actions, would also have increased benefits and protection in areas where these fuel breaks were implemented. Cumulative additions of other fuel breaks within an area would increase the effectiveness and decrease the loss of native vegetation.

Targeted Grazing: Wild Horse and Burro: Consequences

There are 127,005 acres of HMA within Great Group A**.** Temporary fencing infrastructure or increased travel on roads due to Range Improvement Projects could impact wild horses and burro's free-roaming movement throughout HMAs and directly in the project location. Fencing for targeted grazing occurs in long linear strips, with forage in between. Wild horses and burros will travel to nutrition and water sources, and their travel can be obscured by fences and roads. Long fencing would force the wild horses and burros to go around the fence to reach additional forage. Given the large number of HMA acres in the Great Group, fencing and targeted grazing treatments are unlikely to significantly reduce wild horses and burros feed sources. Additionally, during early spring, the horses are pregnant or foaling and water and food are sufficient, so they will be moving less and fences would result in less of an effect. Wild horses and burros may also impact temporary fencing as they could run through and over fences under certain circumstances. This damage of temporary infrastructure impacts the grazing permittee, as well as the horses and burros who roam on these lands.

Range improvement projects that create a water source may shift the movement of horses and burros towards that water source and complicate other aspects of wild horse and burro management, such as competition with other species. Targeted grazing could also result in competition for water sources. In early spring, there are more water sources to choose from, so this is less of a driver for herd movement and less of an effect under Alternative A.

Great Group A includes native perennial bunchgrasses such as basin wildrye and Indian ricegrass. These grasses mature earlier than other species and are an important food source for wild horses and burros. However, targeted grazing under Alternative A would have minimal effects because targeted grazing would occur within an annual state, of which the prevalence of bunchgrasses is minimal. Some direct competition for specific plants may occur within the targeted grazing treatment areas, but would have limited impacts to wild horses and burros compared with the current competition for annual grasses.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to targeted grazing within this Great Group would have minimal impacts overall to wild horses and burros. Native vegetation, while impacted by large wildfires, timber and mining actions, would also have increased benefits and protection in areas where these fuel breaks were implemented so the overall availability of forage to wild horses and burros would remain similar to the existing state. Cumulative additions of other fuel breaks within an area would decrease the loss of native vegetation in the long-term, which increases the forage for wild horses and burros.

Targeted Grazing: Wildlife Including Threatened, Endangered and Sensitive Species

Targeted grazing during early spring is expected to have a minor impact upon wildlife species. Black greasewood present within Great Group A is not considered to be important wildlife forage, though it does provide cover for some wildlife species, especially during winter (Great Group A, Appendix B).As eligible sites for targeted grazing are dominated by cheatgrass and, they are not considered to be quality wildlife habitat, primarily due to reduced structural diversity within invasive annual grass states, which results in reduced availability of life cycle requirements for a majority of wildlife species. Implementing targeted grazing to create fuel breaks would ultimately conserve and protect wildlife habitat from further degradation via invasive annual grasses and associated departures from the endemic fire regime. Though some wildlife species may utilize invasive annual grasses to fulfill their life cycle requirements, the majority of species do not benefit from the continued conversion of habitat to annual states. Sagebrush-obligates and species associated with shrub-steppe habitat would experience the most positive impacts due to decreasing cover of invasive annual grasses. Notably, early spring is a time when invasive annual grasses are green and nutritious and are typically one of the earliest plants to green-up, which can provide foraging opportunities to grazers. Though valuable, this resource is fleeting, and ungulates depend on perennial vegetation to supply the remainder to their nutritional requirements throughout the year. Targeted grazing itself will create fuel breaks that impede the spread of wildfire which would otherwise degrade and destroy high-quality, desirable vegetation communities and therefore impact the wildlife species that depend on them.

Big Game

The proposed action has the potential to disturb low-quality big game habitat; species-specific acreages are described in the Affected Environment (Section 3.3.13). Targeted grazing of invasive annual grasses would likely have short-term impacts to wildlife as invasive annual grasses are removed and livestock competes for forage. As big game ungulates have been shown to forage upon green invasive annual grasses, this alternative would create some competition for forage between wildlife and livestock short-term. However, long-term conservation of other food resources associated with desirable plant communities would benefit big game ungulates. Mule deer would benefit greatly from reduced fire size, intensity, and frequency spurred by invasive annual grasses, as this cycle has been a dominant source of habitat loss. Also, early spring for big game ungulates is a time when females may be carrying, delivering, and rearing young, and thus are more sensitive to competition and disturbances in general. However, big game would be expected to have the ability to selectively avoid areas of disturbance if needed, thus reducing potential impacts. Risk of disease transmission from domestic sheep to bighorn sheep will be mitigated by required design features requiring the maintenance of an effective separation distance between domestic sheep and goats and bighorn sheep (Big Horn Sheep Mapset in Appendix A). No impacts to migrating game would be expected under this action alternative due to the small proportion of total area potentially impacted.

Non-ungulate big game such as mountain lions, are unlikely to experience any direct impacts from targeted grazing and are likely to avoid the area due to intermittent human presence as well as potential herding dogs. Mountain lions can also be expected to benefit as their primary prey benefits from protected habitat.

Migratory Birds

Certain migratory birds may be nesting during early spring, when targeted grazing would occur under this alternative. Though minimal, some grassland species may utilize annual states for nesting and foraging habitat and could be directly impacted by targeted grazing. However, long-term positive impacts upon the landscape due to the impediment of large, intense wildfire, would benefit the majority of species, which require structural diversity offered by desirable plant communities. Overall, targeted grazing under this alternative is expected to maintain and conserve quality habitat for migratory birds and promote avian diversity, though individual grassland species may experience localized events of habitat loss due to the grazing treatment.

Fisheries

Fisheries are not expected to be directly impacted by targeted grazing as required design features would be in place to prohibit targeted grazing within riparian areas. Also, off-site water sources would be utilized to hydrate livestock and would be located at least ¼ mile away from any riparian area unless effective control of livestock can be implemented to avoid any unplanned use of a riparian area. In addition, frequent monitoring of riparian areas would take place so as to ensure that no unintended consequences occur and to ensure that these controls are effective.

Indirect impacts to fisheries would be resoundingly positive as targeted grazing and the resultant fuel breaks decrease the size, intensity, and frequency of fire within and adjacent to the project area. With a reduction in impacts from fire, fisheries would benefit from unburned riparian zones and maintenance of water quality and temperature. Required design features applicable to targeted grazing would further ensure that sediment discharge and erosion is minimized, further maintaining suitable water quality to the benefit of fisheries within the affected area.

General Wildlife

Targeted grazing to create fuel breaks during early spring would have mixed effects upon general wildlife species. Species that may utilize annual states, such as certain small mammals, reptiles, and birds would experience a short-term loss of habitat. However, the long-term positive impacts to the landscape would offset this loss and maintain a community of desirable vegetation that supports a higher diversity of wildlife than invasive annual grass-dominated habitat could. Given the relatively small area disturbed by targeted grazing, it's likely that small mammals and reptiles would be able to effectively avoid the proposed action and move to adjacent suitable habitat, thus minimizing impacts from habitat loss due to targeted grazing. Indirectly, general wildlife populations would be expected to benefit under Action Alternative A as it will protect valuable habitat that would otherwise be threatened by the continued spread of invasive annual grasses perpetuated by shifting fire regimes. Wildlife associated with shrub steppe habitat would be expected to benefit greatly from reductions in invasive annual grasses.

Pollinators and other insects would experience minimal direct effects from targeted grazing because eligible areas do not support high species diversity, thus minimizing any potential population level impact. Indirectly, pollinators are expected to benefit greatly from the conservation of desirable plant communities through targeted grazing. Areas where invasive annual grasses are dominant do not provide sufficient flowering plants to adequately sustain pollinators such as bees, hummingbirds, bats, ants, and others. By conserving desirable plant communities, pollinators and insects alike would benefit from the availability of suitable habitat.

Special Status Species

Federally Listed Species

Federally listed species would experience no direct effect from targeted grazing without proper consultation with USFWS. Required design features would be implemented in order to require a clearance for threatened or endangered species before any action is authorized, and unless it is determined that there will be no effect to a listed species, Section 7 consultation with the U.S. Fish and Wildlife Service would be required prior to authorization. Depending on the resultant determination, proposed activities could be modified or abandoned in response.

As discussed earlier, federally listed species associated with riparian areas including fish, amphibians, and birds, would be protected from direct effects from targeted grazing by required design features for both federally listed species as well as riparian areas. Indirect impacts to these listed species would be positive due to reduced fire size, intensity, and frequency within the landscape. This reduction in wildfire effects is positive for riparian-associated wildlife as it ensures water quality is maintained through the presence of adequate riparian vegetation and reduced sedimentation due to wildfire. Federally listed species associated with shrub steppe habitat would experience indirect benefits from the protection of valuable habitat as a result of the proposed action's role in reducing undesirable impacts from wildfire.

Lahontan Cutthroat Trout

As a threatened species, the Lahontan cutthroat trout would be protected by the aforementioned required design features. Also, targeted grazing treatments would not occur in riparian areas, thus minimizing the potential for any direct impacts. Indirectly, this species would benefit from fuel breaks created by targeted grazing due to reduction in potential impacts on riparian areas due to fire. As fire size, frequency, and intensity is reduced by fuel breaks, the probability of fire occurring in or around occupied riparian areas would be diminished. This trout has been shown to respond negatively to wildfire, which can result in short and long term decreases in thermally-suitable habitat for the Lahontan cutthroat trout (Schulz et al. 2017). Benefits to future expansion of Lahontan cutthroat trout may occur as suitable habitat characteristics such as stream temperature and water quality are maintained as a result of successful fuel breaks across the project area.

Sensitive Species

Potential Sensitive Species within the project area vary widely, but no population level impacts would be expected to occur as a result of targeted grazing during early spring. Sensitive species would not be expected to be present in appreciable numbers within eligible sites for targeted grazing as they are ecologically degraded from invasive annual grasses. Though some sensitive species may utilize project areas, the proposed action would not be expected to incur any population-level impacts to those species. Special status species can be expected to indirectly benefit from the creation of fuel breaks as it will reduce potential impacts from wildfire perpetuated by the presence of invasive annual grasses. Many special status species are associated with desirable vegetation communities and benefit from the conservation and maintenance of intact, suitable habitat, which targeted grazing helps to protect.

Cumulative Effects

Cumulative impacts to wildlife vary widely according to the many species potentially present within the project areas. As a result, referring to impacts on a landscape scale is more relevant to this discussion. Past actions such as mining, recreation, development, and improper grazing resulted in disturbances that facilitated the spread of invasive annual grasses across the project area. These actions occur today, albeit with a suite of protocols intended to mitigate and reduce potential negative impacts. It’s reasonable to expect that these same actions would continue into the future and despite protective measures, may continue to spread some invasive annual grasses across the landscape. However, with the additional assistance of the proposed action, negative impacts from invasive annual grasses and associated changing fire regimes can be mitigated in order to ensure the protection and conservation of intact habitat comprised of desirable plant communities. As fuel breaks increase in number, the efficacy of the treatment would increase, thus protecting a wider range of wildlife species that benefit from the presence of continuous and high-quality habitat. Certain past actions have imperiled certain wildlife species through disease transmissions, non-native species, overharvesting, development and fragmentation, and environmental pollution. Evolving management strategies have arisen to deal with these issues, but some populations would be impacted for generations, which makes the conservation of suitable wildlife habitat paramount to the rebound of affected species. Wildlife will continue to face threats not associated with the proposed action such as mining, climate change, and energy development, though the proposed action may help to create resilience within populations to such threats by conserving other habitat.

Prescribed Grazing: Environmental Justice:

When designing a geographically specific prescribed grazing treatment, the BLM must determine if any potentially affected minority populations and low-income populations are present and disclose any disproportionate adverse impacts. The BLM will follow guidelines outlined in Executive Order 12898, on a project-by-project basis. It is possible that disproportionate effects to one or more environmental justice populations could occur. These impacts could potentially be either adverse or beneficial, depending on the specific project setting and the specific actions being implemented. Implemented grazing treatments for fuels reduction would provide additional stability and jobs to many individuals that fall within these populations. If grazing authorizations were impacted, that would have direct impacts on EJ populations. Impacts to EJ populations would be similar to impacts described in the socioeconomics section.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Prescribed Grazing: Fire and Fuels:

As with prescribed grazing, many factors dictate the level to which prescribed grazing affects fire behavior. These include ambient temperature, wind speed, humidity, fuel composition, fuel continuity, spatial distribution, and topography (Strand and Launchbaugh 2013). Grazing season and intensity are also very important factors.

Fire is a rare disturbance in this Great Group, likely occurring in years with above average production. Historically, black greasewood-saltbush communities had sparse understories and bare soil in intershrub spaces, making these communities somewhat resistant to fire (Paysen et al. 2000, Young 1983). The presence of invasive weeds, however, promotes fire where historically it had been infrequent. The invasion of cheatgrass, which is fine-textured, flammable, and early maturing, shortens fire return intervals (Balch et al. 2013, Brooks et al. 2004, Stewart and Hull 1949), increases fuel continuity (Peters and Bunting 1994), and increases the likelihood of fire ignition and spread (Balch et al. 2013, Bunting et al. 1987, Link et al. 2006). See Predicted Fire Behavior Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications.

Fuel models were considered when evaluating impacts of early spring prescribed grazing on fuel composition and fire behavior within this Great Group. Of all lands within Great Group A, 46 percent are classified as SH5, 14 percent GR1, 10 percent GS1, and the remainder a combination of other fuel types. This indicates that shrubs are a primary carrier of fire in this Great Group. Prescribed grazing has the most potential to effectively reduce fine fuels and fire spread when employed in states with high herbaceous fuels and when fire weather severity is low. In ecological states with relatively high shrub cover, the effects of grazing by livestock on fire behavior and extent would become less pronounced due to the proportionately smaller amount of herbaceous biomass available for consumption. Nonetheless, reduced fire frequency and spread would still be observed due to the removal of fine herbaceous biomass between shrubs, which are most likely to ignite and initiate fire spread (Hobbs 1996, Madany and West 1983, Zimmerman and Neuenschwander 1984). While prescribed grazing would focus on the reduction of invasive annual species, goats and sheep are known to reduce fuel loads in shrublands by consuming woody fuels (Nader et al. 2007, Papanastasis 2009, Popay and Field 1996). Cattle would not be expected to consume shrubs.

Direct impacts in this Great Group include the reduction of fuel bed depth, fine fuel loading, and fine fuel continuity. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would impact livestock behavior and concentration, thus impacting their modifications to the fuel characteristics listed above. Indirect impacts include decreased germination of invasive annual species due to a reduced residual litter layer; increased resources available for perennial vegetation; and reduced flame length, rate of spread, and fire intensity.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect fire and fuels within this Great Group include fire suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Cumulatively with these impacts, early season prescribed grazing activities would reduce the prevalence of invasive annual grasses and modify fire behavior such that fire suppression efforts are more effective.

Prescribed Grazing: Greater Sage-Grouse:

Greater Sage-Grouse are expected to benefit from the implementation of prescribed grazing. As with targeted grazing, prescribed grazing would be subject to the same seasonal and timing restrictions implemented to protect Greater Sage-Grouse as they undergo crucial life cycle processes such as lekking, nesting, and brood-rearing. Areas eligible for prescribed grazing may be moderately to severely impacted by the presence of invasive annual grasses and the associated changing fire regimes. Given this degradation, eligible areas are not considered as suitable habitat for Greater Sage-Grouse and will be improved by Alternative A. Through prescribed grazing, invasive annual grasses will be reduced within the area, allowing desirable vegetation communities to thrive. This action will help to conserve and maintain suitable Greater Sage-Grouse habitat by disrupting the positive feedback loop of invasive annual grasses and changing fire regimes, which result in the widespread loss of suitable Greater Sage-Grouse habitat.

Indirect and direct impacts associated with related infrastructure for prescribed grazing will incur the same effect upon Greater Sage-Grouse as with targeted grazing treatments, as livestock requirements are generally similar regardless of grazing treatment. In some cases, areas eligible for prescribed grazing may require less infrastructure to support grazing livestock. In these cases, indirect and direct impacts to Greater Sage-Grouse would decrease concurrently.

Bi-State Sage-Grouse

Bi-State Sage-Grouse are expected to experience similar direct and indirect impacts from prescribed grazing under Action Alternative A.

Cumulative Effects

Cumulative impacts to Greater Sage-Grouse and the Bi-State Sage-Grouse would be similar to those described for targeted grazing under Action Alternative A, and the implementation of prescribed grazing to reduce invasive annual grasses would similarly help to reduce potential impacts of fire and disrupt the perpetuating cycle of invasive annual grasses and wildfire.

Prescribed Grazing: Lands with Wilderness Characteristics

Prescribed grazing is expected to have minimal impacts to LWCs and wilderness characteristics. Primarily, apparent naturalness and outstanding opportunities for solitude and primitive and unconfined recreation would be impacted by prescribed grazing. Unlike targeted grazing, this grazing action would take place in less ecologically degraded habitat and would not result in a denuded swath of vegetation. Under this alternative, grazing action would occur while perennial vegetation is dormant and cheatgrass is actively growing, thus facilitating the effective removal of cheatgrass from mixed vegetation communities. As with targeted grazing, the short-term degradation of apparent naturalness by livestock presence and infrastructure is offset by the fact that some locations already have authorized grazing actions or are degraded by the presence of invasive annual grasses. Primitive and unconfined recreation may be temporarily hindered or altered by the implementation of this infrastructure which may change available areas for recreation or create barriers. Solitude could be affected by infrastructure and livestock which remind the recreationist of the modern world. However, any impact would be minimal and temporary, with long-term benefits.

Long-term positive impacts would occur as the extent of invasive annual grass cover is reduced by prescribed grazing. Outstanding opportunities for solitude and primitive and unconfined recreation would also benefit long-term from prescribed grazing due to the conservation and protection of desirable plant communities from wildfire and invasive annual grasses. As the spread of invasive annual grasses and associated increased fire size, intensity, and frequency is reduced, the potential for positive impacts to adjacent LWCs exists, even if the proposed action is not completed within a LWC; required monitoring will take place to inform how far these indirect, positive impacts may extend into LWCs.

Cumulative Effects

Cumulative effects to LWCs would be similar to those described under Action Alternative A for targeted grazing, because long-term impacts would be similar. As invasive annual grasses are reduced through prescribed grazing, certain wilderness characteristics would be maintained, such as apparent naturalness. Other disturbing activities would continue to provide a vector for the spread of these invasive annual grasses.

Prescribed Grazing: Livestock and Range

Great Group A contains 499,989 acres of land within permitted grazing allotments. The complete list of allotments that bisect Great Group A can be found in Appendix L. As described in the Required Design Features, permittee participation in prescribed grazing treatments is voluntary and the objectives of the treatment may temporarily interfere with features of the regular grazing permit (i.e. location, timing, duration, livestock kind, etc.) until the project is completed or suspended. Short-term non-use of AUMs of the regular grazing permit will vary on a project-by-project basis and may extend until desired treatment affects are seen or be required prior to project implementation. but the options to use livestock in this season to manage vegetation can provide overall benefits to the existing allotment.

Due to the goals of grazing treatments under this EA being vegetative, with any livestock production goals coming secondarily, the methods of managing livestock to accomplish prescribed grazing would differ greatly from livestock management under regular grazing permits. The workload for livestock management would increase to ensure project objectives are met. Increased workload would include monitoring, frequent herding and movement of water and other resources. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once perennial vegetation begins to enter its growing season and/or site conditions call for removal. Frequent movement of livestock may require additional riders. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to complete project objectives. These livestock management tools may also be needed to protect sensitive plant areas or areas that develop saturated soils with snowmelt during this season. All costs associated with livestock management are expected to increase during prescribed grazing treatments and will be incurred by the operators. This includes costs associated with water movement, supplements, additional herding and any other livestock management tools. Direct impacts to livestock would include stress from concentration and frequent herding received throughout the treatment but operators would use low stress livestock handling techniques to prevent adverse effects.

Areas chosen for prescribed grazing treatments could be in any ecological state in the state and transition models, except reference condition, but must have a sizeable component of invasive annual grasses, most likely cheatgrass. Although cheatgrass can provide nutritious forage in the early spring, palatability is reduced as it matures and production fluctuates year to year due to variable soil moisture compared to perennial grasses that access soil moisture deep in the profile. Therefore, supplements and/or attractants may be needed to ensure livestock health and complete project objectives. Vegetation production would be evaluated prior to project implementation to determine amount of livestock required to achieve treatment objectives and other project design features that address site-specific conditions. There would likely be some impacts to perennial vegetation and saturated soils from livestock trampling and trailing but monitoring and adaptive management would occur to prevent damage Certain ecological sites within this Great Group may contain halogeton within an Annual State. This plant can be toxic to livestock, especially sheep, if eaten in large quantities. Inventory and monitoring of this plant on treatment areas will take place to ensure livestock health.

Great Group A contains 547 acres of land outside of grazing allotments. These areas can be viewed on BLM Grazing Allotments Mapset in Appendix A. There would be no direct impacts to the existing allotments that surround these areas but the producers may benefit from the addition of land available for vegetation treatments by livestock. All considerations for temporary livestock improvements, increased workload, associated costs, and livestock health in these project areas would be similar to those stated above.

Once treatment objectives are met, livestock grazing would cease on the treatment areas until regrowth of cheatgrass or other invasive annual grasses necessitates re-treatment. Repeat treatments within the year may be needed depending upon regrowth of cheatgrass from precipitation events that initiate growth later in the year.

Successful reduction of invasive annual grasses from prescribed grazing treatments could indirectly affect fire regimes over time by decreasing fine fuels that increase fire size, intensity and frequency. In addition, there could be a decrease in cheatgrass through time as the seedbank is decreased and the litter it germinates in is decreased, allowing for perennials to better compete for the limited resources (moisture, nutrients, etc.). Although, these effects may not be appreciable until prescribed grazing treatments are repeated after multiple years. Less frequent fires and decreased spread and competition from invasive annual grasses may help to improve the ecologic integrity and resiliency of the vegetation communities on allotments as well as potentially increase the sustainable forage base of those allotments in the long term. Lack of competition from invasive annual grasses and a change in grazing management could also cause unintended dominance of other species (i.e. bur buttercup, mustards, etc.) that may be harder to manage and/or harmful to livestock. The BLM would be required to monitor for these conditions and would apply adaptive management procedures to ensure the dominance of harmful species does not occur on project areas.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to prescribed grazing within this Great Group would have minimal impacts overall. Native vegetation, while impacted by large wildfires, timber and mining actions, would also have increased benefits and protection in areas where this vegetation management would occur. Cumulative additions of other grazing treatments and fuel breaks within an area would increase the effectiveness and decrease the loss of native vegetation.

Prescribed Grazing: Noxious Weeds

Noxious weeds may be identified in areas chosen for prescribed grazing treatments. Livestock used for treatments located in previously identified noxious weed areas may be subject to an isolation period depending on noxious weed species present. Although, due to seasonality of this alternative, noxious weeds in a treatment area may not have developed seed yet and isolation may be unnecessary. Despite this, it is possible that weed seeds from previous years may attach to livestock hair and skin and could be transported to other locations within or outside of the treatment area. It is also possible that noxious weeds from surrounding infestations and/or the site's seedbank could invade treatment areas due to the lack of competition from invasive annual grasses or increased bare ground in specific areas due to livestock concentrations. Temporary range improvements (i.e. fencing, water troughs, etc.) could also serve as vectors of noxious weeds due to increased potential for bare ground and increased impacts to vegetation immediately surrounding those locations. As discussed in the RDFs, inventory and monitoring of noxious weeds will take place before, during and after treatment to prevent colonization and control further spread. Sites found to have noxious weeds would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

Successful reduction of invasive annual grasses from prescribed grazing treatments could indirectly affect fire regimes over time by decreasing fine fuels that increase fire size, intensity and frequency. In addition, there could be a decrease in cheatgrass through time as the seedbank is decreased and the litter it germinates in is decreased, allowing for perennials to better compete for the limited resources (moisture, nutrients, etc.). Although, these effects may not be appreciable until prescribed grazing treatments are repeated after multiple years. Less frequent fires and decreased spread and competition from invasive annual grasses may help to improve the 2and prevent further spread of noxious weeds due to the lack of disturbance that typically helps propagate weed colonization.

Cumulative Effects

When considering the spread of noxious weeds, prescribed grazing and other disturbance-causing actions (i.e. mining and timber) may cumulatively have moderate impacts at site-specific locations. During the site-specific project planning phase, other actions at that location would be identified and appropriate measures would be taken to minimize impact of grazing treatments. Despite these potential impacts, there would be minimal impacts overall within this Great Group due to increased benefits and protection in areas where prescribed grazing treatments are implemented. Any additions of other treatments within an area would increase the effectiveness even further. While there is potential for noxious weed populations to expand within specific areas due to reasons explained above, the BLM would be required to monitor, report and share data between multiple parties which would increase the ability to manage existing populations better.

Prescribed Grazing: Recreation and Travel Management

Within Great Group A, there are 1,168 miles of roads available for use. The miles of temporary new roads, trails, and travel paths that would be created for prescribed grazing is unknown. These roads and trails could be used for other purposes such as hunting, off-highway vehicles (OHV), wildlife watching, livestock grazing, camping, mining, etc. Permanent roads will not be constructed for temporary sites.

Prescribed grazing would likely be able to use existing roads to access sites, because they are associated with specific allotment and current use. The placement of temporary range improvement projects or temporary fencing would most likely be in previously used areas with existing access. However, if temporary roads are created, this would likely increase the use of unauthorized routes by other users such as recreationists. This could be mitigated by using fencing and signage where new routes intersect an authorized travel route perpendicularly, to prevent users from going on an unauthorized route.

The increase in existing routes due to prescribed grazing would be limited to potential temporary routes going to temporary project sites. These temporary roads that cause surface disturbance would be rehabilitated as necessary, to replace ground cover and prevent erosion. Seasonal differences such as moisture levels can increase damage to permanent roads or widen travel paths. Because Alternative A would focus on the spring season, when moisture levels are typically higher, increased damage due to unauthorized road use could increase. The BLM would work closely with the grazing permittee to ensure routes are not being used for unauthorized purposes.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to prescribed grazing within this Great Group would have minimal impacts overall because other uses would not create temporary routes and any permanent routes would require BLM approval and measures to reduce any environmental effects.

Prescribed Grazing: Riparian and Wetlands

During early spring, cattle tend to disperse to upland sites because of higher quality forage and better water distribution in shallow reservoirs and natural water pockets. Invasive annual grasses, such as cheatgrass, are palatable and nutritious in the early spring followed by the emergence/growth of native perennials, spreading the consumption of livestock and minimizing direct impacts from grazing in riparian areas. In addition, early spring use typically results in better livestock distribution between riparian and upland areas due to flooding and generally cooler temperatures of riparian areas. However, sheep and goats will typically consume spring willow growth even though other adequate herbaceous forage is available. Prescribed grazing in this seasonal alternative requires removal when perennials emerge as part of project objectives.

Short-term, direct effects possible in riparian areas from prescribed grazing in early spring within this Great Group include vegetation loss, soil compaction, reduced runoff retention, biological crust loss, direct soil disturbance, and runoff concentrated into animal trails, with consequent enhanced erosion. Additionally, on saturated soils, grazing animals more easily uproot plants and compact soils or shear streambanks. Cattle, in comparison to goats, would cause increased soil compaction. Grazing animals create waste that can introduce nutrients and pathogens to streams directly or in runoff. Excessive nutrient loading can lead to algal growth, depleted dissolved oxygen needed to support aquatic fauna, reduced water clarity and consequent increased water temperature, and other effects that reduce riparian function. However, since non-use may need to be taken in order for a prescribed grazing to occur, impacts would not be more than what currently occurs with existing grazing authorizations. At the project level, thresholds and available responses will be established in the monitoring plan and based on project objectives. See Table 36 Thresholds and Responses Monitoring in Appendix E.

Black greasewood is commonly found in floodplains in Great Group A where moisture is readily available, and thus, projects in this Great Group have the potential to directly impact riparian areas. However, since black greasewood is considered a low-quality browse species for livestock, they will be expected to graze in uplands for more palatable forage in early spring. The characteristics of the associated uplands, such as upland water distribution and suitable forage availability, will contribute to the determination of appropriate management options in riparian areas.

Prescribed grazing projects could reduce the prevalence of invasive species and would improve ecological conditions throughout a large portion of the analysis area. Such projects would reestablish an understory of forbs and perennial bunchgrasses that are less susceptible to fire than invasive annuals, such as cheatgrass. This would reduce the risk of catastrophic wildfire on rangelands, which might otherwise spread into riparian and wetland areas.

There may be riparian areas included in the analysis area that are not currently within BLM allotments and may be subject to prescribed grazing treatments under this EA. Land considered for prescribed grazing treatments would need to have disturbance by invasive annual grasses. The direct impacts to the invasive annual grasses, riparian function, and water quality on these project sites would be the same as those considered under existing allotments although the level of impact may be lower since monitoring thresholds and responses would be enacted. Generally, only areas that would benefit from prescribed grazing would be considered for treatment.

Required design features for these prescribed livestock grazing treatments would limit livestock access in areas vulnerable to water quality degradation. This, coupled with buffers and exclosures placed on fuel break segments for perennial streams, riparian areas, and wetlands is expected to reduce the potential for cumulative impacts related to livestock use. However, temporary range improvements can also be used to divert grazing from vulnerable areas and reduce impacts to streams. Thus, range improvements and adaptive grazing management would allow managers to apply measures appropriate to specific conditions, reducing the potential for water quality and riparian function degradation.

Over the long term, implementation of this action alternative is expected to reduce water quality impacts and increase riparian function as a result of reduced wildfire impacts and improvement in ecological conditions.

Cumulative Effects

Cumulatively, with past, present, and foreseeable grazing, seeding, or other soil-disturbing actions, prescribed grazing treatments would be similar to cumulative impacts that exist with current authorized grazing actions.

Prescribed Grazing: Socioeconomics

Direct and indirect impacts from proposed management activities related to prescribed grazing are similar to targeted grazing. These impacts would be site-specific and limited, contributing minimally to the overall regional economy, but directly affecting the operator and potentially the local communities. The methods of managing livestock to accomplish prescribed grazing objectives would differ greatly from livestock management under regular grazing permits. Using prescribed grazing under this assessment for reducing fuel loads from invasive annual grass species is a voluntary action for operators, and would provide flexibility and stability for management, as well as options for addressing increased wildfire risk and diminished ecological integrity. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives, but would not offset the increased costs and workload needed to meet those objectives.

The workload and costs for livestock management would increase for the operator to ensure the project meets objectives, similar to the implementation of targeted grazing. Prescribed grazing would also affect fire severity and size, though not at the same levels or timeframe as targeted grazing (see Fire and Fuels analysis). However, impacts to communities would similar as discussed under targeted grazing.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Prescribed Grazing: Soils

As with early season targeted grazing, prescribed grazing would reduce vegetation cover and, due to hoof action, disturb the soil surface horizon and any existing biological soil crusts. Effects, while dependent on grazing intensity and duration, would be similar to those of permitted grazing. Short-term, direct effects to soils within the treatment area of this Great Group include an increase in soil temperature, dryness, compaction, and erosion potential. Since prescribed grazing would be performed at a lower intensity than targeted grazing, these effects would be similar in nature, but less pronounced. Furthermore, in comparison to targeted grazing, which occurs in an annual state, prescribed grazing would occur in states that would typically have a higher degree of resilience and stability. Cattle could cause increased soil compaction (Tate et al. 2004), particularly in flat areas, where they prefer to graze (Walker et al. 2006). Sheep and goats, instead, often graze on steep slopes (Walker et al. 2006). Although several factors contribute to a location's susceptibility to erosional forces, steep slopes are generally at increased risk to water erosion in comparison to low-gradient areas (BLM 2011). Soils that develop saturated conditions with snowmelt in the spring are susceptible to "pugging" where animal hooves breakthrough the unstable soil surface and cause localized compaction. These localized compactions can have negative impacts on soil structure and plant productivity (Menneer et al. 2005). Additional information on areas of high wind and water erosion potential can be found on the Soil Erodibility Mapset in Appendix A.

The direct impacts to soils from treatments outside of existing allotments would be the same as those considered under existing allotments, although the level of impact may be higher since a new disturbance would be introduced to these areas. While the potential exists for disturbance of intact biological soil crusts and subsequent erosion, only areas that would benefit from prescribed grazing would be considered for treatment. In addition, monitoring of these sites would occur and result in treatment modifications or suspension if thresholds were met to ensure damage does not occur. All considerations for biological soil crusts and erosion potential would remain the same as those under projects on existing allotments.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect soil resources within this Great Group include wildfire and associated suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Impacts from past, present, and reasonably foreseeable actions and conditions include the disturbance of biological soil crusts and increased soil erosion. While prescribed grazing also has the potential to cause these impacts in confined areas and over a specified duration, required design features and project monitoring would be in place to limit these impacts. Over the long term, prescribed grazing would indirectly help to minimize erosion within this Great Group by reducing fine fuel loads and preventing adverse impacts of extreme fire behavior. As perennial grasses replace annual grasses, erosion potential would decrease, resulting in increased infiltration and moisture retention.

Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing may lead to further soil compaction, soil erosion, and disturbance of biological soil crusts if placed out of existing disturbed areas.

Prescribed Grazing: Vegetation Including Threatened, Endangered, and Sensitive Species

Areas chosen for prescribed grazing treatments could be in any state that would benefit from early spring grazing to enhance ecologic integrity of the site and reduce fine fuels. The intent of the treatment would be to directly impact the invasive annual grasses prior to seed development in order to reduce their production and recruitment. Big sagebrush (*Artemisia tridentata*) and/or black greasewood may be significant components of the treatment site depending on the state. Trampling damage to shrubs would be assessed on a project-by-project basis and stocking rate would be adjusted to ensure damage does not occur. Native perennial bunchgrasses, such as basin wildrye, Indian ricegrass and thickspike wheatgrass, may also be significant components depending on the state but this action alternative would take place prior to the boot phase of growth; therefore, preventing selective grazing of these species and reducing the risk of damage caused by livestock grazing. Seeded species, such a crested wheatgrass, may also be present if treatment takes places in a Seeded State, but similar to the native perennial grasses, risk of selective grazing and subsequent damage is low due to the seasonality of the treatment. Active monitoring and livestock management would occur to watch phenology of perennial vegetation to prevent damage. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would cause some disturbance, decrease vegetative cover and may serve as vectors for noxious weeds. These sites would be monitored and treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation. Sensitive species would be managed according to BLM Manual Section 6840 (Special Status Species Management), which directs the agency to implement measures to conserve these species and their habitats to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA. If T&E species are determined to be present, treatment would not be authorized until site-specific consultation with USFWS is completed.

Some areas considered for treatment may not fall within currently permitted BLM allotments and would be utilized by controlled livestock grazing for the first time. The direct impacts to the invasive annual grasses and the other vegetation on these project sites would be the same as those considered for vegetation in the existing allotments although the level of impact may be higher since a new disturbance would be added to these areas. Despite this, only areas that would benefit from prescribed grazing would be considered for treatment and monitoring of these sites will occur to prevent damage.

Successful reduction of invasive annual grasses from prescribed grazing treatments could indirectly affect fire regimes over time by decreasing fine fuels that increase fire size, intensity and frequency. In addition, there could be a decrease in cheatgrass through time as the seedbank is decreased and the litter it germinates in is decreased, allowing for perennials to better compete for the limited resources (moisture, nutrients, etc.). Although, these effects may not be appreciable until prescribed grazing treatments are repeated after several years. Less frequent fires and decreased spread and competition from invasive annual grasses may help to improve the ecological integrity of vegetation communities if site conditions allow by improving functional diversity and increasing resistance to future disturbances. Lack of competition from invasive annual grasses and a change in grazing management could also cause unintended dominance of other species (i.e. bur buttercup, mustards, etc.) that may be harder to manage and/or harmful to the ecologic integrity of the vegetation community. Unsuccessful treatment could also lead to increased invasive annual grass cover and decreased perennial vegetation. The BLM would be required to monitor for these conditions and would apply adaptive management procedures to minimize undesirable impacts from treatment outcomes.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to prescribed grazing within this Great Group would have minimal impacts overall. Native vegetation, while impacted by large wildfires, timber and mining actions, would have increased benefits and protection in areas where this vegetation management would occur. Cumulative additions of fuel breaks or other prescribed grazing treatments within an area would increase the effectiveness and decrease the loss of native vegetation.

Prescribed Grazing: Wild Horse and Burro

There are 127,005 acres of HMA within Great Group A**.** Temporary fencing infrastructure or increased travel on roads due to Range Improvement Projects would impact wild horses and burro's free-roaming movement throughout HMAs and within the state. Because prescribed grazing would occur in existing allotments, it would limit the new fencing requirements. Wild horses and burros will travel to nutrition and water sources, and their travel can be obscured by fences and roads. Given the large number of HMA acres in the Great Group, fencing is unlikely to significantly reduce wild horses and burros feed sources. Additionally, during early spring, the horses are pregnant or foaling and water and food are sufficient, so they will be moving less and fences would result in less of an effect. Wild horses and burros may also impact temporary fencing as they could run through and over fences under certain circumstances. This damage of temporary infrastructure impacts the grazing permittee, as well as the horses and burros who roam on these lands.

Range improvement projects that create a water source may shift the movement of horses and burros towards that water source and complicate other aspects of wild horse and burro management, such as competition with other species. Prescribed grazing could also result in competition for water sources. In early spring, there are more water sources to choose from, so this is less of a driver for herd movement and less of an effect under Alternative A.

Great Group A includes native perennial bunchgrasses such as basin wildrye and Indian ricegrass. These grasses mature earlier than other species and are an important food source for wild horses and burros. Utilizing these species under prescribed grazing would increase food source competition for that season. Some direct competition for specific plants may occur within the prescribed grazing treatment areas, but would have limited impacts wild horses and burros compared with the current competition for annual grasses. Additionally, successful reduction of invasive annual grasses may improve the ecologic integrity and resiliency of the vegetation communities within HMAs and improve the overall food source for wild horses and burros.

Cumulative Effects

Cumulatively, other disturbance causing actions and projects in addition to prescribed grazing within this Great Group would have minimal impacts overall to wild horses and burros. Native vegetation, while impacted by large wildfires, timber and mining actions, would also have increased benefits and protection in areas where prescribed grazing was implemented so the overall availability of forage to wild horses and burros would remain similar to the existing state. Cumulative additions of other fuel breaks within an area would decrease the loss of native vegetation in the long-term, increasing the forage for wild horses and burros.

Prescribed Grazing: Wildlife Including Threatened, Endangered and Sensitive Species

Prescribed grazing during early spring is expected to have minimal impacts upon wildlife species as a whole. Black greasewood present within Great Group A is not considered to be important wildlife forage, though it does provide cover for some wildlife species, especially during winter (Great Group A, Appendix B). Eligible areas for prescribed grazing are ecologically degraded by the presence of invasive annual grasses, leaving them susceptible to wildfire and increasingly impacted by changing fire regimes. Livestock presence could potentially impact a wider variety of wildlife species due to the increased diversity of habitat compared to areas eligible for targeted grazing. Notably, early spring is also a time period with increased reproductive activity, which can leave certain species vulnerable to disturbance by livestock or competition for forage. In all, short-term negative impacts to wildlife due to the proposed action is outweighed by long-term maintenance and conservation of intact, suitable habitat.

Big Game

Impacts to big game due to prescribed grazing is expected to be similar to targeted grazing treatments under Action Alternative A. Some competition for forage may occur between livestock and big game ungulates within prescribed grazing areas. As described for targeted grazing, disease transmission between domestic sheep and bighorn sheep would be minimized by required design features prohibiting their overlap. Long-term conservation and maintenance of desirable plant communities due to prescribed grazing would benefit big game ungulates. By removing invasive annual grasses from degraded vegetation communities, those areas are less likely to burn and would continue to provide habitat that satisfies life cycle requirements for big game such as cover and forage.

Migratory Birds

Impacts to migratory birds due to prescribed grazing is expected to be similar to those described for targeted grazing treatments under Action Alternative A. As eligible sites offer increased vegetative diversity, an increased number of migratory bird species could be impacted by prescribed grazing, and individual nests or birds could be disturbed or trampled by grazing livestock. However, long-term population-level benefits to migratory birds due to prescribed grazing would be incurred by the maintenance of suitable habitat for both migratory birds and the food resources upon which they rely.

Fisheries

Potential for direct impacts to fisheries exists as prescribed grazing treatment areas may include riparian areas and required design features could not eliminate all potential impacts to riparian areas and the fisheries they support. Required design features would be implemented to avoid undesirable consequences such as erosion, contamination, or other unacceptable, population-level impacts. If riparian areas are present within an eligible area, riparian objectives will be clearly identified and defined and must be compatible with improving the rating or trend of any riparian system towards achieving PFC. Also, if an undeveloped natural water source is utilized, it would not be the only source of water in the project, unless it can be utilized without creating undue pressure on the riparian resource. For any riparian area within a prescribed grazing project, monitoring would be conducted, and if unacceptable impacts occur, treatment would be modified or discontinued. All of these required design features would be implemented in order to protect riparian areas and consequently, fisheries. Water quality would be maintained at adequate levels to protect fish within applicable waters.

Indirect impacts to fisheries are expected to be similar to those discussed for targeted grazing treatments due to reduced extent of invasive annual grasses and the return to a more natural fire regime, which would create positive impacts for fisheries, which would experience less impacts from nearby wildfire.

General Wildlife

Impacts to general wildlife species are expected to be similar or less than targeted grazing treatments. A higher diversity of wildlife species may be impacted by prescribed grazing because eligible areas could be supporting a higher number of species due to increased vegetation diversity. Overall, some grassland species may experience localized habitat loss as invasive annual grasses are removed from the vegetation community, but overall species diversity will be maintained by its removal, which would disrupt the ecological trajectory towards an annual state. Nesting birds within grazing treatment areas may experience negative impacts due to livestock, which may trample nests or individuals, though this impact is expected to be minimal and would not impact the species at a population-level. Small mammals and reptiles within the grazing area are not expected to be directly impacted by the prescribed grazing action. Pollinators can be expected to benefit from the conservation of desirable plant communities with a higher diversity of flowering plants as a food resource. Indirect benefits to general wildlife species include the conservation and maintenance of desirable plant communities which provide their life cycle requirements. Sagebrush-obligates and species associated with shrub-steppe habitat stand to benefit most from the eradication of invasive annual grasses.

Special Status Species

Federally Listed Species

As described for targeted grazing treatments, the same required design features would apply to prescribed grazing treatments, protecting federally listed wildlife species from effects due to the proposed action. If the proposed action is expected to impact a federally listed species, Section 7 consultation with USFWS will be completed, and the action would be modified appropriately. Indirect and cumulative impacts to federally listed species is expected to be the same for prescribed grazing as for targeted grazing.

Lahontan Cutthroat Trout

Impacts to the Lahontan cutthroat trout would be minimized due to required design features intended to protect federally listed species as well as riparian areas. Direct impacts to this species due to prescribed grazing are expected to be minimal to none, and this species would indirectly benefit from reduced potential impacts from wildfire.

Sensitive Species

Sensitive Species may be present in higher abundance in areas eligible for prescribed grazing, but required design features would be implemented to ensure that no population level effects on any special status species occur. Indirectly, some special status species would benefit from prescribed grazing under this alternative as it would conserve suitable habitat that would otherwise be converted into a self-sustaining annual state that would support a much lower diversity of wildlife species, including sensitive species. Sensitive species which are associated with shrub steppe habitat would be expected to benefit the most from the proposed action as it would help to reduce the spread of invasive annual grasses and associated shifts to endemic fire regimes.

Cumulative Effects

Cumulative impacts to wildlife are expected to be similar to those described under Action Alternative A for targeted grazing. The combinations of past actions that have resulted in widespread invasive annual grasses and increased fire size, intensity, and frequency, create the same impacts that prescribed grazing and targeted grazing can help to minimize.

3.3.2.2 Action Alternative B: Native Perennial Growing Season Grazing

3.3.2.2.1 Great Group A

Targeted Grazing: Environmental Justice

When designing a geographically specific targeted grazing treatment, the BLM must determine if any potentially affected minority populations and low-income populations are present and disclose any disproportionate adverse impacts. The BLM will follow guidelines outlined in Executive Order 12898, on a project-by-project basis. It is possible that disproportionate effects to one or more environmental justice populations could occur. These impacts could potentially be either adverse or beneficial, depending on the specific project setting and the specific actions being implemented. Implemented grazing treatments for fuels reduction would provide additional stability and jobs to many individuals that fall within these populations. If grazing authorizations were impacted, that would have direct impacts on EJ populations. Impacts to EJ populations would be similar to impacts described in the socioeconomics section.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Targeted Grazing: Fire and Fuels

Targeted grazing treatments can be used as tools to reduce fine fuel loads, and thereby fire behavior, particularly in areas already dominated by annual grasses. However, several physical and environmental conditions dictate the level to which grazing affects fire behavior, including ambient temperature, wind speed, humidity, fuel composition, fuel continuity, spatial distribution, and topography (Strand and Launchbaugh 2013). Grazing season and intensity are also very important factors.

Fire rarely occurs in this Great Group, generally in years with above average production. Due to their sparse understories and bare soil in intershrub spaces, black greasewood-saltbush communities historically were somewhat resistant to fire (Paysen et al. 2000, Young 1983). The presence of invasive weeds, however, promotes fire where historically it had been infrequent. The invasion of cheatgrass, which is fine-textured, flammable, and early maturing, shortens fire return intervals (Balch et al. 2013, Brooks et al. 2004, Stewart and Hull 1949), increases fuel continuity (Peters and Bunting 1994), and increases the likelihood of fire ignition and spread (Balch et al. 2013, Bunting et al. 1987, Link et al. 2006). See Predicted Fire Behavior Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications.

The effectiveness of native perennial growing season targeted grazing in reducing fire spread is highly dependent upon vegetation composition. Assuming that this treatment would take place in a cheatgrass-dominated area, it would likely decrease the risk of fire spread. As such, direct impacts in this Great Group include the reduction of fuel bed depth, fine fuel loading, and fine fuel continuity. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would impact livestock behavior and concentration, thus impacting their modifications to the fuel characteristics listed above. Indirect impacts include decreased germination of invasive annual species due to a reduced residual litter layer; and reduced flame length, rate of spread, and fire intensity.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect fire and fuels within this Great Group include fire suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Cumulatively with these impacts, early season targeted grazing activities would reduce the prevalence of invasive annual grasses and modify fire behavior such that fire suppression efforts are more effective. Targeted grazing treatments would be implemented to tie into other fuel breaks or disturbance to increase the effectiveness of these treatments on a larger scale to modify fire behavior.

Targeted Grazing: Greater Sage-Grouse

As analyzed within Action Alternative A (Section 3.3.2.1), impacts to Greater Sage-Grouse are expected to be minimal due to the implementation of required design features placing seasonal timing restrictions and other protective measures upon any proposed project, thus protecting Greater Sage-Grouse habitat and populations. Targeted grazing during the native perennial growing season would not directly impact Greater Sage-Grouse due to the restrictions ensured by required design features. Additionally, eligible sites for targeted grazing are unlikely to contain Greater Sage-Grouse habitat, as the cheatgrass-dominated state does not provide adequate life cycle requirements such as cover, security, or forage. Moreover, when native perennials are growing, invasive annual grasses have dried, resulting in lowered nutrition. Associated infrastructure including fencing, water developments, and mineral supplements have the potential to create direct impacts for Greater Sage-Grouse through increased predation, fence strikes, and accidental drowning. However, required design features would be implemented to reduce these issues, particularly that of drowning, by including rescue ramps within water troughs. Greater Sage-Grouse are not expected to be in close proximity to any targeted grazing treatments, but protective measures have been included in the case that an overlap occurs. During hot summer months, Greater Sage-Grouse may attempt to utilize water developments, though study shows they do not heavily rely upon such water sources (Connelly and Doughty 1988).

Indirect impacts to Greater Sage-Grouse under this alternative are expected to be positive, as the creation of fuel breaks using targeted grazing helps to disrupt changing fire regimes due to invasive annual grasses while also protecting adjacent habitat with value for Greater Sage-Grouse. The conservation of intact, suitable sagebrush habitat is invaluable for the success of Greater Sage-Grouse.

Bi-State Sage-Grouse

Under Action Alternative B, Bi-State Sage-Grouse are expected to experience the same associated direct, indirect, and cumulative impacts as Greater Sage-Grouse. As stated within the analysis of Action Alternative A, the smaller population size of this distinct population segment does put them at increased risk, which gives them greater benefit from the successful creation of fuel breaks through targeted grazing. The proposed action will both inhibit the spread of invasive annual grasses and reduce potential impacts from wildfire, which will protect and conserve important habitat for Bi-State Sage-Grouse.

Cumulative Effects

Cumulative impacts to Greater Sage-Grouse and Bi-State sage grouse are discussed within Action Alternative A and apply to both the Greater Sage-Grouse and the Bi-State Sage grouse.

Targeted Grazing: Lands with Wilderness Characteristics

Direct, and indirect impacts to LWCs under Action Alternative B for targeted grazing would be similar to those described within Action Alternative A for targeted grazing. As eligible sites for targeted grazing are ecologically degraded by the dominating presence of invasive annual grasses, the timing of grazing does not result in an appreciable difference to the end result, the creation of a fuel break. As Alternative B is likely to occur when invasive annual grasses have dried out, aesthetic values that might contribute to wilderness characteristics such as apparent naturalness or solitude would be less pertinent. Recreation may increase in frequency during the native perennial growing season, which could result in a larger number of impacted recreationists. However, given the small and localized extent of these targeted grazing project sites and required design features associated with the action, impacts to wilderness characteristics are expected to be localized and minimal short-term and beneficial at a landscape-scale long-term. Other impacts to these wilderness characteristics would be similar to those discussed under Action Alternative A.

Cumulative Effects

Cumulative impacts to LWCs are similar as discussed within Action Alternative A.

Targeted Grazing: Livestock and Range

Great Group A contains 499,989 acres of land within permitted grazing allotments. The complete list of allotments that bisect Great Group A can be found in Appendix L. As described in the Required Design Features, permittee participation in targeted grazing treatments is voluntary and the objectives of the treatment may temporarily interfere with features of the regular grazing permit (i.e. location, timing, duration, livestock kind, etc.) until the project is completed or suspended. Short-term non-use of AUMs of the regular grazing permit will vary on a project-by-project basis and may extend until desired treatment affects are seen or be required prior to project implementation. But the options to use livestock in this season to target invasive annual grasses to create a fuel break can provide overall benefits to the existing allotment.

Due to the goals of grazing treatments under this EA being vegetative, with any livestock production goals coming secondary, the methods of managing livestock to accomplish targeted grazing would differ greatly from livestock management under regular grazing permits. The workload for livestock management would increase to ensure project objectives are met. Increased workload would include monitoring, frequent herding and movement of water and other resources. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to complete project objectives. These livestock management tools may also be needed to protect sensitive plant areas or areas that develop saturated soils with snowmelt during the early part of this season. All costs associated with livestock management are expected to increase during targeted grazing treatments and will be incurred by the operators. This includes costs associated with water movement, supplements, additional herding and any other livestock management tools. Direct impacts to livestock would include initial stress from concentration and frequent herding received throughout the treatment but operators would use low stress livestock handling techniques to prevent adverse effects.

Areas chosen for targeted grazing treatments would be in an Annual State or Seeded State likely dominated by invasive annual grasses, most likely cheatgrass. Due to the seasonality of this alternative, nutritional quality of the invasive annual grasses would be poor and supplements for livestock would likely be needed to ensure livestock health and complete project objectives. Prior to seed drop, cheatgrass can be unpalatable to livestock due to the long awn of the seed (~0.5 inches) (Marrow and Stahlman 1983). These long awns can also cause injuries to the mouth and eyes of livestock. If shrubs are present on site, attractants may be needed to prevent livestock from consuming harmful quantities when other forage sources are unpalatable. Vegetation production would be evaluated prior to project implementation to determine amount of livestock required to achieve treatment objectives and other project design features that address site-specific conditions. In addition, reevaluation of production would occur to account for annual variations needed to maintain the fuel break. There would likely be some impacts to existing perennial vegetation and early season saturated soils from livestock trampling and trailing but monitoring and adaptive management would occur to prevent damage. Certain ecological sites within this Great Group may contain halogeton within an Annual State. This plant can be toxic to livestock, especially sheep, if eaten in large quantities. Inventory and monitoring of this plant on treatment areas will take place to ensure livestock health.

Great Group A contains 547 acres of land outside of grazing allotments. These areas can be viewed on BLM Grazing Allotments Mapset in Appendix A. There would be no direct impacts to the existing allotments that surround these areas but the producers may benefit from the addition of land available for vegetation treatments by livestock. All considerations for temporary livestock improvements, increased workload, associated costs, and livestock health in these project areas would be similar to those stated above.

Once treatment objectives are met, livestock grazing would cease on the treatment areas until regrowth of cheatgrass or other invasive annual grasses necessitates re-treatment and/or maintenance of fuel breaks. Repeat treatments within the year may be needed depending upon regrowth of cheatgrass from precipitation events that initiate growth later in the year.

The seasonality of this alternative does not change the indirect effects of targeted grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of targeted grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Targeted Grazing: Noxious Weeds

Noxious weeds may be identified in areas chosen for targeted grazing treatments. Livestock used for treatments located in previously identified noxious weed areas may be subject to an isolation period depending on what weed species are present. Many noxious weed species are advantageous growers and may develop seeds during the early part of the growing season of this alternative. Transport of those seeds offsite from livestock could occur by attaching to livestock hair and skin or can be passed through the digestive system (Davidson et al. 2006). Transport of seeds from previous years could also occur. Noxious weeds from surrounding infestations and/or the site's seedbank could invade treatment areas due to the lack of competition from invasive annual grasses or increased bare ground in specific areas due to livestock concentrations. Temporary range improvements (i.e. fencing, water troughs, etc.) could also serve as vectors of noxious weeds due to increased potential for bare ground and increased impacts to vegetation immediately surrounding those locations. As discussed in the RDFs, inventory and monitoring of noxious weeds will take place before, during and after treatment to prevent colonization and control further spread. Sites found to have noxious weeds would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

The seasonality of this alternative does not change the indirect effects of targeted grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of targeted grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Targeted Grazing: Recreation and Travel Management

The direct and indirect effects of targeted grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Cumulative Effects

The cumulative effects of targeted grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Targeted Grazing: Riparian and Wetlands

Targeted grazing will not be permitted within riparian areas and therefore would not directly impact riparian areas. Targeted grazing treatments near or adjacent to riparian areas within pastures must have effective separation. RDFs require monitoring of effectiveness of the separation, and modify or suspend treatment if not effective. Fuel breaks created by adjacent targeted grazing treatments would indirectly have beneficial impacts by preventing catastrophic fires that could spread to and damage adjacent riparian and wetland areas.

Targeted Grazing: Socioeconomics

Direct and indirect impacts from proposed management activities related to targeted grazing would be site-specific and limited, contributing minimally to the overall regional economy, but directly affecting the operator and potentially the local communities. The methods of managing livestock to accomplish targeted grazing objectives would differ greatly from livestock management under regular grazing permits. Using targeted grazing under this assessment for reducing fuel loads from invasive annual grass species is a voluntary action for operators, and would provide flexibility and stability for management, as well as options for addressing increased wildfire risk and diminished ecological integrity. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives, but would not offset the increased costs and workload needed to meet those objectives.

The workload and costs for livestock management would increase for the operator to ensure the project meets objectives. Increased workload and costs would include monitoring, frequent herding or transport of livestock to other areas, labor, equipment, trucking and fuel costs, water and supplement hauling, and fencing. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Hauling of livestock may increase between sites or treatments and dependent on monitoring. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to protect sensitive plant areas or resources that may be impacted by the decrease in nutritional quality of the invasive annual grasses. This increased workload would also affect area roads with potential increases in localized traffic and maintenance and services used to support potentially increased labor needs.

Targeted grazing would directly impact fire severity and size (see fire and fuels analysis), which would directly and indirectly impact local communities. While fires may temporarily increase the economic influx to a community from support services for fighting wildfires, this does not offset the long-term impacts to both social and economic services in an area post-fire. Impacts post-fire include increased costs for rehabilitation, temporary loss of access, reduction and shift in recreation and tourism, impacts to wildlife and activities that are dependent on wildlife (i.e. fishing and hunting), loss of forage for livestock, wildlife or wild horses, or temporary loss of authorized permits for livestock operators. Wildfires can also increase the likelihood for the spread of invasive or noxious weeds. A study analyzing the cost of fire management of native ecosystems (expected to burn every 60 to 110 years) versus cheatgrass ecosystem (expected to burn every 3 to 5 years) concluded that cheatgrass fires cost an average of 24 times the amount as native vegetation fueled fires (Suhr-Pierce 2020).

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Targeted Grazing: Soils

Native perennial growing season targeted grazing would reduce vegetation cover and, due to hoof action, disturb the soil surface horizon. Short-term, direct effects to soils within treatment areas include an increase in soil temperature, dryness, compaction, and erosion potential. Impacts are similar to early spring targeted grazing, although increases in soil temperature, dryness, and erosion potential are more likely as seasonal temperatures increase. Areas where targeted grazing is implemented would be susceptible to these effects for as long as the treatment is continued and would likely already have experienced soil erosion due to invasions by invasive annual grasses. Cattle could cause increased soil compaction (Tate et al. 2004), particularly in flat areas, where they prefer to graze (Walker et al. 2006). Sheep and goats, instead, often graze on steep slopes (Walker et al. 2006). Although several factors contribute to a location’s susceptibility to erosional forces, steep slopes are generally at increased risk to water erosion in comparison to low-gradient areas (BLM 2011). Saturated soils that carry over from a particularly wet spring are susceptible to “pugging” where animal hooves breakthrough the unstable soil surface and cause localized compaction. These localized compactions can have negative impacts on soil structure and plant productivity (Menneer et al. 2005).

Current wind and water erodibility data were considered when evaluating impacts to soil resources of each Great Group. Refer to Table 18 for a list of wind erodibility groups associated with each wind erosion susceptibility class (i.e., low, moderate, or high). Refer to Table 19 for a list of K factor ranges associated with each water erosion susceptibility class. Of all lands within Great Group A, 96 percent are moderately susceptible to wind erosion, and 82 percent are highly susceptible to water erosion. While the impacts to soils (listed above) are present during any form of livestock grazing, they would be more pronounced in areas of moderate to high erosion susceptibility.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect soil resources within this Great Group include wildfire and associated suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Impacts from past, present, and reasonably foreseeable actions and conditions include the disturbance of biological soil crusts and increased soil erosion. While targeted grazing also has the potential to cause these impacts in confined areas and over a specified duration, required design features and project monitoring would be in place to limit these impacts. Over the long term, native perennial growing season targeted grazing would indirectly help to minimize erosion of unburned soils within the Great Group by reducing fine fuel loads and preventing adverse impacts of extreme fire behavior. As perennial grasses replace annual grasses, erosion potential would decrease, resulting in increased infiltration and moisture retention.

Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing my lead to further soil compaction, soil erosion, and disturbance of biological soil crusts if placed off of existing disturbance. However, in a community already dominated by invasive annual grasses, these processes likely have already begun.

The Soil Erodibility Mapset in Appendix A shows areas with high wind and water erosion susceptibility.

Targeted Grazing: Vegetation Including Threatened, Endangered, and Sensitive Species

Areas chosen for targeted grazing treatments would be in an Annual State or Seeded State with significant invasive annual grasses, most likely cheatgrass. By design of the targeted grazing treatments, all vegetation within the project area would be directly affected, including native and/or seeded species still remaining within these vegetative states. Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses will be poor and supplements for livestock would likely be needed. Attractants may also be needed to prevent livestock from preferentially grazing black greasewood and big sagebrush which could be potentially harmful to them if large quantities are eaten. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would cause some disturbance and decrease vegetative cover. Range improvements could serve as vectors for noxious weeds. These sites would be monitored and treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation. Sensitive species would be managed according to BLM Manual Section 6840 (Special Status Species Management), which directs the agency to implement measures to conserve these species and their habitats to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA. It is also unlikely that T&E species would be present in areas chosen for targeted grazing due to the ecological condition of the site but if they are determined to be present during baseline surveys, the treatment would not be authorized until site-specific consultation with USFWS is completed.

The seasonality of this alternative does not change the indirect effects of targeted grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of targeted grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Targeted Grazing: Wild Horse and Burro

Areas chosen for targeted grazing treatments would be in an annual state or seeded state dominated by invasive annual grasses, most likely cheatgrass. Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses will be poor which would result in more competition between livestock and wild horses and burros for food. In addition, because of the low nutritional quality of invasive annual grasses, supplements for livestock would likely be needed to ensure livestock health, and would result in attractants that may change the utilization patterns for wild horse and burros. The direct and indirect effects of targeted grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Cumulative Effects

The cumulative effects of targeted grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Targeted Grazing: Wildlife Including Threatened, Endangered and Sensitive Species

Under Action Alternative B, vegetation would be grazed during the perennial growing season. Wildlife within the analysis area are dependent upon native perennial vegetation as a source of many life cycle requirements, including cover, security, and food. With the green-up of perennial vegetation, wildlife has increased foraging opportunity and responds accordingly, with herbivores capitalizing upon the nutritious plant material. Impacts to wildlife under this alternative are expected to be similar to those described under Action Alternative A, particularly for targeted grazing. As eligible sites for targeted grazing are already ecologically degraded by the dominant presence of invasive annual grasses, these sites support a low diversity of wildlife species. Particularly, invasive annual grasses will have dried out by the time perennial grasses begin to grow, and this means the nutritional value is decreased dramatically, which reduces any value to wildlife species except for the minimal cover these grasses provide. Species residing in these ecologically degraded areas would experience localized loss of habitat, but population-level impacts would not be expected to occur. Long-term maintenance of suitable habitat across the landscape due to the creation of fuel breaks offsets these losses while also conserving higher species diversity across the landscape, particularly within shrub-steppe habitats, which are most vulnerable to impacts associated with invasive annual grasses.

Big Game

Under Action Alternative B, impacts to big game are expected to be minimal. Areas eligible for targeted grazing are not nutritionally valuable to big game ungulates, and these species can be expected to forage on growing perennial vegetation located elsewhere, which would minimize potential competition for forage between ungulates and grazing livestock. Short-term impacts to individuals due to associated infrastructure may occur as big game ungulates come across fencing and other supplemental developments. Impacts to migrating game would be minimal and localized and would not be expected to result in significant impacts to migration patterns due to the small proportion of area potentially impacted by the proposed action. Required design features are in place to minimize any potential impacts to wildlife including lay-down fences where feasible as well as access to water developments. However, the small scale of proposed projects for targeted grazing mean that big game would have the opportunity to reroute or avoid infrastructure, so impacts would be minimized. Overall, big game would benefit from the construction of fuel breaks using targeted grazing as it would maintain and conserve valuable habitat and forage that is needed for various stages of their life cycles. Non-ungulate big game such as mountain lions would also benefit indirectly as mule deer and other large ungulates' populations remain stable, providing lions with necessary food resources. Lions may also benefit indirectly as fire size, frequency, and intensity in adjacent habitat is reduced, which may help maintain the structural diversity needed for rearing young and other life cycle requirements.

Migratory Birds

Under Action Alternative B, most migratory birds will be nearing the end of nesting and moving more independently, with or without juvenile offspring. Some risk of direct impacts due to livestock grazing would exist in the form of individual trampling or injury, though this would be minimized as nesting draws to a close and brood-rearing becomes more prevalent across the landscape. Also, few migratory birds are expected to utilize annual states due to decreased structural diversity and reduced foraging opportunities, particularly after these grasses dry out. Certain prey species of migratory birds are not expected to be appreciably impacted by targeted grazing, particularly within ecologically degraded sites. Given the large ranges utilized by avian predators, the localized impacts of targeted grazing are unlikely to have any direct impacts. Indirectly, migratory birds will benefit from the construction of fuel breaks by targeted grazing as it would conserve suitable habitat for nesting, foraging, and cover by reducing potential impacts from wildfire and invasive annual grasses.

Fisheries

Any direct, indirect, or cumulative impacts to fisheries would be similar to those described under Action Alternative A for targeted grazing. As required design features are in place to prevent targeted grazing in riparian areas, fisheries would not experience direct impacts from the proposed action. Indirect impacts will be similar because the timing of grazing within eligible sites does not have appreciable differences except that invasive annual grasses will be drier than during early spring. The end result, a fuel break, would serve the same purpose; that of reducing potential impacts from wildfire perpetuated by invasive annual grasses. Fisheries would experience the same positive impacts discussed in Action Alternative A, which is the maintenance of crucial riparian vegetation and decreased sedimentation post-fire. Required design features implemented during targeted grazing would ensure that sedimentation or erosion does not occur as a result of the proposed action, and any unintended consequences would trigger adaptive management strategies to remedy the problem.

General Wildlife

Under Action Alternative B, impacts to general wildlife species are expected to be similar to those discussed within Action Alternative A. During the perennial growing season, food resources are more abundant than during other seasons, leaving wildlife less vulnerable to disturbances such as grazing livestock and associated supporting activity. Eligible sites for targeted grazing under this alternative would be ecologically degraded and support a dominant presence of invasive annual grasses. Few wildlife species utilize this type of habitat as it does not provide adequate cover and nutrition to support a higher diversity of wildlife. Wildlife associated with open, grassy habitat may utilize portions of eligible sites, but also typically depend on adjacent habitat with increased structural diversity and foraging opportunity. These species would experience a localized loss of habitat due to targeted grazing, but they can be expected to benefit from the conservation of adjacent, intact habitat types long-term. Wildlife expected to be impacted by this action include certain small mammals, reptiles, birds, and insects, though impacts would occur on an individual level with little to no impact upon larger populations. Overall, these same species could be expected to indirectly benefit due to reductions in potential wildfire impacts and invasive annual grasses. As a result, other habitat utilized by these species would be conserved and maintained on a landscape scale. Large carnivores and mesocarnivores such as bears and foxes are not expected to be impacted by this localized project due to their large range sizes and relative inadequacy of habitat found in eligible sites. Pollinators would experience minimal direct impacts due to targeted grazing and would benefit from the conservation of adequate habitat adjacent to the project area.

Special Status Species

Federally Listed Species

As discussed under Action Alternative A, required design features would be implemented to ensure that no effect to a federally listed species occurs as a result of the proposed action.

Lahontan Cutthroat Trout

As a threatened species, the Lahontan cutthroat trout would be protected by the aforementioned required design features. Also, targeted grazing treatments would not occur in riparian areas, thus minimizing the potential for any direct impacts. Indirectly, this fish will benefit from fuel breaks created by targeted grazing due to reduction in potential impacts on riparian areas due to fire. As fire size, frequency, and intensity is reduced by fuel breaks, the probability of fire occurring in or around occupied riparian areas is diminished. This trout has been shown to respond negatively to wildfire, which can result in short and long term decreases in thermally-suitable habitat for the Lahontan cutthroat trout (Schulz et al. 2017). Benefits to future expansion of Lahontan cutthroat trout may occur as suitable habitat characteristics such as stream temperature and water quality are maintained as a result of successful fuel breaks across the project area.

Sensitive Species

Potential Sensitive Species within the project area vary widely, but no population level impacts would be expected to occur as a result of targeted grazing during the perennial growing season. Sensitive species would not be expected to be present in large numbers within eligible sites for targeted grazing as they are ecologically degraded from invasive annual grasses. Though localized reduction in habitat could occur from the proposed action, it would not result in population-level impacts to sensitive species, many of which rely upon the protection of native habitat that has not been degraded by invasive annual grasses. Special status species can be expected to benefit from the creation of fuel breaks as it would reduce potential impacts from wildfire perpetuated by the presence of invasive annual grasses. Many special status species are associated with desirable vegetation communities and benefit from the conservation and maintenance of intact, suitable habitat, which targeted grazing helps to provide, particularly within shrub steppe habitat.

Cumulative Effects

Cumulative impacts to wildlife are discussed within Action Alternative A and are not expected to differ under Action Alternative B.

Prescribed Grazing: Environmental Justice

When designing a geographically specific prescribed grazing treatment, the BLM must determine if any potentially affected minority populations and low-income populations are present and disclose any disproportionate adverse impacts. The BLM will follow guidelines outlined in Executive Order 12898, on a project-by-project basis. It is possible that disproportionate effects to one or more environmental justice populations could occur. These impacts could potentially be either adverse or beneficial, depending on the specific project setting and the specific actions being implemented. Implemented grazing treatments for fuels reduction would provide additional stability and jobs to many individuals that fall within these populations. If grazing authorizations were impacted, that would have direct impacts on EJ populations. Impacts to EJ populations would be similar to impacts described in the socioeconomics section.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Prescribed Grazing: Fire and Fuels

As with targeted grazing, many factors dictate the level to which prescribed grazing affects fire behavior. These include ambient temperature, wind speed, humidity, fuel composition, fuel continuity, spatial distribution, and topography (Strand and Launchbaugh 2013). Grazing season and intensity are also very important factors.

Fire is a rare disturbance in this Great Group, likely occurring in years with above average production. Historically, black greasewood-saltbush communities had sparse understories and bare soil in intershrub spaces, making these communities somewhat resistant to fire (Paysen et al. 2000, Young 1983). The presence of invasive weeds, however, promotes fire where historically it had been infrequent. The invasion of cheatgrass, which is fine-textured, flammable, and early maturing, shortens fire return intervals (Balch et al. 2013, Brooks et al. 2004, Stewart and Hull 1949), increases fuel continuity (Peters and Bunting 1994), and increases the likelihood of fire ignition and spread (Balch et al. 2013, Bunting et al. 1987, Link et al. 2006). See Predicted Fire Behavior Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications.

In contrast to early spring prescribed grazing, however, prescribed grazing done during the native perennial growing season may not be as effective. Instead of removing fine-textured invasive annual grasses, herbivores would select green biomass (native species) and, in turn, increase the proportion of dead to live biomass (Leonard et al. 2010). The impacts of the treatments on cheatgrass and other invasive annual grasses would be minimized because of the higher palatability and nutritional value of the native species. This effect would be most pronounced in states dominated by perennial grasses. While still having an impact on fire and fuel characteristics, especially over the long term, direct impacts in this Great Group include a decrease in native perennial plants as well as invasive annual grasses, though not as great, leading to a change in the flame length, rate of spread, and fire intensity reductions. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would impact livestock behavior and concentration, thus impacting their modifications to fuel characteristics.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect fire and fuels within this Great Group include fire suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Cumulatively with these impacts, native perennial growing season prescribed grazing activities would not have as large of an impact on invasive annual grasses and would have reduced impacts in reducing increase wildfire risk exacerbated by fine fuel loads.

Prescribed Grazing: Greater Sage-Grouse

Under Action Alternative B, prescribed grazing during the perennial growing season is expected to have minimal impacts to Greater Sage-Grouse. As discussed for Action Alternative A, seasonal timing restrictions and protective required design features would prevent direct impacts from prescribed grazing from occurring in occupied Greater Sage-Grouse habitat. Eligible sites for prescribed grazing could include any composition of plants that would benefit from a reduction in fine fuels to enhance ecological integrity. Direct impacts to Greater Sage-Grouse from prescribed grazing would be minimal and would not result in population-level impacts due to the adherence to required design features.

Indirect impacts to Greater Sage-Grouse may occur due to vegetation phenology under this alternative. When native perennials are growing, invasive annual grasses have dried and contain little nutrition, so livestock would preferentially graze green, growing perennial vegetation, some of which are more tolerant to grazing than others. Required design features would be implemented in order to ensure that undesirable impacts to desirable vegetation does not occur, and these are discussed in further detail in Appendix D. Through the implementation of these required design features, no undesirable consequences to Greater Sage-Grouse habitat is expected to occur as a result of prescribed grazing. Prescribed grazing within Greater Sage-Grouse habitat can be expected to result in a reduction of invasive annual grasses, which would help to conserve suitable habitat with desirable vegetation communities while also reducing potential impacts from wildfire.

Cumulative impacts to Greater Sage-Grouse and Bi-State sage grouse are

Bi-State Sage-Grouse

The Bi-State Sage-Grouse is expected to experience the same direct and indirect impacts as Greater Sage-Grouse under this alternative.

Cumulative Effects

Cumulative impacts to Greater Sage-Grouse and Bi-State Sage-Grouse are discussed within Action Alternative A and are not expected to differ under Action Alternative B.

Prescribed Grazing: Lands with Wilderness Characteristics

Direct, indirect, and cumulative impacts to LWCs under Action Alternative B for prescribed grazing are expected to be similar to those discussed under Action Alternative A for prescribed grazing. Apparent naturalness, primitive and unconfined recreation, and solitude are not expected to be impacted differently according to which season prescribed grazing is conducted during. Long-term indirect benefits to these wilderness characteristics are expected to occur as prescribed grazing removes fine fuel from mixed vegetation communities, thus reducing potential impacts from wildland fire, which can be exacerbated by the presence of fine, continuous fuels. Adjacent habitat would also benefit as fire size, frequency, and intensity is mediated by the lack of fine fuels, further maintaining the wilderness characteristics of apparent naturalness and solitude across a wider landscape than just the project area. Action Alternative A

Cumulative Effects

Cumulative impacts to LWCs are the same as those described under Action Alternative A.

Prescribed Grazing: Livestock and Range

Great Group A contains 499,989 acres of land within permitted grazing allotments. The complete list of allotments that bisect Great Group A can be found in Appendix L. As described in the Required Design Features, permittee participation in prescribed grazing treatments is voluntary and the objectives of the treatment may temporarily interfere with features of the regular grazing permit (i.e. location, timing, duration, livestock kind, etc.) until the project is completed or suspended. Short-term non-use of AUMs of the regular grazing permit will vary on a project-by-project basis and may extend until desired treatment affects are seen or be required prior to project implementation. But the options to use livestock in this season to manage vegetation can provide overall benefits to the existing allotment.

Due to the goals of grazing treatments under this EA being vegetative, with any livestock production goals coming secondarily, the methods of managing livestock to accomplish prescribed grazing would differ greatly from livestock management under regular grazing permits. The workload for livestock management would increase to ensure project objectives are met. Increased workload would include monitoring, frequent herding and movement of water and other resources. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to complete project objectives. These livestock management tools may also be needed to protect sensitive plant areas or areas that develop saturated soils with snowmelt during the early part of this season. All costs associated with livestock management are expected to increase during prescribed grazing treatments and will be incurred by the operators. This includes costs associated with water movement, supplements, additional herding and any other livestock management tools. Direct impacts to livestock would include stress from concentration and frequent herding received throughout the treatment but operators would use low stress livestock handling techniques to prevent adverse effects.

Areas chosen for prescribed grazing treatments could be in any ecological state in the state and transition models, except reference condition, but must have a sizeable component of invasive annual grasses, most likely cheatgrass. Due to the seasonality of this alternative, nutritional quality of the invasive annual grasses present would be poor and livestock would preferentially graze growing perennial native and/or seeded grasses during this time. Prior to seed drop, cheatgrass can be unpalatable to livestock due to the long awn of the seed (0.5 inches) (Marrow and Stahlman 1983). These long awns can also cause injuries to the mouth and eyes of livestock. Prescribed grazing treatments in this alternative allow operators to maintain and improve allotments that have significant buildup of invasive annual grasses and/or other vegetation. Severity of impacts to perennial grasses will vary based on stocking rate and timing of treatment (i.e. before or during boot stage of growth for grasses). To minimize impacts on desirable perennial vegetation during the growing season, elements of allotment rest and rotation will be tailored for each site-specific project, as outlined in the RDFs. Vegetation production would be evaluated prior to project implementation to determine amount of livestock required to achieve treatment objectives and other project design features that address site-specific conditions.

Great Group A contains 547 acres of land outside of grazing allotments. These areas can be viewed on BLM Grazing Allotments Mapset in Appendix A. There would be no direct impacts to the existing allotments that surround these areas but the producers may benefit from the addition of land available for vegetation treatments by livestock. All considerations for livestock health and treatment success in these project areas would be similar to those stated above.

Once treatment objectives are met, livestock grazing would cease on the treatment areas until regrowth of cheatgrass or other invasive annual grasses necessitates re-treatment. Repeat treatments within the year may be needed depending upon regrowth of cheatgrass from precipitation events that initiate growth later in the year.

The seasonality of this alternative does not change the indirect effects of prescribed grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of prescribed grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Noxious Weeds

Noxious weeds may be identified in areas chosen for prescribed grazing treatments. Livestock used for treatments located in previously identified noxious weed areas may be subject to an isolation period depending on what weed species are present. Many noxious weed species are advantageous growers and may develop seeds during the early part of the growing season of this alternative. Transport of those seeds offsite from livestock could occur by attaching to livestock hair and skin or can be passed through the digestive system (Davidson et al. 2006). Transport of seeds from previous years could also occur. Noxious weeds from surrounding infestations and/or the site's seedbank could invade treatment areas due to the lack of competition from invasive annual grasses or increased bare ground in specific areas due to livestock concentrations. Temporary range improvements (i.e. fencing, water troughs, etc.) could also serve as vectors of noxious weeds due to increased potential for bare ground and increased impacts to vegetation immediately surrounding those locations. As discussed in the RDFs, inventory and monitoring of noxious weeds will take place before, during and after treatment to prevent colonization and control further spread. Sites found to have noxious weeds would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

The seasonality of this alternative does not change the indirect effects of prescribed grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of prescribed grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Recreation and Travel Management

The direct and indirect effects of prescribed grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Cumulative Effects

The cumulative effects of prescribed grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season. \

Prescribed Grazing: Riparian and Wetlands

During growing season, late spring to early summer, livestock will be less likely to disperse to upland sites, as in early spring. Instead, livestock may linger in riparian areas as temperatures increase and upland water resources diminish. Furthermore, cooler temperatures and available water in riparian areas will allow vegetation to stay green and palatable longer, increasing likelihood of negative impacts to these areas. Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses present would be poor and livestock would preferentially graze growing perennial native and/or seeded grasses during this time (i.e. Black greasewood, Indian ricegrass, and basin wildrye). However, sheep and goats will typically consume spring willow growth even though other adequate herbaceous forage is available.

Direct effects to riparian areas from prescribed grazing for all Great Groups in this alternative include vegetation loss, soil compaction, reduced runoff retention, biological crust loss, direct soil disturbance, streambank and soil alteration potential due to bank shearing or hummocking, and runoff concentrated into animal trails, with consequent enhanced erosion. Cattle, in comparison to goats, would cause increased soil compaction. Grazing animals create waste that can introduce nutrients and pathogens to streams directly or in runoff. Excessive nutrient loading can lead to algal growth, depleted dissolved oxygen needed to support aquatic fauna, reduced water clarity and consequent increased water temperature, and other effects that reduce riparian function. However, since non-use of some or all the permitted grazing may need to be taken in order for a prescribed grazing to occur, impacts would not be more than what currently occurs with existing allotments. At the project level, thresholds and available responses will be established in the monitoring agreement and decision. See Table 36 Thresholds and Responses Monitoring in Appendix E.

There may be riparian areas included in the analysis area that are not currently within BLM allotments and may be subject to prescribed grazing treatments under this EA. Land considered for prescribed grazing treatments would need to have disturbance by invasive annual grasses. The direct impacts to the invasive annual grasses, riparian function, and water quality on these project sites would be the same as those considered under existing allotments although the level of impact may be higher since a new disturbance would be added to these areas. Despite this, only areas that would benefit from prescribed grazing would be considered for treatment Monitoring and subsequent application of thresholds and responses will ensure that resource damage does not occur.

Required design features for these prescribed livestock grazing treatments would limit livestock access in areas vulnerable to water quality degradation. Temporary range improvements, such as fencing and supplements/attractants can be used to divert grazing from vulnerable areas and reduce impacts to streams. Thus, range improvements and adaptive grazing management would allow managers to apply measures appropriate to specific conditions, reducing the potential for water quality and riparian function degradation.

Prescribed grazing projects could reduce the prevalence of invasive species and would improve ecological conditions throughout a large portion of the analysis area. Such projects would reestablish an understory of forbs and perennial bunchgrasses that are less susceptible to fire than invasive annuals, such as cheatgrass. This would reduce the risk of catastrophic wildfire on rangelands, which might otherwise spread into riparian and wetland areas.

Over the long term, implementation of this action alternative is expected to reduce water quality impacts and increase riparian function as a result of reduced wildfire impacts and improvement in ecological conditions.

Cumulative Effects

Cumulatively, with past, present, and foreseeable grazing, seeding, or other soil-disturbing actions, prescribed grazing treatments would be similar to cumulative impacts that exist with current authorized grazing actions.

Prescribed Grazing: Socioeconomics

Direct and indirect impacts from proposed management activities related to prescribed grazing are similar to targeted grazing. These impacts would be site-specific and limited, contributing minimally to the overall regional economy, but directly affecting the operator and potentially the local communities. The methods of managing livestock to accomplish prescribed grazing objectives would differ greatly from livestock management under regular grazing permits. Using prescribed grazing under this assessment for reducing fuel loads from invasive annual grass species is a voluntary action for operators, and would provide flexibility and stability for management, as well as options for addressing increased wildfire risk and diminished ecological integrity. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives, but would not offset the increased costs and workload needed to meet those objectives.

The workload and costs for livestock management would increase for the operator to ensure the project meets objectives, similar to the implementation of targeted grazing. Prescribed grazing would also affect fire severity and size, though not at the same levels or timeframe as targeted grazing (see Fire and Fuels analysis). However, impacts to communities would similar as discussed under targeted grazing.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Prescribed Grazing: Soils

As with targeted grazing in native perennial growing season, prescribed grazing would reduce vegetation cover and, due to hoof action, disturb the soil surface horizon and any existing biological soil crusts. Effects, while dependent on grazing intensity and duration, would be similar to those of permitted grazing. Short-term, direct effects to soils within the treatment area of this Great Group include an increase in soil temperature, dryness, compaction, and erosion potential. Increases in soil temperature, dryness, and erosion potential are more likely as seasonal temperatures increase. Since prescribed grazing would be performed at a lower intensity than targeted grazing, these effects would be similar in nature, but less pronounced. Furthermore, in comparison to targeted grazing, which occurs in an annual state, prescribed grazing would occur in states that would typically have a higher degree of resilience and stability. annual state. Cattle could cause increased soil compaction (Tate et al. 2004), particularly in flat areas, where they prefer to graze (Walker et al. 2006). Sheep and goats, instead, often graze on steep slopes (Walker et al. 2006). Although several factors contribute to a location's susceptibility to erosional forces, steep slopes are generally at increased risk to water erosion in comparison to low-gradient areas (BLM 2011). Saturated soils that carry over from a particularly wet spring are susceptible to “pugging” where animal hooves breakthrough the unstable soil surface and cause localized compaction. These localized compactions can have negative impacts on soil structure and plant productivity (Menneer et al. 2005).

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect soil resources within this Great Group include wildfire and associated suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Impacts from past, present, and reasonably foreseeable actions and conditions include the disturbance of biological soil crusts and increased soil erosion.

Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing may lead to further soil compaction, soil erosion, and disturbance of biological soil crusts if placed out of existing disturbed areas.

The Soil Erodibility Mapset in Appendix A shows areas with high wind and water erosion susceptibility.

Prescribed Grazing: Vegetation Including Threatened, Endangered, and Sensitive Species

Areas chosen for prescribed grazing treatments could be in any state that would benefit from native perennial growing season grazing to enhance ecologic integrity and reduce fine fuels on the site by directly impacting vegetation. Accumulation and continuity of litter can increase fire mortality to native vegetation and decrease resistance to cheatgrass invasion (Davies et al. 2009, Whisenant 1990). Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses present would be poor and livestock would preferentially graze growing perennial native and/or seeded grasses during this time. Impacts to perennial grasses could be low to moderate if the treatment is completed prior to the boot stage of growth to allow regrowth while soil moisture is still available (Burkhardt and Sanders 2012). If grazing occurs during the boot phase, impacts to native and/or seeded grasses could be moderate to high due to little opportunity for regrowth prior to the end of the growing season. Some grasses on these sites are tolerant to grazing (i.e. Indian ricegrass and thickspike wheatgrass) while other grasses that have growing points above ground (i.e. basin wildrye) are especially sensitive to grazing and may require additional consideration during project planning. All grazing tolerance classifications for this EA were taken from Restoring Western Range and Wildlands, a general technical report from the USFS (Monsen et al. 2004).

Big sagebrush and/or black greasewood may be significant components of these sites depending on the vegetative state but impacts to unpalatable shrubs via trampling or inadvertent browsing damage would be low to moderate depending on the stocking rate and livestock species used. To minimize impacts on desirable vegetation, elements of rest, herding, fencing and supplements/attractants will be tailored for each site-specific project, as outlined in the RDFs.

Sensitive species would be managed according to BLM Manual Section 6840 (Special Status Species Management), which directs the agency to implement measures to conserve these species and their habitats to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA. If T&E species are determined to be present, treatment would not be authorized until site-specific consultation with USFWS is completed. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would cause some disturbance, decrease vegetative cover and may serve as vectors for noxious weeds. These sites would be monitored and treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

The seasonality of this alternative does not change the indirect effects of prescribed grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of prescribed grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Wild Horse and Burro

Areas chosen for prescribed grazing treatments could be in any state that would benefit from native perennial growing season grazing to enhance ecologic integrity and reduce fine fuels on the site by directly impacting vegetation. Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses present would be poor, and livestock would preferentially graze growing perennial native and/or seeded grasses during this time. This would result in more competition between livestock and wild horses and burros for higher quality feed. To minimize impacts on desirable vegetation, grazing of livestock would use elements of rest, herding, fencing and supplements/attractants tailored for each site-specific project, as outlined in the RDFs. This would reduce the effects of prescribed grazing on wild horses and burros under Alternative B because it would spread out impacts on higher quality perennial native and/or seeded grasses used by livestock and leave more available to wild horses and burros. The indirect and cumulative effects of prescribed grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Cumulative Effects

The cumulative effects of prescribed grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Wildlife Including Threatened, Endangered and Sensitive Species

Under Action Alternative B, prescribed grazing would take place during the perennial growing season. Wildlife within the project area depend upon this perennial vegetation and other desirable plant communities to fulfill life cycle requirements such as cover, security, and food. Areas eligible for prescribed grazing would be ecologically degraded by the presence of invasive annual grasses, which would typically be dried out when perennials are growing. Due to the decreased nutritional value, grazing livestock may opt to eat more nutritious, palatable perennial vegetation. Required design features would ensure that no unintended consequences are incurred as a result of the proposed action, and as a result, no habitat would be degraded by prescribed grazing, as the objective and design of this grazing treatment is to increase ecological value of the habitat. Some direct impacts from grazing may occur to individual wildlife as a result of grazing livestock and associated infrastructure, but impacts at the population level would not occur. Additional required design features would be implemented to minimize potential impacts to wildlife where they may occur.

<u>Big Game</u>

Impacts to big game are expected to be similar to those discussed under Action Alternative A. Risk of disease transmission would be minimized due to grazing restrictions of domestic sheep in occupied, identified, bighorn sheep habitat.

When perennial vegetation begins growing, it has high nutritional value for big game ungulates. Due to the wider variety of palatable forage as compared to early spring options, ungulates are able to disperse across the landscape to capitalize upon their relative preferred forage types. Due to an increase in food resources, competition with grazing livestock would be minimal. As big game ungulates follow the green-up of nutritious, growing vegetation, they will traverse vast swaths of the project area and adjacent landscape, often while pregnant or accompanied by young. Associated infrastructure such as fences may pose an obstacle to migrating wildlife, thus the importance required design features intended to minimize those impacts such as lay down fences where possible and wildlife access to water developments. These features will be increasingly important in project areas located within identified migration corridors utilized by a variety of big game. In all, big game can be expected to benefit from prescribed grazing as it would help to reduce the extent of invasive annual grasses as well as reduce the potential impacts of wildfire. Big game ungulates benefit from the conservation and maintenance of intact, suitable habitat comprised of desirable plant communities. Other big game such as mountain lions benefit concurrently with ungulates, which supply their primary food source.

Migratory Birds

Impacts to migratory birds due to prescribed grazing are discussed in detail under Action Alternative A and are expected to be similar under Action Alternative B. As discussed under Action Alternative A for prescribed grazing, a higher diversity of migratory birds would be expected to be supported within a mixed community of vegetation, thus increasing the number of potential impacts to individuals. Under this alternative, fewer migratory birds would be nesting, which would decrease the potential for any direct impacts to nesting individuals. However, required design features regarding livestock grazing and vegetation would be implemented to ensure that improper grazing nor unintended consequences occur. Long-term, migratory birds are expected to benefit from prescribed grazing as it would help to conserve and maintain intact habitat with desirable plant communities that provides important life cycle requirements to both migratory birds and the food resources upon which they rely.

Fisheries

Impacts to fisheries are expected to be similar to those described under Action Alternative A for prescribed grazing. Under Action Alternative B, livestock would likely respond to dwindling water sources by congregating closer to established water developments and accessible riparian areas. This pattern could increase potential impacts to riparian areas through additional sedimentation, erosion, and nutrient loading due to increased livestock presence. However, established required design features would serve to minimize or avoid unintended consequences within riparian areas. Fisheries would benefit indirectly from prescribed grazing under this alternative as potential negative impacts from wildfire are reduced along with invasive annual grasses.

General Wildlife

Under this alternative, impacts to general wildlife may be less than those described under Action Alternative A. Typically, as perennial vegetation is growing, most animals have reproduced and are either independent or rearing young. Given this increased mobility, direct impacts to wildlife is expected to be decreased, primarily that of trampling or injury to nests or individuals. Eligible sites for prescribed grazing are ecologically degraded due to the presence of invasive annual grasses, but they still support a higher diversity of wildlife than annual states. Because of this, required design features intended to ensure proper grazing techniques would be implemented within prescribed grazing areas, with monitoring procedures to avoid unintended consequences. Wildlife most susceptible to direct impacts from grazing include small mammals, reptiles, birds, and insects. Long-term benefits to general wildlife species would occur as desirable plant communities and suitable habitat is conserved and maintained through the removal of invasive annual grasses. Areas adjacent to the project area would also benefit as potential impacts from wildfire are reduced as well as the associated invasive annual grasses which perpetuate increased fire size, intensity, and frequency. As described under Action Alternative A, pollinators and insects would benefits from the conservation of suitable habitat and associated food sources. Carnivores would also benefit as prey species and their habitats are conserved and protected across the wider landscape in addition to the project area.

Special Status Species

Federally Listed Species

Federally threatened or endangered species would be protected by the required design feature that ensures no effect to listed species unless Section 7 consultation occurs and proposed activities are modified or abandoned appropriately. Under Action Alternative B, livestock presence in riparian areas may increase as other water sources diminish, which creates an increased potential for impacts associated with said livestock. Impacts to habitats associated with Nevada’s federally listed species are discussed in detail under Action Alternative A and are not expected to differ under Action Alternative B due to the required design features. Indirect impacts would remain the same and are expected to be beneficial as potential impacts from wildfire are reduced along with invasive annual grass, conserving and protecting intact habitat for a variety of wildlife including federally listed species.

Lahontan Cutthroat Trout

Similar to impacts upon fisheries, the Lahontan cutthroat trout is not expected to be greatly impacted by prescribed grazing. The required design features would ensure that Section 7 consultation would occur if impacts to federally listed species might occur due to the proposed action. The outcome of this consultation could result in impacts to the Lahontan cutthroat trout, but those impacts would occur after consultation. A unique feature of this alternative is that Lahontan cutthroat trout could be spawning, which increases the potential for impacts to the population as both spawning adults and eggs could be present within certain waterbodies. At these life stages, the Lahontan cutthroat trout is more vulnerable to potential impacts such as increased sedimentation and nutrient loading resulting in low levels of dissolved oxygen, which could affect the individual health of fish as well as the developmental processes of eggs (Hoffman and Scoppettone 1988). Prescribed grazing is expected to have positive, indirect impacts to Lahontan cutthroat trout by reducing fine fuels composed of invasive annual grasses, which in turn reduced the potential impacts of wildfire across the landscape. Lahontan cutthroat trout and other fishes benefit from this result as it helps to maintain thermal conditions and water quality within occupied reaches of streams. Cumulatively, positive effects upon Lahontan cutthroat trout can be expected as occupied reaches are protected from fire and possible future range is similarly protected from degradation.

Sensitive Species

Impacts to Sensitive Species are expected to be minimal because eligible areas for prescribed grazing would already be ecologically degraded by the presence of invasive annual grasses. In order to prevent further degradation of the proposed project area, prescribed grazing would occur to help remove invasive annual grasses while also assisting the reduction of potential impacts from wildfire. Sensitive Species are expected to indirectly benefit from the conservation and maintenance of the suitable habitat types to which they are adapted.

Cumulative Effects

Cumulative impacts to wildlife are discussed in detail under Action Alternative A and are not expected to differ under Action Alternative B.

3.3.2.3 Action Alternative C: Native Perennial Dormant Season Grazing

3.3.2.3.1 Great Group A

Targeted Grazing: Environmental Justice

When designing a geographically specific targeted grazing treatment, the BLM must determine if any potentially affected minority populations and low-income populations are present and disclose any disproportionate adverse impacts. The BLM will follow guidelines outlined in Executive Order 12898, on a project-by-project basis. It is possible that disproportionate effects to one or more environmental justice populations could occur. These impacts could potentially be either adverse or beneficial, depending on the specific project setting and the specific actions being implemented. Implemented grazing treatments for fuels reduction would provide additional stability and jobs to many individuals that fall within these populations. If grazing authorizations were impacted, that would have direct impacts on EJ populations. Impacts to EJ populations would be similar to impacts described in the socioeconomics section.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Targeted Grazing: Fire and Fuels

Targeted grazing treatments can be used as tools to reduce fine fuel loads, and thereby fire behavior, particularly in areas already dominated by annual grasses. However, several physical and environmental conditions dictate the level to which grazing affects fire behavior, including ambient temperature, wind speed, humidity, fuel composition, fuel continuity, spatial distribution, and topography (Strand and Launchbaugh 2013). Grazing season and intensity are also very important factors.

Fire rarely occurs in this Great Group, generally in years with above average production. Due to their sparse understories and bare soil in intershrub spaces, black greasewood-saltbush communities historically were somewhat resistant to fire (Paysen et al. 2000, Young 1983). The presence of invasive weeds, however, promotes fire where historically it had been infrequent. The invasion of cheatgrass, which is fine-textured, flammable, and early maturing, shortens fire return intervals (Balch et al. 2013, Brooks et al. 2004, Stewart and Hull 1949), increases fuel continuity (Peters and Bunting 1994), and increases the likelihood of fire ignition and spread (Balch et al. 2013, Bunting et al. 1987, Link et al. 2006). See Predicted Fire Behavior Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications.

Targeted grazing would remove any fall growth of cheatgrass, reduce cheatgrass litter subsequent regrowth, and seed input (Launchbaugh et al. 2008), therefore decreasing fire hazards. As such, direct impacts in this Great Group include the reduction of fuel bed depth, fine fuel loading, and fine fuel continuity. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would impact livestock behavior and concentration, thus impacting their modifications to the fuel characteristics listed above. Indirect impacts include decreased germination of invasive annual species due to a reduced residual litter layer; and reduced flame length, rate of spread, and fire intensity.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect fire and fuels within this Great Group include fire suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Cumulatively with these impacts, native perennial dormant season targeted grazing activities would reduce the prevalence of invasive annual grasses and modify fire behavior such that fire suppression efforts are more effective. Targeted grazing treatments would be implemented to tie into other fuel breaks or disturbance to increase the effectiveness of these treatments on a larger scale to modify fire behavior.

Targeted Grazing: Greater Sage-Grouse

Greater Sage-Grouse are present within the shrub-steppe throughout fall and winter, when perennial vegetation is dormant. Some overlap between occupied Greater Sage-Grouse habitat and grazing livestock may occur during fall and early winter. Minimal direct impacts would be expected from targeted grazing on Greater Sage-Grouse. Moreover, sage grouse are unlikely to be present within areas eligible for targeted grazing because of the annual state. Grazing livestock may reduce some sagebrush or other shrubs within the project area during this timeframe, but this is likely to be intermittent and have no lasting impact upon Greater Sage-Grouse.

As winter approaches, Greater Sage-Grouse may move to more suitable winter habitat. Relatively small migrations have been documented for sage grouse, likely to avoid deep snow in higher elevations (Fedy et al. 2012). Important components of winter habitat for sage grouse include adequate cover, typically provided by sagebrush species as well as forage. During winter, sagebrush leaves make up almost the entirety of a sage grouse's diet (Wallestad and Eng 1975). It's also important that sage grouse are left relatively undisturbed during winter because energy stores are at a premium and repeated disturbances can be detrimental to the individual bird. Potential negative impacts to sage grouse could occur if wintering areas were consistently disturbed by human or livestock activity. Additional threats to sage-grouse during late fall and winter include weather events and heavy snowfall that leave sage grouse vulnerable to predation and starvation (Moynahan et al. 2006). Altogether, intact habitat dominated by sagebrush provide Greater Sage-Grouse with adequate resources to overwinter successfully.

Under this alternative, targeted grazing would still take place in areas dominated by invasive annual grasses, which do not provide food or cover for sage grouse. It is unlikely that any direct impacts to sage grouse would occur due to livestock grazing. As fuel breaks are created, potential habitat loss and fragmentation due to wildfire and invasive annual grass would decrease, which will benefit sage grouse long-term. Required design features including seasonal restrictions will be implemented so that no effect is incurred to sage grouse within identified, occupied habitat including lekking, nesting, or brood-rearing areas.

Cumulative Effects

Cumulative impacts to Greater Sage-Grouse and Bi-State sage grouse are described within Action Alternatives A and B.

Targeted Grazing: Lands with Wilderness Characteristics

Any direct or indirect impacts to LWCs are expected to be similar to those discussed within Action Alternatives A and B as the construction of the fuel break via targeted grazing would occur in areas which are ecologically degraded by the presence of invasive annual grasses. By removing these grasses and creating fuel breaks, LWCs would benefit from subsequent reductions in wildfire size, intensity, and frequency, which perpetuates the spread of invasive annual grasses. In doing so, apparent naturalness would be improved and conserved as desirable plant communities, which are mostly native, are protected. Also, solitude will be improved long-term as less mitigation is required on the landscape to control invasive annual grasses or to manage wildfires.

Cumulative Effects

Cumulative impacts to LWCs are discussed within Action Alternatives A and B and would not be expected to differ under this Action Alternative C.

Targeted Grazing: Livestock and Range

Great Group A contains 499,989 acres of land within permitted grazing allotments. The complete list of allotments that bisect Great Group A can be found in Appendix L. As described in the Required Design Features, permittee participation in targeted grazing treatments is voluntary and the objectives of the treatment may temporarily interfere with features of the regular grazing permit (i.e. location, timing, duration, livestock kind, etc.) until the project is completed or suspended. Short-term non-use of AUMs of the regular grazing permit will vary on a project-by-project basis and may extend until desired treatment affects are seen or be required prior to project implementation. but this Action Alternative allows operators the flexibility to manage vegetation on allotments outside of their normal permitted grazing period by reducing litter during the dormant season. Litter can act as a seedbed for cheatgrass and the reduction of litter via grazing during the dormant season has been shown to decrease cheatgrass germination with repeated treatments over several years (Perryman et al. 2020).

Grazing in this Alternative would provide added diversity to the livestock production industry which should benefit producers over time. Although due to the goals of grazing treatments under this EA being vegetative, with any livestock production goals coming secondarily, the methods of managing livestock to accomplish targeted grazing would differ greatly from livestock management under regular grazing permits. The workload for livestock management would increase to ensure project objectives are met. Increased workload would include monitoring, frequent herding and movement of water and other resources. Operators would need to monitor utilization and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to complete project objectives. These livestock management tools may also be needed to protect sensitive plant areas or any other areas that require protection. Grazing during the dormant season provides additional challenges due to winter conditions with freezing temperatures and snow. Special consideration would need to be taken to ensure livestock health and safety concerning forage and drinkable water availability. All costs associated with livestock management are expected to increase during targeted grazing treatments and will be incurred by the operators. This includes costs associated with water movement, supplements, additional herding and any other livestock management tools. Direct impacts to livestock would include initial stress from concentration and frequent herding received throughout the treatment but operators would use low stress livestock handling techniques to prevent adverse effects.

Areas chosen for targeted grazing treatments would be in an Annual State or Seeded State likely dominated by invasive annual grasses, most likely cheatgrass. Cheatgrass may produce new growth with fall precipitation but this varies among years and supplements would likely still be needed to ensure livestock health and achievement of project objectives. If shrubs are present on site, attractants may be needed to prevent livestock from consuming harmful quantities when other forage sources are unpalatable and/or covered in snow. Vegetation production would be evaluated prior to project implementation to determine amount of livestock required to achieve treatment objectives and other project design features that address site-specific conditions. In addition, reevaluation of production would occur to account for annual variations needed to maintain the fuel break. Certain ecological sites within this Great Group may contain halogeton within an Annual State. This plant can be toxic to livestock, especially sheep, if eaten in large quantities. Inventory and monitoring of this plant on treatment areas will take place to ensure livestock health.

Great Group A contains 547 acres of land outside of grazing allotments. These areas can be viewed on BLM Grazing Allotments Mapset in Appendix A. There would be no direct impacts to the existing allotments that surround these areas but the producers may benefit from the addition of land available for vegetation treatments by livestock. All considerations for temporary livestock improvements, increased workload, associated costs, and livestock health in these project areas would be similar to those stated above.

Once treatment objectives are met, livestock grazing would cease on the treatment areas until regrowth of cheatgrass or other invasive annual grasses necessitates re-treatment and/or maintenance of fuel breaks. Repeat treatments within the year may be needed depending upon regrowth of cheatgrass from precipitation events that initiate growth later in the year.

The seasonality of this alternative does not change the indirect effects of targeted grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of targeted grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Targeted Grazing: Noxious Weeds

Noxious weeds may be identified in areas chosen for targeted grazing treatments. Livestock used for treatments located in previously identified noxious weed areas may be subject to an isolation period depending on what weed species are present. Many noxious weed species will have produced seeds and may still be attached to standing vegetation. Transport of those seeds offsite from livestock could occur by attaching to livestock hair and skin or can be passed through the digestive system (Davidson et al. 2006). Transport of seeds from previous years could also occur. Noxious weeds from surrounding infestations and/or the site’s seedbank could invade treatment areas due to the lack of competition from invasive annual grasses or increased bare ground in specific areas due to livestock concentrations. Temporary range improvements (i.e. fencing, water troughs, etc.) could also serve as vectors of noxious weeds due to increased potential for bare ground and increased impacts to vegetation immediately surrounding those locations. As discussed in the RDFs, inventory and monitoring of noxious weeds will take place before, during and after treatment to prevent colonization and control further spread. Sites found to have noxious weeds would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

The seasonality of this alternative does not change the indirect effects of targeted grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of targeted grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Targeted Grazing: Recreation and Travel Management

The direct and indirect effects of targeted grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Cumulative Effects

The cumulative effects of targeted grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Targeted Grazing: Riparian and Wetlands

Targeted grazing will not be permitted within riparian areas and therefore would not directly impact riparian areas. Targeted grazing treatments near or adjacent to riparian areas within pastures must have effective separation. RDFs require monitoring of effectiveness of the separation, and modify or suspend treatment if not effective. Fuel breaks created by adjacent targeted grazing treatments would indirectly have beneficial impacts by preventing catastrophic fires that could spread to and damage adjacent riparian and wetland areas.

Targeted Grazing: Socioeconomics

Direct and indirect impacts from proposed management activities related to targeted grazing would be site-specific and limited, contributing minimally to the overall regional economy, but directly affecting the operator and potentially the local communities. Grazing treatments implemented in this alternative would provide added diversity to the livestock production industry, which should benefit producers over time. The methods of managing livestock to accomplish targeted grazing objectives would differ greatly from livestock management under regular grazing permits. All costs associated with livestock management are expected to increase during targeted grazing treatments and will be incurred by the operators. Using targeted grazing under this assessment for reducing fuel loads from invasive annual grass species is a voluntary action for operators, and would provide flexibility and stability for management, as well as options for addressing increased wildfire risk and diminished ecological integrity. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives, but would not offset the increased costs and workload needed to meet those objectives.

The workload and costs for livestock management would increase for the operator to ensure the project meets objectives. Increased workload and costs would include monitoring, frequent herding or transport of livestock to other areas, labor, equipment, trucking and fuel costs, water and supplement hauling, and fencing. Operators would need to monitor utilization, plant phenology, soil saturation and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Hauling of livestock may increase between sites or treatments and dependent on monitoring. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed. Grazing during the dormant season provides additional challenges due to winter conditions with freezing temperatures and snow. Special consideration would need to be taken to ensure livestock health and safety concerning forage and drinkable water availability. This increased workload would also affect area roads with potential increases in localized traffic and maintenance and services used to support potentially increased labor needs. Targeted grazing treatments in this alternative allow operators the flexibility to manage vegetation on allotments outside of their normal permitted grazing period by reducing litter during the dormant season, which has been shown to decrease germination of cheatgrass over time (Schmelzer et al. 2014). This indirectly impacts fire severity and size (see fire and fuels analysis), which would directly and indirectly impact local communities.

While fires may temporarily increase the economic influx to a community from support services for fighting wildfires, this does not offset the long-term impacts to both social and economic services in an area post fire. Impacts post-fire include increased costs for rehabilitation, temporary loss of access, reduction and shift in recreation and tourism, impacts to wildlife and activities that are dependent on wildlife (i.e. fishing and hunting), loss of forage for livestock, wildlife or wild horses, or temporary loss of authorized permits for livestock operators. Wildfires can also increase the likelihood for the spread of invasive or noxious weeds. A study analyzing the cost of fire management of native ecosystems (expected to burn every 60 to 110 years) versus cheatgrass ecosystem (expected to burn every 3 to 5 years) concluded that cheatgrass fires cost an average of 24 times the amount as native vegetation fueled fires (Suhr-Pierce 2020).

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Targeted Grazing: Soils

Native perennial dormant season targeted grazing would reduce vegetation cover and, due to hoof action, disturb the soil surface horizon. Short-term, direct effects to soils within treatment areas include an increase in soil temperature, dryness, compaction, and erosion potential. Areas where targeted grazing is implemented would be susceptible to these effects for as long as the treatment is continued and would likely already have experienced soil erosion due to invasions by invasive annual grasses. Increases in soil temperature, dryness, and erosion potential are more likely as seasonal temperatures increase early in the dormant season. During winter months, however, the direct effects listed above would be less severe, particularly when temperatures are low enough to freeze the soil surface. In these conditions, soil would be less prone to both compaction and erosion. Cattle could cause increased soil compaction (Tate et al. 2004), particularly in flat areas, where they prefer to graze (Walker et al. 2006). Sheep and goats, instead, often graze on steep slopes (Walker et al. 2006). Although several factors contribute to a location's susceptibility to erosional forces, steep slopes are generally at increased risk to water erosion in comparison to low-gradient areas (BLM 2011).

Current wind and water erodibility data were considered when evaluating impacts to soil resources of each Great Group. Refer to Table 18 for a list of wind erodibility groups associated with each wind erosion susceptibility class (i.e., low, moderate, or high). Refer to Table 19 for a list of K factor ranges associated with each water erosion susceptibility class. Of all lands within Great Group A, 96 percent are moderately susceptible to wind erosion, and 82 percent are highly susceptible to water erosion. While the impacts to soils (listed above) are present during any form of livestock grazing, they would be more pronounced in areas of moderate to high erosion susceptibility.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect soil resources within this Great Group include wildfire and associated suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Impacts from past, present, and reasonably foreseeable actions and conditions include the disturbance of biological soil crusts and increased soil erosion. While targeted grazing also has the potential to cause these impacts in confined areas and over a specified duration, required design features and project monitoring would be in place to limit these impacts. Over the long term, targeted grazing would indirectly help to minimize erosion of unburned soils within the Great Group by reducing fine fuel loads and preventing adverse impacts of extreme fire behavior. As perennial grasses replace annual grasses, erosion potential would decrease, resulting in increased infiltration and moisture retention.

Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing my lead to further soil compaction, soil erosion, and disturbance of biological soil crusts if placed out of existing disturbed areas. However, in a community already dominated by invasive annual grasses, these processes likely have already begun.

The Soil Erodibility Mapset in Appendix A shows areas with high wind and water erosion susceptibility.

Targeted Grazing: Vegetation Including Threatened, Endangered, and Sensitive Species

Areas chosen for targeted grazing treatments would be in an Annual State or Seeded State with significant invasive annual grasses, most likely cheatgrass. Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses will be poor and supplements for livestock would likely be needed. Cheatgrass may germinate and produce new growth with fall precipitation but this varies among years. Targeted grazing treatments in this Action Alternative allow operators the flexibility to manage vegetation on allotments outside of their normal permitted grazing period by reducing litter during the dormant season which has been shown to decrease germination of cheatgrass over time (Perryman et al. 2020, Schmelzer et al. 2014). By design, all vegetation within the project area would be directly affected, including native and/or seeded species still remaining within these vegetative states. If shrubs are present on site, attractants may be need to prevent livestock from overgrazing when other forage sources are unpalatable and/or covered in snow. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would cause some disturbance and decrease vegetative cover. Range improvements could serve as vectors for noxious weeds. These sites would be monitored and treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation. It is unlikely that sensitive plant species would be present in areas considered for targeted grazing due to competition from annual grasses but if they are present, monitoring would occur to prevent damage. Sensitive species would be managed according to BLM Manual Section 6840 (Special Status Species Management), which directs the agency to implement measures to conserve these species and their habitats to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA. It is also unlikely that T&E species would be present in areas chosen for targeted grazing due to the ecological condition of the site but if they are determined to be present during baseline surveys, the treatment would not be authorized until site-specific consultation with USFWS is completed.

The seasonality of this alternative does not change the indirect effects of targeted grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of targeted grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Targeted Grazing: Wild Horse and Burro

Areas chosen for targeted grazing treatments would be in an annual state or seeded state dominated by invasive annual grasses, most likely cheatgrass. Fuel breaks created by targeted grazing would create long, linear strips that could impede wild horse and burro movement in the localized area during a time that authorized grazing is not often taking place. Temporary fencing could cause concern with wild horse and burro movement, but the overall size of these individual projects would not impact movement throughout the larger area as a whole. These treatments would have minimal competition for native forage sources as these treatments are implemented in cheatgrass dominated or annual states and would not impact growing native vegetation in intact ecosystems. Competition for forage in these annual or seeded states would still be minimized as these treatments would be very localized. Indirectly, targeted grazing would impact the spread and intensity of a fire that could move through an area and impact native ecosystems. Reducing the intensity of fires that move through these locations would help protect these sites and decrease the movement of invasive annuals into intact systems. If the overall health of the ecological system improves, wild horses and burros would be expected to feed more on native grasses, with higher nutritional values and longer palatability.

The direct and indirect effects of targeted grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Cumulative Effects

The cumulative effects of targeted grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Targeted Grazing: Wildlife Including Threatened, Endangered and Sensitive Species

Under Action Alternative C, many general impacts discussed within Alternative A hold true as perennial vegetation components are dormant within both alternatives. Seasonality would alter certain impacts and would be discussed. This alternative would take place towards the end of fall and during winter, when grazing activities are feasible and prudent. In some cases, invasive annual grasses would produce new growth due to fall precipitation, but this is variable and is not considered to be an important resource for wildlife. Typically, during fall and winter, most wildlife address resource scarcity by limiting energy expenditures and modifying behaviors to better maximize forage, cover, and security. Many wildlife migrate to winter range, beginning their treks during fall and others may enter a state of dormancy such as hibernation or brumation to wait until resources become more available. Nevada's endemic wildlife is well-adapted to winter conditions, but winter mortality still occurs due to exposure and starvation. Eligible sites for targeted grazing would be ecologically degraded by the presence of invasive annual grass and would not provide adequate nutrition or cover during fall and winter months.

Big Game

All big game ungulates within Nevada are well adapted to deal with winter weather conditions. Bighorn sheep generally does not migrate in winter, but elk, mule deer, and pronghorn have well-known migration patterns to winter ranges at lower elevations. Within winter range, ungulates are found in greater densities than during other seasons, feeding upon available browse and forb species and utilizing vegetation for thermal cover. As eligible areas for targeted grazing are typically dominated by invasive annual grasses, they provide neither adequate forage nor cover and are not considered suitable habitat for wildlife, particularly during fall and winter, once they are dried out. Little competition is expected between grazing livestock and wildlife due to the reduced allure of cheatgrass-dominated sites for wildlife during winter. Disease transmission would be minimized by preventing overlap of grazing domestic sheep in occupied bighorn sheep habitat. In some cases, fall green-up of invasive annual grasses may occur and offer slight benefits to grazers, but this effect is variable and is not considered an important food source for ungulates under this alternative. Large ungulates may be more susceptible to disturbance during fall and winter months. Indirect impacts to ungulates would be positive under this alternative as fuel breaks limit the spread of wildfire perpetuated by invasive annual grasses; important winter range and forage along migration corridors would likewise be conserved as the spread of invasive annual grasses is reduced. Big game populations would benefit as important habitat is protected, with positive impacts to populations. Non-ungulate big game such as mountain lions would also benefit along with large ungulates, as they comprise a major component of their diet. Migrating game and associated migration patterns would not be expected to be impacted by the proposed action.

Migratory Birds

Most migratory birds begin migrations south during fall and into winter. The majority of the project area is unlikely to support large numbers of migratory birds due to cold temperatures and snowfall that dissuades all but the hardiest of birds from overwintering. Some migratory birds may have winter ranges that include the warmer, southernmost portions of Nevada, such as within the Mojave Desert ecoregion, which is not included within the project area for this proposed action. Targeted grazing under this alternative would have little to no impact upon migratory birds during their fall migration as the ecologically degraded site does not offer adequate food resources, water, or structural cover for migratory birds to utilize as a stopover site. Migratory birds would benefit from conserved habitat that they utilize during other seasons to fulfill life cycle requirements such as nesting, brood-rearing, and foraging habitat.

Fisheries

Impacts to fisheries are described in detail under Action Alternative A and are not expected to significantly differ under this alternative. No targeted grazing would take place within riparian areas under any alternative, and required design features would be implemented to avoid unintended consequences to the riparian resource, including fisheries. Typically, fishes would do well within cooler water temperatures and would occupy different microhabitats accordingly. Some other threats fish face during winter include ice, temperature fluctuations, and decreased metabolic activity associated with colder temperatures (Brown et al. 2011). These impacts during fall and winter can increase fishes' susceptibility to disturbances, but as no targeted grazing would take place within riparian areas, any impacts would be indirect and minimal. Indirect impacts to fisheries would be positive as fuel breaks help to reduce potential impacts from fire while disrupting the perpetuating cycle of increasing invasive annual grasses and changing fire regimes.

General Wildlife

Wildlife diversity and activity in Nevada decreases during fall and winter as migratory animals leave for warmer climes, and many smaller animals enter dormant states to conserve energy during the colder months. Many species congregate where resources and cover are available and their movements are generally minimal compared to other seasons. As weather cools and perennial vegetation enters a dormant stage, it is still palatable to many wildlife species and also offers critical thermal cover for animals active during cold winter months. At higher elevations, areas with sufficient snowfall may support an active subnivean zone where small mammals spend the winter insulated from the cold with access to below-snow forage. Reptiles are known to escape the cold by undergoing brumation, a state of dormancy. Insects, amphibians, and other small animals also often enter dormant states or alternate life stages until temperatures increase. Leading up to fall migrations and dormant periods, foraging activity may increase so that animals maximize stored energy during scarce months.

Areas eligible for targeted grazing are low in both nutritional value and cover and does not offer valuable habitat during fall or winter, when perennial plants are dormant. Wildlife in the southern reaches of the project area may be more active during winter and are expected to experience the same impacts as those discussed under Action Alternative A. Pollinators, small mammals, insects, and reptiles are expected to respond similarly to grazing during the perennial dormant season as during early spring. Typically, these wildlife species would be dormant or absent and any impacts from targeted grazing would be minimal and localized. Indirect benefits to general wildlife would be greatest for shrub-steppe species that require intact, suitable habitat, which the creation of fuel breaks through targeted grazing would help to accomplish.

Special Status Species

Federally Listed Species

As discussed in previous alternatives, required design features would be implemented to ensure that no action takes place that would have an effect on a federally listed species without undergoing proper consultation.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout is not expected to have any direct impacts from targeted grazing due to required design features that would be implemented to protect riparian areas and fisheries. Potential impacts to this species due to fall and winter conditions are expected to be the same as those discussed within the fisheries section of this alternative. Indirectly, the Lahontan cutthroat trout would benefit greatly from reduced potential impacts from wildfire, as this has been shown to negatively impact this species.

Sensitive Species

Sensitive Species vary widely within the project area, some of which are migratory and not present when perennial vegetation typically enters dormancy. Eligible sites for targeted grazing are ecologically degraded and do not provide an adequate source of nutrition or cover under this alternative, so any Sensitive Species are unlikely to be present within annual states with invasive annual grasses. As fuel breaks help to minimize potential impacts from wildfire perpetuated by invasive annual grasses, Sensitive Species would benefit as suitable habitat comprised of desirable plant communities is conserved, thus ensuring the maintenance of habitat that supports a higher diversity of species than areas degraded by invasive annual grasses would.

Cumulative Effects

Cumulative impacts to wildlife are discussed within Action Alternative A and are not expected to differ under this action alternative.

Prescribed Grazing: Environmental Justice

When designing a geographically specific prescribed grazing treatment, the BLM must determine if any potentially affected minority populations and low-income populations are present and disclose any disproportionate adverse impacts. The BLM will follow guidelines outlined in Executive Order 12898, on a project-by-project basis. It is possible that disproportionate effects to one or more environmental justice populations could occur. These impacts could potentially be either adverse or beneficial, depending on the specific project setting and the specific actions being implemented. Implemented grazing treatments for fuels reduction would provide additional stability and jobs to many individuals that fall within these populations. If grazing authorizations were impacted, that would have direct impacts on EJ populations. Impacts to EJ populations would be similar to impacts described in the socioeconomics section.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Prescribed Grazing: Fire and Fuels

As with targeted grazing, many factors dictate the level to which prescribed grazing affects fire behavior. These include ambient temperature, wind speed, humidity, fuel composition, fuel continuity, spatial distribution, and topography (Strand and Launchbaugh 2013). Grazing season and intensity are also very important factors. Grazing season and intensity are also very important factors.

Fire is a rare disturbance in this Great Group, likely occurring in years with above average production. Historically, black greasewood-saltbush communities had sparse understories and bare soil in intershrub spaces, making these communities somewhat resistant to fire (Paysen et al. 2000, Young 1983). The presence of invasive weeds, however, promotes fire where historically it had been infrequent. The invasion of cheatgrass, which is fine-textured, flammable, and early maturing, shortens fire return intervals (Balch et al. 2013, Brooks et al. 2004, Stewart and Hull 1949), increases fuel continuity (Peters and Bunting 1994), and increases the likelihood of fire ignition and spread (Balch et al. 2013, Bunting et al. 1987, Link et al. 2006). See Predicted Fire Behavior Mapset in Appendix A for an identification of areas that have greater than 15 percent cheatgrass cover and high fuel model classifications.

Fuel models were considered when evaluating impacts of early spring prescribed grazing on fuel composition and fire behavior within this Great Group. Of all lands within Great Group A, 46 percent are classified as SH5, 14 percent GR1, 10 percent GS1, and the remainder a combination of other fuel types. This indicates that shrubs are a primary carrier of fire in this Great Group. Prescribed grazing has the most potential to effectively reduce fine fuels and fire spread when employed in states with high herbaceous fuels and when fire weather severity is low. In ecological states with relatively high shrub cover, the effects of grazing by cattle on fire behavior and extent would become less pronounced due to the proportionately smaller amount of herbaceous biomass available for consumption. Nonetheless, reduced fire frequency and spread would still be observed due to the removal of fine herbaceous biomass between shrubs, which are most likely to ignite and initiate fire spread (Hobbs 1996, Madany and West 1983, Zimmerman and Neuenschwander 1984). Prescribed grazing after perennial grasses produce seed would reduce the residual biomass carried over to the following spring and summer (Launchbaugh et al. 2008), decreasing fire hazards. Furthermore, grazing after seed production would have minimal impact on the survival of native perennials than when it occurs before floral initiation (Adler et al. 2001). While prescribed grazing would focus on the reduction of invasive annual species, goats and sheep are known to reduce fuel loads in shrublands by consuming woody fuels (Nader et al. 2007, Papanastasis 2009, Popay and Field 1996). Cattle would not be expected to consume shrubs.

Direct impacts in this Great Group include the reduction of fuel bed depth, fine fuel loading, and fine fuel continuity. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would impact livestock behavior and concentration, thus impacting their modifications to the fuel characteristics listed above. Indirect impacts include decreased germination of invasive annual species due to a reduced residual litter layer; increased resources available for perennial vegetation; and reduced flame length, rate of spread, and fire intensity.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect fire and fuels within this Great Group include fire suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Cumulatively with these impacts, perennial dormant season prescribed grazing activities would reduce the prevalence of invasive annual grasses and modify fire behavior such that fire suppression efforts are more effective.

Prescribed Grazing: Greater Sage-Grouse

Under Action Alternative C, prescribed grazing would occur while perennial vegetation is dormant. Areas eligible for prescribed grazing would support sizable numbers of sagebrush and other larger shrubs, but without mitigation, fire is likely to occur and these would be replaced by competitive invasive annual grasses. General discussion of potential impacts to Greater Sage-Grouse during fall and winter is located within targeted grazing under Action Alternative C. Some overlap of sage grouse and grazing livestock might occur during fall and early winter, when grazing is feasible and heavy snow has not precluded the treatment. Some impacts to Greater Sage-Grouse could occur on an individual level, but population level effects would not occur as no habitat would be removed or degraded due to prescribed grazing. Required design features would be implemented including seasonal timing restrictions to protect occupied lekking, nesting, and brood-rearing habitat. In all, prescribed grazing would help remove fine fuels and reduce the spread of invasive annual grasses, which in the long-term, would help to conserve and maintain important sage grouse habitat that is particularly susceptible to increased fire size, intensity, and frequency associated with the spread of invasive annual grasses.

Cumulative Effects

Cumulative impacts to Greater Sage-Grouse and Bi-State sage grouse are discussed within Action Alternative A.

Prescribed Grazing: Lands with Wilderness Characteristics

Impacts to LWCs are described within Action Alternatives A and B and are not expected to differ under Alternative C. Apparent naturalness and solitude might be slightly impacted during the grazing treatment, simply from the presence of livestock and necessary associated infrastructure such as fences and water developments. Long-term improvements to wilderness characteristics would occur as the spread of invasive annual grasses and associated changing fire regimes is reduced, which would protect apparent naturalness primarily with limited improvement to solitude due to reduced need for drastic measures to curb spreading invasive grasses or wildfire.

Cumulative Effects

Cumulative impacts to LWCs is expected to be similar to those discussed in Action Alternatives A and B.

Prescribed Grazing: Livestock and Range

Great Group A contains 499,989 acres of land within permitted grazing allotments. The complete list of allotments that bisect Great Group A can be found in Appendix L. As described in the Required Design Features, permittee participation in prescribed grazing treatments is voluntary and the objectives of the treatment may temporarily interfere with features of the regular grazing permit (i.e. location, timing, duration, livestock kind, etc.) until the project is completed or suspended. Short-term non-use of AUMs of the regular grazing permit will vary on a project-by-project basis and may extend until desired treatment affects are seen or be required prior to project implementation. but this Action Alternative allows operators the flexibility to manage vegetation on allotments outside of their normal permitted grazing period by reducing litter during the dormant season. Litter can act as a seedbed for cheatgrass and the reduction of litter via grazing during the dormant season has been shown to decrease cheatgrass germination with repeated treatments over several years (Perryman et al. 2020).

Grazing in this Alternative would provide added diversity to the livestock production industry which should benefit producers over time. Although due to the goals of grazing treatments under this EA being vegetative, with any livestock production goals coming secondarily, the methods of managing livestock to accomplish prescribed grazing would differ greatly from livestock management under regular grazing permits. The workload for livestock management would increase to ensure project objectives are met. Increased workload would include monitoring, frequent herding and movement of water and other resources. Operators would need to monitor utilization and other site conditions and move livestock off rangelands or to different locations once site conditions call for removal. Frequent movement of livestock may require additional riders. Installation, maintenance and movement of temporary fencing, minerals and other attractants, and/or water sources may be needed to complete project objectives. These livestock management tools may also be needed to protect sensitive plant areas or any other areas that require protection. Grazing during the dormant season provides additional challenges due to winter conditions with freezing temperatures and snow. Special consideration would need to be taken to ensure livestock health and safety concerning forage and drinkable water availability. All costs associated with livestock management are expected to increase during prescribed grazing treatments and will be incurred by the operators. This includes costs associated with water movement, supplements, additional herding and any other livestock management tools. Direct impacts to livestock would include initial stress from concentration and frequent herding received throughout the treatment but operators would use low stress livestock handling techniques to prevent adverse effects.

Areas chosen for prescribed grazing treatments could be in any ecological state in the state and transition models, except reference condition, but must have a sizeable component of invasive annual grasses, most likely cheatgrass. Cheatgrass may produce new growth with fall precipitation but this varies among years. Nutritional quality of perennial grasses during the dormant season would be poor and supplements would likely still be needed to ensure livestock health and achievement of project objectives. If shrubs are present on site, attractants may be needed to prevent livestock from consuming harmful quantities when other forage sources are unpalatable and/or covered in snow. Vegetation production would be evaluated prior to project implementation to determine amount of livestock required to achieve treatment objectives and other project design features that address site-specific conditions. Certain ecological sites within this Great Group may contain halogeton within an Annual State. This plant can be toxic to livestock, especially sheep, if eaten in large quantities. Inventory and monitoring of this plant on treatment areas will take place to ensure livestock health.

Great Group A contains 547 acres of land outside of grazing allotments. These areas can be viewed on BLM Grazing Allotments Mapset in Appendix A. There would be no direct impacts to the existing allotments that surround these areas but the producers may benefit from the addition of land available for vegetation treatments by livestock. All considerations for temporary livestock improvements, increased workload, associated costs, and livestock health in these project areas would be similar to those stated above.

Once treatment objectives are met, livestock grazing would cease on the treatment areas until regrowth of cheatgrass or other invasive annual grasses necessitates re-treatment. Repeat treatments within the year may be needed depending upon regrowth of cheatgrass from precipitation events that initiate growth later in the year.

The seasonality of this alternative does not change the indirect effects of prescribed grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of prescribed grazing treatments on livestock grazing and range therefore they are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Noxious Weeds

Noxious weeds may be identified in areas chosen for prescribed grazing treatments. Livestock used for treatments located in previously identified noxious weed areas may be subject to an isolation period depending on what weed species are present. Many noxious weed species will have produced seeds and may still be attached to standing vegetation. Transport of those seeds offsite from livestock could occur by attaching to livestock hair and skin or can be passed through the digestive system (Davidson et al. 2006). Transport of seeds from previous years could also occur. Noxious weeds from surrounding infestations and/or the site's seedbank could invade treatment areas due to the lack of competition from invasive annual grasses or increased bare ground in specific areas due to livestock concentrations. Temporary range improvements (i.e. fencing, water troughs, etc.) could also serve as vectors of noxious weeds due to increased potential for bare ground and increased impacts to vegetation immediately surrounding those locations. As discussed in the RDFs, inventory and monitoring of noxious weeds will take place before, during and after treatment to prevent colonization and control further spread. Sites found to have noxious weeds would be treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

The seasonality of this alternative does not change the indirect effects of prescribed grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of prescribed grazing treatments on noxious weeds therefore they are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Recreation and Travel Management

The direct and indirect effects of prescribed grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Cumulative Effects

The cumulative effects of prescribed grazing treatments on recreation and travel management are similar to those in Great Group A under Alternative A as OHV riding in Nevada occurs throughout the year and is not tied to a season.

Prescribed Grazing: Riparian and Wetlands

It has been recorded that cattle selection for riparian habitat was highest from July to September, but virtually no cattle use occurred in the riparian areas during the dormant season as a result of a relative lack of green vegetation in the riparian zones compared to upland sites where evergreen shrubs provided available browse (Goodman et al. 1989). Due to the seasonality of the treatment, nutritional quality of the invasive annual grasses present would be poor and livestock would preferentially graze growing perennial native and/or seeded grasses during this time. Important forage species for livestock, utilized in winter include Indian ricegrass, basin wildrye, and shadscale (Atriplex confertifolia). Additionally, livestock often leave valley and canyon bottoms late in the season when cold air accumulates in riparian areas, and when late-summer or early fall rains improve the palatability of the forage on adjacent slopes and water levels are low. The characteristics of the associated uplands, such as upland water distribution and suitable forage availability, will contribute to the determination of appropriate management options in riparian areas.

Direct effects to riparian areas from prescribed grazing for all Great Groups in this alternative include vegetation loss, soil compaction, reduced runoff retention, biological crust loss, direct soil disturbance, and runoff concentrated into animal trails, with consequent enhanced erosion. Cattle, in comparison to goats, would cause increased soil compaction. These impacts would be lessened while the ground is frozen, but may increase when mid-season thawing results in surface mud. Grazing animals create waste that can introduce nutrients and pathogens to streams directly or in runoff. Nutrients that are not absorbed onto sediment are more likely to be transported in overland flow when soils are frozen (Mosley et al. 1997). Excessive nutrient loading can lead to algal growth, depleted dissolved oxygen needed to support aquatic fauna, reduced water clarity and consequent increased water temperature, and other effects that reduce riparian function. Freezing-thawing is another natural destabilizer of streambanks. Bare ground undergoes more freeze-thaw cycles than does ground covered by mulch and the basal area of plants. Excessive grazing this time of year can remove protective plant cover necessary during the following spring high stream-flow periods. Browse on shrubs is higher in this season and riparian shrubs could be impacted. However, since non-use may need to be taken in order for a prescribed grazing to occur, impacts would not be more than what currently occurs with existing grazing authorizations. At the project level, thresholds and available responses will be established in the monitoring agreement and decision. See Table 36 Thresholds and Responses Monitoring in Appendix E.

Required design features for these prescribed livestock grazing treatments would limit livestock access in areas vulnerable to water quality degradation. This, coupled with buffers and exclosures placed on fuel break segments for perennial streams, riparian areas, and wetlands is expected to reduce the potential for cumulative impacts related to livestock use. However, temporary range improvements can also be used to divert grazing from vulnerable areas and reduce impacts to streams. Thus, range improvements and adaptive grazing management, including monitoring and subsequent application of thresholds and responses, would allow managers to apply measures appropriate to specific conditions, reducing the potential for water quality and riparian function degradation.

Prescribed grazing treatments would focus on the reduction of invasive annual species or the maintenance of any current vegetative state with invasive annual grasses present and which has the potential to improve ecological condition in the analysis area. Implementation of prescribed grazing treatments in the period of time when native perennial vegetation is dormant intends to reduce fine fuel cover, reduce litter accumulation, and thereby reduce invasive annual grass germination rates and seed bed accumulation and transfer. This would reduce the risk of catastrophic wildfire on rangelands, which might otherwise spread into riparian and wetland areas.

Over the long term, implementation of this action alternative is expected to reduce water quality impacts and increase riparian function as a result of reduced wildfire impacts and improvement in ecological conditions.

Cumulative Effects

Cumulatively, with past, present, and foreseeable grazing, seeding, or other soil-disturbing actions, prescribed grazing treatments would be similar to cumulative impacts that exist with current authorized grazing actions.

Prescribed Grazing: Socioeconomics

Direct and indirect impacts from proposed management activities related to prescribed grazing are similar to targeted grazing. These impacts would be site-specific and limited, contributing minimally to the overall regional economy, but directly affecting the operator and potentially the local communities. Using prescribed grazing under this assessment for reducing fuel loads from invasive annual grass species is a voluntary action for operators, and would provide flexibility and stability for management, as well as options for addressing increased wildfire risk and diminished ecological integrity. Free-use permits (§ 4130.5) may be authorized as part of the plan to meet project objectives, but would not offset the increased costs and workload needed to meet those objectives.

The workload and costs for livestock management would increase for the operator to ensure the project meets objectives, similar to the implementation of targeted grazing. Prescribed grazing would also affect fire severity and size, though not at the same levels or timeframe as targeted grazing (see Fire and Fuels analysis). Impacts to communities would be similar as discussed under targeted grazing.

Cumulative Effects

Cumulative impacts from proposed management activities are likely to be site-specific and limited, contributing minimally to the overall regional economy. Decreasing fire size or severity would have long-term cumulative impacts for providing local stability for services that are dependent on BLM-administered lands for providing direct or indirect opportunities.

Prescribed Grazing: Soils

As with native perennial dormant season targeted grazing, prescribed grazing would reduce vegetation cover and, due to hoof action, disturb the soil surface horizon and any existing biological soil crusts. Monitoring of these sites would occur and result in treatment modifications or suspension if thresholds were met to ensure damage does not occur. Effects, while dependent on grazing intensity and duration, would be similar to those of permitted grazing. Short-term, direct effects to soils within the treatment area of this Great Group include an increase in soil temperature, dryness, compaction, and erosion potential. Since prescribed grazing would be performed at a lower intensity than targeted grazing, these effects would be similar in nature, but less pronounced. Furthermore, in comparison to targeted grazing, which occurs in an annual state, prescribed grazing would occur in states that would typically have a higher degree of resilience and stability. annual state

During the dormant season, the direct effects described above are more likely to occur during increased temperatures, as is the potential for disturbance of biological soil crusts. During the winter months of the dormant season, however, the direct effects listed above would be less severe, particularly when temperatures are low enough to freeze the soil surface. In these conditions, soil would be less prone to both compaction and erosion. Cattle could likely still cause increased soil compaction (Tate et al. 2004), particularly in flat areas, where they prefer to graze (Walker et al. 2006). Sheep and goats, instead, often graze on steep slopes (Walker et al. 2006). Although several factors contribute to a location's susceptibility to erosional forces, steep slopes are generally at increased risk to water erosion in comparison to low-gradient areas (BLM 2011).

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions that have affected or could in the future affect soil resources within this Great Group include wildfire and associated suppression activities, hazardous fuels management, livestock grazing, invasive grass introduction and management, recreation and OHV use, infrastructure development, and climate change. Impacts from past, present, and reasonably foreseeable actions and conditions include the disturbance of biological soil crusts and increased soil erosion. While prescribed grazing also has the potential to cause these impacts in confined areas and over a specified duration, required design features and project monitoring would be in place to limit these impacts. Over the long term, prescribed grazing would indirectly help to minimize erosion within this Great Group by reducing fine fuel loads and preventing adverse impacts of extreme fire behavior. As perennial grasses replace annual grasses, erosion potential would decrease, resulting in increased infiltration and moisture retention.

Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing my lead to further soil compaction, soil erosion, and disturbance of biological soil crusts if placed out of existing disturbed areas.

The Soil Erodibility Mapset in Appendix A shows areas with high wind and water erosion susceptibility.

Prescribed Grazing: Vegetation Including Threatened, Endangered, and Sensitive Species

Areas chosen for prescribed grazing treatments could be in any state that would benefit from native perennial dormant season grazing to enhance ecologic integrity and reduce litter on the site by directly impacting vegetation. Due to the seasonality of the treatment, nutritional quality of all grasses present (native and invasive) would be poor and supplements/attractants would likely be needed to ensure livestock health and complete project objectives. Cheatgrass may produce new growth with fall precipitation but this varies among years. Negative impacts to native and/or seeded perennial grasses would be minimal because species will be dormant and therefore would not be harmed by livestock grazing. Dormant season grazing can provide positive impacts to native and/or seeded grasses to removing dead material and allowing room for new growth.

Big sagebrush and/or black greasewood may be significant components of these sites depending on the vegetative state but impacts to unpalatable shrubs via trampling or inadvertent browsing damage would be low to moderate depending on the stocking rate and livestock species used. Attractants may be need to prevent livestock from overgrazing when other forage sources are unpalatable and/or covered in snow.

Prescribed grazing treatments in this Action Alternative allow operators the flexibility to manage vegetation on allotments outside of their normal permitted grazing period by reducing litter during the dormant season which has been shown to decrease germination of cheatgrass over time. If sensitive plant species are present on the treatment site, monitoring and adaptive management, if needed, would take place to prevent damage. If T&E species are determined to be present, treatment would not be authorized until site-specific consultation with USFWS is completed. Associated temporary range improvements such as water haul sites, pipelines, and temporary fencing would cause some disturbance, decrease vegetative cover and may serve as vectors for noxious weeds. These sites would be monitored and treated according to BLM protocol and priorities. If the spread of noxious weeds takes place, appropriate control methods would be applied to the new areas of infestation.

The seasonality of this alternative does not change the indirect effects of prescribed grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Cumulative Effects

The seasonality of this alternative does not change the cumulative effects of prescribed grazing treatments on invasive annual grasses and other vegetation therefore they are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Wild Horse and Burro

Areas chosen for prescribed grazing treatments would contain invasive annual grasses, most likely cheatgrass. Cheatgrass may produce new growth with fall precipitation but this varies among years. Alternative C allows operators the flexibility to manage vegetation on allotments outside of their normal permitted grazing period which could result in more competition between livestock and wild horses and burros for food during seasons when wild horses and burros did not previously experience this competition. Because of the low nutritional quality of the invasive annual grasses, supplements for livestock would likely be needed to ensure livestock health. These supplements/attractants could draw wild horses and burros into areas that they may not normally frequent. Overtime, grazing during this season could reduce litter during the dormant season which, as noted in Livestock and Range, has been shown to decrease cheatgrass germination with repeated treatments over 2-3 years. This could reduce cheatgrass as a potential food source for wild horses and burros but would be expected to improve native grasses which would introduce other sources of food for wild horses and burros. If the overall health of the ecological system improves, wild horses and burros would be expected to feed more on native grasses, reducing the effects of temporary competition and reduced cheatgrass.

Cumulative Effects

The cumulative effects of prescribed grazing treatments on livestock grazing and range are similar to those in Great Group A under Alternative A.

Prescribed Grazing: Wildlife Including Threatened, Endangered and Sensitive Species

Under Action Alternative C, perennial vegetation would be dormant during grazing, with the intent of the alternative being to reduce fine fuel cover, reduce litter accumulation, and thereby reduce invasive annual grass germination rates and seed bed accumulation. As a result, prescribed grazing would help to reduce the spread of invasive annual grasses, which also reduced potential negative impacts due to associated changed to endemic fire regimes. As described within targeted grazing for this alternative, wildlife activity and diversity are reduced during the fall and winter due to diminishing resources and a need to conserve valuable energy. Eligible areas of prescribed grazing would have some ecological degradation due to the presence of invasive annual grasses, which has low nutritional value or structural diversity to support wildlife during fall and winter. Dormant perennial vegetation would likewise offer relatively poor nutritional value, but sufficient nutrition remains for a variety of wildlife to subsist upon and also importantly, to use as thermal cover. Big sagebrush and/or black greasewood may be present in varying amounts within Great Group A and provide important cover and forage for wildlife. However, availability of these plants may be minimal and grazing is not expected to have direct or indirect impacts to wildlife. Given that areas eligible for prescribed grazing contain some degree of perennial vegetation, potential competition between grazers and livestock is possible but is not expected to result in direct or indirect impacts due to required design features ensuring proper grazing techniques and stocking rates. As prescribed grazing reduces the spread of invasive annual grasses, a variety of wildlife would benefit as habitat is protected and conserved from both invasive annual grasses as well as altered fire regimes.

Big Game

As described under targeted grazing for this alternative, big game migrate to lower elevations where forage is more readily available. Bighorn sheep are the exception and typically does not do not migrate. Disease transmission risk would be mitigated by separation between domestic sheep and desert bighorn sheep. Given that prescribed grazing would take place in mixed communities, there is potential for forage competition, but as grazing is already permitted in these areas, it would not constitute an added pressure and thus is expected to have a minimal impact. Indirect benefits to prescribed grazing would include reduced extent of invasive annual grasses and impacts from wildfire, which would benefit big game long-term as vital winter habitat within the shrub-steppe is conserved. Mountain lions would not experience direct impacts from prescribed grazing and would benefit along with large ungulates.

Migratory Birds

Any direct or indirect impacts to migratory birds are described under targeted grazing and are not expected to vary with prescribed grazing as migratory birds are unlikely to be present for an appreciable amount of time under this alternative. In early fall, numbers of migratory birds may appear fleetingly as they embark upon fall migration routes. No direct impacts to migratory birds would be expected at this time. Indirect benefits to migratory birds would occur as the extent of invasive annual grass is reduced and damaging wildfire reduced in size, intensity, and frequency across the landscape, conserving habitat and food resources for a variety of migratory birds that utilize the shrub-steppe area.

Fisheries

Overall impacts to fisheries are discussed in detail under targeted grazing for this alternative. Direct impacts to fisheries would be similar to those described within Action Alternative A, which highlights how prescribed grazing within riparian areas may impact fisheries to some extent. As discussed within Action Alternatives A and B, required design features would be implemented to ensure that prescribed grazing in and around riparian areas does not result in unintended consequences. Fisheries would indirectly benefit as wildfire across the landscape decreases due to the reduction of invasive annual grasses, minimizing harmful post-fire impacts on riparian areas and fisheries within.

General Wildlife

Typical impacts to wildlife are discussed within the targeted grazing section of this alternative. Areas eligible for prescribed grazing are likely to support a higher diversity of wildlife species, thus increasing the potential for any impacts. Required design features would be implemented to ensure that proper grazing is conducted and no undesirable consequences occur. Especially during later fall and winter, many wildlife species would drastically reduce their mobility, with many migrating or entering dormancy. Before they do this, a burst of activity may occur in fall, which could cause an increase in impacts to wildlife. However, long-term conservation of suitable habitat would be beneficial for a wide variety of wildlife that depend upon desirable plant communities to provide cover, security, and forage, particularly during winter and other times of scarcity.

Special Status Species

Federally Listed Species

Impacts to federally listed species are discussed within the targeted grazing section of Alternative C and are not expected to differ for prescribed grazing treatments.

Lahontan Cutthroat Trout

Though prescribed grazing may occur in riparian areas, required design features for federally listed species and riparian areas would ensure that no effect occurs to Lahontan cutthroat trout unless proper consultation occurs. Fisheries conditions during fall and winter are described under targeted grazing and will similarly affect this species. Indirectly, this species would benefit from reduced impacts from wildfire, to which it is particularly sensitive.

Sensitive Species

Though degraded, eligible sites for prescribed grazing may support certain Sensitive Species. Direct impacts could occur due to livestock grazing, but no direct impacts to the population are expected to occur. As suitable habitat is protected from to annual states, Sensitive Species would be protected from further habitat loss or degradation. Particularly, species associated with the shrub-steppe are expected to benefit the most from prescribed grazing.

Cumulative Effects

Cumulative impacts to wildlife are discussed in detail within Action Alternative A.

4 Consultation and Coordination

Persons, agencies and organizations that were contacted or consulted during this EA are identified in Table 29. Invitations were extended to many of these parties for cooperating agency status and eight memorandums of understanding were requested for participation.

Table 29. List of Contacts and Findings

Name	Reason	Findings
US Fish and Wildlife Service, Reno Field Office	Coordination with federal agency.	Participated as cooperating agency on this EA.
Department of Defense Fallon Naval Air Station	Coordination with federal agency.	Contacted but did not provide a response.
Department of Defense Nellis Air Force Base	Coordination with federal agency.	Contacted but did not provide a response.
Federal Highway Administration	Coordination with federal agency.	Contacted but did not provide a response.
Natural Resources Conservation Service	Coordination with federal agency.	Contacted but did not provide a response.
US Forest Service Humboldt-Toiyabe National Forest	Coordination with federal agency.	Contacted but did not provide a response.
Nevada Division of State History, State Historic Preservation Office	Consultation as required by NHPA (16 U.S.C. 470)	Projects will be reviewed on a case-by-case basis according to the BLM Nevada-Nevada SHPO Protocol Agreement (the Protocol Agreement) (2014); undertakings that do not require an EIS-level of NEPA analysis and that do not result in adverse effects to historic properties, do not require formal consultation with the Nevada SHPO. These undertakings, referred to as “under-threshold” in the Protocol Agreement, allow BLM Nevada to make unilateral determinations of eligibility and effect. Any cultural resources reports generated from these under-threshold undertakings are sent to the Nevada SHPO’s office as informational copies following BLM approval. The Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada meets the definition of an under-threshold undertaking under the Protocol Agreement. Any authorizations approved in the Decision Record will be subject to site-specific review for additional NEPA compliance to determine if any cultural inventories will be required prior to implementation. Cultural resource reviews and inventories in support of such authorizations will ensure that adverse effects to any historic property, including those of religious and cultural significance to tribes, will not be adverse in nature.

Name	Reason	Findings
Nevada Department of Agriculture	Coordination with State Government.	Participated as cooperating agency on this EA.
Nevada Dept. Conservation & Natural Resources	Coordination with State Government.	Contacted but did not provide a response.
Nevada Office of the Governor	Coordination with State Government.	Contacted but did not provide a response.
Nevada Division of Minerals	Coordination with State Government.	Contacted but did not provide a response.
Nevada Department of Transportation	Coordination with State Government.	Contacted but did not provide a response.
Nevada Department of Wildlife	Coordination with State Government.	Contacted but did not provide a response.
Carson City, Churchill County, Douglas County, Elko County, Esmeralda County, Eureka County, Humboldt County, Lander County, Lincoln County, Lyon County, Mineral County, Nye County, Pershing County, Storey County, Washoe and White Pine County.	Coordination with county government.	Carson City, Elko County, Eureka County, Humboldt County, and Lincoln County participated as cooperating agencies on this EA. Other Counties provided responses or feedback but did not complete Memorandums of Understanding for formal participation.
N4	Coordination with grazing board.	Participated as cooperating agency on this EA.
Duckwater Shoshone Tribe, Ely Shoshone Tribe, Fort McDermitt Tribe, Lovelock Paiute Tribe, Fallon Paiute-Shoshone Tribe, Pyramid Lake Paiute Tribe, Reno-Sparks Indian Colony, Duck Valley Shoshone-Paiute Tribe, Summit Lake Paiute Tribe, Te-Moak Tribe of Western Shoshone, Walker River Paiute Tribe, Washoe Tribe, Yerington Paiute Tribe, and Yomba Shoshone Tribe	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) and NHPA (16 U.S.C. 470).	The BLM invited tribes via formal letter, to engage in government-to-government consultation on the targeted grazing effort. The BLM did not receive any comments or requests to engage in consultation on the targeted grazing effort from any tribal government or individual. There have been no other responses at this time.

Name	Reason	Findings
Project Mailing List	Coordination with public and interested parties	Interested Public lists from each District were gathered and members on the list were contacted by USPS mail with a letter announcing the project, including meeting dates and a contact address to send comment letters. Letters were mailed to 531 recipients.
Project Media List, Nevada State Clearing House	Coordination with Media.	A notification of the public scoping period for the proposed Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada was posted on ePlanning and the BLM's website on July 12 and July 19, 2019, respectively inviting the public to participate in the development of this EA. The scoping comment period was open from July 22 to August 21, 2019. Four public scoping meetings were held in July 2019 in Reno, Elko, Ely and Winnemucca. A second scoping period from February 13 to March 2, 2020, was opened when one District realized a field office was missed from the initial list.

5 List of Preparers

Table 30 List of Preparers for the Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecoregions of Nevada

Name	Title	Responsibility
BLM Specialists and Managers		
Kathryn Dyer	Nevada Range Program Lead	Project Management
Sabrina McCue	Rangeland Management Specialist	Livestock and Range
Barbara Keleher	Outdoor Recreation Lead	Dispersed Recreation, Special Recreation Permits & Visual Resource Management
Bryan Hockett	Deputy Preservation Officer	Paleontological & Tribal Consultation
Carolyn Sherve	Planning and Environmental Coordinator	Sage Grouse Plan Implementation Lead
Fred Edwards	Great Basin Ecoregional Coordinator	Vegetation, T&E Flora
J.A. Vacca	Wildlife Program Lead	Wildlife (including sage grouse), T&E Fauna
Jamie Fields	Wilderness Lead	Wilderness
Julie Suhr-Pierce	Socioeconomic Specialist	Environmental Justice & Socioeconomics
Miles Gurtler	Outdoor Recreation Planner	Recreation and Travel Management, Special Recreation Permits, & Visual Resource Management
Virginia Morales	Realty Specialist	Lands, Access and ROWs
Quinn Young	Monitoring Coordinator and State Weeds Lead	Invasive Weeds & Vegetation
Ruth Thompson	Wild Horse and Burro Project Coordinator	Wild Horse & Burro
Sarah Peterson	State Lead for Soils and Aquatic Habitat Management Programs	Riparian & Soils
Gregory Helseth	Recreation Planner	Visual Resource Management
Tim Theisen	State Fuels Program Manager	Fire, Fuels and Vegetation
Patti Novak-Echenique	Rangeland Management Specialist	Fire, Fuels and Vegetation
DJ&A Team		
Dessa Dale	Lead Project Manager	Project Management and Facilitation
Connie McCune	Deputy Project Manager	Editor and Deputy Project Manger
Allison Hendryx	Wildlife Biologist	Cultural, Dispersed Recreation & Vegetation; Sage Grouse, Wildlife including T&E
Christopher Miller	Environmental Scientist	Soils, Paleo, Tribal Consultation, Fuels and Vegetation & Livestock and Range
Emily Capello, Aspen Environmental	Environmental Scientist	Wild Horse and Burro & Recreation and Travel Management
Kelsey O'Neill	Environmental Scientist	Vegetation, Invasive Weeds & Livestock and Range
Rachel Powers	Environmental Scientist	Riparian, Socioeconomic, Environmental Justice, Special

Name	Title	Responsibility
		Recreation Permit, and Visual Resources
Travis Benton	Senior GIS Specialist	Maps and Data Spatial Analysis
Tyler Andrews	Biologist	Sage Grouse & Wildlife/T&E Species

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7 APPENDICES

Important components of this document are contained within the following appendices:

Appendix A: Maps

Appendix B: Great Groups

Appendix C: Targeted and Prescribed Grazing Comparison

Appendix D: Required Design Features

Appendix E: Required Monitoring

Appendix F: Current Range Improvement Projects (RIPs)

Appendix G: Conformance and Considerations

Appendix H: Supplemental Authorities and Other Relevant Resources and Concerns

Appendix I: Synopsis of Cheatgrass Characteristics

Appendix J: Synopsis of Livestock Grazing Behavior and Nutritional Requirements

Appendix K: Cumulative Impact Activities

Appendix L: Allotments within Analysis Area

Appendix M: Nevada Noxious Weed List

Appendix N: Travel Routes and Roads

Appendix O: Greater Sage-Grouse and Bi-State Distinct Population Segment Habitat by Great Group

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Appendix Q: BLM Nevada Sensitive and Special Species Status List

Appendix R: Wild Horse and Burro Herd Management Areas Per Great Group

Appendix S: Migratory Birds

Appendix T: Environmental Consequences for Targeted and Prescribed Grazing of Annual Grasses