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Final

Environmental Impact Statement

Great Basin South Rangeland Project

BRIDGEPORT RANGER DISTRICT, HUMBOLDT-TOIYABE NATIONAL FOREST

Lyon and Mineral Counties, Nevada and Mono County, California

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Great Basin South Rangeland Project
Final Environmental Impact Statement
Lyon and Mineral Counties, Nevada and Mono County, California

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Abstract: This Final Environmental Impact Statement documents the environmental analysis of the Great Basin South Rangeland Project. The project provides for management of 12 livestock grazing allotments on the Bridgeport Ranger District. Alternatives include No Action, Proposed Action, and No Grazing. The selected alternative is Proposed Action which will re-authorize livestock grazing on 11 allotments and close one allotment to grazing. This alternative includes allotment by allotment direction to incorporate rest into the management and/or reduce utilization standards. The selected alternative also incorporates adaptive management principles in order to address changed conditions in the future. This Final EIS discloses the impact of all three alternatives on the natural and social resources in the project area.

SUMMARY

Background

The Great Basin South Rangeland Project area is located within portions of the Bridgeport Ranger District of the Humboldt-Toiyabe National Forest, east of Bridgeport, California. The project area is located in Nevada and California in portions of Mineral, Lyon, and Mono Counties. Physical features include the East Walker River, the Excelsior Mountains, Bodie Hills, Wassuk Range, Whiskey Flat, and Huntoon, Alkalai, and Aurora Valleys.

The project is located in one of the driest areas of the nation. Minimal precipitation and surface water is caused by the rain shadow effect of the Sierra Nevada mountain range. Due to the dry conditions, watershed and ecosystem conditions have very slow rates of recovery from environmental disturbances.

The project addresses 12 livestock grazing allotments, totaling 410,500 acres. There are designated deer winter ranges in the vicinity. There is no domestic livestock grazing on the deer winter ranges. Topography and distance to water discourage domestic livestock cattle from entering these areas.

Cattle are currently authorized to graze 10 of the 12 allotments; two are vacant. The project area lies within Management Area #6, Bridgeport Pinyon-Juniper, of the 1986 Toiyabe Land and Resource Management Plan (Toiyabe Forest Plan). Management area direction emphasizes the key values of wildlife, dispersed recreation, grazing, and wild horse management. Approximately 35 percent of the project area includes lands transferred from the Bureau of Land Management (BLM) to the National Forest System in the Nevada Enhancement Act of 1989 (P.L. 100-550). These lands are to be managed under the existing BLM Resource Management Plan until the Toiyabe LRMP is amended or revised. The 1986 Walker Resource Area RMP emphasizes improving rangeland and watershed conditions, maintaining wildlife habitat, and protecting and maintaining existing and potential fisheries and riparian habitats (BLM 1986).

This analysis is being conducted at this time because the *Rescission Act* of 1995 (Public Law 504) required the development of a schedule to complete the *National Environmental Policy Act* (NEPA) analysis to re-authorize grazing. The allotments in the Great Basin South project area are scheduled for analysis and disclosure at this time.

This project's goal is to manage livestock grazing in order to achieve healthy, sustainable rangelands that provide forage for livestock and wildlife, clean water, and adequate habitat for wildlife and fish. Sustainability requires the physical and biological components of the environment, including the vegetation and soil resources, to efficiently and effectively cycle water and nutrients. When ecological processes function properly, the resulting healthy rangelands provide goods and services for the public.

Livestock grazing, as well as the people and communities associated with ranching operations, have been an integral part of the area for more than a hundred years. This project

considers the importance of this industry's contributions, as well as the needs of the other resources and users. The alternatives considered in this analysis provide different options for managing livestock grazing.

Purpose and Need for Action

The purpose of the proposed action is to provide an economic return for use of the forage resource in an environmentally sustainable manner. The purpose of the Great Basin South Rangeland Project is to alter livestock grazing practices, where needed, to maintain natural resources in a desired condition as described in the 1986 Toiyabe Forest Plan and meet the goals and objectives of the 1986 Walker RMP.

The need for the project is to re-authorize grazing with updated management practices where needed to move towards desired conditions. Since the Toiyabe Forest Plan and Walker RMP goals were identified in 1986, wildlife, range, and natural resource science have continued to evolve. More is now known about the relationship between species and the environments in which they live; as a result, management direction for specific species has changed over the last decade. In addition, the Humboldt-Toiyabe ecology personnel have developed vegetation community specific desired conditions (see Appendix 1 of this FEIS). Changes are needed in livestock management practices on some allotments to move towards those desired condition parameters. Range scientists have also conducted research on the influences of livestock grazing on the environment. This research has been applied in many areas across the West in effective adaptive management strategies. This current science and knowledge should be applied to grazing management in the project area.

Issues

The Forest Service identified the following as important issues for consideration in this EIS.

- Continued livestock grazing has the potential to affect the health of riparian vegetation. Livestock grazing has the potential to affect the plant composition, structure and health of the various riparian sites in the project area. Riparian areas include streams, seeps, springs, and meadows.
- Continued livestock grazing has the potential to affect the health of upland vegetation. The health of upland vegetation is the degree to which the integrity of the soil, vegetation, water and air as well as the ecological process of the rangeland ecosystem, are balanced and sustained.
- Continued livestock grazing has the potential to affect sage grouse habitat. Brood-rearing meadows are also a critical component of sage grouse habitat. The quality of these meadows can affect the forage availability for young sage grouse after the nesting season.
- Continued livestock grazing has the potential to affect watershed conditions. Livestock grazing has a direct physical impact on soil properties. Soil compaction and increased erosion can be affects of livestock grazing. This can affect sediment delivery to waters in the project area.

Alternatives

The EIS considers three alternatives in detail: No Action, Proposed Action, and No Grazing. The No Action alternative would continue current grazing management on all allotments. The Proposed Action would adjust use periods and utilization levels, change type of livestock, and close portions of one currently active allotment and all of one currently vacant allotment. The No Grazing alternative would end grazing as current grazing permits expire.

Environmental Consequences

The primary consequences of the alternatives are outlined in the following table.

Table 1: Comparison of Alternatives described in the FEIS.

Comparison of Alternatives Table				
Issue	**Indicator**	**Alternative**		
		No Action	**Proposed Action**	**No Grazing**
Riparian Vegetation: Aspen	Number of Aspen Seedlings and saplings	Unchanged or Decrease	Increase	Increase
Riparian Vegetation: Meadows	Species Composition	Unchanged or Decrease	Increase	Increase
	Percent Bare Ground	Unchanged or Increase	Decrease	Decrease
Upland Vegetation	Species Composition	Unchanged or Decrease	Increase	Increase
	Percent Bare Ground	Unchanged or Increase	Decrease	Decrease
Sage Grouse	Upland Species Composition	Unchanged or Decrease	Increase	Increase
	Riparian Meadow Quality	Unchanged or Decrease	Increase	Increase
Watersheds	Soil Compaction	Static	Decrease	Decrease
	Erosion	Static	Decrease	Decrease

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CHAPTER ONE: PURPOSE OF AND NEED FOR ACTION

Document Structure

The Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

Chapter One. Purpose and Need for Action: This chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter Two. Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter Three. Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by issue.

Chapter Four. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental impact statement. Appenidix 3 contains a summary of the comments received on the Draft EIS and our response to them.

Index: The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project record located at the Bridgeport Ranger District Office.

Changes between the Draft and Final EIS

The Final EIS contains more detailed analysis of the effects of the proposed action on vegetation and wildlife species, in particular. In response to internal review comments, the background, purpose and need and proposed action sections have been clarified and are presented in more detail. Adapative management is explained in more detail as is use of the matrices in Appendix 1. The effects discussion contains more information on Management Indicator Species and other wildlife species in the project area. The vegetation sections have been augmented. Appendix 2 on capability and suitability has also been expanded and clarified. In some sections, formatting has been changed.

Introduction

Project Area

The Great Basin South Rangeland Project area is located within portions of the Bridgeport Ranger District of the Humboldt-Toiyabe National Forest, east of Bridgeport, California. The project area is located in Nevada and California in portions of Mineral, Lyon, and Mono Counties. Physical features include the East Walker River, the Excelsior Mountains, Bodie Hills, Wassuk Range, Whiskey Flat, and Huntoon, Alkalai, and Aurora Valleys.

The climate in the project area is dry, with most of the precipitation in the form of summer thundershowers and winter snows. Average precipitation is less than 10 inches throughout the area. The majority of the springs are ephemeral in which the drainages only run water for a few weeks in the early spring, if they run water at all.

Because of the dry environment, rates of recovery are slow. Dryer climates take more than the average amount of time to recover from historical and present disturbances.

The project addresses 12 livestock grazing allotments, totaling 410,500 acres. There are designated deer winter ranges in the vicinity. There is no domestic livestock grazing on the deer winter range. Topography and distance to water discourage domestic livestock cattle from entering those areas.

Cattle are currently authorized to graze 10 of the 12 allotments; two are vacant. The project area lies within Management Area #6, Bridgeport Pinyon-Juniper, of the 1986 Toiyabe Land and Resource Management Plan (Toiyabe Forest Plan). Management area direction emphasizes the key values of wildlife, dispersed recreation, grazing, and wild horse management. Approximately 35 percent of the project area includes lands transferred from the Bureau of Land Management (BLM) to the National Forest System in the Nevada Enhancement Act of 1989 (P.L. 100-550). These lands are to be managed under the existing BLM Resource Management Plan until the Toiyabe LRMP is amended or revised. The 1986 Walker Resource Area RMP emphasizes improving rangeland and watershed conditions, maintaining wildlife habitat, and protecting and maintaining existing and potential fisheries and riparian habitats (BLM 1986).

Background to Livestock Grazing Management

The Forest Service provides livestock grazing opportunities to provide economic benefit to permittees and to local communities and regional economies. Numerous legislative mandates including both programmatic legislation as well as annual appropriations language make it clear that this is consistent with Congressional intent. The general objectives for range management programs as defined in the Forest Service Manual (FSM) 220, Section 2202.1, include among others:

- Providing forage, wildlife food and habitat, outdoor recreation, and other resource values dependent on range vegetation;
- Integrating management of range vegetation with other resource programs to achieve multiple use objectives contained in Forest land

and resource management plans; and

- Contributing to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood.

These objectives are consistent with the Multiple-Use Sustained-Yield Act (MUSYA) and other legislation that determines the Forest Service management of these lands (e.g. "It is the policy of Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes." MUSYA).

It is important to note that while the Forest Service grazing program is expected to contribute to local economic stability it cannot necessarily ensure the viability of ranching operations. Macroeconomic and other factors well beyond Forest Service control can be the ultimate determinants of economic return. In addition, forest managers are expected to manage the range program in a way that ensures the sustainability of the other uses and values of these ecosystems. These dual economic and environmental objectives are the essence of the Forest Service's stewardship mission.

Great Basin South Analysis

This project addresses both of these components of the Forest Service mission. This analysis is being conducted at this time because the *Rescission Act* of 1995 (Public Law 504) required the development of a schedule to complete the *National Environmental Policy Act* (NEPA) analysis and disclose the impacts of re-authorizing grazing. The allotments in the Great Basin South project area are scheduled for analysis and disclosure at this time. The proposed action of this project is to manage livestock grazing in order to achieve healthy, sustainable rangelands that provide forage for livestock and wildlife, clean water, and adequate habitat for wildlife and fish. This project also considers the importance of the livestock industry, as well as the needs of the other resources and users. The alternatives considered in this analysis provide different options for managing livestock grazing in order to address the issues identified in the analysis.

Purpose and Need for Action

The purpose of the proposed action is to provide an economic return for use of the forage resource in an environmentally sustainable manner. Livestock grazing practices will be altered, where needed, to meet or move toward desired conditions of the resources, as described in the 1986 Toiyabe Forest Plan and meet the goals and objectives of the 1986 Walker RMP.

The need for the project is to re-authorize grazing with updated management practices where needed to move towards desired conditions. Since the Toiyabe Forest Plan and Walker RMP goals were identified in 1986, wildlife, range, and natural resource science have continued to evolve. More is now known about the relationship between species and the environments in which they live; as a result, management direction for specific species has changed over the last decade. In addition, the Humboldt-Toiyabe ecology personnel have developed vegetation community

specific desired conditions (Appendix 1 of this FEIS). Changes are needed in livestock management practices on some allotments to move towards those desired condition parameters. Range scientists have also conducted research on the influences of livestock grazing on the environment. This research has been applied in many areas across the West in effective adaptive management strategies. This current science and knowledge should be applied to grazing management in the project area.

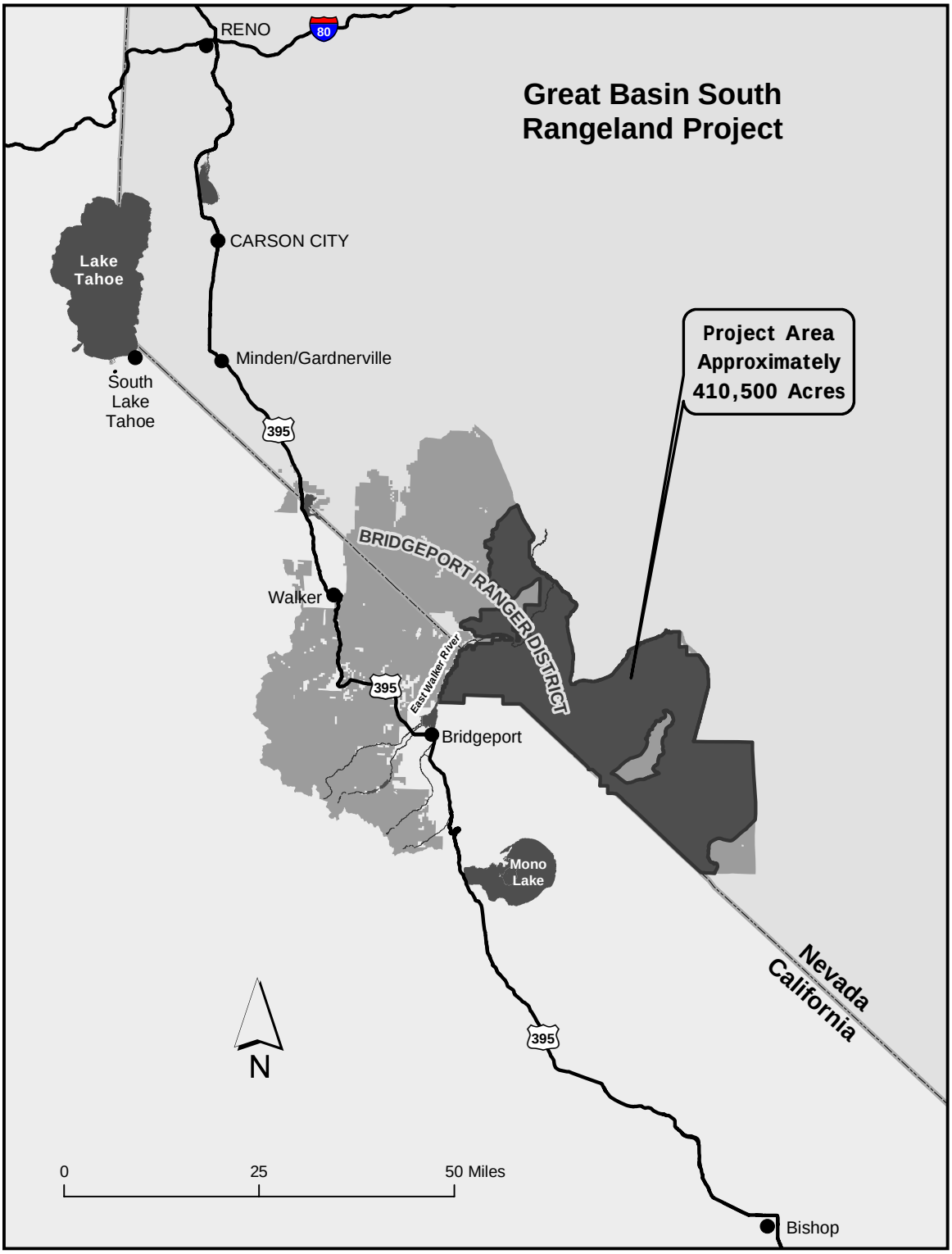
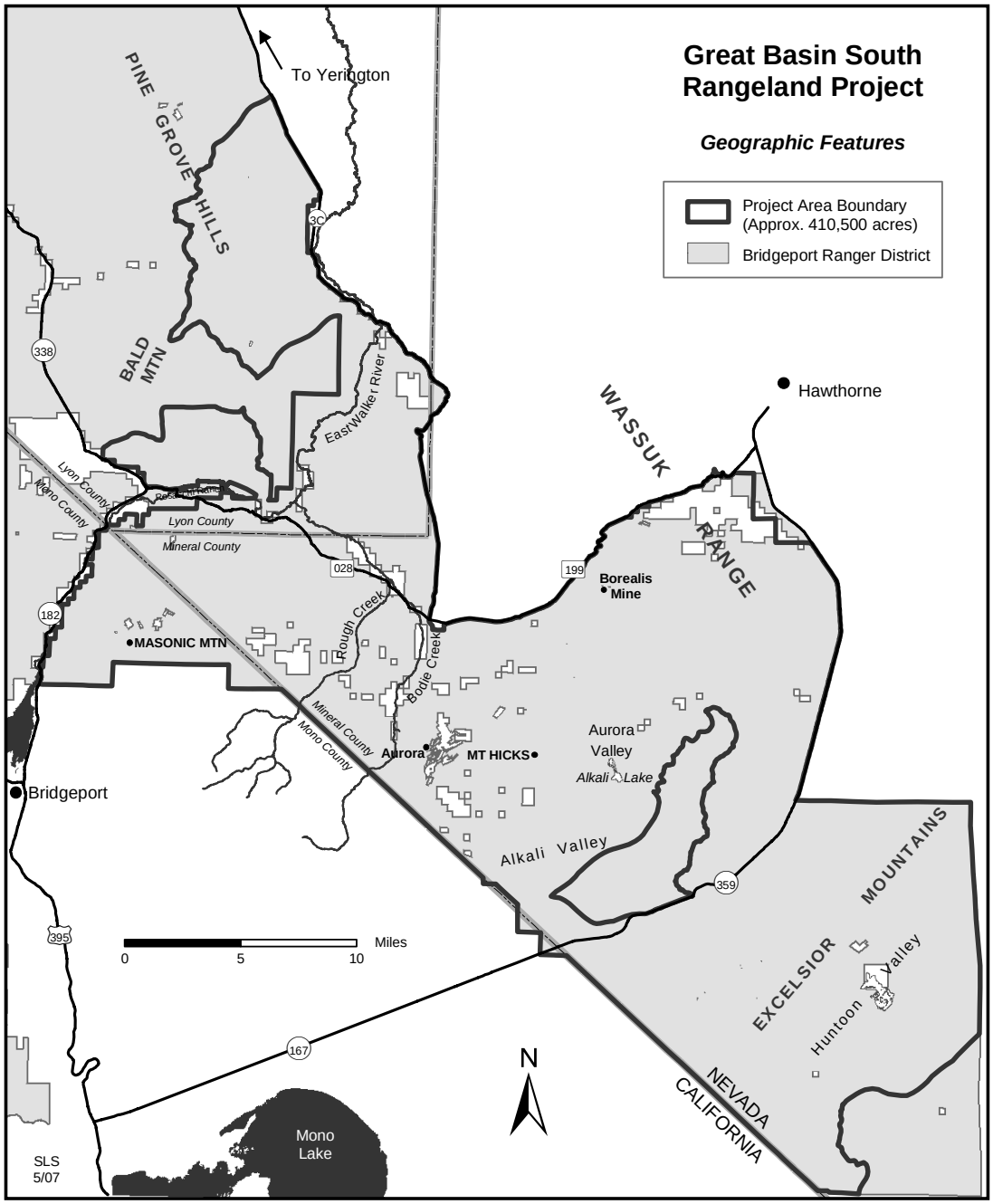


Figure 1: Vicinity Map showing Great Basin South project area.



This GIS product was compiled from various sources and may be corrected, modified, or replaced at any time. For more information, contact the GIS Specialist at the Bridgeport Ranger District, Bridgeport, CA (760) 932-7070.

Figure 2: Map showing geographic features in the Great Basin South project area.

Desired Conditions

This action responds to the goals and objectives outlined in the Toiyabe Forest Plan, and helps move the project area towards desired conditions described in that plan and includes more specific vegetation desired conditions.

The Forest Plan goals, standards and guidelines, and desired conditions for rangeland management and specific direction for the Management Prescription Area #6, which includes this project area, follows:

- Strive to achieve or maintain a minimum of 60 percent ground cover on upland rangelands, with the exception of low sagebrush types, Wyoming big sagebrush types, crested wheatgrass seedings, pinyon/juniper types and south facing sagebrush types on granitic slopes of the Sierra Nevada (pg IV-26)
- Achieve or maintain rangeland in satisfactory condition, which is defined as: (1) having a resource value rating of 50 or above for vegetation or other features; or (2) being in a mid-succession or higher class of ecological status; and (3) having a stable or upward trend in soil vegetation (pg IV-26).
- Implement noncontinuous use management systems on all livestock grazing allotments. When feasible, use a rest rotation system when significant range is in unsatisfactory condition (pg IV-27).
- Allow no livestock grazing for two grazing seasons after prescribed or natural fires and planting and seeding. (pg IV-30).
- Manage riparian areas to achieve or maintain a medium or high ecological status. (pg IV-42).
- Strive to achieve and maintain at least 90 percent of the natural bank stability for streams supporting Lahontan or Paiute cutthroat trout, and 80 percent on all other streams (pg IV-42).
- Maintain 20 percent to 55 percent canopy cover on sage grouse range. (pg IV-49)
- Maintain meadows in sage grouse range in high ecological status (pg IV-49).
- Maintain desirable sagebrush habitat within two miles of leks (pg IV-49).
- Maintain desirable sagebrush habitat on known sage grouse wintering areas (pg IV-49).
- Protect critical areas for sage grouse brood rearing (pg IV-49).
- Manage ecosystems containing sensitive plant and animal and threatened and endangered animal populations to maintain or increase these populations and to achieve recovery (pg IV-49).
- Desired Future Condition: Ninety-five percent of all rangelands would have been brought to satisfactory condition (pg IV-4).
- Within key antelope range within Rough Creek: 1) antelope will have priority for available forage and habitat; 2) fencing will be held to a minimum and safely designed for antelope use; and 3) do not allow conversion of operations from cattle to sheep (pg IV-114).

The Great Basin South Rangeland Project also responds to the following

specific direction in the Walker Resource Management Plan which applies to the lands acquired in the Nevada Enhancement Act of 1989 (P.L. 100-550):

- Maintain or improve the condition of public rangelands and watersheds so as to enhance productivity for all rangeland and watershed values.
- Initially, manage livestock use at existing levels.
- Manage wildlife habitat to achieve a long term goal of reasonable numbers of big game.
- Protect and maintain existing and potential fisheries habitat and riparian habitat in a good or better condition.
- Develop and implement AMPs…to improve and/or maintain condition; provide for proper utilization within key areas; achieve better livestock distribution to obtain more uniform utilization; and provide and increase in available forage and water for livestock, wild horses and wildlife.
- Continue rangeland and watershed monitoring to determine if management objectives are being met and what future adjustments in grazing use are necessary.

In the two decades years since the Toiyabe LRMP and Walker RMP were developed, changes have occurred in how we look at rangeland vegetation conditions. Classifications are different and monitoring methods have changed. In order to use the best available information, this project analysis describes the desired condition in terms of whether a vegetative community is "functioning". The term functioning indicates the same concepts as the desired conditions in the Forest Plan (satisfactory, i.e. mid or later ecological status). In a general sense, "functioning" means a vegetative community has the most appropriate soil and vegetative characteristics that enable it to efficiently process precipitation, reproduce healthy vegetation and withstand or be resilient to disturbance.

A more in-depth description of what is considered "functioning" for specific vegetative communities is defined in documents that are referred to in this analysis as the matrices. These vegetative community specific descriptions are detailed in Appendix 1: Matrices to Guide Determination of Vegetative Condition.

The desired conditions for allotments in the Great Basin South project area is to move towards or meet the attributes of functioning systems as described in the most current version of the matrices. The most current version of those matrices at the time of this analysis is in Appendix 1.

Proposed Action

The action proposed by the Forest Service to meet the purpose and need and desired conditions described in this analysis *and* the goals of the Forest Service livestock grazing program is to re-authorize continued domestic livestock grazing in the Great Basin South project area under updated grazing management direction. This alternative is designed to move existing rangeland resource conditions within the project area toward desired conditions. The project includes closing the vacant Squaw Creek Allotment, shifting the Aurora Allotment from sheep to cattle, incorporating rest cycles into five

allotments, reducing utilization on upland vegetation, and eliminating grazing on portions of the Huntoon Allotment that can no longer sustain domestic livestock grazing. The updated direction would be incorporated into term grazing permits and allotment management plans to guide grazing management within the project area during the coming decade, or until amendments are warranted based on changed condition or monitoring.

Decision Framework

Given the purpose and need, the Forest Service will review the proposed action, the other alternatives, and the environmental consequences in order to make the following decision:

Whether or not to continue domestic livestock grazing on the allotments within the project area. This decision can be made either on an individual allotment basis or as an allotment group. If the decision is to continue grazing, then what type of management direction?

Public Involvement

Scoping for the project proposal began August 16, 2002 and ended September 20, 2002. Letters were mailed to interested parties. A legal notice to inform the public of the proposed action was published in the Mammoth Times, the newspaper of record for the Bridgeport Ranger District (at the time). In addition, articles were also published in the Mineral County Independent News and the Mason Valley Times. Four comment letters were received.

Following this effort, it was determined that the agency would proceed with an Environmental Impact Statement (EIS), rather than an Environmental Assessment as originally proposed.

A notice of intent to prepare an EIS was published in the Federal Register on May 20, 2005. The notice asked for public comment on the proposal from May 20, 2005 to June 20, 2005. In addition, as part of the public involvement process, the agency mailed copies of the scoping document to interested parties and published it on the Forest Service web site. Two additional comment letters were received.

Notices regarding this project were also distributed to the public through the Forest Service Schedule of Proposed Actions each quarter since February, 2002.

In February and March of 2006 and March 2007, members of the project team met with grazing permittees in the field to review grazing and ecosystem conditions and options for future management. These meetings included representatives from the Natural Resources Conservation Service, the Nevada Department of Agriculture, the University of Nevada, and the University of Nevada Cooperative Extension, as well as interested parties from the area.

Using the comments from the public, grazing permitees and other agencies, the interdisciplinary team developed a list of issues to address.

Following completion of the Draft EIS, it was released for public review in January, 2007. Copies were mailed to interested parties, a Federal Register notice was published, a legal notice was published in the Mammoth Times[1] and

[1] When the Draft EIS was issued and the 45-day notice of public comment occurred, the Mammoth Times was the official paper of record

the Draft EIS was made available for review on the Humboldt-Toiyabe National Forest website.

During the 45 day public review period a total of five commenters submitted written comments and two provided oral comments. Agency comments included:

"The Nevada Department of Wildlife has reviewed the Draft EIS and supports the Proposed Action. This document best represents a resource based approach and management strategy necessary to protect and restore Nevada rangelands."

"The U.S. Environmental Protection Agency supports the effort to move rangeland conditions for the Great Basin South grazing allotments towards desired functioning conditions."

Public comments focused on grazing / sage grouse issues as well as a variety of general grazing related subjects such as:

"Factors that may influence determinations of suitability include protection of T&E species habitat, limited funding or staff to monitor or otherwise manage, voluntary or involuntary reductions for resource protection, permit waivers back to the government, livestock market and ranch economies reactions, recovery for wildlife."

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for the Bridgeport Ranger District. The official paper of record has since been changed to the Reno Gazette Journal.

Issues

The Forest Service identified the following as major issues for consideration in this EIS.

- Continued livestock grazing has the potential to affect the health of riparian vegetation. Livestock grazing has the potential to affect the plant composition, structure and health of the various riparian sites in the project area. Riparian areas include streams, seeps, springs, and meadows.

  Livestock can impact riparian areas through: 1) removing leaf material, this could affect root systems and may contribute to a change in plant community; 2) trampling stream banks which affects sediment in the stream and impacts fish habitats, or 3) concentrating in meadows during periods when soils are most susceptible to compaction which would affect the ability of the soil to maintain adequate soil moisture and rooting capability.

  Although riparian areas do not encompass a large percentage of the project area, they are dispersed throughout. All of these potential impacts could affect the basic health of a riparian system and alter its ability to function as necessary to ensure clean water and adequate vegetation.

  Indicators for comparing alternatives relative to the effects of livestock grazing on riparian areas would be plant composition (percent of plants that indicate the riparian areas are functioning as desired) and percent of bare ground. For aspen, the indicators would be the numbers of seedling and sapling trees.

- Continued livestock grazing has the potential to affect the health of upland vegetation. The health of upland vegetation is the degree to which the integrity of the soil, vegetation, water and air as well as the ecological process of the rangeland ecosystem, are balanced and sustained.

  Livestock use can affect several components of rangeland health, such as 1) removal of leaf matter from a plant which could affect its ability to produce and maintain healthy root systems, which could contribute to the alteration of the plant community, and 2) changes in the amount of bare ground, moisture absorption, overland flow, and soil erosion.

  All of these impacts could affect the functioning of natural ecological process such as the capture, storage and redistribution of water, conversion of sunlight to plant and animal matter and the cycle of nutrients through the physical and biological environments. The variety of ecosystems within the rangelands, such as different types of sagebrush communities and salt desert shrub communities are important to many species of wildlife.

  Indicators for comparing effects to rangeland health by alternative would be species composition (percent of plants that indicate the plant communities are functioning as desired), and percent of bare ground. Other components would also be discussed, but these would be the main ones used to compare alternatives.

- Continued livestock grazing has the potential to affect sage grouse

habitat. Brood-rearing meadows are also a critical component of sage grouse habitat. The quality of these meadows can affect the forage availability for young sage grouse after the nesting season. These meadows are noted as a limiting factor within the analysis area (Draft Bi-State Sage Grouse Conservation Plan 2003).

Lek and nesting areas are a critical component of sage grouse habitat. Sage grouse nesting in this area occurs around the end of June. Livestock grazing may alter the vegetation composition of an area or affect the availability of hiding cover needed during nesting and brood-rearing seasons. This change in cover may result in impacts to the quality and quantity of forage available or result in sage grouse vulnerability to predators. Livestock may also directly affect sage grouse by trampling nests.

Several sage grouse leks are located within the project area and potential habitat exists throughout the area. Sage grouse are identified as a Management Indicator Species and a Region Four Sensitive Species in the Toiyabe Forest Plan.

Indicators for comparing effects to sage grouse and sage grouse habitat by alternative would be the upland species composition and change in condition of meadow habitats used during early- and late-brood rearing.

- Continued livestock grazing has the potential to affect watershed conditions. Livestock grazing has a direct physical impact on soil properties. Soil compaction and increased erosion can be affects of livestock grazing. This can affect sediment delivery to waters in the project area.

  Major water sources include the East Fork Walker River. It is the main drainage within the project area. The river originates in California, in the Sierra Nevada west of Bridgeport, and flows in and through Lyon County, Nevada. The river terminates in Walker Lake, a closed basin occupying Nevada's high desert interior in Mineral County. The East Walker River flows through portions of the Nine Mile and East Walker Allotments. Rough and Bodie Creeks are perennial streams that drain smaller portions of the project area. These creeks flow into the East Walker River. Portions of the project area also drain into Mono Lake in California and into the Fishlake/Soda Springs Basin.

  Indicators for comparing effects to watersheds by alternative would be soil compaction and erosion.

Other Resource Concerns

Other resource concerns that are analyzed in this document include wildlife, rare plant, and fishery habitat; heritage resources; livestock grazing; invasive weeds and social economics.

High elevation rare plants were not carried forward for detailed analysis because there is no potential habitat for these species within the analysis area (Bergstrom 2007). In addition, there are wildlife threatened, endangered, and sensitive (TES) species that have habitat on the Bridgeport Ranger District, but are not discussed further in this analysis (Murphy, 2007a). The following table is a list of those TES species and why they will not be carried forward.

Impacts of livestock grazing on recreation were not evaluated in the FEIS because they are not relevant in this area. Recreation use is very sparse and dispersed in nature. Livestock use is also very dispersed and there are no known concentration areas which impact recreation or recreational experiences. Impacts to recreation would not vary by alternative, would not be measurable, and are not essential to a reasoned decision.

Species Name	**Scientific Name**	**Reason for not discussing further**
Sierra Nevada bighorn sheep (E)	*Ovis canadensis californiana*	Only occurs in the southwestern most area of the District and there is no potential habitat within the project area.
Bald eagle-De-listed (formerly T)	*Haliaeetus leucocephalus*	No potential nesting habitat
North American wolverine (S)	*Gulo gulo*	No potential habitat
Fisher (S)	*Martes pennanti*	No potential habitat
Flammulated owl (S)	*Otus flammeoulus*	No potential habitat
Great gray owl (S)	*Strix nebulosa*	No potential habitat
California spotted owl (S)	*Strix occidentalis occidentalis*	No potential habitat

Table 2: Threatened (T), Endangered (E), and Sensitive (S) wildlife species not discussed further in the FEIS and reason for not analyzing.

Other Related Efforts

The Bridgeport Ranger District is currently working on a route designation project to designate routes and areas available for motor vehicle use. The project is intended to protect resource values, enhance management efficiency, and provide for recreation opportunities. Its largest potential interaction with this project is its consideration of limiting cross-country vehicle use. This should enhance both riparian and upland vegetation as well as wildlife and fishery habitat and protect cultural resources.

Applicable Laws and Executive Orders

Disclosures and findings required by these laws and orders are contained in this EIS where appropriate:

- *American Indian Religious Freedom Act* of 1978
- *Archeological Resource Protection Act* of 1979
- *Rescission Act* of 1995 (as amended)
- *Clean Air Act* of 1979 (as amended)
- *Clean Water Act* of 1977 (as amended)
- *Endangered Species Act* of 1973 (as amended)
- *National Forest Management Act of 1976*
- Executive Order 11593 (heritage)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)
- Executive Order 13007 (American Indian sacred sites)
- Executive Order 13175 (consultation and coordination with Indian Tribal Governments)
- Executive Order 13186 (Migratory Bird Treaty Act)
- *Forest and Rangeland Renewable Resources Planning Act* of 1874 (as amended)
- *Magnuson-Stevens Fishery Conservation and Management Act* of 1996
- Executive Order 13443 (Facilitation of Huting Heritage and Wildlife Conservation)
- *National Environmental Policy Act* (NEPA) of 1969 (as amended)
- *Nevada Enhancement Act* of 1989 (P.L. 100-550)

CHAPTER TWO: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter describes and compares the alternatives considered for the Great Basin South Rangeland Management Project. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, providing a clear basis for choice among options by the decision maker and the public. Information used to compare the alternatives is based on the design of the alternative and the environmental, social, and economic effects of implementing each alternative. A more in-depth discussion of the effects of the alternatives and other environmental considerations follows in Chapter Three.

Alternatives Considered in Detail

The Forest Service developed the Proposed Action to meet the purpose and need. The No Action and No Grazing alternatives were developed to address regulatory requirements in the National Environmental Policy Act and other guidance. These three alternatives are described in detail in the following sections.

Alternative One: No Action

Under the No Action alternative, current management would continue to guide management of the project area. No changes in grazing permits would be implemented.

Livestock management practices and standards in existing permits on ten allotments would continue to be used. Allowable utilization of forage would vary depending on standards in existing grazing permits and the Toiyabe Forest Plan. Grazing use on herbaceous species would range from 40 to 65 percent and use on shrub species would range from 20 to 50 percent. The Squaw Creek and Aurora Allotments would remain vacant.

A detailed description of current livestock grazing management is provided in the Livestock Grazing section of Chapter Three.

Alternative Two: The Proposed Action

The Proposed Action was developed to meet the purpose and need of the project. It also addresses issues identified during the scoping process. The Proposed Action includes reauthorizing grazing on 11 allotments on the Bridgeport Ranger District. One allotment, **Squaw Creek,** has not been authorized for grazing since 1989 and would be closed as part of the Proposed Action. The **Squaw Creek** allotment is comprised of approximately 66 percent private lands with mixed ownership. The ownership structure makes the allotment not feasible to graze. No new range improvements are being proposed as part of this project.

The direction described herein would be incorporated into the Term Grazing Permits, Annual Operating Plans, and Allotment Management Plans as appropriate and in accordance with the Forest Service Range and Permit Administration Handbooks.

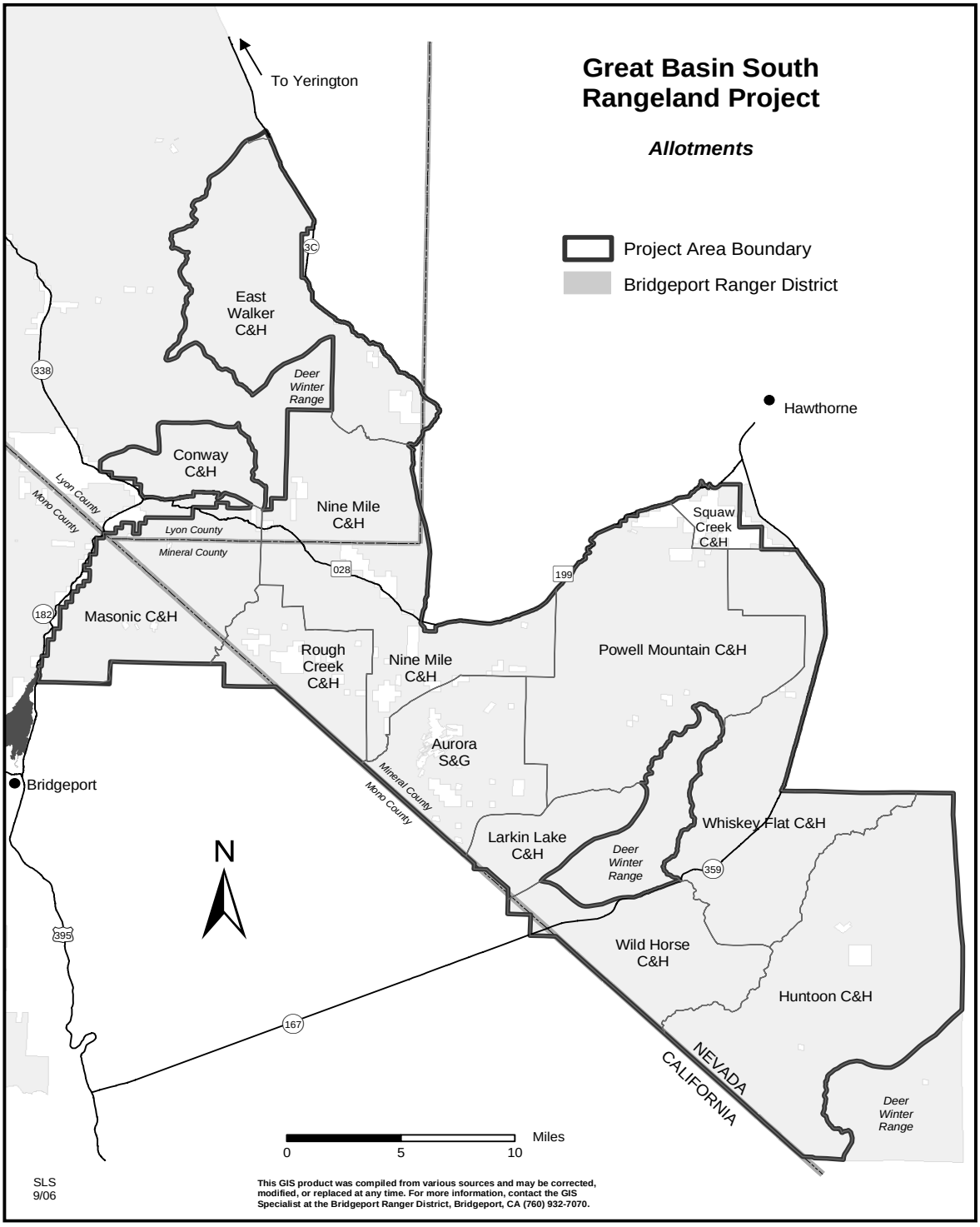


Figure 3: Map of livestock grazing allotments in the Great Basin South project area.

Table 3: Proposed, approximate season of use by allotment.

Proposed Season of Use Table	
Allotment	**Season of Use**
Aurora	April-May or Oct-Nov
Conway	Nov-Feb
East Walker	Dec-March
Huntoon	Nov-Apr
Larkin Lake	Nov-Feb
Masonic	July-Oct
Nine Mile	April-May or Oct-Nov
Powell Mountain	April-Oct
Rough Creek	Jun-Oct
Squaw Creek	No Use
Wild Horse	Dec-May
Whiskey Flat	Nov-Apr

In general, the season of use for the allotments where grazing is re-authorized would be as shown in the above table. Exact dates would vary depending on range readiness and when endpoint indicators are met.

This alternative would reduce the allowable utilization on allotments by up to 25 percent. The literature on grazing in desert ecosystems indicates that with 40 percent utilization, the herbaceous vegetation can be sustained. Beyond that, vegetation becomes more susceptible to drought and other factors (Holechek et al. 1999). Thus, 40 percent utilization would be the maximum allowable use on upland herbaceous species in all allotments.

Endpoint indicators for **all allotments except Rough Creek and the southern part of Masonic** would be as shown below. Livestock would be moved to the next pasture or removed from an allotment once any of the endpoint indicators are reached.

- 40 percent utilization on upland herbaceous species
- 20 percent on upland shrub species
- 40 percent for riparian herbaceous species (including in aspen stands)
- 20 percent on riparian shrubs (willows and aspen)

The following allotment-by-allotment direction would also be incorporated into the Term Grazing Permits if this alternative is selected. The direction would also be used to develop the Allotment Management Plans (AMPs) in accordance with Forest Service Range and Permit Administration Handbooks.

On the **Conway** Allotment, grazing would be re-authorized primarily for winter use. Allowable utilization would be reduced to 40 percent.

The **Nine Mile, Wildhorse, Larkin Lake, Powell Mountain** and the northern part of **Masonic** Allotments would be re-authorized for grazing with rest for one year out of three. This would be accomplished through more intensive livestock management rather than extensive fencing.

- On **Wildhorse** and **Larkin Lake** Allotments, the rest would be for the entire allotment at once.
- On **Nine Mile**, **Powell Mountain,** and the northern portion of the **Masonic** Allotments, the rest would be on portions of the allotments in any given year so that all acres would be rested one of three years.
- The aspen stands located in the **Powell Mountain** Allotment would have periods of rest written into the management as well as the limits on browsing and herbaceous utilization described above.

The **Whiskey Flat** and **East Walker** Allotments would be re-authorized for grazing on a four year rotation with two years dormant-season use and two years early- season use.

The **Aurora** Allotment would be authorized for grazing by cattle. This would be a change from its current authorization for sheep. This allotment would be incorporated into the Nine Mile Allotment and grazed as described above. This addition would facilitate incorporating rest into the Nine Mile allotment. No additional numbers or season of use would be authorized. The aspen stands located in the **Aurora** Allotment would have periods of rest written into the management as well as the limits on browsing and herbaceous utilization described above.

The **Huntoon** Allotment would be re-authorized for grazing on the foothills and upper elevations only. No grazing would be authorized in Huntoon Valley (See Huntoon Closure Map). Rest would be incorporated into the areas that are grazed. The rest would be on portions of the allotment in any given year so that all acres would be rested in one out of three years.

The southern part of **Masonic** and all of **Rough Creek** Allotments will be re-authorized for grazing primarily during the summer. The areas described here are higher elevations areas and snow covers the ground during the winter months; this make these allotments not available for grazing domestic livestock during the late fall/winter/early spring season. Due to the different season of use and topographic features of these two allotments, utilization standards for both herbaceous and browse plant species would be different than the other allotments. On these two allotments, the available information indicates that the aspen, dry meadow and wet meadow communities are mostly “at risk” and the majority of the sagebrush community types are “functioning as desired”. The permits for these two allotments would be modified to include these endpoint indicators:

- 10% use on riparian browse in aspen and wet and dry meadows
- 30% use on riparian herbaceous species in aspen and wet and dry meadows
- 20% streambank disturbance in aspen and wet and dry meadows
- 40% use on upland herbaceous species in sagebrush communities
- 20% use on upland browse in sagebrush communities

Livestock would be moved to the next pasture or removed from the **Masonic** or **Rough Creek** allotments once any of the endpoint indicators are reached. Periodic rest would be continued in the Masonic Riparian Pasture as needed to move towards desired conditions.

In the future, additional condition assessments would be done the southern portion of the **Masonic** and **Rough Creek** allotments to determine conditions at a smaller scale. Functioning condition would be evaluated using the Humboldt-Toiyabe condition matrices[2] in Appendix 1 of the FEIS and the utilization limits set based on the condition as shown in the Recommended Utilization Standards Table also in Appendix 1.

[2] Each matrix contains several attributes that are measured to determine a functioning level. Those attributes are guidelines and are be used in together to determine the functioning level.

Figure 4: Map showing the area in Huntoon Valley which is proposed for closure in the Proposed Action alternative.

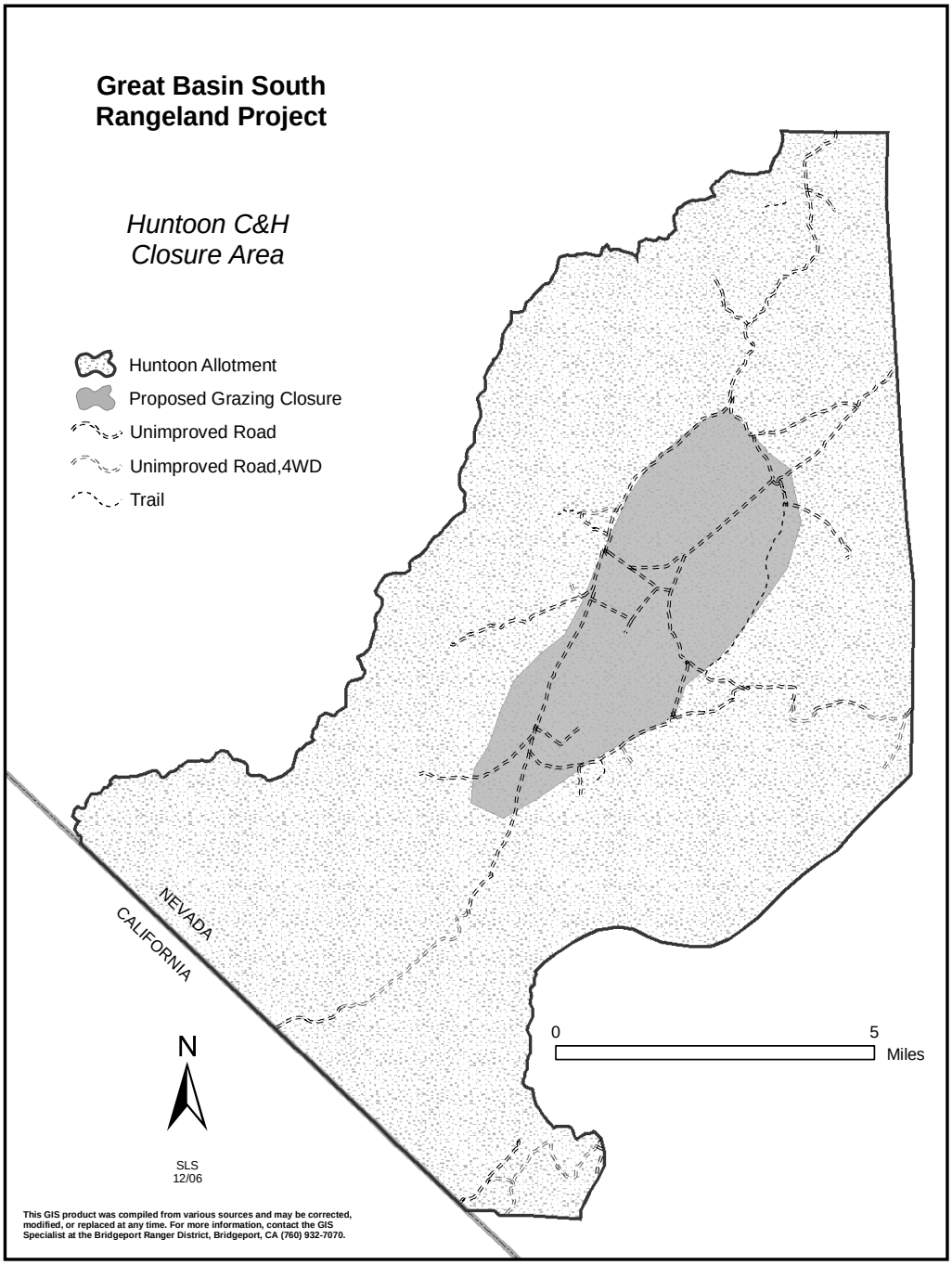


Table 4: Summary of differences in livestock management between Current Management Alternative and the Proposed Action Alternative.

Allotment	Current Management Alternative	Proposed Action Alternative
Aurora	No domestic livestock use. No rest-rotation.	Class of livestock change from sheep to cattle. Incorporated into the Nine Mile allotment grazing strategy. Season of use, April/May or October, November. No additional AUMs would be added.
Conway	Grazed from December to February (dormant season grazing)	Winter use, November thru February. Dormant season of use
East Walker	Four year rotation, with two years dormant season use, two years early season use; December to March. No rest-rotation.	Four year rotation, with two years dormant season use, two years early season use; December to March.
Huntoon	Grazed from November to April.	Grazing re-authorized on foothills and upper elevations only. No grazing on the valley floor. November to April.
Larkin Lake	Grazed in November. No rest-rotation.	Rest one year out of three over entire allotment; November to February.
Masonic	Grazed July to October	Season of use change from current situation. Rest one year out of three on the north portion and riparian pasture in the allotment. The season of use would range from April/May. On the southern portions and the riparian pasture, grazing use would be July thru October with the southern portions of the allotment using the matrices.
Nine Mile	Grazed from April to May and October to November No rest-rotation.	Aurora allotment would be incorporated into Nine Mile. During any given year rest would occur on a portion of the allotment with all acres rested one of three years.
Powell Mountain	Grazed from June thru October. No rest-rotation.	During any given year rest would occur on a portion of the allotment with all acres rested one of three years. April to October.
Rough Creek	Grazed from June thru October	Grazing season from June-October and matrices would be used.
Wild Horse	Grazed from December thru May. No rest-rotation.	Rest entire allotment one year of three. December to May.
Whiskey Flat	Four year rotation, two years dormant season use, two years early-season use. November to April. No rest-rotation.	Four year rotation, two years dormant season use, two years early-season use. November to April.

Project Design Features

Proposed design features to protect important resources would be:

- Protective livestock grazing practices and structures would be implemented on the **Aurora** Allotment to preserve the integrity of historic features in and around the ghost town of Aurora. These features would be in place before authorizing cattle grazing on the **Aurora** Allotment and may include drift fencing.
- Before new or additional livestock concentration activities such as salting, trailing, and water developments are placed within potential pygmy rabbit habitat, these areas would be surveyed for denning areas. If dens are found, no new livestock concentration activities would occur in their vicinity.
- Sage grouse critical breeding complexes (leks and nesting habitat within two miles of each lek) would not be grazed during the reproductive season (March 1-June 30). On sage grouse brood-rearing meadows (Aurora and China Camp meadows in the **Aurora** and **Rough Creek** allotments, resp.) that are not at desired functioning condition, grazing would not take place in those meadows during brooding season (April 10-June 30) until the meadows improve to functioning condition. Implementation might include the use of letdown fences around critical habitats such as leks, removing livestock grazing from the critical areas, or changing the season of use in critical areas.
- In areas where the sensitive plant, Williams combleaf (*Polyctenium williamsiae*), is found, livestock use would not occur during the critical growing period for this species (generally May-July). Activities which concentrate livestock use would be avoided in occupied *Polyctenium* habitat. Activities for this mitigation could include fencing, re-routing livestock trails around sensitive plant populations, changing the season of use in the critical areas, management of livestock, and removing livestock from the area affected.
- Future planned activities that are likely to concentrate livestock use, such as salting, placement of watering sources, and placement of temporary handling facilities, shall not occur any closer than 0.25 miles of known sensitive and rare plant locations. Future livestock concentrating activities would not occur in potential habitat for sensitive plant species until surveys are performed.
- If future monitoring reveals areas where livestock concentration activities have already affected known sensitive and rare plant populations, the activity would be evaluated for its adverse effects and the resource specialist would determine if mitigation is needed to remain consistent with the determination of effects in the Biological Evaluation. Future surveys would also include existing activities that concentrate livestock use in *potential* habitat.

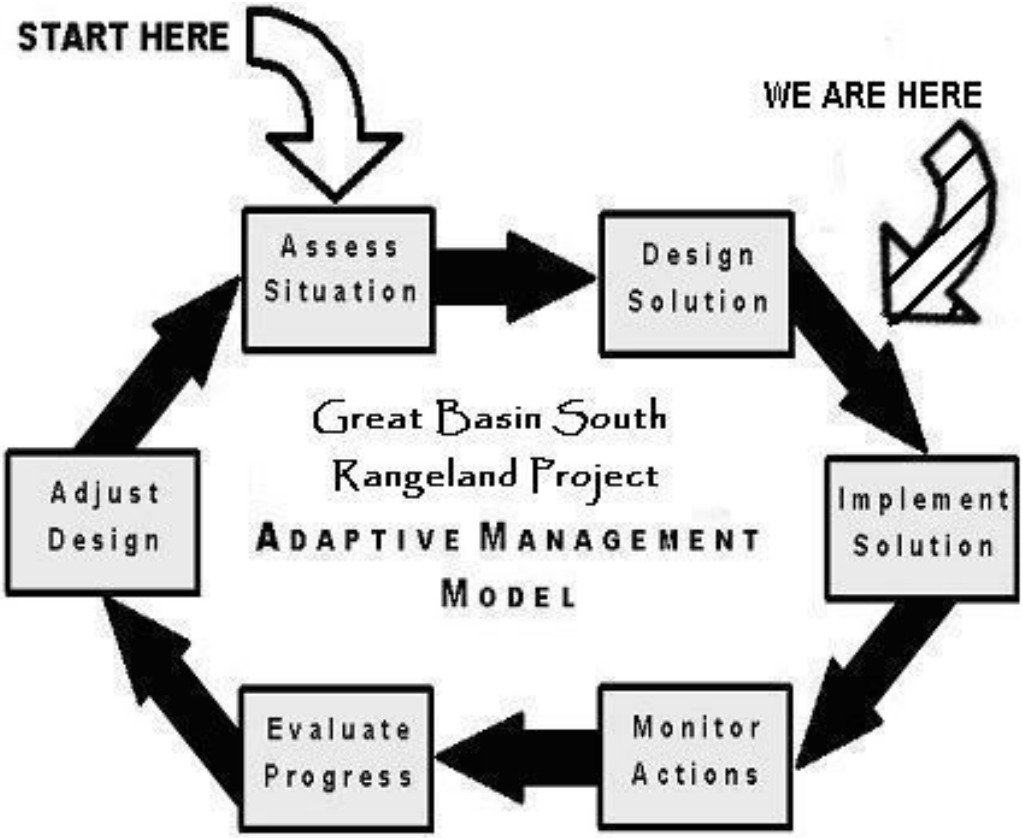
Design features that are ground disturbing and result in measurable environmental effects not disclosed in this FEIS may be subject to a subsequent environmental review.

Adaptive Management and Monitoring

This alternative formally incorporates the adaptive management concept into allotment management and permit administration. Adaptive management is a relatively new term in livestock grazing management but it is not a new concept. For over a century, allotments on National Forest System (NFS) lands have been managed using the concept. Forest managers observed resource conditions and adjusted management accordingly. These changes have been made in the form of incremental changes to livestock management practices or permitted on monitoring results. The process is based on a six step cycle identified in the figure below. The process by which adaptive management would fit into this alternative is described in detail below.

Livestock Grazing Program on NFS Lands

The current livestock grazing permits for the allotments in the project area include standards from the 1986 Toiyabe Land and Resource Management Plan and, where applicable, the Walker Resource Area of the BLM Resource Management Plan. The Toiyabe LRMP provides for the development of more site-specific standards if resource conditions warrant.



Rescission NEPA and Allotment Management Planning (Assess Situation and Design Solution)

After determining capability, suitability, and standards and guidelines in Forest Plans, these must be implemented on a site-specific level. Because Forest Plans are guiding documents, rather than a project decision, a two-stage decision making process is used in order to comply with other environmental regulations. On the Forest, the site-specific analysis is being done according to the schedule submitted to Congress for compliance with Section 504(a) of the Recission Act (PL 104-19) of 1995. (FSH 2209.21, Chapter 14). The NEPA analysis is done on the effects of grazing livestock within certain parameters on a site-specific piece of land. The Great Basin South Rangeland project is such a site-specific analysis.

The range NEPA analysis process begins with assessing the existing and desired condition of specific areas on the allotments. Inventories are completed in vegetation communities in each allotment. The number and location of these inventories is based on site-specific conditions in the project area. The conditions assessed include vegetation community distribution and diversity, topography, and past use. Inventories would be used to select key areas for monitoring livestock use and ecological trend.

In preparing for the Great Basin South Rangeland Project analysis, teams of resource specialists gathered condition data throughout the project area. This data is described in Chapter 3 of the FEIS. The data was compared to the condition matrices developed by the Humboldt-Toiyabe NF ecology staff and to Natural Resource Conservation Service (NRCS) range site information. Based on this comparison, the Forest determined that changes would be needed to improve resource conditions on some of the allotments. Thus, the proposed action includes site-specific use levels and other management actions for the riparian and upland areas in each allotment. These more site-specific standards would replace the default standards in the Term Grazing Permits. These site-specific standards would also be included in the Annual Operating Instructions (AOI) and AMP update.

Based on the selected alternative, the Forest Service then develops an Allotment Management Plan (AMP) and modifies the Term Grazing Permits to reflect any changes in standards, if necessary. The AMPs, authorized by the Federal Land Policy Management Act and the Public Rangeland Improvement Act, are a long-term plan of how each allotment will be managed to achieve desired future conditions and goals from the Forest Plan and those developed at the site-specific level during the “range NEPA” process. AMPs include livestock rotation schedules, utilization requirements, structural and non-structural improvements planned, maintenance standards, tentative grazing capacities, etc.

The livestock grazing permits for the allotments in the Great Basin Project area would be modified to reflect the changes described in the selected

alternative. These modifications would be issued once the decision could be implemented. The District Ranger may modify the annual use indicators if it is determined an alternate annual use indicator or strategy would be more effective in reaching or maintaining the desired conditions. The permits may be modified again if necessary.

Annual Livestock Permit Administration (Implement Solution)

The Annual Operating Instructions (AOI) is a set of instructions issued to the livestock permittees before each grazing season on how they are to manage their livestock while on the National Forest that year. AOIs include approximate numbers and rotation dates for grazing throughout the season. These numbers and dates, however, are simply a starting point (see discussion below). The AOIs are also incorporated into the Grazing Permit making them a binding term of the permit. Once all the standards and guidelines have been established, each allotment must be administered to meet those standards and guidelines. If the standards are appropriate, the desired future conditions and goals from the Forest Plan and AMPs should be met.

Permit administration is the key to successful livestock grazing on National Forest System lands. When livestock use standards have been met on a particular unit of land, the livestock must move to the next unit or leave the Forest if they are at the end of their rotation. This action is taken regardless of the scheduled move dates in the AOI or the numbers and season on the face of the permit.

Moving livestock based on use levels, such as stubble height, bank disturbance, percent utilization of the vegetation, or some other parameter, instead of scheduled dates, insures that resource needs are met, regardless of annual environmental variation. It also allows flexibility for Forest Service managers and permittees to meet desired future conditions. In a dry year where forage production levels are low, livestock will move through the allotments much faster than scheduled; therefore this results in a de facto reduction of livestock grazing capacity. For instance, during the summer of 2007, permittees removed their livestock from the project area up to a month earlier than scheduled in order to meet current use standards. Other allotments were not grazed at all due to drought conditions. Thus, while permitted numbers and seasons (AUMs) stayed the same, the actual use allowed in the project area was much lower due to reduced forage conditions.

Actual use can fluctuate for a variety of reasons, including the resolution of conflicts with other resources such as recreation, wildlife, or timber regeneration. By its very nature, the livestock grazing permit is a flexible, but powerful, tool for ensuring proper management of livestock grazing on National Forest System lands.

The permittees would be responsible for implementing the management strategies and ensuring the annual use indicators or strategies are followed. The Forest Service would monitor the implementation periodically.

Monitoring Plan (Monitor Actions)

Through the years, periodic livestock adjustments have been made, up and down, to better match the use with the existing resources, including other users. If several years of monitoring data show consistent problems with

meeting endpoint indicators and that the resource conditions are not meeting or moving toward desired conditions then changes would be made on a permanent basis. Monitoring is the key to adaptive management as grazing systems, kind or class of livestock, and resource standards continue to change through time.

In this project area, long-term trend monitoring sites have been established in key areas. These were used to assess rangeland conditions using the H-T matrices. In this alternative, they would be used to assess progress towards the desired condition. The sites evaluated to assess current conditions would be *re*-evaluated to measure progress towards desired conditions. The studies are an important part of the AMPs described above. Additional data may be collected, as needed.

Herbaceous and browse utilization observations would be conducted as needed on riparian habitat and upland key sites listed within the term grazing permits.

Operating instructions, and terms and conditions, would be monitored for compliance.

A long-term trend monitoring schedule would be established and incorporated into each AMP. Appropriate key areas would be established in representative areas that would help determine if the management practices that have been prescribed are moving the area towards the desired condition. Monitoring would follow Forest Service Handbook (FSH) accepted methodologies, including establishing photo points where appropriate.

The condition of sage grouse brood-rearing meadows described in the project design feature, above, would be monitored and evaluated using the matrices in Appendix 1. This would determine when or if livestock are allowed in those meadows.

The proposed action includes monitoring of livestock use patterns on the Masonic allotment to validate the assumption that livestock use will be widely dispersed and not affect rare plant habitat. On the Powell Mountain allotment monitoring will be conducted in Long Valley milkvetch habitat to validate assumptions in the analysis. This monitoring will include review of livestock use patterns in relation to rare plant population distribution, yearly vigor of the rare plants and habitat impacts. The monitoring would include site visits and generalized observations, not a quantitative assessment.

Long-term Grazing Administration (Evaluate progress, Adjust design)

As described previously, adaptive management allows flexibility during implementation to make adjustments due to changing conditions or results from the long- and short-term monitoring. Discussions between the Forest Service, interested parties and the grazing permittee(s) occur to address these issues:

- Past season grazing strategy,
- Triggers and annual use indicators,
- Results from any inventory or long-term condition and trend monitoring,
- Drought, fire or other issues that affected the previous grazing season,
- Any factors that could affect the up-coming grazing season, and

- Any changes needed in the grazing strategy to improve upon the conditions from the past seasons.
- Whether the past year's grazing left the rangeland in a condition which is likely to result in the desired trend towards meeting management objectives.

Any adjustments in grazing management would be to correct problems, take advantage of successes, or adjust for other conditions or events that may occur such as fire, drought, or economic conditions. Adjustments could include changing the timing or amount of time livestock are in any particular area, increasing riding to improve distribution, changing salting locations, changing triggers, or using temporary facilities such as fencing or water developments.

Over the long term, permitted numbers and seasons may be modified, if necessary, to balance the permitted numbers or season with the livestock manager's ability to meet annual use indicators and long-term objectives. The amount of adjustment in seasons or numbers of livestock, if any, is usually dependent on the effectiveness of the permittee's livestock management. The amount of change would be based on monitoring. Any permanent changes to numbers or seasons would be made through the term grazing permit and not subject to further environmental analysis.

Alternative Three: No Grazing

This alternative would phase out grazing. When current term grazing permits expire, new permits would not be issued. The last permits to expire would be at the end of the 2012 grazing season. This would result in a reduction of 9929 cattle animal unit months. The allotments would be managed under their current systems and standards until they become vacant.

Existing improvements that are no longer functional or needed would be removed. This would include interior fences, cattle guards, and water developments. This would occur over time as allotments become vacant and budgets allow.

Alternatives considered but eliminated from detailed study

Several other alternatives were considered but eliminated from detailed analysis.

- An alternative that would establish long-term monitoring and adaptive management but make no short-term adjustments in seasons-of-use was considered. This alternative was dropped because sufficient information is available to show the need for the adjustments in the Proposed Action.
- An alternative to remove existing livestock grazing facilities was considered, but eliminated from detailed study because existing facilities are needed for proper livestock grazing management.
- An alternative to implement ecosystem restoration projects was considered, but eliminated from detailed study. This alternative was

dropped because for two reasons 1) Projected costs from active ecosystem restoration such as berms or revegetation are too high to be considered reasonably implementable, 2) The proposed action restores ecosystems through implementation of the project design features and adjusting livestock grazing as needed to meet desired conditions.

- An alternative to reduce livestock numbers through use of only stubble height as a parameter was considered, but eliminated from detailed study because that parameter would not apply to all of the project area. Instead, the proposed action includes utilization and rest to improve vegetation condition on a site-specific basis.

Comparison of Alternatives

The comparison of alternatives draws together the conclusions from the information and discussion presented for the issues throughout this FEIS and provides the results of the analysis in a brief summary.

The Alternative Comparison Table provides a summary and comparison of the effects of implementing each alternative. Information in the table is focused on the issues identified for detailed analysis for this project. The effects of implementing each alternative are described in detail in Chapter Three.

Table 5: Comparison of the effects of the alternatives on the significant issues described in the FEIS.

Issue	Indicator	Alternative		
		No Action	Proposed Action	No Grazing
Riparian Vegetation: Aspen	Number of Aspen Seedlings and saplings	Unchanged or Decrease	Increase	Increase
Riparian Vegetation: Meadows	Species Composition	Unchanged or Decrease	Increase	Increase
	Percent Bare Ground	Unchanged or Increase	Decrease	Decrease
Upland Vegetation	Species Composition	Unchanged or Decrease	Increase	Increase
	Percent Bare Ground	Unchanged or Increase	Decrease	Decrease
Sage Grouse	Upland Species Composition	Unchanged or Decrease	Increase	Increase
	Riparian Meadow Quality	Unchanged or Decrease	Increase	Increase
Watersheds	Soil Compaction	Static	Decrease	Decrease
	Erosion	Static	Decrease	Decrease

CHAPTER THREE: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on those environments. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter.

The discussion in this chapter is arranged by affected resource and includes issues brought forward during the public and agency scoping process as well as other resources of concern as identified in Chapter One.

This section describes the direct effects, indirect effects, and cumulative effects.

Direct effects are those occurring at the same time and place. Indirect effects occur at a later time or at a different place. Cumulative effects result from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes the action. Generally, cumulative effects are considered on a larger scale than the direct and indirect effects, they describe a larger picture across a longer time frame. Determining the environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources, ecosystems and human communities of concern.

The Council on Environmental Quality regulations provide for identification of relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an EIS. If the information is essential to a reasoned choice among alternatives, it is included or addressed in an EIS.

Knowledge and information for complex ecosystems is incomplete. The components of these ecosystems include terrestrial and aquatic species, forestlands, rangelands, and human uses. They interact in ways that elude definition by even the most complex models. However, fundamental ecological relationships and interactions have been well established in the science. A substantial amount of Great Basin South project specific data and information have been collected, evaluated and used in this analysis. The alternatives and their effects were evaluated using the best available scientific information. While additional information may add greater precision to understanding the ecological, social and economic relationships, that information is unlikely to significantly change the basic understanding of these relationships and concepts. That information is not necessary to make a reasonable decision on this project.

No incomplete or unavailable information was deemed essential to a reasoned choice among the alternatives portrayed in this FEIS.

Livestock Grazing

Affected Environment

When the Forest Service was established in the western states, livestock were already using the lands heavily. Vegetation was already degraded and erosion was starting in many places (Alexander, 1987). Early agency managers worked hard at getting livestock numbers reduced, considering the challenges of doing the job with few employees and vast expanses of country that could only be accessed with a horse and packhorse. Grazing permits were based on the numbers of livestock the first ranchers grazed, and the season of use was determined by the weather. As soon as an area opened up in the spring, livestock started grazing it. With very few fences present on the landscape, livestock followed the most palatable forage wherever it occurred. Fall storms or lack of feed would drive livestock to lower elevations.

Ranchers historically used National Forest System land for cattle and sheep grazing during the summer months and moved their stock to the home ranch or other public lands for winter feeding. Domestic livestock have grazed the project area for more than 100 years. These lands were grazed prior to the formation of the USDA Forest Service. The size of these operations has been in decline since the late 1800's. For example, the number of cattle in Lyon, Mineral, and Mono Counties has declined from 59,700 head in 1985 to 46,000 head in 2005 (NASS 2006).

The project area contains 12 allotments, of which two are currently vacant. On these 12 allotments, there are four different permittees with permits to graze a total of 2,900 head of cattle. The grazing season varies by allotment with the earliest on-date being April 1 and the latest off-date being May 31 of the following year. The typical permit season lasts four months (Livestock Numbers and Seasons Map). Several of the allotments border lands administered by the Bureau of Land Management (BLM) in Nevada and California. There are limited physical or structural barriers between National Forest System Lands and the BLM. Therefore, domestic livestock drift between the two jurisdictions, but each land management agency administers their portion independently, but with cooperation with one another.

Current livestock management is summarized in the following table.

Changes in grazing standards or requirements may result in the need to adjust on or off dates, change labor requirements for moving livestock, change the amount or location of salt blocks, supplements, fences, or water developments, or change in the number of livestock in an allotment. Any additional fences or water development needs that are identified through adaptive management would have separate environmental analysis done as projects are identified. These changes would be based on resource conditions, current management, existing range improvements, topography, and the ability of the permittee to incorporate changes to the entire ranching operation.

Table 6: Current livestock management by allotment described in terms of kind and class of livestock, permitted numbers and season of use.

Current Livestock Management Table				
Allotment	Kind of Animals	Class of Animals	Available Numbers	Season of Use
Aurora	No Use	No Use	No Use	No Use
Conway	Cattle	Cow/calf	109	12/11-02/14
East Walker	Cattle	Cow/calf	452	12/1-03/31
Huntoon	Cattle	Cow/calf	165	11/16-04/15
Larkin Lake	Cattle	Cow/calf	446	11/01-11/30
Masonic	Cattle	Cow/calf	80	07/01-10/15
Nine Mile	Cattle	Cow/calf	1076	04/01-05/31
Nine Mile	Cattle	Cow/calf	102	10/1-11/30
Powell Mountain	Cattle	Cow/calf	151	06/01-10/15
Rough Creek	Cattle	Cow/calf	33	06/01-10/15
Squaw Creek	No Use	No Use	No Use	No Use
Wild Horse	Cattle	Cow/calf	50	12/01-05/31
Whiskey Flat	Cattle	Cow/calf	203	11/01 - 04/15

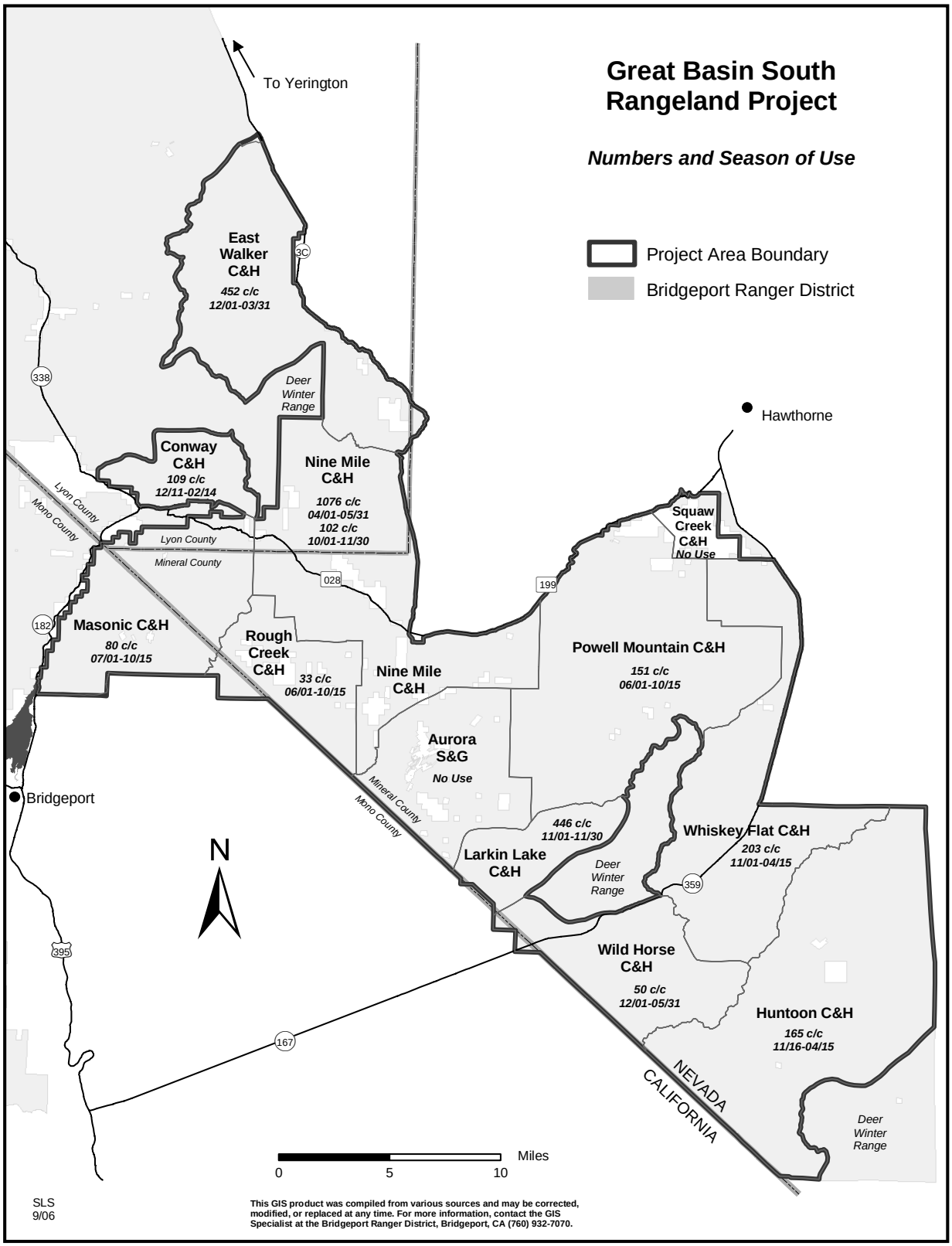


Figure 5: Map showing allotment locations and permitted numbers and season of use.

Environmental Consequences

No Action

Under this alternative there would be no change in the current utilization standards that have been directed through the Toiyabe Forest Plan and current term grazing permits. Implementation and the required compliance with these standards would remain in effect. If permittees are able to currently meet these standards, there should be no change in their current operation. There may still be areas where permittees have to change their operations to comply with the standards that are currently in their term grazing permits.

Proposed Action

This action provides for flexibility for permittees to adapt management and overall ranching operations to changes in range condition, along with annual influences such as weather and economics. The proposed action is intended to maintain healthy rangelands or improve the condition of the health of the rangeland resources where they have been impacted by livestock grazing. Periods of rest would be incorporated into the grazing systems, in some cases with an emphasis on the plant growing season, to aid in the reduction of use on key cool season grasses. To accomplish this, it may be necessary to establish new pastures within the existing allotments to increase control of livestock, or in certain cases increase stock density while shortening the overall duration in any one pasture. These pastures may be delineated by the use of natural topographic boundaries or with fences.

Under the proposed action permittees would need to change management strategies, which may affect the overall ranching operation. Permittees with allotments that have a large area at risk and not functioning as desired, there may be a larger impact to their ranching operation. Incorporating rest into allotments without the use of fences will require more intense management such as riding more often, strategic salting, and adjusting water availability. Timing or numbers of livestock may need to change in order to develop an upward trend toward meeting the desired conditions. Increasing allotment management means an increase in cost for the permittees. As part of adaptive management, a variety of management strategies can be used in addition to the changes already described in this alternative. These “tools” or strategies may be used if needed to 1) implement the changes in the proposed action or 2) address issues identified in the “evaluate progress” phase of adaptive management. These are described in the table on the next page.

For those allotments that are currently functioning as desired, just minor changes may be necessary to maintain the current desired conditions, with little overall effect to the ranching operation. Periods of rest and more intense management, such as increased riding, would be needed to help achieve management goals.

If areas within these allotments are functioning at risk without an upward trend, additional measures may need to be taken, such as: combining allotments, changing on-and off-dates, or installing range improvements such as fences, in order to provide the rest or protection needed to change the trend in condition of those areas. If the areas are currently functioning, the Forest Service can modify the annual use

Table 7: Livestock management practices available for use on allotments if conditions and trend dictate the need.

Management tool	Outcomes	Cautions
Alternate seasons of use	Utilize plants in different areas in different times of year. Provides for plant recovery during different times of year. Moves away from systems which graze livestock on the same piece of ground at the same time of year, every year.	Due to the time specific project design features for sage grouse and rare plants, this may not be possible.
Creating pastures within allotment to implement different grazing systems.	Allows more flexibility to add deferment or rest into an allotment. Allows timing changes. Can be accomplished with or without additional structural improvements.	Smaller pastures require more management. Costs are higher. Structural improvements such as fences require environmental analysis to implement and increased maintenance.
Herding (riding)	Better livestock distribution. Distribute utilization across the allotment into different plant communities. Ensures livestock moved out of pastures on time and thoroughly.	Increased expense for permittees.
Salting and supplement placement	Draw livestock away from water or riparian areas. Better livestock distribution within an allotment.	Heavy use in areas immediately adjacent to supplement
Managed timing of livestock grazing (rest)	Provides for growth and re-growth of plants at different times of year. Defers grazing in pastures within the allotment.	Intensified management requires more work. May result in some hot season use in given pastures.
Placement/repair of off-stream water sources	Better distribution of livestock away from riparian areas.	There is added expense when repairing or moving troughs. Requires additional NEPA to address site specific environmental concerns.

indicators or requirements in the proposed action if it can be shown that the modification would maintain or continue movement toward the desired conditions.

Elimination of grazing in the valley bottom on the Huntoon Allotment could reduce the feasibility of grazing on the allotment as a whole.

No Grazing

Under this alternative, ranchers would no longer be able to depend on the project area for forage for their livestock. They would be required to change their ranching operation to account for this loss of the available forage. This may include a change in use of their private lands, leasing other private lands, buying large amounts of feed, or selling livestock.

Vegetation

Analysis Process

Vegetation within the project area is typical of the Great Basin region and consists mostly of Wyoming and mountain big sagebrush, low and black sagebrush, pinyon/juniper, and salt desert shrub. Precipitation is very low from summer to mid-autumn. Summers are hot and dry with low humidity, and winters are cold and dry. The growing season ranges from 60 to 150 days and plant production can be low.

For the analysis, vegetation communities were delineated and mapped using data from several sources, including Natural Resource Conservation Service (NRCS), National Gap Analysis Program (GAP), and on-the-ground inspections.

GAP is a national-level effort for identifying the degree to which native animal species and natural communities are represented in our present-day mix of conservation lands. Vegetation is mapped from satellite imagery and other records using the National Vegetation Classification System (Federal Geographic Data Committee 1996). Data are combined and displayed with a computerized geographic information system (GIS) at a cartographic scale of 1:100,000.

NRCS soil surveys for Lyon and Mineral Counties were used in delineating salt desert shrub and sagebrush communities in the Nevada portion of the project (a Mono County NRCS soil survey was not available). “Pits, dumps, barren, and playas” were also derived from NRCS data. Aspen, meadow, and pinyon juniper communities were derived from both GAP and NRCS data.

A portion of the analysis area in Mono County California was not covered by GAP data. Range analysis data was used to fill in this information. There was only a very limited area of the project area where no vegetation data was available. Areas where vegetation data was unclear or unknown were inspected on the ground. The map reflects these inspections.

The Vegetation Type Table displays, by percent and acreage, the relative amount of each dominant vegetative community that is found within the analysis area.

Table 8: Type, acres, and relative amount of dominant vegetation in the project area.

Vegetation Type	% of project area	Acres (approximate)
Aspen	<1.0	320
Meadow	<1.0	40
Basin Big Sagebrush	<1.0	2,260
Mountain Big Sagebrush	5.0	26,500
Silver Sagebrush	<1.0	530
Wyoming Big Sagebrush/Low Sagebrush	31.0	144,400
Salt Desert Shrub	10.0	43,000
Pinyon/Juniper with shrub understory	1.0	4100
Pinyon/Juniper	51.0	189,170
No Vegetation (Pit/Dump/Barren/Playa)	<1.0	50
No Vegetation Data	<1.0	130
Total	**100.0**	**410,500**

Issue One: Riparian Communities

Aspen

Affected Environment

Aspen stands tend to occur as small islands on smooth to concave mountain side slopes of primarily northern exposure. Slopes range from four to 75 percent, but are typically 15 to 50 percent. Elevations range from 6500 to 9500 feet. Aspen stands in the project area are very limited and make up 320 acres which is approximately less than one, one thousandth (0.001) of a percent of the area. Aspen is located on the Masonic, Aurora, and Powell Mountain allotments. Currently only some of the aspen stands in the project area are grazed by cattle.

An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on an aspen site in the pristine environment. All aspen communities are multi-layered, where sufficient light is able to penetrate the canopy to support abundant undergrowth. It is recognized that aspen is dependent on large-scale disturbance such as fire (Campbell and Bartos 2000), and most aspen stands are even-aged because of the rapid reproduction by suckering following these major disturbances.

Uneven-aged stands are likely to form under stable aspen conditions where the overstory gradually disintegrates with disease or age and is replaced by suckers. Uneven-aged stands also occur where individual clones gradually expand into adjacent grasslands or

shrublands. Mountain brome, slender wheatgrass, Idaho fescue, horsemint, and groundsel are common understory species associated with the aspen type (USDA Soil Conservation Service, rev 1992).

Data collected in an aspen/sweet cicely stand on the Masonic allotment showed this stand to be in low ecological status, or “at risk”, according to the attributes in the aspen matrices in Appendix One. The matrices take the focus to from one or two factors indicative of health to multiple factors and thereby show us a bigger picture. Understory in this type was dominated by roundleaf snowberry, Sierran tansy mustard, twincrest onion, and nodding brome (USDA Forest Service, 1994).

Data collected in an aspen/dandelion stand on the Masonic allotment indicates moderate ecological status or “at risk”, according to the attributes in the aspen matrices in appendix one. Understory of this type was dominated by Booth willow, white-stemmed gooseberry, western yarrow, bigleaf avens, Nebraska sedge, smallwing sedge, and Kentucky bluegrass (USDA Forest Service, 1994).

Table 9: Current riparian (aspen) allowable utilization levels.

Allotment	Riparian Grass Utilization	Riparian Shrub Utilization
Aurora	No Use	No Use
Masonic	45%	20%
Powell Mountain	45%	20%

Currently aspen types are managed similarly to riparian communities. Riparian herbaceous utilization is limited to 45 percent or lower. Two allotments (Masonic and Powell Mountain) are managed at 45 percent, with the remaining allotment being vacant (Aurora). Riparian shrub utilization is limited to 20 percent or less. Two allotments are managed at 20 percent, with the remaining allotment being vacant.

Environmental Consequences

Grazing was frequently intense in the late 1800’s and early 1900’s, by different classes of livestock as well as occasionally by wild ungulates. This altered species composition and production (Mueggler 1988). Like wild ungulates and many other terrestrial species, domestic livestock are drawn to aspen communities because of their association with water and the quality of forage that is consistently found under aspen (Mueggler 1988).

Concentrated grazing by wildlife or livestock can impact aspen stands by removing the leaders and leaves of the young trees (suckers or saplings). When these young trees are browsed, they either cannot grow back or grow from the side instead of the top, which creates short bushy trees, instead of tall, straight trees. There may also be fewer total trees, which impacts the overall regeneration of the aspen stand. Limited browsing does not seem to negatively impact aspen stands.

If livestock congregate in the aspen stands when the soils are wet (early season), there is a potential for soil compaction that could reduce the soil’s ability to absorb and retain water. This could contribute to drying out of the soils, with increased bare ground and a

negative change in species composition (Mueggler 1998, Sheppard et al. 2006).

The larger stands are not usually impacted as much by herbivores as the smaller stands because it can be too difficult to access the interior of the larger stands, due to the heavy understory or dead and down trees. Larger stands seem to be mostly impacted on the edges (Sheppard et., al 2006).

Smaller stands, less than five acres in size, tend to be the most heavily impacted (Sheppard et., al 2006). The majority of the aspen stands in the project area are less than five acres in size; however some of these stands are inaccessible to domestic livestock. Small stands that are accessible to livestock will show the most impacts from domestic livestock within the project area.

Numbers of seedling and sapling trees would be used to indicate change under each alternative.

No Action

By continuing the use of current utilization levels on the shrub (20%) and understory vegetation (45%), browsing on seedling and saplings of aspen is limited. If utilization levels are exceeded, there can be a reduction in age class representation and little regeneration.

Usually the herbaceous component is grazed to standard prior to the shrub component. Therefore, the permittee moves the domestic livestock out of the area before the shrub component reaches allowable use. However, by maintaining current utilization standards, regardless of functioning condition or incorporating rest, the least amount of progress would be made toward desired condition.

The effects of continuing with current management could impact small stands of aspen by reducing or eliminating regeneration and reducing the health of the aspen stand.

Livestock grazing can remove the understory vegetation and if concentrated enough, potentially eliminate seedling and sapling establishment. The result would be a slow disappearance of these stands. Smaller stands are more accessible, therefore they are the most heavily impacted. Larger stands would be affected around the periphery and over time may show a reduction in size of the stand.

In aspen stands that are currently functioning as desired, the number of seedlings and saplings would remain the same or increase. In aspen stands that are currently functioning at risk or have crossed below the threshold, the number of seedlings and saplings would be expected to decrease.

Proposed Action

This alternative would limit the amount of browsing on aspen by livestock to 20 percent or less and would including rest one of three years on some stands. Maximum utilization limit on herbaceous vegetation within the aspen stands would be limited to a range of zero to 40 percent based upon functioning condition. The aspen stands located in the Masonic allotment would have utilization standards based upon the Matrices. Occasional rest may be required depending on the condition and location of the individual aspen stand.

For aspen stands located in the Aurora and Powell Mountain allotments, the

Proposed Action would prescribe periods of rest as well as limits on amounts of browsing (20%) and herbaceous utilization (40%). These provisions should allow for aspen regeneration to maintain stands at a desired functioning level. Aspen stands in the Aurora allotment may have been used as bedding or nooning grounds by domestic sheep. This type of heavy livestock concentration will not occur with cattle. Many of the stands are inaccessible to domestic cows and will not be impacted by the change in class of livestock (Shepperd et., al. 2006). Utilization levels within the aspen stands are set at levels that can sustain domestic livestock use.

Grazing intensities will be light under the proposed action therefore, those stands that are currently not functioning as desired should move toward functioning as desired (Sheppard et., al 2006). It may not be ecologically or economically feasible to restore aspen stands that have crossed below threshold. Consequently, improvement in those stands that have crossed the threshold may never be documented or would be documented long after the life of this project.

In aspen stands that are currently functioning as desired, the number of seedlings and saplings would remain the same or increase. In aspen stands that are currently functioning at risk or have crossed below the threshold, the number of seedlings and saplings would be expected to increase (Sheppard et., al 2006).

No Grazing

Under this alternative, use from livestock would decrease to zero after term grazing permits expire. Implementation of the no grazing alternative would allow for restoration of aspen stands in the least amount of time. There would still be some browsing by wildlife, but this browsing should have a minimal impact to the aspen. By eliminating domestic livestock grazing and trampling in the aspen clones, natural processes would move the aspen clone into recovery mode. Existing vegetation would increase in vigor and density, bare ground would decrease, and increased vegetation would allow for more sediment to be trapped and decrease erosion.

The elimination of cattle grazing in an aspen stand reduces browsing on the aspen suckers and allows them to grow into larger size classes (Kay and Bartos, 2000). With protection from cattle grazing, aspen stands have successfully established new stems without fire or other disturbance and increased in size (Kay and Bartos, 2000). The rate of recovery would depend on the current condition of an aspen stand. Again, aspen stands that are not functioning as desired would recover faster than areas that have crossed below threshold. Areas that have crossed below threshold may not fully recover.

Recovery in the Great Basin is a slow process; therefore it may take many years or possibly even decades before changes become noticeable. It may not be ecologically or economically feasible to restore aspen stands that have crossed below threshold. Consequently, changes in the aspen clone may never be documented or would be documented long after the life of this project.

In aspen stands that are currently functioning as desired, the number of seedlings and saplings would increase.

In aspen stands that are currently functioning at risk or have crossed below the threshold, the number of seedlings and saplings would be expected to increase.

Meadows

Affected Environment

Wet meadows are adjacent to streams with above-ground flow and fens with water that flows below the surface where vegetation communities are strongly influenced by the presence of water. It is essentially a transitional area between the aquatic environment and the upland environment, and in the project area is usually very narrow. Vegetation typically found in wet meadows may include willows, sedges, and grasses.

Wet meadows are very limited in the project area. There are only approximately 40 acres, which is less than one hundredth thousandth (0.0001) of a percent of the area. Dry/moist and wet meadows were combined for mapping purposes so the acreage is reported together. However, their ecological and economic importance exceeds the relative area they occupy. For example, wet meadow areas filter sediments and nutrients from floodwaters and upland runoff, prevent erosion during flood flows by binding stream banks, provide wildlife habitat, and provide thermal cover for aquatic and terrestrial life (Mosely et al. 1977).

Vegetation stability along stream banks determines how well a stream would withstand erosion during high stream flows. A stable bank is covered by vigorous vegetation or rocks that bind the soil.

Water sources scattered throughout the project area are minimal. Not all water sources have meadows associated with them.

Dry to moist meadow community types occur within the project area and are generally areas where the depth to groundwater is 100 plus centimeters for dry meadows and 55 to 100 centimeters for the moist meadow community (Appendix One). Dry to moist meadows occur on slopes of one to ten percent and at elevations of 5,200 to 9,700 feet.

Under optimal conditions, dry to moist meadows should be occupied by species such as Sandberg's bluegrass (*Poa secunda*), slender wheatgrass (*Elymus trachycaulus*), Great Basin wildrye (*Leymus cinereus*), tufted hairgrass (*Deschampsia caespitosa*), oatgrass (*Danthonia spp.*), and Douglas sedge (*Carex douglasii*). Because tufted hairgrass is a bunchgrass, which reproduces by seed, it has a competitive disadvantage compared to sedges and grasses that spread vegetatively. The typically clayey or clayey-skeletal soils are susceptible to compaction when wet, and as sites dry, they are less likely to be compacted under light to moderate grazing (Manning and Padgett, 1995).

Land management can cause wet meadows to convert to dry/moist meadows. Forb and shrub species that are present the dry to moist meadows, which have been converted from wet meadows, include Kentucky bluegrass (*Poa pratensis*), redtop (*Agrostis stolonifera*), dandelion (*Taraxacum officinale*), Western yarrow (*Achillea millefolium*), aster (*Aster spp.*), and wild iris (*Iris missouriensis*).

A dry meadow, Kentucky bluegrass site on the Masonic allotment, is rated as high ecological status, or "functioning as desired", with zero percent bare ground (USDA, Forest Service, 2004).

Three dry meadow, Douglas sedge sites on the Masonic and Aurora allotments are rated in low ecological status or "crossed below the threshold". Percent bare ground and relative forb cover were among the attributes that pushed these sites into the low ecological class (USDA, Forest Service 2004).

Two wet meadow, sandbar willow sites on the Ninemile allotment along Rough Creek, are rated in moderate ecological status, or "at risk". Relative forb cover and forb/shrub species present, that are indicative of management problems, were among the attributes that pushed these sites into the moderate ecological class (USDA, Forest Service, 2004).

A wet meadow, cows clover site on the Ninemile allotment, along Rough Creek, is rated in moderate ecological status, or "at risk". Percent bare ground, relative forb cover and forb/shrub species present, that are indicative of management problems, were among the attributes that pushed these sites into the moderate ecological class (USDA, Forest Service, 2004).

A wet meadow, Nebraska sedge site on the Ninemile Allotment, along Rough Creek, is rated in moderate ecological status, or "at risk". Percent bare ground, relative forb cover and forb/shrub species present that are indicative of management problems, were among the attributes that pushed these sites into the moderate ecological class (USDA, Forest Service, 2004).

Riparian herbaceous utilization is limited to 45 percent or lower. Three allotments are managed at 45 percent (Masonic, Ninemile, and Rough Creek), with the remaining allotment being vacant (Aurora). Riparian shrub utilization is limited to 20 percent or less. Three allotments are managed at 20 percent (Masonic, Ninemile, and Rough Creek), with the remaining allotment being vacant (Aurora). Meadow systems in the Aurora allotment are small and size and did not show up in vegetation mapping efforts, therefore are not reflected in the *Hydrology* map. Local expertise speaks to the presence of meadows on the Aurora allotment.

Table 10: Current riparian allowable utilization levels.

Allotment Name	Riparian Grass Utilization	Riparian Shrub Utilization
Aurora	No Use	No Use
Masonic	45%	20%
Ninemile	45%	20%
Rough Creek	45%	20%

Environmental Consequences

Research suggests that the effects of livestock grazing on meadows vary depending on the intensity of grazing more than on the timing and duration of grazing. Too much grazing, especially season-long, would weaken the desirable fibrous heavy-rooted grasses and grass-like species. Under intense grazing, livestock can trample and compact the soils, which over time can create hummocks, increase bare ground, and lower the water table. As the desirable plants weaken, less desirable plants move in that survive and thrive on areas with lowered water tables (Platts, 1990).

Manning and Padgett (1995) suggest that management of wet meadows should allow for regrowth at the end of the grazing season to replenish spring growth. The typically wet, fine-textured

soils are susceptible to compaction by excessive livestock use. Particularly if the sod layer is broken and hummocks are already present, this compaction can cause an increase in number and size of hummocks. Under rigorous grazing pressure, especially when accompanied by a drop in the water table, Nebraska sedge can be replaced by other species with wider tolerances to environmental conditions, such as Baltic rush, meadow barley, or Kentucky bluegrass (Platts, 1990). Additional vegetative changes include and increase in forb cover under heavy cattle grazing (Clary and Webster, 1989). Forb species that are present in these converted wet meadows include dock, thistle, water hemlock, yellow pea, dandelion, Western yarrow, aster and false hellebore. These plants have a deep tap root system and are capable of extracting water from compacted soils.

Forb species that are present in wet meadows that are not functioning as desired include dock (*Rumex spp.*), thistle (*Carduus spp.*), water hemlock (*Cicuta spp.*), yellow pea (*Lathyrus aphaca*), dandelion, Western yarrow, aster and false hellebore (*Veratrum spp.*). These plants have a deep tap root system and are capable of extracting water from compacted soils.

Dry to moist meadow types are most likely the first plant communities to experience impacts from cattle, and have been affected by cattle grazing more than any other vegetation community. Early in the season, when water is more abundant, cattle generally stay out of the wet meadow areas, concentrating on the dry to moist meadow vegetation.

The dry/moist and wet meadow type is a *very* small portion of the project area; however, cattle have a tendency to collect in the meadow, especially wet meadow, environments. It has been shown that they spend more time in the riparian areas, mid-late summer season than in the late spring or early summer, when they distribute their time more evenly between the uplands and riparian areas (Parsons, et al. 2003). This is important to this project area because the riparian areas that are within the project area are on the allotments that are grazed during the summer/early fall season.

Using a grazing strategy in riparian areas that provides for re-growth of riparian plants should leave an adequate amount of vegetation at the time of grazing to maintain plant vigor and provide stream bank protection. Allowing forage plants to regrow should provide vegetation cover for stream bank protection during the following winter and early spring high flow periods (Clary and Webster 1989). Maintaining appropriate use indicators can help preserve plant vigor, reduce browsing on willows, stabilize sedimentation, and limit stream bank trampling.

Meadows are often comprised of different dominant plant species. Although drier types are closely associated with wetter types, livestock may use drier areas at different times. Livestock use in spring and early summer tends to begin on the dry to moist meadow sites earlier because of accessibility. The wetter meadows are saturated at this time and inaccessible to livestock. The desirable plant species are favored during this time period.

If livestock are in meadow communities early and for extended periods of time, soils can become compacted and less able to absorb and store water.This can

result in the phasing out of plants that require more water for longer periods of time, and establishment of plants that can take advantage of greater depths-to-water later in the season. An increase in bare ground and an undesirable change in grasses and forbs increases the potential for the establishment of weedy species. No meadows systems in the project area are currently grazed early in the season.

Streamside vegetation serves as a natural trap to retain sediments during high flows (Clary and Webster 1989). Under grazing levels where plant vigor is promoted and sediments can be captured, desired plants can maintain their health and site integrity remains. If the site is functioning at risk, such as in the Ninemile allotment, light to moderate grazing and periodic rest should allow for the site to begin moving to an upward trend (Holechek et al. 1999).

No Action

By maintaining current utilization standards in riparian areas, the least amount of progress would be made toward desired condition. The physical conditions of the riparian areas would remain relatively unchanged throughout the project area.

Meadow systems that are functioning as desired on the Masonic allotment, with a maximum allowable use of 45 percent would continue to function adequately. They would maintain plant species composition and have adequate ground cover, and not allow for weedy species establishment.

Physical conditions of the riparian areas would stay somewhat the same across the project area. Maintaining current standards would not degrade riparian areas that are functioning as desired.

Effects to riparian areas that are not meeting desired function or have crossed below threshold could perhaps be negative under the no action alternative. Riparian areas that are currently not meeting desired function or have crossed below threshold, such as those on the Aurora, Masonic, and Ninemile allotments, are more susceptible to disturbance events. Riparian areas that are currently functioning as desired would likely remain so, or possibly move toward an upward trend.

Two indicators for comparing alternatives relative to the effects of livestock grazing on riparian areas were discussed in Chapter Two. Under current management, species composition would remain unchanged or decrease. Percent bare ground would remain unchanged or increase.

Proposed Action

Severity of livestock effects on physical riparian function is related to the amount of time the livestock spend in the riparian area and the amount of plant material used while there. By setting utilization standards based upon functioning condition, livestock would likely be spending less time in riparian areas that are not functioning as desired and have crossed below the threshold and progress would be made toward desired condition.

In meadow systems that are functioning as desired, maximum utilization levels would be 40 percent at the end of the grazing season. Plants would remain healthy and well rooted, soils would be capable of holding water, stream banks would be healthy, bare soils would be at a minimum, and species composition would be as expected.

In meadow areas that already have structural range improvements in place (i.e. fences), such as on the Masonic Allotment, those would continue be used to incorporate rest into the meadow systems. This would provide rest to meadow systems at least one of three years. Those meadows that are currently functioning as desired should remain in a functioning condition.

For meadow systems that are functioning at risk or have crossed below the threshold, utilization levels would be less than 30 percent in the southern portion of the Masonic and Rough Creek allotments. It would be important to understand current condition of the system when determining management for these meadows. Meadow systems that are functioning at risk with an upward trend would be managed differently than those systems that are at risk with a downward trend. Meadow systems at risk with an upward trend would be allowed higher utilization levels than a system functioning at risk with a downward trend rating. The above approach would be applied to meadow systems on the Ninemile allotment.

Periodic rest in these systems should allow for decreased bare ground, an increase in desirable species and species composition, and an improvement in overall hydrologic function. The accumulation of litter over a period of years seems to retard herbage production in wet meadow areas; thus, some grazing of riparian areas could have beneficial effects.

Meadow systems that have crossed below the threshold, such as those in the Aurora and Masonic allotments, should begin a slow recovery with reduced utilization levels and prescriptive rest.

There are very small meadows in the Aurora allotment that do not show up on the vegetation layers. These meadows are especially important to sage grouse. If necessary, these meadows would have additional protective measures in place before livestock are re-authorized back into the allotment. Utilization on herbaceous species would be 40% and browse utilization would be 20%. Rest would be incorporated one of three years.

In the past the Aurora allotment was grazed by sheep during the summer season. Because a herder was present with the sheep at all times, meadows systems could be avoided. Under the proposed action, the Aurora allotment would be grazed by cattle and incorporated into the Nine Mile allotment. No additional numbers or AUMs would be authorized. Because cattle spend more time in riparian areas during the mid to late summer season, active management will be needed to stay within the 40%/20% utilization standards in these ***very*** small meadow systems. This can be accomplished by more intensive and frequent riding, strategic salting, or other non-structural means. If necessary, structural improvements such as fences and/or off-site water development would be used. The latter would be subject to additional environmental analysis.

This alternative would limit the amount of browsing on willows and other riparian shrubs by livestock to 20 percent or less. Maximum utilization level on herbaceous vegetation within the riparian areas would be limited to a range of zero to 40 percent based upon functioning condition. These standards

should allow for improvement toward a desired functioning level.

The current functioning condition of the meadow complex would determine the rate of recovery. Ecosystems in the Great Basin region show slow recovery rates. Recovery can be expected to take longer on sites that do not meet desired function; sites that have crossed below threshold may never fully recover. Management changes associated with this alternative would lead to recovery in riparian areas that do not meet desired function. It may not be ecologically or economically feasible to restore riparian areas that have crossed below threshold (Laycock, 1994). Since recovery, however slow, is expected under this alternative, there are no direct detrimental effects to accumulate.

Two indicators for comparing alternatives relative to the effects of livestock grazing on riparian areas were discussed in Chapter Two. Under this alternative, species composition would increase and percent bare ground would decrease.

No Grazing

Under this alternative, as term grazing permits expire, they would not be renewed, therefore eliminating domestic livestock grazing in these areas. Implementation of the no grazing alternative would allow for restoration of wet/moist/dry meadows in the least amount of time, regardless of functioning condition. By eliminating domestic livestock trampling and grazing in the riparian zone, natural processes would move the vegetation and soils toward recovery. Existing vegetation would increase in vigor and density, allowing more sediment to be trapped and decreasing bare ground and erosion.

The rate of recovery would depend on the current condition of the meadow complex. Again, meadow areas that are not functioning as desired would recover faster than areas that have crossed below threshold. Areas that have crossed below threshold may not fully recover. Management changes associated with this alternative would lead to recovery in riparian areas that do not meet desired function. Recovery in the Great Basin is a slow process; therefore it may take many years or possibly even decades before changes become noticeable (Laycock, 1994). It may not be ecologically or economically feasible to restore meadow areas that have crossed below threshold.

Consequently, changes would be noted long after the life of this project. Since recovery is expected under this alternative, there are no direct detrimental effects to accumulate.

Dry to moist meadows would recover at a slower rate than wet meadows, but would still recover at a faster rate than in either of the other alternatives. Over time, there would be more desirable species composition in the meadow systems, as well as a decrease in bare ground.

Two indicators for comparing alternatives relative to the effects of livestock grazing on riparian areas were discussed in Chapter Two. With no livestock grazing, species composition and canopy cover would increase and percent bare ground would decrease.

Issue Two: Upland Communities

Affected Environment

The project area supports many upland vegetation community types. Those that

can be affected by livestock grazing and are therefore analyzed in this document are basin big sagebrush, mountain big sagebrush, silver sagebrush, Wyoming big sagebrush/low sagebrush, salt desert shrub, and pinyon/juniper with shrub understory.

Sagebrush communities make up 43 percent of the project area totaling approximately 176,500 acres. They exist from about 4,400 feet to 11,000 feet in elevation. Because of the vast acreage and large range in elevation, these communities are the most significant vegetative types in the project area.

Historically, heavy livestock grazing reduced the fine fuels, such as grasses, that are an important component contributing to fire frequency regimes in sagebrush. Fire can be an important disturbance that helps maintain a low degree of canopy cover, 10-30 percent that is critical for a functioning sagebrush ecosystem (Humboldt-Toiyabe Matrices). Grazing by herbivores increases patchiness of vegetation which should increase diversity of both plants and animals on a *landscape* level (Laycock 1994). The natural fire frequency varies depending on the type of sagebrush community. Throughout the Great Basin's sagebrush communities, decrease in fire frequency and historic heavy grazing have resulted in an increase in dominancy by both sagebrush and pinyon species (Miller et., al 1994). Wyoming big sagebrush cover has increased from less than 10-20 percent and mountain big sagebrush cover from less than 20 percent to 30-40 percent. As sagebrush canopy cover increases, understory vegetation, such as grasses and forbs, decreases. Adequate sagebrush canopy covers as well as a good understory vegetation component is important to overall ecosystem heath. This trend can be observed throughout the project area.

Basin Big Sagebrush

Basin big sagebrush *(Artemisia tridentata* ssp. *Tridentata)* sites tend to occur on floodplains and alluvial fans. Slopes range from zero to four percent. Elevations range from 4500 to 6800 feet. The basin big sagebrush type is limited to approximately 2,300 acres, less than one percent of the project area, which is mainly located along Rough and Bodie Creeks.

The plant community is dominated by basin big sagebrush, with an understory of Great Basin wildrye *(Leymus cinereus)*, Indian ricegrass *(Achnatherum hymenoides)*, Thurber's needlegrass *(Achnatherum thurberianum)*, needle and thread *(Hesperostipa comata)*, squirreltail *(Elymus elymoides)*, and some antelope bitterbrush *(Purshia tridentata)*. As ecological condition declines, black greasewood *(Sarcobatus vermiculatus)*, basin big sagebrush, and inland saltgrass *(Distichlis spicata*) become dominant and Great Basin wildrye decreases in the plant community. Black greasewood can become a co-dominant shrub in lower condition classes of this site. Rubber rabbitbrush *(Ericameria nauseosa)*can also become dominant. Species most likely to invade this site are annuals (USDA Natural Resource Conservation Service, rev 1992, rev 2000).

Field observations have noted that the basin big sagebrush communities are in similar condition to the Wyoming big sagebrush communities, which is "at risk." Percent bare ground and species composition are indicators for this type.

Mountain Big Sagebrush

Mountain big sagebrush sites tend to occur on mountain side slopes and toe slopes and mountain valley fans on all aspects. Although this community occurs on all aspects, it is usually restricted to northerly aspects at lower elevations. Slopes range from two to 50 percent, but slope gradients of four to 30 percent are most typical. Elevations range from 6000 to 9000 feet. The mountain big sagebrush type is limited to approximately 26,500 acres, five percent of the project area.

This plant community is dominated by needlegrasses, mountain big sagebrush *(Artemisia tridentata* ssp. *Vaseyana)* and antelope bitterbrush. As ecological condition declines, mountain big sagebrush, snowberry*(Symphoricarpos spp.)*, currant *(Ribes spp.)*, and rabbitbrush would increase as needlegrasses decrease. Species most likely to invade this site are cheatgrass *(Bromus tectorum)*, mustards, and other annual forbs. Singleleaf pinyon *(Pinus monophylla)* and Utah juniper *(Juniperus osteosperma)* would invade this site when it occurs adjacent to these woodlands (USDA Natural Resource Conservation Service, rev 2000, rev 1997).

Indicators for this type are percent bare ground and species composition.

An assessment plot on the Aurora allotment west of Mount Hicks is “at risk” (close to functioning). Bare ground is 28 percent (less than 20 percent is functioning) and there was zero percent cover of grasses, forbs, and shrubs that are indicative of management problems (USDA Forest Service, 2004),

An assessment plot on the Aurora allotment northwest of Spring Peak “functions as desired”. Bare ground is 48 percent and there was one percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004).

An assessment plot on the Masonic allotment, southeast of Masonic Mountain, “functions as desired”. Bare ground is 48 percent and there is no cover of grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2006).

An assessment plot on the Wildhorse allotment, south of pole line road, is “at risk.” Bare ground is 47% and there is a 7 percent cover of shrubs that indicate management problems. The overall vegetation is functioning well but the ground cover needs to increase (USDA Forest Service, 2006).

The community type mountain big sagebrush/basin wildrye has been noted on the Masonic allotment. The data from this indicates a ”functioning as desired” condition according to the attributes in the mountain sagebrush matrix in Appendix 1.

Silver Sagebrush

Silver sagebrush sites tend to occur on intermountain basins and depression areas within intermountain valleys. Slopes range from zero to eight percent, but slope gradients of two to four percent are most typical. Elevations range from 5000 to 9200 feet. The silver sagebrush type is limited to approximately 200 acres, less than one one thousandth of a percent (0.001) of the project area.

The plant community is dominated by silver sagebrush *(Artemisia cana)*, Nevada bluegrass, Letterman or

California needlegrass *(Achnatherum lettermanii, Achnatherum occidentale* ssp. *Californicum)*, mat muhly *(Muhlenbergia richardsonis)*, and creeping wildrye *(Elymus spp)*. When livestock overuses the site, needlegrasses, western wheatgrass *(Pascopyrum smithii)*, and forbs decline while mat muhly and silver sagebrush increase. Lupine *(Lupinus spp)* species increase under disturbed conditions. Big sagebrush species increase as the water table drops or conditions become dry. Species most likely to invade this type are annuals such as cheatgrass and mustards (USDA Soil Conservation Service 1992).

Percent bare ground and species composition are indicators for this type.

An assessment plot on the Powell Mountain allotment, on Upper Powell Flat, "functions as desired." Bare ground was 51%, a little high, but the overall vegetative condition is desirable.

Wyoming Big Sagebrush/Low Sagebrush

Wyoming big sagebrush/low sagebrush occurs on a variety of sites including summits and side slope, pediment slopes, hills, lower mountain side slopes, rock pediments, foothills, alluvial flats, high windswept mountain ridges, mountain summits and plateaus of all aspects. Wyoming big sagebrush is found mostly on the plains and in the foothills, characteristically below (in elevation) but in contact with the zone of mountain big sagebrush. Low sagebrush is found on dry plains and slopes, commonly in shallower soil or less favorable sites than the big sagebrushes. For both species, slopes range from zero to over 75 percent, but slope gradients of two to 50 percent are most typical. Elevations range from 4400 to 11,000 feet. The Wyoming big sagebrush/low sagebrush type totals approximately 144,500 acres or 31 percent of the project area.

The plant community is dominated by needlegrasses, bluegrasses, Wyoming big sagebrush, low sagebrush *(Artemisia arbuscula)*, antelope bitterbrush, green ephedra *(Ephedra spp.)*, spiny hopsage *(Grayia spinosa)*, Indian ricegrass, prairie junegrass *(Koeleria macrantha)*, and bottlebrush squirreltail. When livestock and wild horses overuse this vegetation type, big sagebrush, low sagebrush, currant, Anderson peachbrush *(Prunus andersonii)*, spiny hopsage, littleleaf horsebrush *(Tetradymia glabrata)*, and rabbitbrush would increase, while needlegrasses, Indian ricegrass, basin wildrye, perennial bunchgrasses, and antelope bitterbrush would decrease. Bottlebrush squirreltail and Sandberg bluegrass can initially increase in the plant community understory with a decline in ecological condition. If overgrazing continues, perennial grasses would be eliminated and browsing on spiny hopsage may occur. Species most likely to invade this site are cheatgrass, mustards, Russian thistle *(Salsola spp.)*, filaree *(Erodium spp.)*, pinyon/juniper, and other annual forbs. Singleleaf pinyon and Utah juniper would invade this site where it occurs adjacent to these woodlands.

Table 11: Functioning condition assessment of Wyoming big sagebrush sites using ecological parameters described in Humboldt-Toiyabe matrices (Appendix 1).

Allotment	Location	Functioning Condition	Comments[3]
Conway	north of the East Walker River	"at risk"	bare ground is 65% (greater than 50% has "crossed below the threshold); 0% cover of the grasses, forbs, and shrubs that indicate management problems
Conway	north of the East Walker River	"functioning as desired"	bare ground is 14% and there is 0% cover of grasses, forbs, and shrubs that indicate management problems
Larkin Lake	Alkali Valley	"at risk"	bare ground is 85% and there was 7% cover of the grasses, forbs, and shrubs that indicate management problems
Masonic	south of the East Walker River	"functioning as desired"	bare ground is 43%, which indicated ground cover needs to increase, but overall vegetative condition is functioning
Nine Mile	Nine Mile Flat	"at risk"	bare ground is 74% and there was 0% cover of the grasses, forbs, and shurbs that indicate management problems
Powell Mountain	near Alkali Lake	"at risk"	bare ground is 48% and there was 8% cover of the grasses, forbs, and shrubs that indicate management problems
Powell Mountain	Lower Powell Flat	"at risk"	bare ground is 57% and there was 6% cover of the grasses, forbs, and shrubs that indicate management problems
Whiskey Flat	Little Whiskey Flat	"at risk"	bare ground is 79% and there was 1% cover of the grasses, forbs, and shrubs that indicate management problems
Whiskey Flat	Whiskey Flat	"at risk"	bare ground is 60% and there was 1% cover of the grasses, forbs, and shrubs that indicate management problems
Wildhorse	west of unnamed dry lakes	"functioning as desired"	bare ground is 40% which indicated that ground cover needs to increase, but overall vegetative condition is functioning
East Walker	near Twin Springs	"functioning as desired"	bare ground is 14%, 62% rock (less than 60% is functioning) and there was 0% cover of the grasses, forbs, and shrubs that indicate management problems
East Walker	near Paralde Springs	"at risk"	relative cover of grasses that are indicative of desired condition is too low (2%) and cheatgrass cover is too high at 14%; ground cover is adequate
Rough Creek	south of China Camp	"at risk"	relative cover of grasses that are indicative of desired condition is too low (less than 1%); overall ground cover is adequate, but too close to "at risk" category

[3] All data described is from Bridgeport range management 2210 data files (USDA-FS 2004 and 2006).

When Utah juniper and singleleaf pinyon occupy this site, these trees compete with other species for available light, moisture, and nutrients (USDA Soil Conservation Service, rev. 1992, USDA Natural Resource Conservation Service, rev. 2000).

Based upon data collected in the Wyoming big sagebrush/low sagebrush vegetation community over the last several years in the project area, it is estimated that 20 percent of this vegetation community "functions as desired" and the remaining 80 percent is in some stage of the "at risk" category. Please refer to table below that describes recent data collected.

Field observations show that the effects of past heavy grazing use and season of use (timing) remain today. This use has contributed to grass, especially cool-season species, and forb reductions within the Wyoming sagebrush communities that are grazed during the plants' growing season.

Indicators for this type are percent bare ground and species composition.

Salt Desert Shrub

The salt desert shrub community tends to occur in the lowest elevations in the project area, on fan remnants and inset fans. It also occurs on sand sheets deposited over various landforms. Slopes range from zero to 30 percent. Elevations are from 4000 to 5500 feet. The salt desert shrub community totals 43,000 acres or ten percent of the project area.

Dominant shrubs are four-wing saltbush and winterfat. Green rabbitbrush, spiny hopsage, littleleaf horsebrush, and Nevada indigobush are other shrubs present in the community. Indian ricegrass dominates the herbaceous cover.

Huntoon Valley makes up approximately 58% of the salt desert shrub community in the project area.

An assessment plot on the Huntoon allotment in the southeast corner of Huntoon Valley does not "function as desired." Bare ground is 69 percent (less than 60 percent is functioning) and there was zero percent cover of grasses, forbs, and shrubs that are indicative of management problems. There was only one grass species present (three percent) of the species that are indicative of desired function. Fifteen to 40 percent cover is desired (USDA Forest Service, 2004),

An assessment plot on the Huntoon allotment near a cow camp in the in Huntoon Valley does not "function as desired." Bare ground is 92 percent, (less than 60 percent is functioning) and there was zero percent cover of the grasses, forbs, and shrubs that indicate management problems. There was only one grass species present (1 percent) of the species that indicate desired function. Fifteen to 40 percent cover is desired (USDA Forest Service, 2004),

Field observations show that the effects of past heavy grazing use and season of use remain today. This use has contributed to grass, especially cool season species, and forb reductions within the salt desert shrub community in Huntoon Valley.

Indicators for this type are percent bare ground and species composition.

Pinyon/Juniper with shrub understory

The pinyon/juniper with shrub understory site occurs on mountain slopes on all aspects. Slopes range from two to 75 percent, but are typically two to 50 percent. Elevations are from about 4800 to 8000 feet. The Pinyon/Juniper with shrub understory type totals 4100 acres or about one percent of the project area.

The site is dominated by singleleaf pinyon. Utah juniper occurs sporadically throughout the tree canopy, but may dominate. Mountain big sagebrush, antelope bitterbrush, and Wyoming big sagebrush are the principal understory shrubs. Where Utah juniper dominates, Wyoming big sagebrush is the principal understory shrub, while gooseberry *(Ribes spp.)* and ephedra are other important shrubs in the understory community. Needlegrasses, Indian ricegrass, muttongrass *(Poa fendleriana)*, and bluegrass are the most prevalent understory grasses. Cheatgrass and thistles are species likely to invade this plant community after disturbance, especially below 6,300 feet. (USDA Natural Resource Conservation Service, rev. 2000, USDA Soil Conservation Service, rev 1992, Miller and Tausch, 2001).

Field observations have noted that Pinyon/Juniper with shrub understory communities are in similar condition to the Wyoming big sagebrush communities. Indicators for this type are percent bare ground and species composition.

Figure 6: Pinyon-juniper woodland in the Aurora allotment. Picture shows Mount Hicks in the background.

Pinyon/Juniper

The pinyon/juniper woodland occurs as a forest type, but more often is woodland because trees are generally shorter than 20 feet and crowns rarely touch (Eyre, 1980). Elevation ranges from 4500 to 8000 feet. The pinyon/juniper type totals 189,000 acres or 51 percent of the project area.

Singleleaf pinyon dominates, while Utah juniper is the most important juniper species of the type. The canopy coverage is greater than 30 percent and shrubs and grasses are sparse. There is little understory present in this community type. The understory, if present, in this type is similar to the understory in the pinyon/juniper with shrub understory type. This woodland is typically not grazed by domestic livestock due to slope and lack of vegetative cover in the understory.

Environmental Consequences

It is well known that the degree of forage removal affects individual plants, plant succession, forage production, and modifies microclimate and soil (Schwan et., al. 1949). Moderate stocking rates show increases in forage production over heaving stocking rates and different rotation schemes (Holecheck, et., al 1998). Livestock grazing can cause alteration of species composition, ecosystem function, and ecosystem structure (Fleischner 1994; Huntly 1991). It is well known that unmanaged or improperly managed grazing can be detrimental to vegetation communities. None of the alternatives analyzed in this document allow for heavy grazing, but we do know that under heavy grazing, plants show a loss of vigor and reduction of reproduction activity (Stoddart et al. 1975; Vallentine 1980).

Managed properly, grazing is a natural process that can maintain plant health (Bradford, et al. 2002). It can also be used as a land treatment, to decrease unwanted species, and provide more desirable plant communities (Bradford, et al. 2002). A plant subjected to overgrazing, either by domestic livestock or wildlife species, would weaken over time, making it less able to grow adequate healthy roots, reducing above-ground production of leaf material, reducing its capability to store carbohydrates for the following year's growth and to withstand drought, extreme winters, or additional grazing from herbivores. A plant's ability to continue to grow healthy roots is critical to its survival.

The amount of bare ground is an important factor in desert ecosystems. The soils in the project area have a high instance of wind and water erosion potential. Cryptogamic crusts are essential to the health of the upland ecosystem. Leaving the cryptogamic crusts intact protects the surface soils from natural wind and water erosion by helping to stabilize the soils (Anderson et., al. 1982). Grazed areas in the cold deserts of the Intermountain Region, where accelerated erosion can occur, benefit from grazing management practices that favor cryptogamic cover. Winter grazing with frozen soil conditions appears to be compatible with stable, moss-dominated, cryptogam populations. Continued repetitive summer and especially spring grazing may jeopardize long-term ecosystem stability in these fragile environments (Memmott et. al., 1998).

Effects of livestock grazing include impacts directly to individual plants and alteration of the physical environments and surrounding plant communities. Direct impacts from livestock include trampling and removal of plant materials. Livestock also alter the physical environment by urine deposition and other excretions (Day 1990). Additionally, indirect impacts such as soil compaction and related reduction in soil water infiltration, soil erosion, noxious weed introduction, and spread, changes in the seed bank, reduction in soil liter, loss of the cryptogrammic crust, and effects to pollinators may occur under some grazing regimes in some areas (Belnap et al. 2001, Stoddard et al. 1975, Vallentine 1980).

Over time, if desired plants are weakened through repeated intense grazing or other environmental conditions, other less desirable species that are more adapted to the impacts may establish and the existing desirable

grasses, forbs, and shrub species would decrease. As the less desirable species become more abundant, they may make use of available nutrients and water before, or more efficiently than, the desirable plants, thus even further reducing the ability of the desirable plants to exist in the community. Some of the less desirable plants may be annuals that die at the end of the year, leaving bare ground that is susceptible to erosion. Shrubs, including sagebrush, may become more abundant and have an increase in canopy cover with a potential loss in ground cover. As herbaceous cover is decreased through heavy grazing, soil loss is accelerated and the changes result in a downward spiral.

Figure 7: Active wind erosion on damaged cryptogramic crusts in Huntoon Valley.

Livestock grazing can affect sagebrush communities through: the direct impact of trampling on specific plants, injuring or killing them; by removing too much of the plant too often, which could affect its ability to process sunlight and grow healthy vigorous roots, leaf material, and seeds. In sagebrush communities, grazing can increase shrub cover by reducing the vigor of understory species, decrease palatable forbs and grasses, and introduce invasive weeds. This can result in a change to the structure and species composition of a plant community (Saab et al. 1995; Vallentine 1980; Young et al. 1979). Similar processes are seen in all plant communities.

Many rangelands still experiencing downward trend would respond favorably to lighter stocking, but some rangelands have probably reached a point where mere changes in utilization levels may not restore them to some previous condition.

Factors such as when and how long the area is grazed are also critical to management of livestock. Growth on desert ranges normally starts in March and continues until sometime in June. Vegetation then usually remains somewhat dormant for the rest of the year, except when summer thunderstorms with precipitation pass through the area.

Desert plants harvested even moderately during late spring differed significantly in vigor measurements from grazed plants not grazed, even after seven years of protection (Cook and Child, 1971). The lower the vigor, the less rapid the recovery is for the plant. Desert plants can be grazed in late spring only if herbage removal is 30 percent or less. Utilization levels of greater than 50 percent are detrimental (Cook and Stoddart, 1963).

In low-nutrient environments like the semiarid Great Basin desert, grazing can decrease plant diversity. Cattle tend to seek out the most palatable plants. This preferential grazing can cause a decrease in palatable species

and plants susceptible to grazing injury, resulting in decreased competition for less desirable and more resistant individuals.

Tree stems bearing fire scars and charred wood indicate that, historically, fire was an important factor influencing succession in pinyon-juniper woodlands of Nevada and eastern California (Gruell, 1997). Fire scar evidence indicates that past fires played a critical role in pinyon-juniper woodlands. Woodlands in the analysis area were fire maintained until shortly after European settlement, when removal of light fuels by livestock, followed later by aggressive fire suppression, altered the low intensity fire regime. Lack of fire in the analysis area has contributed toward sagebrush stands becoming decadent and lacking in understory herbaceous species. Also there has been an increased density of pinyon/juniper woodlands. Trees have invaded sagebrush sites and impacted and reduced these sagebrush communities.

No Action

Desert plants can sustain approximately 40 percent use of annual herbage production (Holechek, et al. 1999). Current maximum allowable utilization levels authorized in term grazing permits on the allotments within the project area are displayed in the table below. Under this alternative, condition of upland vegetation would remain the same in those areas with a 45 percent utilization level and may deteriorate in areas used at utilization levels higher than 45 percent on an annual basis.

Table 12: Current maximum allowable utilization by allotment.

Allotment Name	Upland Grass Utilization	Upland Shrub Utilization
Aurora	No Use	No Use
Conway	45%	40%
East Walker	45%	40%
Huntoon	40%	30%
Larkin Lake	45%	40%
Masonic	45%	40%
Nine Mile	45%	40%
Powell Mountain	45%	40%
Rough Creek	45%	40%
Squaw Creek	No Use	No Use
Wild Horse	45%	40%
Whiskey Flat	55%	30%

Steeper slopes and increased distance to water usually result in less livestock use. Utilization levels are almost always reached first in accessible riparian areas, and then in adjacent uplands or in the areas surrounding water developments. Livestock uses tend to become lighter as slopes and distances to water increase.

Currently, upland herbaceous utilization is limited to 55 percent, and upland shrub utilization is limited to 40 percent. By allowing this level of utilization on the upland herbaceous vegetation, understory grasses may decease and browsing on upland shrubs may result. At these use standards, communities that are functioning as desired would probably continue to function, but

because many areas are grazed during the growing season, they may move towards a downward trend and would most likely lose their cool season grass component.

For areas functioning at risk, such as on the Nine Mile Allotment, there would be a downward trend resulting in an even further decrease in the number of desirable plants, an increase in bare ground, and a higher potential for weedy species to establish over time. Cool-season grass and forb components would be totally lost from the site over time and would not be able to reestablish without a major restoration effort. By maintaining current utilization standards and season of use on many areas within the project area, the least amount of progress would be made toward desired condition.

Vegetation and soil conditions in Huntoon Valley would continue to deteriorate due to concentration of livestock activities in the valley bottom and overuse of the few grasses there.

In addition to utilization levels, many of the allotments are traditionally grazed during the entire growing season, year after year. Grazing the plant when it is using all of its energy to grow, year after year, has detrimental effects. This practice has caused a decrease in cool-season grass species (USDA Forest Service, 2006; USDA Forest Service, 2004).

The upland communities would also be more vulnerable to the establishment of less desirable annual grasses and forbs as well as introduction of noxious weeds under this alternative.

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Proposed Action

Moderate grazing use of 40 percent is acceptable and can be managed on most rangelands. Grazing use of no more than 30-35 percent use is needed for improvement in rangeland vegetation. Desert forage plants can sustain about 40 percent use of annual herbage production (Holechek, et al., 1999).

By reducing utilization to sustainable levels, changing season of use, and providing periodic rest, the rangelands within the project area can improve and become sustainable. These utilization standards would reduce intensity of grazing on plant communities that are not functioning as desired or have crossed below the threshold, throughout the project area.

Effects of historical heavier grazing use and season of use are reflected on the range today in grass, especially cool-season species, and forb reductions in the rangelands of the area. This alternative ensures that utilization standards are at sustainable levels; this action would improve upland vegetative condition over time. Rest would also be incorporated or continued on the allotments.

For the proposed action, the standards for utilization and rest in the upland communities were recognized to provide: forage for domestic livestock; healthy plant growth and reproduction; allow for sufficient residual cover and forage for wildlife habitat needs. The utilization standards and rest systems should help to ensure that plants are able to produce sufficient root growth to remain vigorous and healthy (Holechek, et., al 1999).

Table 5: Proposed action alternative maximum allowable utilization level by allotment.

Allotment Name	Upland Grass Utilization	Upland Shrub Utilization
Aurora	No Use	No Use
Conway	0-40%	0-20%
East Walker	0-40%	0-20%
Huntoon	0-40%	0-20%
Larkin Lake	0-40%	0-20%
Masonic	0-40%	0-20%
Nine Mile	0-40%	0-20%
Powell Mountain	0-40%	0-20%
Rough Creek	0-40%	0-20%
Squaw Creek	No Use	No Use
Wild Horse	0-40%	0-20%
Whiskey Flat	0-40%	0-20%

The seed bank for cool-season grasses and forbs currently has not been lost. Incorporating rest into management of the project area would allow for cool-season species and forbs to grow, produce and set seed, and therefore establish more plants into interspaces. This would help to increase the number of cool-season species and forbs as well as increase ground cover, helping to assure there is adequate litter remaining on site at the end of the grazing season to help protect the soils (Bradford et al. 2002). Also, the resulting increased organic matter content in the soil would improve water holding capacity, which would aid seedling growth. Because plants would be more vigorous, they are going to be able to produce more seed, which would increase seedlings over time, thus increasing ground cover with desirable herbaceous species while decreasing the amount of bare ground (Holechek et al. 1999).

Upland shrub utilization would be limited to 20 percent or less. Upland herbaceous utilization would be limited to 40 percent, regardless of functioning condition in some areas; in other areas the matrices would be applied. By allowing 40 percent maximum utilization on the upland herbaceous vegetation, plants would be able to grow healthy roots. These roots would penetrate deeper into the soil and break up compaction; plant cover would increase, resulting in an improvement of condition over time.

The proposed action sets new utilization standards for herbaceous and woody vegetation. The levels of utilization vary based upon functioning condition of that community for certain areas within the project area; some areas would have rest incorporated into the system so that not every acre is grazed at the same

Figure 8: Upland sagebrush community, Wildhorse Allotment.

time every year or grazed every year.

The levels of use and incorporation of rest should result in maintaining upland communities that are in a functioning condition and improve upland communities that are either at risk or below the threshold. Rest is going to be the key to restoring upland areas that are functioning at risk due to a decrease in species composition and a high instance of bare ground.

In the past the Aurora allotment was grazed by sheep during the summer season. Under the proposed action the Aurora allotment would be grazed by cattle and incorporated into the Nine Mile allotment. No additional numbers or AUMs would be authorized. By making more area available for the domestic livestock, there will be little impacts from the change in class of livestock to the upland vegetation communities. Maximum upland herbaceous utilization would be 40% and maximum shrub utilization would be 20%. There will also be periodic rest on this allotment.

In Huntoon Valley, removal of livestock from the valley floor would result in improved plant vigor and root biomass. However, due to the limited rainfall, non-productive soils, and low percent of grass composition, such improvements would be slow, occurring over a period of many decades.

The proposed action would provide for recovery of the upland communities that are currently at risk or have crossed the threshold; it may be slower than the no grazing alternative, but will be faster than continuing current management.

No Grazing

As grazing permits expire, they would not be renewed, leaving the project area ungrazed by 2012. With forage utilization by livestock grazing at zero percent, improved or sustained plant productivity should occur due to improvements in plant vigor.

Removal of livestock grazing would allow for plant species to complete their growth cycle, unless they are grazed by wildlife or wild horses. Plant vigor, soil stability, and ground cover would increase. Composition of plant species would also move toward more desirable conditions. Upland communities that are functioning as desired would continue to function. Adequate litter should be left every year for ground cover to add organic matter into the system and to protect soils from erosion. Grasses, especially cool season grasses, which have been most effected and forbs will be able to produce seeds and in the quantities needed to establish new seedlings. The plants on the site would continue to reproduce; therefore the desired species composition would be maintained.

If plant communities have not crossed a threshold into another steady state, return to a functioning as desired condition can occur under the no grazing alternative. If the plant community has crossed the threshold into another steady state, then return to pristine conditions will not likely occur. Removal of livestock would result in little or no improvement in the ecological condition for many years or possibly even decades. Many other changes including climatic shifts, increases in woody plant species, and various human activities have occurred. The effect of these activities on plant communities is uncertain. Effects of historical grazing use remain today. Past grazing actions have contributed to grass and forb reductions in shrublands

of the area. Transition back to desired condition will be a slow process. No livestock grazing, therefore no vegetation treatment, will allow for natural succession to take place on the landscape. Conifer invasion into the shrublands will continue. Reductions in the shrublands will reduce forage production on the landscape.

Fine fuel, such as grass and forbs, should increase in upland areas. This added fuel can increase the possibility for fire. Fires may occur more frequently and/or on a larger basis as result of the increased fuel. The effects from fire would be short term, unless there was a conversion of native vegetation species to cheatgrass.

Issue Three: Sage Grouse

Affected Environment

Sage grouse are listed as a Region Four sensitive species, as well as a Management Indicator Species (MIS) under the Toiyabe Land Management Plan (1986). Sage grouse breeding, nesting and brood-rearing habitats occur throughout the analysis area. Several sage grouse leks, or breeding areas, are found within the analysis area, all within the Rough Creek, Aurora, Nine Mile and Powell Mountain allotments. The Nevada Department of Wildlife mapped suitable winter and summer habitats (Sage Grouse Habitat Map) within the analysis area and although some allotments (Larkin Lake, East Walker, and Conway) fall within this area, there are currently no sage grouse populations within these areas. Lek and nesting areas are critical components of sage grouse habitat. The nesting areas generally occur within two miles of the leks.

Sage grouse found within the analysis area belong to the Mono Basin population of sage grouse. The U.S. Fish and Wildlife Service have been petitioned to list this population as threatened under the Endangered Species Act (as amended). In a 90-day finding published in the Federal Register on December 19, 2006, the U.S. Fish and Wildlife Service concluded that listing is not warranted at this time (USDI 2006). As part of the 2001 Nevada Sage Grouse Conservation Strategy, the Bi-State Local Group was developed to report on the current condition of sage grouse populations and habitat for the Mono Basin population. A Conservation Plan was then written outlining current conditions, threats to the populations or habitat as well as projects designed to reduce or eliminate threats. The majority of the analysis area falls within the Mt. Grant Population Management Unit (PMU) as well as portions of the Bodie, Desert Creek/Fales, and White Mountains-Truman Population Management Units.

Sage grouse population numbers for the Mt. Grant PMU, located within analysis area, are between 200-280 birds. Lek attendance monitoring in this area began in 1969. In 2005 and 2006, the average number of strutting males was 18. The brood count survey showed a peak in the 1980's with one hundred forty birds and 38 chicks recorded per 100 hens. During 2005, the total number of birds from brooding surveys declined to an average of 26 birds and three chicks per 100 hens. Trend information from both lek attendance and brooding surveys,indicates stabilization of the population, but at a reduced level (Nevada Department of Wildlife 2006).

Sage grouse leks in this area are located above 8,800 feet in elevation, near ideal nesting habitat. Nesting habitat is characterized primarily by Wyoming big sagebrush communities that have 15 to 38 percent canopy cover and a grass and forb understory. Residual cover of grasses may also be important, ranging from three to 30 percent at successful nest sites. Brood meadows mostly occur between 8,000 and 9,000 feet, where plants have a short growing season. The alfalfa crop that is irrigated by a center pivot system on the privately owned Nine-Mile Ranch provides summer brood habitat for sage grouse in this area. A possible limiting factor in this area is the inadequacy of brood rearing sites, including meadows used during brood seasons. The areas of most concern are meadow systems southeast of the Aurora Mine on the Aurora allotment (Bi-State Plan, 2004) as well as a meadow system north of China Camp on the Rough Creek allotment (Murphy, 2007b).

Wyoming big sagebrush and low sagebrush in Nevada is used for late brood and fall-use. The amount of snow determines winter use areas. Low sagebrush is used as long as available, with birds moving to big sagebrush sites as snow depths increase. Sagebrush canopy on winter-use sites can be highly variable. Sagebrush that is exposed at least 10 to 12 inches above snow level provides food and cover for wintering birds.

A combined summer/winter habitat range has been identified by the Nevada Department of Wildlife. It accounts for 26 percent of the analysis area, and includes several sagebrush communities: Wyoming big sagebrush/low sagebrush, mountain big sagebrush, and basin big sagebrush (Sage Grouse Habitat Map). All sagebrush species account for 38 percent of the summer/winter habitat area. Also present in summer/winter habitat are pinyon-juniper communities, aspen, meadow, and salt desert shrub. Pinyon-juniper is unsuitable for sage grouse breeding, nesting and brooding-rearing habitat. It comprises almost a quarter of the analysis area.

The current condition for sagebrush is described in the Vegetation section. The following table summarizes the current condition of sagebrush based on monitoring from 2004 and 2006. These areas were surveyed and compared to the matrices for upland sagebrush habitats. The majority of these plots are located several miles from known lek locations, at least five miles away, within sagebrush stands.

The Forest Service Ecology Team collected data on dry and wet meadows within the analysis area. For a full description of meadow habitats within the analysis area see the Vegetation Section. Two of these meadows are used by sage grouse during brood-rearing season and are located within the Aurora allotment. They are categorized as functioning as desired. Based on field observations, the meadow system in the China Camp area on the Rough Creek allotment is at risk due to the presence bull thistle (Murphy and Baumer, 2007).

Due to sage grouse being categorized as a Management Indicator Species, Forest-level modeling was conducted to determine the capable and satisfactory condition of sage grouse nesting and foraging habitats, per Forest-Plan

Table 6: Current condition for sagebrush community types in the project area.

Allotment Name	Sagebrush Type and Status	Bare Ground	Sagebrush Canopy Cover
Aurora	Mountain big sagebrush Does Not Function as Desired	28%	33%
Aurora	Mountain big sagebrush Functions as Desired	48%	18%
Nine Mile	Wyoming big sagebrush Does Not Function as Desired	74%	8%
Powell Mountain	Wyoming big sagebrush Does Not Function as Desired	48%	11%
	Wyoming big sagebrush Does Not Function as Desired	57%	6%
Rough Creek	Black sagebrush Functioning as Desired	56%	No information

direction. Capable habitat was defined based on the habitat conditions needed to provide for suitable habitat. These factors included, amount of cover, vegetation community, and distance from lekking areas. Satisfactory condition was defined as those capable acres in the condition to maintain sage grouse nesting and foraging habitats. It was then determined why areas would be in unsatisfactory condtion.

Forest-level modeling consisted of defining capable nesting habitat within two miles of a lek and less than 55% of the canopy cover of the appropriate vegetation types between 10 and 30 percent (USDA, 2007). The total acres of capable nesting habitat for the project area are approximately 22,815 acres. Satisfactory nesting habitat looked at areas within two miles of a lek and 55% of canopies of appropriate vegetation types between 10 and 30%. Of the capable acres, 20,980 acres were categorized as satisfactory nesting. These acres are found within the Aurora, Nine Mile, and Rough Creek allotments.

Unsatisfactory sage grouse nesting habitat includes those sagebrush stands with pinyon-juniper encroachment or a lack of understory cover of grasses and/or forbs. Historic spring, season livestock use on the Nine Mile allotment has reduced cool season grasses and forbs (See Vegetation Section). This is reducing the satisfactory condition of sage grouse nesting habitat.

Capable sage grouse foraging habitat was also modeled using areas beyond two miles of a lek and less than 55% of the canopy cover of appropriate vegetation types between 10 and 30 percent (USDA, 2007). Capable foraging habitat within the analysis area is approximately 310,500 acres with 128,875 acres of this rated as satisfactory.

Areas in unsatisfactory condition are due to those with pinyon-juniper encroachment, and large-decadent

stands of sagebrush which have reduced the condition of foraging habitat.

Some inaccuracies with the modeling effort, on the Forest-level, depicted more capable habitat for sage grouse then what actually exists (Murphy, 2007c). For example, high elevation sagebrush communities were depicted as capable habitat for sage grouse in the model, yet sage grouse do not occupy these high elevation sites. This occurs at the higher elevation sagebrush communities in the East Walker, Masonic, Nine Mile, Aurora, Rough Creek, Powell Mountain, Whiskey Flat, Wild Horse, and Huntoon allotments. Sage grouse have not been observed utilizing these capable areas.

Environmental Consequences

Livestock grazing can disturb sage grouse during the nesting season. This may lead to dispersal from the area or abandoning nest sites. Nest destruction by livestock trampling is rare, however, the presence of livestock can cause sage grouse to abandon their nests (Crawford, Olson et al. 2004; Call and Maser 1985). Impacts also include those related to vegetation structure. Grazing can remove grass or forb cover that helps conceal sage grouse nests from predators (Hockett 2002; Beck and Mitchell 2000). Trampling of vegetation by livestock can kill sagebrush, particularly the smaller plants (Beck and Mitchell 2000).

Indirect impacts to sage grouse habitat can include changes in composition, density, and structure of vegetation and removal of brood forage and cover in meadows (Call and Maser 1985; Crawford, Olson, et al. 2004). Grazing can move sagebrush-grass communities into lower successional stable states dominated by sagebrush with little herbaceous understory (Beck and Mitchell 2000). The reduction in herbaceous understory can reduce the understory cover and decrease the suitability of these areas for nesting. The reduction in forbs during the spring and summer may also limit their availability for sage grouse broods (Call and Maser 1985, Hockett 2002).

Livestock grazing can also affect the quality and quantity of nesting and brood-rearing habitat within riparian areas, wet meadows and springs. Riparian meadows in the analysis area that are not at functioning as desired, within sage grouse habitat, would continue in this trend. This would not provide for suitable forage production needed by sage grouse during the brooding season.

Localized and concentrated use by livestock can reduce understory grass cover, which may impact the quality of nesting habitat the following year and may affect nesting if grazed during the late spring. High levels of livestock grazing can also reduce competition between grasses and sagebrush, which can trigger increases in sagebrush density. This does not allow for suitable sage grouse nesting habitat (Beck and Mitchell, 2002).

Wintering habitat for sage grouse is also located within the analysis area, and allotments are grazed during this time of year (Conway, Larkin Lake, and East Walker). Potential impacts could occur in areas where livestock may concentrate in upland habitats; there is the potential for livestock to browse or trample sagebrush plants, which can affect the quality of winter forage for sage grouse.

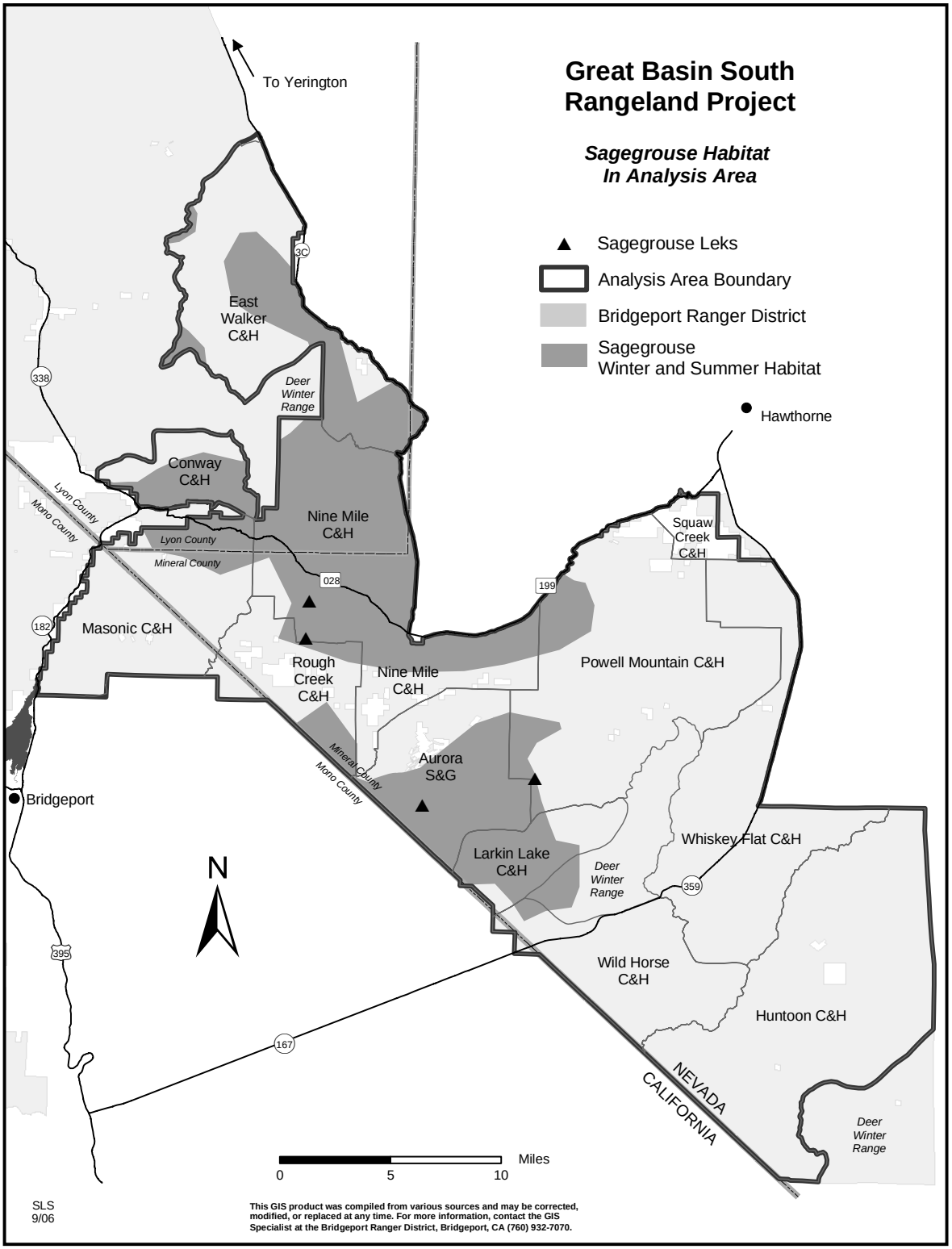


Figure 9: Map showing sage grouse winter and summer habitat in the project area.

No Action

Under current management, livestock grazing would affect nesting, early- and late-brood and wintering sage grouse habitat. Although limited in the analysis area, nesting and early-brood habitat is essential for successful chick production.

Under this alternative, livestock grazing in the uplands may have a continued effect on sage grouse nesting habitat. Utilization levels for upland shrub will remain at 45% within suitable and occupied sage grouse habitats. Condition trends for sagebrush within sage grouse habitat may continue in not functioning as desired status and will not provide suitable nesting, brood-rearing, or winter habitat for sage grouse. The upland species composition may continue within its current trend and the understory species, including cool-season grasses which provide suitable cover during the nesting season, may not increase over time.

The condition of meadows providing suitable early-brood rearing habitat may be maintained or begin to decline to not functioning as desired under this alternative. Livestock grazing will also continue to occur within breeding, nesting, and wintering habitats.

Under this alternative, impacts to sage nesting and brood-rearing habitat would continue. Meadow and sagebrush communities not functioning as desired may remain in this condition or decline overtime; this may reduce suitable sage grouse habitat and may lead to a decline in trend, as sage grouse may disperse from the area.

Proposed Action

Under the proposed action, livestock grazing would be affecting nesting, early- and late-brood and wintering sage grouse habitat. These effects would be the same as stated under the No Action Alternative; however, effects of livestock grazing under this alternative will be reduced due to the incorporation of rest, reduction of the utilization levels on upland shrub species, and proposed project design features.

Under the proposed action, livestock grazing in the uplands may have a continued effect on sage grouse nesting habitat, including trampling of nest locations and the reduction of understory species used for cover. However, incorporating rest would allow for understory grass cover to be maintained or increase over time within sage grouse nesting habitat. The diversity of understory species may also increase as cool season grasses, currently lacking within sage grouse nesting habitat, would recover overtime. This will allow for an increase in the upland species composition.

The sage grouse project design feature will also reduce livestock grazing within breeding and nesting areas during these critical periods. This will reduce trampling of nest locations as well as the reduction of cover needed during nesting. The reduction of upland shrub utilization within sage grouse nesting habitat will allow for suitable sagebrush cover during nesting season, as well as providing cover during brood-rearing and wintering seasons.

Localized and concentrated use by livestock can reduce understory grass cover, which may impact the quality of nesting habitat the following year and may affect nesting if grazed during the late spring (Beck and Mitchell, 2002). Under this alternative any areas (within potential sage grouse nesting habitat) of

new concentrated use, such as salt blocks or fences will be surveyed for sage grouse use. This will allow for the determination of suitable sage grouse habitat and use within these areas. Concentrated activities will not occur within occupied suitable habitats.

Meadows critical for sage grouse brood rearing that are not functioning as desired would not be grazed during the brood rearing period. These meadows include the Aurora meadow complex, in the Aurora allotment, and the China Camp meadow system, in the Rough Creek allotment. This would insure that the grasses and forbs critical to brood-rearing would be available for sage grouse. In addition, the lower allowable use standards for meadows would improve riparian conditions in these meadows. Incorporating rest within allotments with suitable meadow habitats will also allow for these areas to be maintained at their current condition or improve overtime. Refer to the Vegetation Section for a more complete description of effects to meadow/riparian vegetation.

Wintering habitat for sage grouse is limited within the analysis area, although allotments are grazed during this time of year. Potential impacts could occur in areas where livestock may concentrate in upland habitats. In these areas there is the potential for livestock to browse or trample sagebrush plants, which can affect the quality of winter forage for sage grouse. However, under the proposed action, no livestock grazing would occur within this winter range during the wintering period for sage grouse; reducing the impacts to sage grouse winter range.

Under this alternative, livestock grazing impacts to sage grouse nesting and brood rearing habitats will be reduced and the condition of these habitats will improve overtime. Although the Proposed Action may impact individuals it will not lead toward federal listing or a loss of viability.

No Grazing

Under the no grazing alternative, livestock grazing would be completely removed from the analysis area. Riparian meadow habitats would recover over time at a faster rate than any of the three alternatives. Amount of ground cover to conceal chicks, nests, and birds from predators would be the greatest of the three alternatives. The abundance of grass and forb species would increase for the most part, providing more forage for this species during the spring and summer.

This alternative may also result in increased grazing use of private lands. Private lands have many meadows and riparian areas used by sage grouse during the nesting and brood rearing season. With this alternative, quality of habitats on private land may decline, which could affect sage grouse populations.

Issue Four: Watersheds

Water Resources

Affected Environment

The Great Basin South project area is in the range shadow of the Sierra Nevada Mountains and is extremely dry. Precipitation ranges from below 10 inches per year to approximately 20 to 25 inches per year in some of the higher mountain areas. The town of Hawthorne, on the eastern edge of the project area, has an annual rainfall of less than five inches per year.

The East Fork Walker River is the main drainage within the project area. The river originates in California, in the Sierra Nevada west of Bridgeport, and flows in and through Lyon County, Nevada. The river terminates in Walker Lake, a closed basin occupying Nevada's high desert interior in Mineral County. The East Walker River flows through portions of the Nine Mile and the East Walker allotments. Flow in the East Walker River through the project area is regulated by releases from Bridgeport Reservoir.

Besides the East Walker River, Rough and Bodie Creeks are the only perennial stream systems within the project area. Both streams are tributary to the East Walker River. The rest of the project area is drained by numerous ephemeral and intermittent streams. Although most of the area drains into the Walker River, portions of the project area drain into Mono Lake in California and into the Fishlake/Soda Springs Basin.

The source of Rough Creek is high on Potato Peak on BLM land in California. It flows through BLM administered lands and private land before crossing the state line and entering the project area on the Humboldt-Toiyabe National Forest. Within the project area it crosses Rough Creek and Nine Mile allotments. Once it leaves Forest Service land, it flows through the Ninemile Ranch and other private lands before entering the East Walker River in Nevada.

Bodie Creek has its source in Bodie Bowl, where there is a concentration of historic mines. It then flows east through private and BLM administered land, entering the National Forest at the California/Nevada state line in the Ninemile allotment. An intermittent drainage flows from a tailings pond, and enters Bodie Creek at about Gray Mill. Bodie Creek joins Rough Creek near Ninemile Ranch.

Bodie Creek and Rough Creek are both listed on California's 303(d) list of water quality limited segments. Bodie Creek is listed for metals with the potential sources being active and inactive mining. Rough Creek is listed for habitat alterations with the potential source being grazing. The stream reaches that are listed are upstream of NF lands and the project area. The State of Nevada does not have either Bodie Creek or Rough Creek on their 303(d) list of water quality limited segments.

The East Walker River, below Bridgeport Reservoir to the state line, is on the California 303(d) list for water quality impairment from nitrogen, phosphorus and sedimentation. The potential sources include grazing. This reach of the river flows near the Masonic allotment, although the land immediately adjacent to the river is administered by the California Department of Fish and Game.

The East Walker River is also listed by the State of Nevada from the state line downstream for about 23 miles. The pollutants of concern are pH and total phosphorous, but no potential source is listed. This reach of river flows through the Ninemile and East Walker allotments.

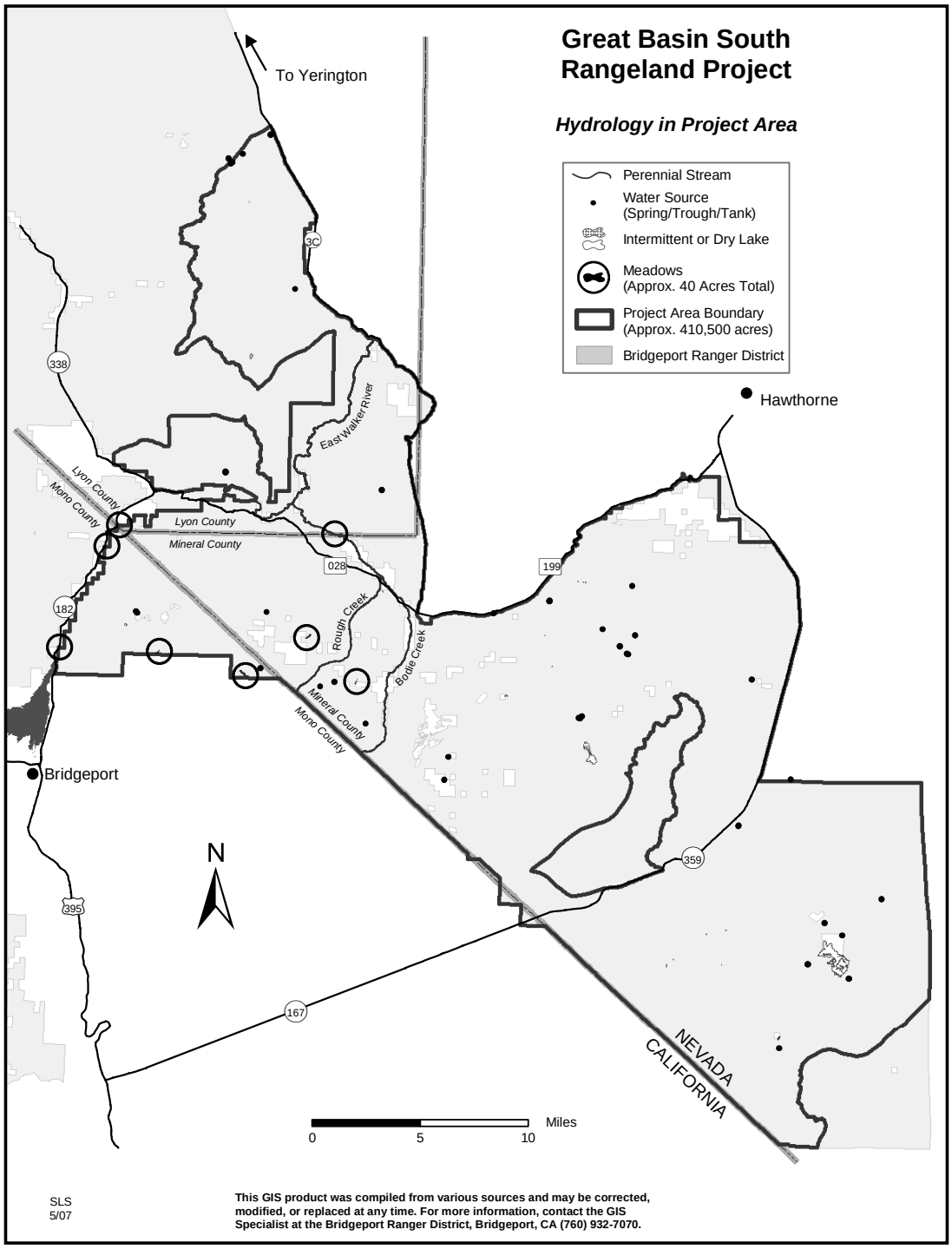


Figure 10: Hydrologic features in the project area.

Environmental Consequences

No Action

Healthy riparian vegetation is important to stream bank stability. By maintaining current utilization standards in riparian areas, the least amount of progress would be made toward desired condition. The effect of grazing on water quality would remain the same.

Proposed Action

The severity of livestock effects on riparian function is related to the amount of time that the livestock spend in the riparian area. By lowering utilization standards, livestock would spend less time in the riparian areas and progress would be made toward desired condition. More vigorous riparian vegetation could result in a decrease in stream sedimentation. However, the change in utilization standards would be unlikely to affect the East Walker River since it is mostly inaccessible to cattle. Less sediment may enter Bodie and Rough Creeks, although neither stream is listed for sediment in Nevada.

No Grazing

By eliminating livestock trampling and grazing in the riparian zone, natural processes would move the vegetation and soils toward recovery. Existing vegetation would increase in vigor and density, allowing more sediment to be trapped and decreasing bare ground and erosion. However, the change in use would be unlikely to affect the East Walker River since it is mostly inaccessible to cattle. Less sediment may enter Bodie and Rough Creeks, although neither stream is listed for sediment in Nevada.

Soils

Affected Environment

Mineral County

The geology of Mineral County is complex. Granitic rocks that are chiefly quartz monzonite and some granodiorite are found mostly in the Wassuk Range and the western Excelsior Mountains. The rocks are Cretaceous in age and correlate with the Sierra Nevada Batholith. The volcanic rock in the project area within Mineral County includes rhyolitic and andesitic tuffs, welked ash-flow tuffs, and basalt and related pyroclastic rocks.

Lyon County

Geologically, Lyon County lies entirely within the borders of the Cretaceous Sierra Nevada Batholith. The granitic rock of this batholith formed very shallow soils. The latest general period of volcanic activity extruded basaltic flows.

Mono County

Project area hills to the east of Bridgeport are composed of volcanic rocks that erupted a few million years ago, and because they are contiguous with the volcanic hills of the project area in Mineral County, that description would be extended to the California lands within the project. These hills include rhyolitic and andesitic tuffs, welked ash-flow tuffs, and basalt and related pyroclastic rocks. Most of the volcanic rock is Miocene or Pleicene in age. The exception is the andesite and rhyolite Excelsior Formation of the Triassic age.

Erodibility of Soils

The erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Based upon the characteristics of the soils found within the Nevada portion of the project area, a high potential for water erosion is predicted to occur on 23 percent of the project area. Predictions are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion. The assumption being made is that the soil is bare, lacks a surface crust, or is cultivated. Sandy soils are the most erodible, increasing loam and clay content decreases susceptibility for wind erosion. Approximately four percent of the Nevada portion of the project area has an extreme potential for wind erosion.

A soil can be susceptible to both wind and water erosion. Less than one percent of the Nevada portion of the project area is susceptible to both wind and water erosion. The erosion hazard is displayed in the table below. Highly erodible soils are found throughout the project area, except for the Larkin Lake and Wild Horse Allotments. Both the Huntoon and Powell Mountain Allotments have large areas of erodible soils.

Table 15: Percent of project area in soil erosion hazard zones ash shown by NRCS soils data.

Erosion Hazard	Percent of Project Area
Water	23
Wind	4
Water and Wind	<1.0

Environmental Consequences

No Action

Livestock grazing has a direct physical impact on soil properties. Grazing can impact soil compaction and erosion. Under current grazing management practices, compaction and trampling disturbance is expected to remain static.

Proposed Action

Soil compaction and increased erosion are direct soil impacts that have been documented as due to grazing.

A decrease in forage utilization would likely help to reduce bare ground, increase soil organic matter and nutrient cycling, break up soil compaction, and improve soil infiltration and water holding capacity (Stoddart et al. 1975). The areas where forage utilization is decreased would likely recover to a desired function while continuing to be grazed.

Decreased forage utilization criteria and the incorporation of periodic rest, combined with some limits on season of use, have the potential to reduce direct livestock impacts to soils. The combination of the benefits of improved plant vigor would likely provide a method for soil recovery on existing impacted areas due to lower forage utilization (Stoddart et al. 1975; Aldon 1963). Regardless of these overall changes, existing detrimental soil disturbance may be perpetuated at sites where concentrated livestock use occurs.

Soil quality indicators for compaction and erosion are expected to trend upward due to less grazing pressure, resulting from lower forage utilization. Water erosion and wind erosion trends are likely to remain static where a site

has crossed below threshold due to excessive soil loss. Otherwise, the erosion trends that may be attributed to livestock grazing should be upward because of increased ground cover due to lower forage utilization (Stoddart et al. 1975).

Elimination of livestock grazing in Huntoon Valley would reduce wind erosion over time due to improved plant vigor. This improvement would likely occur over many decades due to the limited rainfall and grass composition and poor soils.

No Grazing

Soil compaction and increased erosion are direct soil impacts that have been documented as due to grazing. A decrease in forage utilization would likely help reduce bare ground, increase soil organic matter and nutrient cycling, break up soil compaction, and improve soil infiltration and water holding capacity (Stoddart et al. 1975). The areas where forage utilization is decreased would likely recover from previous grazing effects to a desired function.

The removal of grazing would eliminate direct livestock impacts to soils. The combination of benefits of improved plant vigor would likely provide a method for soil recovery on existing impacted areas due to lower forage utilization. Regardless of these overall changes, existing detrimental soil disturbance may be perpetuated at sites where concentrated livestock use occurs (Stoddart et al. 1975).

Under the No Grazing alternative, soil quality indicators for compaction and erosion are expected to trend upward due to the elimination of livestock grazing. Water erosion and wind erosion trends are likely to remain static where a site has crossed below threshold due to excessive soil loss. Otherwise the erosion trends that may be attributed to livestock grazing should be upward because of increased ground cover due to lower forage utilization (Stoddart et al. 1975).

Other Resource Concerns

Invasive Weeds

Affected Environment

Invasive weeds are very limited within the project area. There is one known population of perennial pepperweed *(Lepidium latifolium),* on National Forest System lands. Perennial pepperweed is one to three feet in height, with deep-seated rootstocks. This population is downstream from “the Elbow”, along the East Walker River. This species is listed on the Nevada Department of Agriculture’s invasive weed list.

Private lands in the project area include one species that is on the Nevada Department of Agriculture invasive weed list. This species, hoary cress *(Cardaria draba)*, is a deep-rooted perennial up to two feet tall, reproducing from root segments and seeds. Plants emerge in very early spring and have bloomed and set seed by mid-summer. This perennial is common on alkaline, disturbed soils, and is highly competitive with other species once it becomes established. There is a known population of hoary cress on the private lands within the Aurora allotment along Bodie Creek.

There is one know population of salt cedar *(Tamarix ramosissima)* on National Forest System lands along the East Walker River. Salt Cedar forms monocultures which severly limit wildlife

biodiversity. This species is also listed on the Nevada Department of Agriculture's invasive weed list.

One other weed that is not identified as invasive on the Nevada Department of Agriculture list, bull thistle *(Cirsium vulgare)*, is also found on National Forest System and private lands in the project area. Bull thistle is a biennial with a short, fleshy taproot. Leaves in the first year form a rosette. Bull thistle is a native of Eurasia and is now widely established in North America, having been introduced many times as a seed contaminant. There are populations of bull thistle within the Rough Creek allotment, on private land along Road 155, and on National Forest System lands in the Aurora allotment along Aurora Creek.

Environmental Consequences

Livestock are one of many vectors of weed transport. They consume the plant and seeds and deposit the invasive weed seeds at various locations. Invasive weed seeds are also transported via hair, hooves, and feces. Livestock trails and areas of concentration are ideal areas for invasive weeds to become established. Domestic livestock are able to access some of the invasive weed populations in the project area. In addition, areas that are disturbed are more susceptible to weed infestations than are areas that are functioning as desired. The indicator for invasive species would be presence or absence of any invasive species.

No Action

It is possible that invasive weeds could be spread by domestic livestock because they may pass through one of the small populations in the project area and drop seeds in a new location. Areas that are more vunerable would be the most likely areas where weeds would establish. The No Action alternative would likely keep areas that are not functioning as desired in that state and areas that are functioning as desired could remain that way or possibly move towards a downward trend. Because areas that are degraded are more vulnerable to weed infestations, this alternative provides for the most likely establishment of weedy species in the project area.

Proposed Action

It is possible that invasive weeds could be spread by domestic livestock because they may pass through one of the small populations in th project area and drop seeds in a new location. Areas that are more vunerable would be the most likely areas where weeds would establish. The Proposed Action would maintain areas that are functioning as desired in that condition and would move areas that are at less than desired function toward functioning as desired, therefore invasive weed spread potential would be kept to a minimum.

No Grazing

By eliminating livestock grazing in the project area as grazing permits expire, one vector of weed transport would be eliminated from the project area. Permittees are out on the ground for extensive periods of time during the grazing season; once the allotments are no longer stocked with domestic livestock, the Bridgeport Ranger District would lose one source of information on the location of any established or new populations of potentially invasive weeds. Under this alternative, invasive

species numbers would be expected to remain static.

Rare Plants

Affected Environment

For the analysis area, potential and occupied habitat was identified for Region Four Forest Service Sensitive Species in habitats that are likely to be utilized by livestock and their associated activities. Also included are species identified on the Nevada Natural Heritage Sensitive and Watch Plant Lists (March 18, 2004) and the California Natural Diversity Database Sensitive and Watch Plant Lists (October 2005) with known, occupied habitat within the analysis area.

Sagebrush Habitats

Black Sagebrush

BODIE HILLS ROCKCRESS (*Arabis bodiensis*)

Bodie Hills rockcress is designated as a sensitive species by the Forest Service. This plant has been listed as a species of concern by the US Fish and Wildlife Service. Bodie Hills rockcress is a perennial herb ranging from six to 14 inches tall, with flowering occurring from April through June.

The range of Bodie Hills rockcress includes Mineral County, Nevada and Fresno, Inyo, Mono and Tulare Counties in California. There are 15 documented occurrences. Known locations in the project area by allotment are: Masonic, north of Masonic Mountain; Aurora, east of Brawley Peaks; Rough Creek, east of Bald Peak and north of China Camp; and Powell Mountain, west of Butler Mountain (CNNDB 2002, NNHP 2004).

Bodie Hills rockcress is found in dry, open, rocky, high or north-facing slopes. The plant is associated with moisture accumulating microsites in sagebrush communities (Morefield 1994).

The trend for this plant is unknown. Threats include mineral prospecting and development, and roads. Sheep grazing can also affect the plant (USDA Forest Service, 2001.) In a 1994 review in Mono County, California the plant was found to be vulnerable to cattle and sheep grazing, mining, and off-road vehicle activity, but these were not considered to be major threats (Morefield 1994). The higher elevation habitat in which this plant occurs is not usually impacted by high concentrations of livestock. There are no water developments present within occupied habitats for Bodie Hills rockcress.

BODIE HILLS DRABA (*Cusickiella quadricostata*)

Bodie Hills draba is designated as a sensitive species for Forest Service Region four occurring on the Humboldt-Toiyabe National Forest, Bridgeport Ranger District. It is on the watch list for the Inyo National Forest. This plant has been listed as a species of concern by the US Fish and Wildlife Service. Bodie Hills draba is a mat-forming perennial which has been taxonomically classified within a genus consisting of two species which occur in the western United States. Blooming period extends from May into June.

The range for Bodie hills draba includes Douglas, Lyon and Mineral Counties in Nevada and Mono County, California. Known populations are present within the Masonic, Powell Mountain, and Rough Creek allotments. There are sixteen documented populations on the Bridgeport Ranger District. Twelve sites occur within the Great Basin South

analysis area(CNNDB 2002, NNHP 2004).

Bodie Hills draba occurs in low sagebrush, mountain mahogany, big sagebrush and pinyon juniper communities within an elevational range of 6500 to 8500 ft. Draba are found on flat, gentle slopes or windswept ridges, with low sage and long-leaf phlox (*Phlox longiloba)* as associated plant species. The population trend for this species is unknown.

Threats to the species are poorly understood. Both livestock grazing and trampling impact plants, especially when cattle trail adjacent to fence lines where populations occur.

Mountain Sagebrush

LAVIN'S EGG VETCH (*Astragalus oophorus var. lavinii*)

Lavin's egg vetch is designated as a sensitive species in Forest Service Region four and occurs on the Humboldt-Toiyabe National Forest. It is considered a watch-list species for the Inyo National Forest in Region 5. The US Fish and Wildlife Service listed Lavin's egg vetch as a species of concern, while the Bureau of Land Management designates the plant as a special status species for the state of Nevada. Lavin's egg vetch is a perennial herb within the pea family, with several to many trailing to ascending stems four to ten inches tall.

The documented range for Lavin's egg vetch is primarily restricted to west central Nevada, including sites within the Pine Nut Mountains and Wellington Hills of Douglas and Lyon Counties, and the Bodie Hills of Mono County, CA. Within Nevada eight occurrences have been mapped. Within the Great Basin South analysis area, locations occur on the Masonic south of Rosaschi Ranch, the East Walker and Powell Mountain allotments(CNNDB 2002, NNHP 2004).

Lavin's egg vetch is a soil endemic associated with open, dry, barren slopes, knolls, or outcrops, derived from volcanic ash or carbonate. It is usually found on northeast to southeast aspects. Occupied sites occur within the pinyon-juniper or sagebrush zones from 5700 to 7467 ft. in elevation.

Threats to Lavin's egg vetch include mineral exploration and development, road construction and associated maintenance, and rangeland treatments to pinyon-juniper or sagebrush communities. Grazing has not been documented as a major impact due to the sparsely vegetated community the plant is associated with. Light grazing has been documented at one site (Morefield 2001). Habitat for Lavin's egg vetch is more prone to damage incurred from livestock trailing through a population to other areas.

MASONIC MOUNTAIN JEWEL FLOWER (*Streptanthus oliganthus*)

Masonic Mountain jewelflower is designated as a sensitive species for both Forest Service Regions four and five and occurs on the Humboldt-Toiyabe, Bridgeport Ranger District and Inyo National Forest respectively. The jewelflower is listed as a species of concern by the US Fish and Wildlife Service, and as a special status species in both Nevada and California by the Bureau of Land Management. The Masonic Mountain jewelflower is a perennial plant growing six to 14 inches

tall. Bloom period for the jewelflower extends from June into July.

The Masonic Mountain jewelflower occurs in Inyo and Mono counties in California and in Lyon, Mineral and Esmeralda Counties in Nevada. The distribution is centered primarily within the watershed of the East Walker River. A disjunct population occurs in Nye County in the Shoshone and Toiyabe Mountain Ranges. Nine occurrences of this species have been mapped in Nevada. Within the Great Basin South analysis area known populations occur within the Masonic, Rough Creek, and Powell Mountain allotments (CNNDB 2002, NNHP 2004).

Typical habitat for Masonic Mountain jewelflower includes rocky slopes or sometimes in talus situated in ravines or canyon bottoms. The soils are sandy or gravelly of decayed granite or decomposing volcanic rock. Within the analysis area the plant also has been documented as occurring on wooded slopes within the pinyon-juniper and sagebrush zones. It has been reported from old dumps associated with mining and growing in litter under trees. The elevation range for the jewel flower within the analysis area is 6,400 to 8,700 ft., on north to northeast aspects.

Impacts to Masonic Mountain jewelflower include, hydrologic alteration, livestock trampling, off-highway vehicles, road development and maintenance, grazing, mechanical treatments, loss of habitat to noxious weeds and floods (USDA Forest Service, 2001). Within the analysis area threats to the jewelflower can include road grading and mining operations. One site located within the analysis area, but on private land was noted as being impacted by mineral exploration and soil disruption from concentrated livestock use (Morefield 2001). The population trend for this species is unknown.

LONG VALLEY MILKVETCH (*Astragalus johannis howellii*)

Long Valley milkvetch is listed on the California Rare Plant List and has a sensitive designation with the Nevada Heritage Program. It is currently a watchlist species for the Inyo National Forest and a special status species for the Bureau of Land management in California. The Long Valley milkvetch is a slender, diffuse or loosely matted, perennial herb with tiny flowers. It is a member of the pea family and blooms in June and July.

The range for Long Valley milkvetch includes Mono County, California and Mineral County, Nevada. Its distribution has been described as locally abundant within the Bodie Hills in the area of the Nevada and California state lines to sparingly distributed further south in Mono County and within Long Valley (CNNDB 2002, NNHP 2004). Five occurrences have been documented in Nevada. Known populations within the Great Basin South analysis area include Powell Mountain and Rough Creek .

Potential habitat for the Long Valley milkvetch is found on sandy, rhyolitic soils occurring on flats, gentle slopes and gullies within the sagebrush zone. The elevation range which has been documented for this species is 7080 to 8430 ft.

With respect to the habitat affinities for Long Valley milkvetch, known impacts to the plant and habitat include rangeland treatments involving seeding or grading, grazing by domestic livestock and wild horses, and mineral exploration.

Grazing impacts have been documented in Long Valley milkvetch habitat (CNNDB 2007). The population trend is unknown for this species.

Wyoming Sagebrush

MONO PHACELIA (Phacelia monoensis)

Mono phacelia is designated as a sensitive species for both Forest Service Regions four and five and occurs on the Bridgeport Ranger District of the Humboldt-Toiyabe National Forest and the Inyo National Forest respectively. This plant has been listed as a species of concern by the US Fish and Wildlife Service and as a special status species by the Bureau of Land Management for both Nevada and California. The Northern Nevada Native Plant Society has designated the plant as threatened. Mono phacelia is a small annual plant which blooms from late-spring into early summer.

The range for Mono phacelia includes Mono County of California and Esmeralda and Mineral Counties of Nevada. Over this range, less than 40 occurrences are known. Within the Great Basin South analysis area, known populations occur in Nine Mile, Masonic and Powell Mountain allotments (CNNDB 2002, NNHP 2004).

Mono phacelia is an adaphic specialist occurring on alkaline, barren or sparsely vegetated grayish, brownish, or reddish shrink-swell clays of mostly andesitic origin. It occurs on various slopes and aspects, mostly stabilized or low intensity maintained natural or artificial disturbances such as road banks which cross the specific soil types required by this plant. Mono phacelia tends to occupy micro-sites within the Wyoming sagebrush community which receive some soil disturbance activity such as small ephemeral drainages. The amount of soil disturbance is critical to this annual plant; light disturbance which maintains the seedbank resource tends to perpetuate the plant at a given site (Morefield 1994). Associated habitat is found within the pinyon-juniper and mountain sagebrush zone from 6000 to 9000 ft in elevation.

Threats to Mono phacelia include roads and road maintenance, mechanical treatments to habitat, stock trampling, off-road vehicles, invasive weeds, mining, reforestation, lack of fire and prescribed burns which occur in the spring (USDA Forest Service, 2001, Morefield 2001). Conversely, this plant is unusual in its rarity and its primary adaptation to disturbance. However, disturbance impacts which promote permanent habitat alteration need to be avoided in the conservation of this species.

MONO BUCKWHEAT (*Eriogonum ampullaceum*)

Mono buckwheat is designated as sensitive by Region 4, Humboldt – Toiyabe, National Forest and occurs on the sensitive list for the Heritage Program in Nevada. The Mono buckwheat is a low spreading herbaceous annual with cream colored flowers.

The range for Mono buckwheat includes Esmeralda and Mineral Counties in Nevada and the eastern edge of California within Mono County. Three occurrences of this plant have been mapped in Nevada. Within the Great Basin South analysis area the plant occurs within the Powell Mountain allotment (NNHP 2004).

The habitat affinity for Mono buckwheat is seasonally moist sandy soil around alkaline desert springs. It has been listed as a wetland dependent species in Nevada. Potential habitat occurs within the desert scrub community association with an elevation range of 5,480 to 7,100 ft. Population trend for this plant is unknown.

Threats to habitat and plant populations include mineral exploration and development, trampling by livestock, and off-road vehicle impacts. Occurring within a seasonally moist habitat, in some locations the plant may be susceptible to grazing by domestic livestock and wild horses. Grazing has been documented within occupied habitat (Morefield 2001).

Low sagebrush

NEVADA SUNCUP (*Camissonia nevadensis*)

Nevada suncup has been listed by the Nevada Heritage Program as a state watch list species. Nevada suncup is a small tap-rooted annual within the evening primrose family. Its unusual decumbent growth habit separates it from other members of this genus. Nevada suncup flowers in the spring during April and May. Characteristic to this group of plants, the white flowers open in early afternoon to evening and fade the following day.

Nevada suncup is endemic to Nevada and is restricted in its geographical range. Seven occurrences of the plant have been mapped over the documented range of Carson City, Churchill, Douglas, Lyon, Pershing, Storey and Washoe Counties, Nevada (NNHP 2004). Within the Great Basin South analysis area Nevada suncup occurs along the eastern boundary of the East Walker allotment.

The known habitat affinities for this species include dry open areas in foothill and valley locations on sandy, gravelly or clay soil. The plant appears to be somewhat tolerant of alkali. Habitat has been documented in the salt-desert, shadscale and lower sagebrush zones, from 4,050 to 5,250 ft. in elevation.

While concentrated livestock use could impact plants and habitat, this has not been documented for the population occurrence within the East Walker allotment. Major threats have not been assessed for this species and the population trend is unknown (Morefield 2001). The distribution of the plant occurs primarily on public lands administered by the Bureau of Land Management.

Meadow Habitats

Within the analysis area the few wet to moist meadows are limited to higher elevations above 8,000 feet near seeps and springs. Wet meadows are typically dominated by tall, deep-rooted sedges, rushes, bulrushes and wetland grasses such as bluejoint, tufted hairgrass, mannagrass and alpine timothy. These sites have a high water table with water in the top 50 centimeters for the duration of most growing seasons.

The three rare plant species which are associated with wet to moist meadow habitats are members of the genus Botrychium: upswept, dainty and slender moonworts. Understanding the life cycle of moonworts, which is unique compared to other flowering plants or ferns, is important for effectively managing the species (Johnson-Grohl

et. al. 2002a). Spores from the moonworts are produced above the ground where they filter into the soil and germinate underground. Following germination, a significant portion of the moonwort lifecycle is then spent below the ground where reproduction occurs and the offspring can remain for a number of years (Johnson-Grohl et al 2002b). Often the density of below ground reproductive plants exceeds the sporophytes above ground. This below-ground population often acts as a reservoir for above-ground plants that may be impacted from disturbance or other unfavorable environmental conditions. Although above-ground populations of moonworts are subject to impacts from activities such as fire, grazing, herbicides, and timber harvest, these plants are resilient and would usually recover following disturbance (Johnson-Grohl et. al. 2002a). Because reproduction and juvenile recruitment occur below the ground, protecting the below the ground environment, in particular the mycorrhizal relationship, is critical to the overall survivorship of these ferns (Johnson-Grohl et. al. 2002a, b, USDA 2001). Any activity that reduces shading, soil moisture, or disrupts the organic matter would affect the mycorrhizal community.

Identified risks to upswept, dainty and slender moonworts include: noxious weeds, vegetation mechanical treatments and fuels reduction activities, prescribed fire, reforestation, roads, grazing and stock trampling, fire suppression activities, recreational activities including off-road vehicles, trails/hikers, camping and development, mining, flooding, hydrologic alterations, and plant collectors (USDA 2001). Small populations are more vulnerable to random events.

UPSWEPT MOONWORT (*Botrychium ascendens*)

Upswept moonwort is designated as a sensitive species in both Forest Service Regions four and 5. It is listed by the US Fish and Wildlife Service as a species of concern. The Nevada Heritage Program also lists this fern as a sensitive species. Upswept moonwort is a small perennial fern (please reference life history discussion above). Upswept moonwort is primarily associated with open habitats in well-drained natural and artificially maintained habitats including alpine meadows, avalanche meadows, pastured forest meadows, and grassy roadsides in southern latitudes, which includes Nevada and California (Farrar 2005).

Upswept moonwort is widely scattered in western North America, including Nevada and California, from southern Nevada north to Alaska and eastward across Canada to Newfoundland, Quebec and northern Minnesota (Farrar 2005). There are no known populations on the Bridgeport Ranger District; however favorable habitat conditions do occur and there is a potential for the species.

DAINTY MOONWORT (*Botrychium crenulatum*)

Dainty moonwort has been designated as a sensitive species in both Forest Service Regions four and five and by the Nevada Heritage Program. The US Fish and Wildlife Service has listed this plant as a species of concern. Dainty moonwort is a small perennial. It usually grows in the saturated soils of seeps and along the stabilized margins of small streams. It also occurs occasionally in the seasonally wet roadside ditches and drainages (Farrar

2005). Habitat for this plant includes lower montane coniferous forest, wet meadows, marshes, bog-fen habitat types and springs (Moorefield 2001, and USDA 2001). Dainty moonwort is found from 5,000 ft in California to 11,000 ft in Nevada.

Dainty moonwort is found throughout the western United States and Canada. This fern is found in isolated pockets in many of the higher and wetter mountains in Nevada (Morefield 2001). There are no known populations in the analysis area, however, favorable habitat conditions do occur and there is a potential for the species.

SLENDER MOONWORT (*Botrychium lineare*)

Slender moonwort is designated as sensitive for both Forest Service Regions four and 5. It is a US Fish and Wildlife Service federal candidate for listing as threatened or endangered; it was determined that listing of this species is warranted but precluded by other priority action.

Habitats of western populations include heavily forested sites and grassy meadows, fen-like seeps and gravelly roadsides (Farrar 2005). There is some indication that slender moonwort, as well as other moonwort species, tend to occur on limestone influenced substrates.

Slender moonwort is known from several sporadic occurrences in the western US and Quebec, from California, Utah and Colorado, northward to Washington and Montana (Farrar 2005). A historic record is documented on the Spring Mountains NRA, Humboldt-Toiyabe National Forest, with potential habitat on the Bridgeport Ranger District.

Ephemeral Lake Habitats

WILLIAM'S COMBLEAF (*Polyctenium williamsiae*)

William's combleaf is designated as a sensitive species for both Forest Service Regions four and five and occurs on the Humboldt-Toiyabe and Inyo National Forests respectively. This plant is a proposed candidate for federal listing as threatened or endangered by the US Fish and Wildlife Service. In the state of Nevada it is listed as a fully protected species. A member of the mustard family, William's combleaf is a small short-lived perennial herb. The plant is 1.5 to four inches tall and produces clusters of white and purple flowers in the early spring.

The William's combleaf is known from Douglas, Lyon, Mineral and Washoe Counties in Nevada and Mono County, California. Several disjunct populations have been documented in Northern California, Southern Oregon and Central Nevada. There are fourteen documented occurrences of William's combleaf in Nevada. The majority of the population distribution across the species range occurs on federally administered lands (Holland 1997). The overall population trend for this species has been documented as declining (Morefield 2001). Within the Great Basin South analysis area, known populations are located in the Nine Mile, East Walker, and Wild Horse Allotments.

William's combleaf is closely associated with seasonally wet, vernal habitats of non-alkaline ephemeral lakes. The plant occurs in the relatively barren sandy to sandy-clay or mud margins and bottoms of these shallow lake features, which are perched over volcanic bedrock. The elevation range

for this species is 5,670 to 8930 ft., which corresponds with the sagebrush, pinyon-juniper, and mountain sagebrush vegetation zones.

Documented impacts to William's combleaf populations include trampling of plants by domestic livestock and wild horses, and the physical alteration of the seasonal lake habitat through the installation of water developments, drainage structures, or due to excessive off- road vehicle use of the area. Within the analysis area, water developments have altered the distribution of ephemeral lakes and associated William's combleaf habitat within two locations in the Anchorite Hills in the Wildhorse Allotment (Holland 1997).

Pinyon/Juniper Woodland Habitats

WASSUK BEARDTONGUE (*Penstemon rubincundus*)

Wassuk beardtongue has been listed with the Nevada Natural Heritage Program as sensitive. It is an endemic plant to the Wassuk Range in Mineral County Nevada. The known distribution for this species extends over 39.5 miles, (excluding one disjunct population), and it has been recorded in Douglas, Mineral and Esmeralda Counties, Nevada. Wassuk beardtongue is a robust perennial herb with dark pink to deep rose flowers. The plant grows from 20 inches to four feet tall.

The Wassuk beardtongue is found on open, rocky and gravelly soils on the shores above Walker Lake, steep decomposed granite slopes, rocky drainage bottoms and roadsides, or other recovering disturbances with enhanced run-off. The beardtongue has also been documented as locally abundant on recent burns within the preferred habitat. This plant occurs within the desert scrub, sagebrush and pinyon-juniper zones. The elevational range for this species is 4,200 to 6,850 ft.

Within the Great Basin South analysis area, populations of Wassuk beardtongue have been documented within the Powell Mountain, Squaw Creek, and Whiskey Flat Allotments. Grazing within the occupied habitats is known, however the potential impact to the plant has not been assessed. Obviously, concentrated use in key areas promoting trampling of the habitat and plants would not be desirable. The latter has not been documented at this time. Population trend is unknown for this species (NNHP 2004).

Environmental Consequences

Modification of the plant community structure and composition, especially in the herbaceous species, would impact rare plants and their habitats (Beck and Mitchell 2000). Adverse impacts to rare plant species can also result from trampling, soil compaction, competition with invasive species, and changes in the relationship of mycorrhizae and the rare plants populations (Johnson-Grohl et al. 2002a, b; USDA Forest Service, 2001). Depending on the magnitude, these impacts can lead toward losses of habitat or populations and result in listing under the endangered species act.

Sagebrush Habitats

No Action

Eight rare plant species are associated with sagebrush communities found within the Great Basin South analysis area. Four species, Bodie Hills

rockcress, Lavin's egg vetch, Masonic Mountain jewelflower and Nevada suncup occur within sparsely vegetated sites within the sagebrush community. With some exceptions these sites do not support forage use by livestock and receive minimal trampling damage (Morefield 2001). The exceptions noted did not occur on National Forest administered land. On National Forest System lands, some grazing use was noted within the surrounding plant community or to the rare plant but, this was not considered detrimental to the persistence of the rare species. The No Action alternative would maintain the current levels of grazing use and predictably the same level of impact to these species.

Bodie Hills draba habitat on the Masonic allotment has been impacted by livestock trailing and resulting soil compaction. These impacts to Bodie Hills draba would continue. Mono phacelia and Mono buckwheat are both annual plants which are susceptible to trampling damage resulting in the disruption of current year seed production and possible alteration of habitat. Mono phacelia tends to occupy sparsely vegetated sites. While some grazing use of these areas has been noted, current grazing use patterns have not appeared to be detrimental to this species. On the Masonic Allotment current grazing use occurs after Mono phacelia has flowered and produced seed. Conversely, Mono buckwheat is associated with alkaline spring habitats which are susceptible to more concentrated livestock use. Continuing the current grazing use patterns on specific sites on the Powell Mountain allotment may alter habitats and populations of Mono Buckwheat (Morefield 2001). Long Valley milkvetch appears to tolerate moderate levels of grazing use. However, trampling and grazing use by both livestock and wild horses is a concern for known locations of the milkvetch on the Powell Mountain allotment (CNNDB 2002). This would not be resolved with the continuation of current use.

Proposed Action

With implementation of the proposed action sagebrush habitats in the Great Basin South project area would, over time, track towards a desired functioning condition as defined by the attributes in the vegetation matrices (Appendix A. FEIS). Sagebrush habitats which are functioning as desired would have a minimal presence of invasive weedy species which could competitively displace rare plants. Five species, Bodie Hills rockcress, Lavin's egg vetch, Masonic Mountain jewel flower, Mono buckwheat, and Nevada suncup occur within sparsely vegetated sites within the sagebrush community. This may reflect rare plant habitats found along rocky ridgelines such as those occupied by Bodie Hills rockcress or, plant habitat affinities associated with a specific soil feature, such as the alkaline soil association displayed by Nevada suncup that restrict their distribution. Generally, the habitat for the rare plant represents a unique island separated from the sagebrush community matrix by a topographic or soil feature. These areas would not be expected to achieve the same vegetative cover as would be present within the overall sagebrush matrix when functioning as desired at some sites. It is anticipated that when desired conditions have been met within the sagebrush matrix the rare plant habitat would also be maintained, ie. invasive weeds would not be present and soils would not be compacted.

The Mono phacelia, Bodie Hills draba and Long Valley milkvetch each occupy a micro-site within the sagebrush matrix. Mono phacelia while associated with andesitic clays requires some disturbance activity to be maintained on the site. This may occur in small ephemeral drainages or areas where water moves across the soil surface. This type of microsite would also be present, to some extent, when the sagebrush community is functioning as desired. Both the Bodie Hills draba and Long valley milkvetch are perennial, deep tap-rooted plants which would be represented in a functional plant community. Both plant species are able to withstand some grazing pressure and occur with other perennials which would be part of a mid to late seral vegetation community.

Under the proposed action rest has been built into many of the grazing allotment strategies which would benefit Bodie Hills rockcress, Bodie Hills draba, Lavins egg vetch, Masonic Mountain jewel flower, Long Valley milkvetch, Mono phacelia, Mono buckwheat and Nevada suncup as compared to the current management. Rest would allow perennial plants to restore root carbohydrate reserves and allow for the recruitment of new plants. Annual plants, with favorable climatic conditions, would be able to flower, produce seed and replenish the soil seed bank in the absence of livestock. Rest cycles would help to facilitate an added resilience for rare plant species to grazing related impacts.

Also under the proposed action, utilization levels would be reduced to 20 per cent on shrubs and 40 percent on upland herbaceous plants on all allotments with the exception of Rough Creek and the southern portion of Masonic allotments. For most allotments in the project area the proposed action represents a negligible decrease in herbaceous plant utilization, while the decrease in shrub use is substantial compared to the current condition. The proposed utilization level would further limit livestock impacts to occupied and potential rare plant habitats by limiting the length of time cattle would stay within a given area. It follows that this would reduce the indirect effects of soil compaction or trampling to rare plant habitat. Within the Rough Creek and southern portion of the Masonic allotment, utilization levels would be determined from an assessment of current conditions with the matrices. Utilization levels for the latter two allotments could vary over time. However, utilization levels would correspond to the functional condition of the sagebrush community; pastures which are not at a functional condition would have lighter use levels established than those areas which are functional and are able to better withstand grazing pressure. As described previously, the rare plants either associated with the sagebrush community matrix or, as unique habitat inclusions within the sagebrush community would be present when the vegetation is at a functional status.

The proposed action also incorporates a change in the season of use for some allotments. The Masonic allotment would be re-authorized for grazing use earlier in the spring. Early livestock use would coincide with flowering for Mono phacelia. This could impact plant annual seed production and species viability. In addition, livestock trailing could be accentuated in Lavin's egg vetch habitats when soils are moist in the spring. Powell Mountain allotment

would also be re-authorized for grazing use starting in April, as compared to the current use date which initiates grazing use in June. The change in season of use could alter the existing livestock grazing patterns on Long Valley milkvetch. While the plant currently withstands grazing pressure, it is likely that livestock grazing during an earlier period of plant phenology would be detrimental to the rare species. However, the proposed action also incorporates an adaptive management strategy which enables the project manager and allotment permittee to determine problem situations and implement solutions. Livestock use patterns would be evaluated and adjusted with respect to rare plant habitats in the Masonic and Powell Mountain allotments.

As stipulated in the project design feature for rare plants and the adaptive management framework of the proposed action, monitoring of specific, known rare plant locations will be completed to determine any potential impacts resulting from changes in grazing management. Activities that gather cattle together within rare plant habitats would be mitigated. For example, actions which would cause livestock to congregate in an area, such as supplement placement and water troughs would not occur prior to surveys for rare plants. Volcanic outcrops or hills that lack dense vegetation and have shallow soils would also be avoided, as would ridgelines with low and black sagebrush, as per resource protection measures for the proposed action.

No Grazing

The No Grazing alternative would provide the greatest protection for sensitive and rare plant habitat for the long-term viability of these rare populations. Recovery of areas impacted by cattle grazing would proceed in the absence of livestock. The long-term benefits of no grazing within the analysis area would improve the viability of the habitat for rare and sensitive plant species affected by grazing.

Meadow Habitats

No Action

Under current management, livestock grazing would continue to affect the potential habitat of the moonwort species at the current level. In meadow habitats, direct and indirect effects from livestock grazing include trampling, grazing on the plants, and habitat modification resulting from soil compaction. Meadow systems which are functioning at a desired ecological status would be maintained at the current forage use levels. However those which are ecologically below desired condition or functioning at risk could remain static or even deteriorate at the current use levels. Meadow systems functioning at a desired status would also provide habitat for rare moonwort ferns.

Proposed Action

The proposed action would allow for the recovery of meadow vegetation through adjustments in forage utilization standards as displayed in the vegetation matrices (Appendix A) on the southern portion of the Masonic and Rough Creek allotments. This would promote the improved condition of sites functioning below the desired condition or areas functioning at risk. Potential habitat for rare moonwort ferns would be enhanced

by maintaining meadow riparian sites in a high ecological status.

The conversion of the Aurora allotment from sheep to cattle could place grazing pressure on meadow habitats depending on the grazing use patterns. The early season use should allow cattle to use drier meadow types and upland sites. Late season use would occur when vegetation is dormant and soils are less prone to compaction. The adaptive management strategy of the proposed action incorporates monitoring, evaluation and adjustment of livestock grazing activities to address unacceptable use on meadow habitats.

Rest has alos been incorporated into the grazing management strategies for many of the allotments in the project area. This would also allow recovery of meadow riparian areas and consequently improve the potential habitat for rare moonwort ferns.

With the documentation of occupied habitat for a rare moonwort fern only dispersed grazing activity would occur in and near known population. As per the project design feature for rare plants, activities that congregate livestock would be minimized in occupied and potential habitat for these species, reducing many of the impacts from livestock grazing. Salt blocks and other congregating activities such as trailing would not occur in rare plant habitats.

The proposed action would continue livestock use in potential and possibly occupied moonwort fern habitat however, the effects would be less than under current management. The ecological functioning of meadow systems would improve over time which would enhance habitats for moonwort ferns.

No Grazing

The direct effects of domestic livestock grazing on moonwort occupied and potential habitat would be eliminated. Meadow and riparian conditions would be expected to recover within a shorter period of time with the removal of livestock. This would also correspond with improved potential habitat for rare moonwort ferns.

Ephemeral Lake Habitats

No Action

Under current management, the Bridgeport Ranger District has curtailed livestock concentrating activities in ephemeral lake bed habitats containing William's combleaf by modifying the respective Annual Operating Plans to exclude livestock from these sites. It is prohibited to place salt within the vicinity of the lakebed. Monitoring has indicated that these efforts have been successful (Stanton 2006). In the past, two lakebeds in the Anchorite Hills (Wildhorse Allotment) which provided habitat for William's combleaf were altered by construction of water developments.

Proposed Action

The proposed action incorporates a specific design feature which excludes livestock concentrating activities from ephemeral lakebed habitats supporting William's combleaf. Implementation of the proposed action would re-authorize grazing use of the Wildhorse Allotment from December through May and incorporate rest in one of three years, Nine Mile Allotment (including the Aurora allotment) from April though May with rest incorporated into the grazing strategy and, East Walker Allotment

from December through March with two years early season use alternated with two years dormant season use. Livestock use of these allotments would coincide with William's combleaf emergence and potential flowering. The design feature would exclude livestock concentrating activities from rare plant habitat. Two existing water development within ephemeral lake habitats occurring on the Wild Horse Allotment would be assessed with regard to restoring William's combleaf habitat.

No Grazing

Grazing would be removed from allotments containing dry lakebed habitat and documented William's combleaf populations. Currently, the Bridgeport Ranger District has successfully excluded grazing from these sites. The water developments within William's combleaf habitat on the Wildhorse allotment would not be assessed for potential restoration of the rare plant habitat at that site as described in the proposed alternative.

Pinyon/Juniper Habitats

No Action

Both the Wassuk beardtongue and Masonic Mountain jewelflower occur in pinyon/juniper habitats. Effects to rare plants occurring in this vegetation association under current management include direct impacts from trampling and, loss of habitat from the indirect impacts of soil compaction and site conversion. In general, both Wassuk beardtongue and Masonic Mountain jewelflower tend to occur on rocky sites with sparse vegetation cover. Impacts resulting from herbivory are low in these habitats. Typically, livestock activities within the pinyon/juniper habitats include trailing through or resting.

Proposed Action

Impacts to rare plant species found within pinyon/juniper habitats would be reduced compared to current management, given that rest would be incorporated into livestock management. The proposed reduction in use standards would lessen livestock impacts to forage plants and potentially the adjacent plant communities. This would also reduce impacts to rare plant habitat. Activities that gather cattle together would not occur within 0.25 miles of any known site for sensitive species or rare species habitat. The latter would correct trailing impacts to Masonic Mountain jewel flower and Wassuck beardtongue.

No Grazing

This alternative would remove livestock grazing impacts from sensitive and rare plant habitat for the long-term viability of these populations. The Wassuck beardtongue and Masonic Mountain jewel flower receive incidental grazing use by livestock and, in limited situations, rare plant habitat has been indirectly modified by livestock trampling. However, based on the habitat requirements for these species, livestock grazing has not limited the distribution for either rare plant.

Wildlife

Affected Environment

The primary wildlife habitats within the analysis area include sagebrush and pinyon/juniper. In addition, some conifer, aspen, wet and dry meadows, and riparian habitats occur intermittently throughout the areas. Aspen stands are limited within the analysis area to the Masonic, Powell Mountain, Nine Mile and Aurora allotments and are less than one percent of the analysis area (Aspen Map).

The Vegetation Type table depicts the current vegetation classifications that would be used to analyze the changes in wildlife and sensitive plant populations from livestock grazing alternatives. This table and a more thorough description of these vegetative communities may be found in the Vegetation Section of this chapter.

Modeling of potential wildlife habitat was conducted using more up-to-date vegetation satellite data (CalVeg) for the analysis area. This information was used because it is the most recent (February, 2005) satellite vegetation data for the analysis area. The acreages for aspen are recorded differently in the vegetation table, as GAP and soils survey data were used to compile those acreages. The percentages of the vegetation types have remained the same, although the approximate acreages may be different. This vegetation information was also used to model potential pygmy rabbit habitat as well as Management Indicator Species capable habitat (Murphy, 2007a; USDA, 2007).

Threatened and Endangered Species

SIERRA NEVADA BIGHORN SHEEP

The Sierra Nevada bighorn sheep, an endangered species, historically has occurred on the Bridgeport Ranger District, but not within the analysis area. There are no plans for recovery within the analysis area for this species (USDI, 2006). Due to the lack of suitable Sierra Nevada bighorn sheep habitat within the analysis area, effects to this species will not be further analyzed.

Bald eagles were delisted on August 7, 2007 after publication of the delisting in the Federal Register on July 9, 2007 (USDI, 2007). Bald eagles have been observed foraging along the East Walker River in the State of California, which borders the analysis area. Although the river borders the analysis area the land surrounding the river is managed by the State of California and no livestock grazing occurs there. Livestock can not access this portion of the East Walker River. There is no potential bald eagle nesting or foraging habitat located within the analysis area. Although there is foraging habitat along the East Walker River, there is a lack of conifer trees which provide for suitable nesting habitat. Due to the lack of suitable nesting and foraging habitat within the analysis area, effects to this species will not be further analyzed.

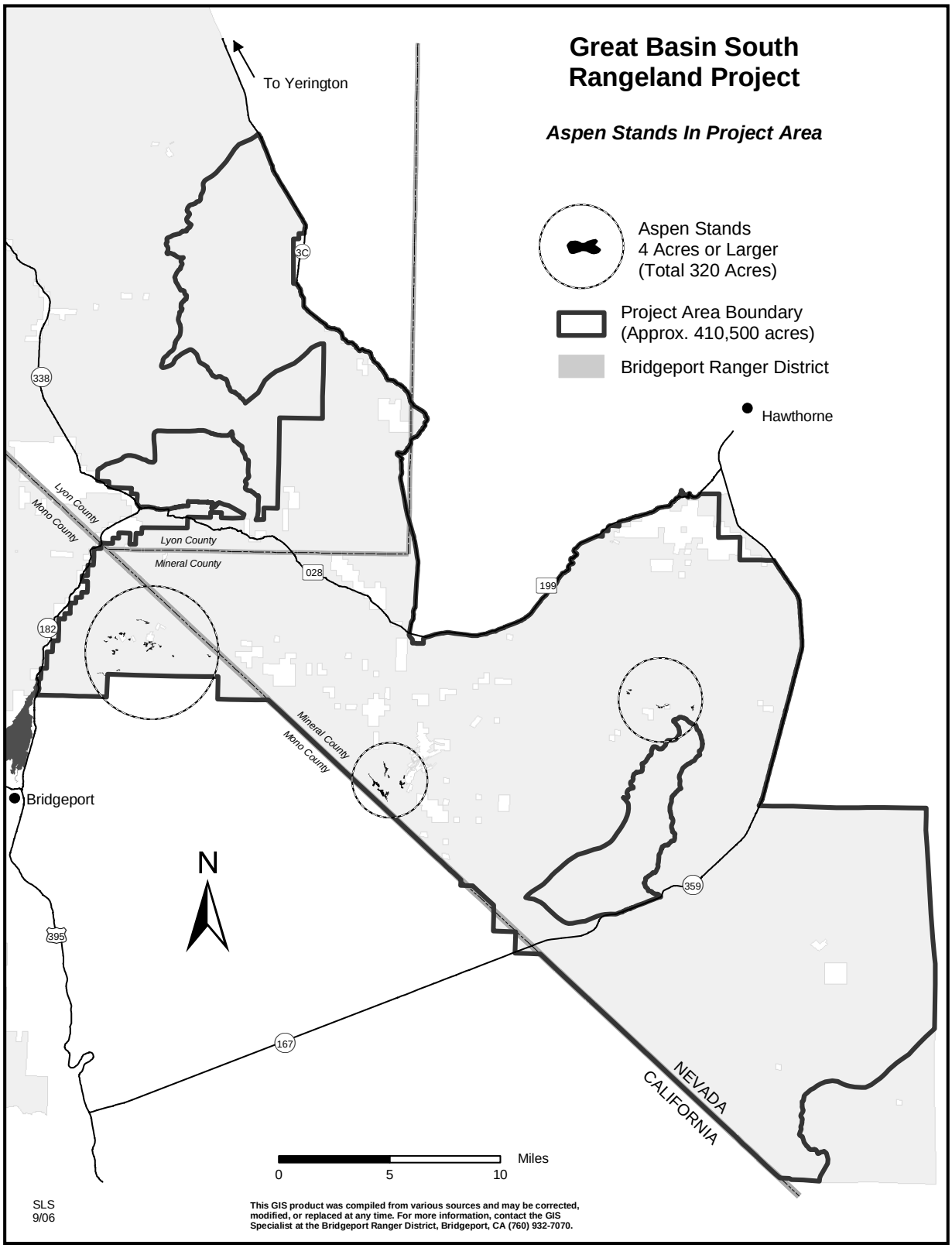


Figure 11: Map showing aspen stands of 4 acres and larger in the project area.

LAHONTAN CUTTHROAT TROUT

The Lahontan Cutthroat Trout (LCT) was listed as endangered in 1970 and reclassified to threatened in 1975 to allow regulated fishing and more management flexibility. A Recovery Plan for Lahontan Cutthroat Trout was finalized in 1995 which lists recovery objectives and specific actions needed to recover the species (USDI 1995). Specific management objectives identified in the Plan include 1) manage and secure habitat to maintain all existing LCT populations; 2) establish self-sustaining fluvial LCT populations within native range; and 3) determine appropriate numbers of LCT within native range (Ibid). As part of the restoration effort for LCT, various streams have been identified within the West Walker River Basin as having existing populations of LCT or as potential reintroduction sites (USDI 1995). Recovery objectives associated with these sites include maintaining and improving the hydrology, water quality, and fish passageways of the West Walker River Basin and its tributaries. Currently, pure strains of LCT do not occur within the analysis area. Bodie Creek is identified in the 1995 recovery plan as a “Current or Recently Existing Population”; Rough Creek is identified as a “Potential Site”. The Short-Term Action Plan for Lahontan Cutthroat Trout (*Oncorhynchus clarki henshawi*) in the Walker River was completed in 2003 (FWS 2003). Recovery Criteria #1 calls for a self-sustaining, networked LCT population composed of wild, indigenous strains, established in interconnected habitat, i.e., in streams, lakes, mainstem and tributaries of the Walker River Basin. Pure strains of LCT historically existed within interconnected habitat in the East Walker River, and in Bodie and Rough creeks but are now all occupied by hybridized LCT and other non-native fish species. The U.S. Fish and Wildlife Service and the Bridgeport Ranger District are currently evaluating the watersheds in the Bridgeport area, including East Walker River, Bodie and Rough creeks, to determine if future recovery in these areas is possible. (No decisions have been made to reintroduce LCT into any stream within the analysis area).

To determine habitat suitability for LCT within the analysis area, the Bridgeport Ranger District conducted stream habitat surveys on National Forest sections of Rough and Bodie creeks in 2006 and on the East Walker River in 2007. Survey results for Rough and Bodie creeks revealed that both portions of streams contained quality habitat for LCT. Specifically, based on water quality, streambank stability, riparian vegetation and other characteristics, Rough Creek contained approximately 10.5 miles of potential LCT habitat and approximately 10 miles of potential habitat were present on Bodie Creek streams (HTNF 2006a and 2006b). Survey results for the East Walker River were not completed at the time of this analysis although it is estimated approximately 28 miles of potential habitat is present for LCT. Although both Rough Creek and Bodie Creek provide potential LCT habitat, some stream bank erosion and reduced vegetative cover were noted on both streams (HTNF 2006a and 2006b). Roads, road-stream crossings, dispersed campsites, and grazing activities are all likely factors contributing to erosion and vegetation impacts in the area. Based on survey observations as well as accessibility and use patterns of cattle in

the area, grazing appears to be having a minor influence on erosion compared to other factors. For example, the East Walker River is inaccessible to livestock on National Forest Systems lands and is not currently grazed. The majority of the access to Rough Creek occurs on private property and there are fences preventing livestock from access to portion of Rough Creek on most of the National Forest System Lands. The portions of Rough Creek that are available to cattle provide only limited forage value due to the lack of riparian vegetation in the area. Access for cattle to Bodie Creek is located within a steep canyon and although livestock may access the creek, forage availability in this area is minimal due to the lack of riparian forage availability.

Sensitive Species

Eleven species of wildlife on the Region Four Sensitive Species list have the potential to occur on the Bridgeport Ranger District; however, only five occur, or have the potential to occur, within the analysis area including sage grouse, pygmy rabbit, mountain quail, spotted bat, and Townsend's big-eared bat. These species occur in a variety of habitats including sagebrush and forested areas consisting of aspen, pinyon-juniper and Jeffery pine and are discussed below (with the exception of sage grouse which is discussed under Issue Three in the EIS).

Sagebrush Habitats

PYGMY RABBIT

Pygmy rabbit surveys were conducted in the Bodie Hills area in June, July and October, 2005 (Sequin 2006). Three survey locations are located within the Masonic allotment and were surveyed in July, 2005; no pygmy rabbits were observed during these surveys (Ibid). The closest known positive location is seven miles southwest of the analysis area in Bodie California State Park (Ibid).

Pygmy rabbit habitat in Nevada is typically found in broad valley floors, drainage bottoms, alluvial fans, and other areas with friable soils. These soils are usually associated with rabbitbrush or sagebrush vegetation. The understory of grasses and forbs can vary from almost none to dense. However, the analysis area is more closely compared to pygmy rabbit habitat found in the Mono Basin area of California. Near Mono Lake, pygmy rabbits occur in islands of big sagebrush and loamy soils, similar to areas in Nevada, but with sandier soils. Burrows tend to be in sandy loam soils, which are often surrounded by very sandy soils. Burrow locations near Bodie, CA have more uniform sagebrush, often less than three feet tall, with less clumping of the sagebrush. The elevation for this site is 8400 feet, one of the highest populations.

Pygmy rabbits are generally considered sagebrush obligate species as the majority of their diet, denning and life history occur within the sagebrush ecosystem. During the winter season, sagebrush is 99 percent of the pygmy rabbit's diet. During the summer, this is reduced to about 51 percent, when forb and grass species become an important component of their diet (Green and Flinders 1980b).

Potential pygmy rabbit habitat was modeled using mountain, Wyoming and basin big sagebrush vegetation types,

with soils categorized as loamy, from sandy loam to silt and clay loam, elevations ranging from 4500-9000 feet and slopes less than 20 percent (Green and Flinders 1980a). Soils data from NRCS soil surveys within the analysis area were used to determine which soils provide for suitable denning habitat and CalVeg data was used to map vegetation within the analysis area. Approximately 65,570 acres were identified as potential pygmy rabbit habitat (Potential Pygmy Rabbit Habitat Map; Murphy 2007a).

Forested Habitats

MOUNTAIN QUAIL

Surveys for mountain quail were done within the Borealis mine area in the Powell Mountain allotment in 2004 and 2005 and no mountain quail were observed in this area (JBR Environmental Consultants, 2004 and 2005). There are incidental sightings for the historic Aurora, NV area in the Aurora allotment (Buma, 2001). Great Basin Bird Observatory (GBBO) conducted bird point count surveys in the analysis area and mountain quail were observed in the Nine Mile and Powell Mountain allotments.

Mountain quail inhabit a variety of vegetative communities including pine, montane conifer, white and red fir forests, pinyon-juniper, occasionally foothill woodland if shrubs are present, high-elevation aspen stands surrounded by sagebrush, and riparian habitats associated with these forests and woodlands (Gutierrez 1999). Several of these communities exist in the analysis area. Mountain quail appear to be opportunistic nesters, utilizing a wide variety of habitat types for breeding. These include old growth coniferous forest, mixed shrub and grasslands, regenerating clear- cuts and old burned areas. Nests are hidden under logs or fallen pine branches, in weeds, shrubs, or at the base of large trees.

Mountain quail feed primarily on plant food obtained while foraging on the ground in low growing shrubs. Legumes appear to be an important food source for mountain quail, particularly during the fall (Pope and Crawford 1999, Gutierrez 1977). Mountain quail also feed on seeds, fruit, and insects.

The effects of livestock grazing on mountain quail within the analysis area are limited. Livestock grazing tends to be outside of the suitable nesting habitat for mountain quail. However, livestock moving through the pinyon-juniper communities while trailing may trample nest locations. Mountain quail nest on the ground at the base of trees or shrubs. Trampling of nests may lead to the loss of nests and young and the dispersal of mountain quail from the area. Due to the limited impacts of livestock grazing on mountain quail, no further anlaysis will be conducted.

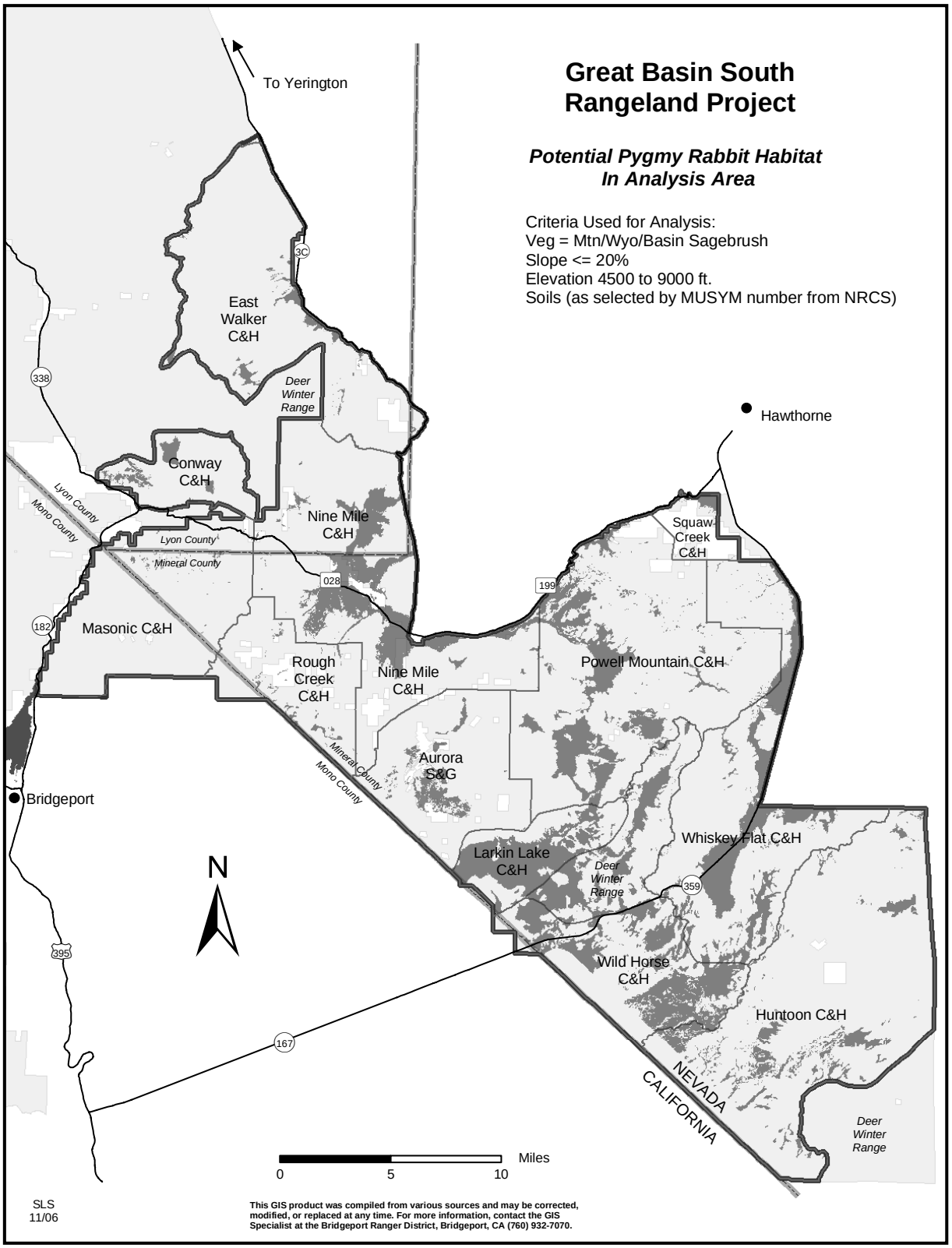


Figure 12: Map showing potential pygmy rabbit habitat in the analysis area, as modeled.

SPOTTED BAT AND TOWNSEND'S BIG-EARED BAT

Several bat surveys have occurred within and adjacent to the analysis area. In 2003, bat survey stations were established in several areas on the Bridgeport District. The closest survey location to the analysis area is the Bridgeport Reservoir/East Walker River site, which is located approximately three miles east of the Masonic allotment. Two Townsend's big-eared bats were recorded for this area and listed as foraging (USDA Forest Service 2003).

In 2005 bat surveys were completed at the historic Chemung mining site in the Masonic allotment. Several bat species were present within this area, but no spotted or Townsend's big-eared bats were observed (Faught 2005). JBR Environmental Consultants, Inc. conducted a bat survey at the Borealis Mine site in the Powell Mountain allotment in June 2005. One recorded location was tentatively identified as a Townsend's big-eared bat, but the call sequence was not long enough or of good enough quality for a positive identification (JBR Environmental Consultants, 2005). This was located at an open pit which holds water during most of the year.

The Nevada Department of Wildlife has conducted bat surveys and site visits to several adits and shafts in the Borealis mining area which overlaps with the Powell Mountain allotment. Surveys occurred in the spring and fall of 2006. Field site visits in the spring identified several adits which had potential for roosting and hibernating sites. NDOW also surveyed at the open pit within the Borealis mining site and recorded on Townsend's big-eared bat foraging there (NDOW, 2006).

The mining adits and shafts within the analysis area include potential roosting habitat for both spotted and Townsend's big-eared bats. There are several historic mines and town sites which provide hibernation and roost locations. The majority of these historic areas are found in the Masonic, Aurora, Rough Creek, and Powell Mountain allotments. These species also utilize pinyon-juniper, sagebrush and riparian areas for foraging.

Spotted bats have been observed at four sites in Esmeralda County, Nevada, and one site in Mineral County, Nevada. However, these sites are not located within or near the analysis area. Observations were in both desert shrub and pinyon-juniper woodlands (Kuenzi, 1999). Three observations of pale Townsend's big-eared bat were recorded in southeastern Mineral County, Nevada, located outside of the analysis area (Kuenzi, 1999). Threats to these bat species include disturbance or distruction of roosting sites by recreational caving, closure of mines, or renewed mining (Bradley, 2006).

Management Indicator Species

Management indicator species (MIS) are identified in the Toiyabe National Forest Land and Resource Management Plan as representing a group of species having similar habitat requirements. MIS are not federally listed as threatened, endangered, or Forest Sensitive but have the potential to be affected by project activities. A review was conducted to determine: 1) if the project is within the range of any MIS, 2) if habitat is present within the proposed

project area, and 3) if there are potential direct, indirect or cumulative effects on habitat components. MIS associated with habitats that may be affected by the project will be analyzed below.

The following MIS were selected for analysis for the Great Basin South Rangeland project due to the presence of suitable habitat that may be impacted by the project: Lahontan cutthroat trout, macroinvertebrates, hairy woodpecker, yellow-rumped warbler, yellow warbler, mule deer and sage grouse as appropriate for this analysis area. These are grouped into habitat types and discussed below.

The following species were <u>not selected</u> for further analysis due to absence of habitat or because the project will not directly or indirectly affect the habitat: northern goshawk, Williamson's sapsucker, American marten, Paiute cutthroat trout, and Palmer's chipmunk.

Habitat capablility and suitability models were developed on a Forest-Wide level and were used to determine the capable and suitable habitats for MIS species per Forest Plan direction. The species habitat models included sage grouse, mule deer, northern goshawk, yellow warbler, hairy woodpecker, macroinvertebrates, and Lahontan cutthroat trout (USDA, 2007). Capable habitat was defined for each individual species based on the habitat conditions needed to provide for suitable habitat. These factors included, amount of cover, elevation, slope, vegetation communities, etc. Satisfactory and unsatisfactory condition was determined based on prefessional judgement of the Geographic Areas used in relation to land uses and management occurrying within those areas (Ibid).

These models were then reviewed at the project-level and capable and satisfactory condition of habitats was determined for MIS within the Great Basin South project area. These models included Lahontan cutthroat trout, macroinvertebrates, sage grouse, mule deer, and yellow warbler.

Aquatic Habitats

MACROINVERTEBRATES

Freshwater-inhabiting benthic macroinvertebrates are animals without backbones that are larger than ½ millimeter. These animals live in water on rocks, logs, sediment, debris, and aquatic plants during some period in their life. Macroinvertebrates include: crustaceans such as crayfish, mollusks such as clams and snails, aquatic worms, and the immature forms of aquatic insects such as stonefly and mayfly nymphs.

Macroinvertebrates are an important part of the food chain; they play a critical role in the natural flow of energy and nutrients. As they die, they decay, leaving behind nutrients that are reused by aquatic plants and other animals. The Nevada Department of wildlife conducted a general aquatic wildlife survey in Rough and Bodie Creeks in 1980 (NDOW 1980) Several species, including species from the Orders Trichoptera, Plecoptera, Ephemeroptera, Coleoptera and Diptera were noted as occurring in the area.

Populations of aquatic macroinvertebrates occur throughout perennial waters and seasonal waters within the project area. Approximately

278 miles of capable macroinvertebrate habitat lies within the East Walker River 4th code Hydrologic Unit Code (HUC) 16050301; the project lies within this HUC. Over 90 percent of capable habitat within this HUC has been determined to be in satisfactory condition.

Riparian and Meadow Habitats

YELLOW-RUMPED WARBLER

The yellow-rumped warbler is found in ponderosa pine to subalpine conifer and pinyon-juniper habitats. It most commonly breeds in Douglas-fir and lodgepole pine and nests in the middle- to upper-level of trees or shrubs. Suitable habitat includes trees, shrubs and ground layers in middle and high-elevation coniferous forests which provide cover in the breeding season, and diverse habitats are used in lowlands for winter cover. The analysis area provides suitable nesting habitat for yellow-rumped warbler within the pinyon-juniper communities.

Great Basin Bird Observatory conducted bird point counts within the analysis area in June and July of 2002. Surveys were located in a variety of different habitat types such as sagebrush, pinyon/juniper and montane riparian. Six survey transects were established within the analysis area; one in the Nine Mile, two in Powell Mountain, two in Whiskey Flat and one in Wild Horse Allotments. One yellow-rumped warbler was detected in the Powell Mountain allotment in pinyon-juniper habitat, however it was not listed as breeding (GBBO 2002).

According to USGS Breeding Bird Survey information, population trends of yellow-rumped warblers in the Sierra Nevada and the state of Nevada have increased between 1996 and 2006 (Saurer, Hines and Fallon, 2007).

YELLOW WARBLER

The yellow warbler inhabits many different vegetative types, from riparian deciduous habitats to montane areas. They are usually associated with cottonwoods, willows, alders and other small trees and shrubs typical of low, open-canopy riparian woodland. Yellow warblers typically are found within these habitat types that have a diverse structure of understory, midstory and overstory species. Riparian habitats are limited within the analysis area; the majority of the riparian habitats that provide suitable nesting habitat for yellow warbler are found along the East Walker River on the Rosaschi Ranch, located outside the analysis area. During surveys done within the analysis area, no yellow warblers were observed.

Habitat modeling for capable yellow warbler habitat consisted of modeling the vegetation communities; riparian mixed shrub, willow, and wet grass/herbs as well as placing a 30 meter buffer along perennial streams with areas less than 8% slope (USDA, 2007).

Modeling on a forest-level resulted in 2,040 acres of capable yellow warbler habitat; however, 950 acres are found on private property, but within the project boundary. This model displayed 1,050 acres of capable habitat; however, based on local knowledge of vegetation conditions there is actually only approximately 40 acres of capable yellow warbler habitat within the project area (Murphy, 2007c). The difference between these acres is due to the forest-level model creating a 30 meter buffer around perennial streams to

represent areas that may have been converted to another habitat type. However, within the anlaysis area there is no riparian vegetation present along Rough or Bodie Creek which provides suitable structure needed for yellow warbler nesting or foraging habitat. This is due to the dry conditions present in these areas. Therefore there is no capable riparian habitat along these creeks for yellow warbler. The acreage was reduced also due to a large-acre privately, owned meadow/agricultural field within the analysis area. Although this habitat is located within the analysis area, it is not part of National Forest System Lands and is not analyzed under this document.

The small acreage of riparian habitat found in the project area is considered unsatisfactory due to the lack of diversity or structure for nesting and foraging within the riparian or aspen stands. This is likely due to the naturally drier conditions and associated vegetation community types within this area (See Riparian Section of this document).

The USGS Breeding Bird Survey reports that yellow warbler population trends in the Sierra Nevada have increased between 1966 and 2006 (Saurer, Hines and Fallon, 2007). However, during the same time frame in the in the state of Nevada, yellow warbler population trends have been on the increase (Ibid).

Due to natural conditions within the analysis area there is no suitable yellow warbler habitat. None of the alternatives will improve yellow warbler habitat within the riparian areas, as riparian vegetation is not expected to reach the potential to provide for suitable yellow warbler habitat. If livestock grazing is removed from the analysis area, suitable yellow warbler habitat will still not occur within the analysis area; therefore this species will not be analyzed further.

Sagebrush Habitats

SAGE GROUSE

See Issues Section.

Pinyon-Juniper Habitats

MULE DEER

There are two mule deer herds located within the anlaysis area; the East Walker and Mono Lake herds. These herds occupy the Sierra Nevada during the summer and winter within the anlaysis area.

The primary winter range described for the East Walker deer herd is an area bordered by the Bodie Hills to the south, the Pine Grove Hills and Bald Mountain to the north, and the Sweetwater Mountains to the west, in Mono County, California and Mineral and Lyon Counties, Nevada (Taylor 1991). The allotments present within this area include portions of the Conway, Nine Mile, and East Walker allotments.

The primary winter range described for the Mono Lake deer herd is the area including the Wassuk and Excelsior mountain ranges in Mineral County, Nevada (Taylor 1991). The allotments present within this winter range include portions of the Huntoon, Wild Horse, Whiskey Flat, and Powell Mountain allotments (Mule Deer Map). Vegetation in these wintering areas includes sagebrush scrub type and pinyon pine woodlands.

Within the anlaysis area there are also three designated winter ranges. These designated areas are administrative

designations and they are not grazed by livestock. They are separated from grazing allotments by topography and are inaccessible to livestock. One of these ranges borders the east side of the Conway allotment and the southwest side of the East Walker allotment. Another borders the Huntoon allotment to the northeast. The third is bordered by these allotments: Whiskey Flat to the east, Wild Horse to the south, Larkin Lake to the west, and Powell Mountain to the north (Allotment Map).

Population estimates are made for the three mule deer herds found within the X12 Hunting Zone, these include the West and East Walker and Mono Lake herds. The population estimate for 2005 is 5,190 with the average population estimate from 1998-2005 around 5,122. The trend is listed as relatively stable, but declining overall (Taylor pers. comm. 2006).

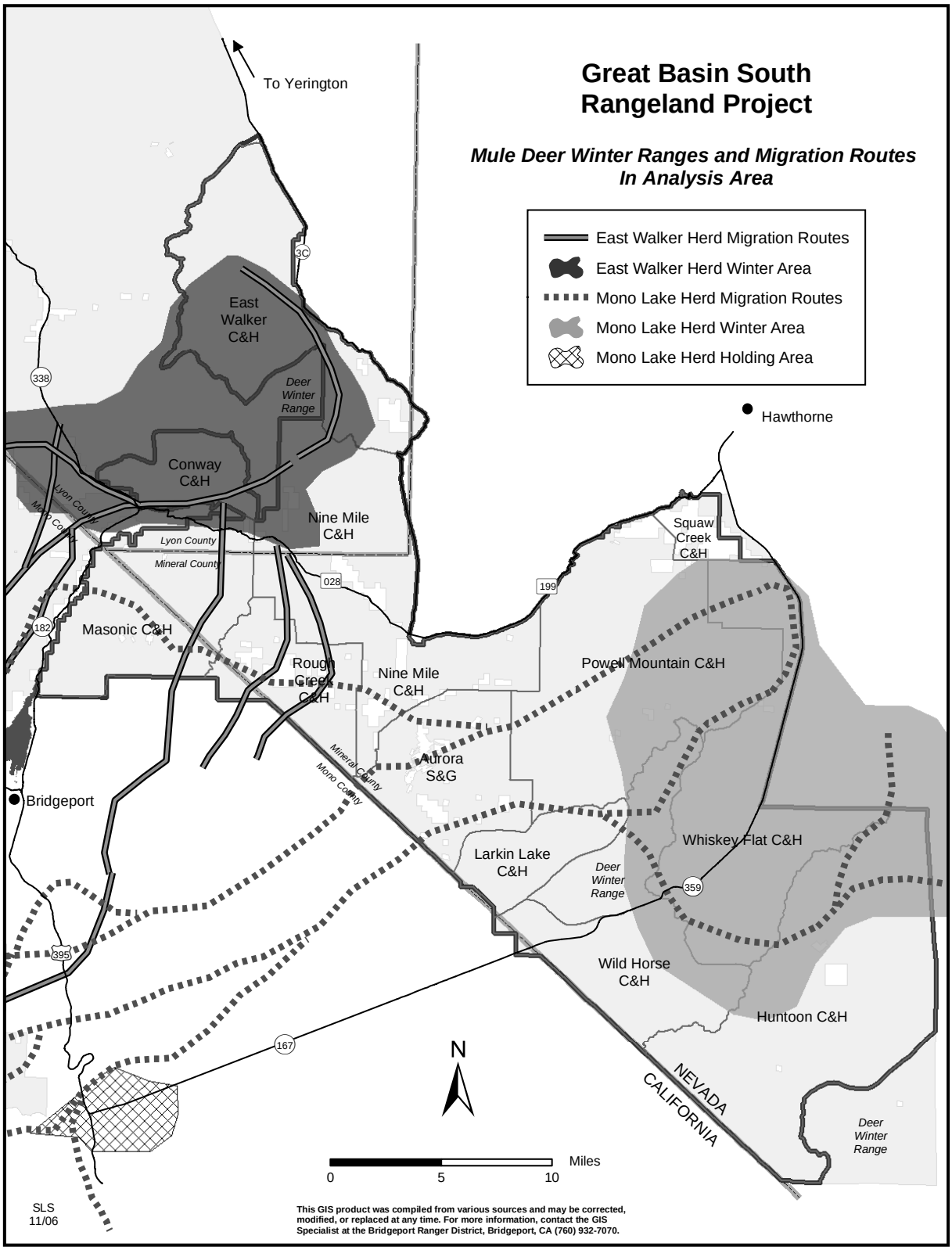
Capable and satisfactory condition mule deer summer and winter habitat was modeled at the Forest-level. This model incorporated different vegetation types and compared it to a 70% slope to develop capable habitat (USDA, 2007). Within the project area there is no summer mule deer habitat. The Forest model showed 384,060 acres of capable mule deer habitat. However, the Forest model had errors when mapping the vegetation types. There were discrepancies with the conifer, pinyon-juniper, and sagebrush acreage.

Due to this error, the capable model was re-run using vegetation communities found within the project area and no slope restriction (Murphy, 2007c). The vegetation types determined to be utilized by mule deer in the winter were sagebrush, mountain shrub, and pinyon-juniper. Although riparian, herbaceous (annual and perennial grasses and forbs), conifer, and aspen communities occur within the project area, their acreage is small (less than one percent of the project area). Therefore these community types were dropped from the model. After this modeling, 352,190 acres showed capable for mule deer. Of this 263,560 acres showed as satisfactory within the project area.

Within the Powell Mountain, Whiskey Flat, Larkin Lake, and Nine Mile allotments within the analysis area the sagebrush community is in unsatisfactory condition due to pinyon-juniper encroachment, decadent or dead stands of sagebrush stands, no recruitment of younger plants, and lack of understory vegetation. Livestock grazing may be impacting the lack of understory present within the sagebrush stands but is not the primary cause of the other unsatisfactory conditions.

HAIRY WOODPECKER

The hairy woodpecker is a fairly common, permanent resident of mixed conifer and riparian deciduous habitats from sea level to 9000 feet. Hairy woodpeckers can be found in aspen, mixed conifer-fir, lodgepole, Jeffrey pine, and pinyon-juniper forests. This species uses stands of large, mature trees and snags of sparse to intermediate density. During bird point count surveys two hairy woodpeckers were observed, one in the Nine Mile and one in the Powell Mountain allotments in montane riparian and pinyon/juniper habitats. These were listed as individuals and not breeding (GBBO, 2002).


Great Basin South Rangeland Project
Mule Deer Winter Ranges and Migration Routes In Analysis Area
East Walker Herd Migration Routes
East Walker Herd Winter Area
Mono Lake Herd Migration Routes
Mono Lake Herd Winter Area
Mono Lake Herd Holding Area
To Yerington
Hawthorne
Bridgeport
East Walker C&H
Deer Winter Range
Conway C&H
Nine Mile C&H
Lyon County
Mineral County
Mono County
Masonic C&H
Rough Creek C&H
Nine Mile C&H
Aurora S&G
Squaw Creek C&H
Powell Mountain C&H
Whiskey Flat C&H
Larkin Lake C&H
Deer Winter Range
Wild Horse C&H
Huntoon C&H
Deer Winter Range
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Breeding Bird Survey data for hairy woodpecker shows a stable trend in the Sierra Nevada and State of Nevada (Saurer, Hines and Fallon, 2007).

Special Status Species

WILLOW FLYCATCHER

The willow flycatcher is listed as a Region 5 sensitive species and a special status species under the Sierra Nevada Forest Plan Amendment (2003). Willow flycatchers occur on the Bridgeport Ranger District within the area known as Rosaschi Ranch (Booth, 2002; GBBO, 2006). Rosaschi Ranch is not located within the analysis area. Potential nesting habitat for willow flycatchers does not occur elsewhere within the analysis area, as there is a lack of riparian vegetation, specifically willow species, which provide suitable cover required for nesting. Due to natural conditions within the analysis area there is no suitable yellow warbler habitat. None of the alternatives will improve yellow warbler habitat within the riparian areas, as riparian vegetation is not expected to reach the potential to provide for suitable willow flycatcher habitat. If livestock grazing is removed from the analysis area, suitable willow flycatcher habitat will still not occur within the analysis area; therefore this species will not be analyzed further.

Other Wildlife Species

DESERT BIGHORN SHEEP

A small population of desert bighorn sheep occurs within the Wassuk Mountain Range within the analysis area. In 1993 the Nevada Department of Wildlife introduced 21 desert bighorn sheep along the East Walker River. This population is located in the Nine Mile C&H and East Walker C&H allotments; along the East Walker River north of the Elbow and south of the Flying-M Ranch. The habitat type within this area is rocky, with steep cliffs and open vegetation. The Nevada Department of Wildlife Big Game Status report estimated 40 animals in 2005 for this area (NDOW 2005).

Impacts from livestock grazing to bighorn sheep are due to the risk of disease transmission from domestic sheep (USDA, 2006; Schommer, 2007). Within the anlaysis area there are no domestic sheep allotments which are currently being grazed. The Aurora allotment is located 15 miles southeast of bighorn sheep locations and is not currently grazed by domestic sheep. Within each of the alternatives, no domestic sheep grazing will occur within the analysis area; therefore there will be no impacts from disease transmission on desert bighorn sheep populations within the anlaysis are and no further analysis will be conducted.

PRONGHORN ANTELOPE

A native herd of pronghorn antelope is present within the analysis area and located within the Rough Creek, Nine Mile and East Walker allotments. Pronghorn antelope is only found in sagebrush, low sagebrush, bitterbrush, grassland, pinyon-juniper, riparian, and alkali desert scrub habitats within the Great Basin (CDFG, 1990). Pronghorn forage on shrub species throughout the year and eat more forbs in the summer. The Nevada Department of Wildlife conducted surveys in February 2005 estimated this population at 140 animals with a stable population trend (NDOW 2005).

Table 16: Bird species identified by Nevada Partners in Flight in the project area. Table describes allotments grazed during the breeding season.

Bird Species	Breeding Season	Allotments grazed during breeding season											
		Huntoon	Masonic	Nine Mile	Powell Mountains	Rough Creek	Wild Horse	Whiskey Flat	East Walker	Conway	Squaw Creek	Aurora	Larkin Lake
Mountain Bluebird	April-July	X	X	X	X	X	X	X					
Orange-crowned Warbler	April-July	X	X	X	X	X	X	X					
Yellow warbler	April-August	X	X	X	X	X		X					
MacGillivray's warbler	May-July		X	X	X	X							
Ferruginous hawk	April-July	X	X	X	X	X	X	X					
Pinyon jay	April-June	X		X	X	X	X	X					
Black-throated gray warbler	May-July			X	X	X	X						
Prairie falcon	March-August	X	X		X	X	X	X	X				
Loggerhead shrike	March-May	X	X	X			X		X				
Sage thrasher	April-August	X	X	X	X	X	X	X					
Vesper sparrow	April-August	X	X	X	X	X	X	X					
Sage sparrow	March-August	X	X	X	X	X	X	X	X				

Table 17: Priority bird species trend and presence in allotments.

Priority Bird Species Habitat and Trend Table					
HABITAT	SPECIES	TREND* 1966-2000 (%/year)	TREND** 1966-2000 (%/year)	SEASON PRESENT	Observed during Great Basin Bird Observatory Surveys
ASPEN	Northern goshawk	No data	0.9	Not listed	No
	Mountain bluebird	-1.4	2.0	Permanent	Yes
	Orange-crowned warbler	No data	-1.2	Summer	No
	Yellow warbler	9.0	0.2	Summer	No
	MacGillivray's warbler	45.0	-0.2	Summer	Yes
PINYON/ JUNIPER	Ferruginous hawk	4.5	3.9	Winter	No
	Pinyon jay	-11.4	-4.5	Permanent	Yes
	Black-throated gray warbler	No data	0.6	Summer	Yes
SAGEBRUSH	Prairie falcon	-8.8	1.7	Permanent	No
	Loggerhead shrike	-5.8	-4.2	Permanent	No
	Sage thrasher	-1.3	-0.3	Summer	No
	Vesper sparrow	-0.7	-0.3	Summer	No
	Sage sparrow	2.4	1.4	Permanent	Yes
* from Nevada Breeding Bird Survey ** from Western Region Breeding Bird Survey					

NEOTROPICAL MIGRATORY BIRDS

Neotropical migratory birds are Western Hemisphere species in which the majority of individuals breed north of the Tropic of Cancer and winter south of that same latitude.

Priority species identified in the Nevada Partners in Flight Conservation Plan (Neel 1999), are listed in the tables above. Population trends for these species have been calculated from data in the Breeding Bird Survey. Great Basin Bird Observatory conducted bird point count surveys within the analysis area in June and July of 2002. These surveys are located within the Nine Mile, Powell Mountain (2 surveys), Wild Horse, and Whiskey Flat (2 surveys) allotments. The next table outlines if this species was observed during these surveys. These species use all habitats of the analysis area during the breeding season. The second table (Priority Bird Species and the Allotments Grazed Table) outlines the breeding seaon for

each of the species and which allotments are grazed during the breeding seasons.

No Action

Threatened and Endangered Species

LAHONTAN CUTTHROAT TROUT

Currently, pure strains of LCT do not occur within the analysis area. Pure strains of LCT historically existed in the East Walker River, and in Bodie and Rough creeks but are now all occupied by hybridized LCT and other non-native fish species. These hybridized LCT are not managed under the Endangered Species Act. Stream habitat surveys conducted in the analysis area, revealed approximately 20 miles of total suitable habitat is present in Bodie and Rough creeks for LCT and an estimated 28 miles is available on East Walker River.

During stream habitat surveys, some stream bank erosion and reduced vegetative cover were noted along portions of the stream (HTNF 2006a and 2006b). Roads, road-stream crossings, dispersed campsites, and grazing activities are all likely factors contributing to erosion and vegetation impacts in the area. Reduced vegetative cover reduces the terrestrial and aquatic insect populations (Platts 1979, Minshall 1976) and thus the food supply for fish. Loss of vegetation also decreases the crown closure and stream shading, and thus results in higher water temperatures (Kauffman and Krueger 1984). Johnson et al. (1977) showed temperature changes have drastic effects on both fish and aquatic insect populations. Increases in water temperature can also cause streams to have more intermittent flows. Reduced vegetation also decreases the stream bank stability and results in increased sedimentation. Increased sediment from stream bank erosion decreases the number of spawning areas by filling the interstitial spaces with fines. Increased sedimentation also changes the in-stream channel morphology. Stream bank erosion can result in increased width/depth ratio's, channel incision, and loss of undercut banks. This results in direct loss of habitat features that are important to trout, such as undercut banks, shoreline depth, and quality pool habitat. A wide shallow channel can also act as a barrier to fish movement. With a wide and shallow stream, fish are also impacted during the winter months from lack of thermal protection and freezing, and the formation of anchor ice. Anchor ice, which forms in shallow channels, prevents fish movement between rocks on the bottom of the stream and inhibits fish from feeding on aquatic invertebrates. Streams that are deep and narrow and have healthy riparian vegetation are less likely to have anchor ice than shallow, exposed streams.

Based on survey observations as well as accessibility and use patterns of cattle in the area, grazing appears to be having a minor influence on erosion and on water quality in Rough and Bodie creeks. The project areas streams currently provide habitat that supports self-reproducing non-native trout populations. Under current management, existing conditions and trends in aquatic habitat quality would continue. Therefore, the no action alternative would not preclude the recovery of LCT within Bodie Creek, Rough Creek or the East Walker River.

Sensitive Species

PYGMY RABBIT

Within the analysis area the use of potential pygmy rabbit habitat is unknown. Surveys have been conducted in the Masonic allotment, but no pygmy rabbits were observed. No pygmy rabbit surveys have been conducted within other areas of the analysis area.

Livestock grazing can affect pygmy rabbit habitats by trampling dens and reducing the summer grass and forb forage available to the rabbits (USDA Forest Service 2001). Under this alternative any new concentrated livestock activities may impact pygmy rabbit denning areas.

Grazing can also damage the structure of the sagebrush, breaking off branches and opening the canopy (USDA Forest Service 2001). Under current management livestock grazing may impact the availability of grasses and forbs needed in the summer for foraging. The utilization standards would remain the same and this may not increase suitable habitat for pygmy rabbits. Currently sagebrush habitat in several of the allotments are not in the desired condition and are not providing for suitable pygmy rabbit habitat; therefore this may be an indication that habitat for pygmy rabbits is being impacted. This may lead to a dispersal of pygmy rabbits from the area.

Under the No Action Alternative direct and indirect impacts may be reducing suitable pygmy rabbit habitat. Suitable pygmy rabbit habitat may not improve overtime under this alternative.

MOUNTAIN QUAIL

Mountain quail occur within the pinyon-juniper habitats within the analysis area. They have been observed within the Aurora allotment (Buma, 2001). Direct impacts to mountain quail, under this alternative, include being flushed from nest sites and/or trampled by livestock as livestock move through suitable nesting habitat; however mountain quail tend to nest within dense understory vegetation and livestock may not travel through these areas. Mountain quail are also generally found in more forested areas, with heavy understory cover, where livestock may not forage.

Indirect impacts to mountain quail nesting and foraging habitat include the loss of understory browse species or cover needed for nesting. Suitable nesting and foraging habitats include dense understory needed for cover, as livestock graze through these areas, cover maybe reduced. However, suitable nesting and foraging habitat occurs within forested areas, such as pinyon pine woodlands and livestock grazing generally do not occur within these areas.

Under the No Action Alternative impacts to mountain quail habitat will be minimal.

SPOTTED BAT AND TOWNSEND'S BIG-EARED BAT

Bat surveys have occurred within historic mining sites in the Masonic and Powell Mountain allotments. One Townsend's big-eared bat was observed at the Borealis mining site (Powell Mountain allotment). No spotted bats have been observed within the analysis area.

The biggest threat to these species is disturbance in hibernation sites (old mines and caves). No disturbance to

hibernation or roosting sites is expected under this alternative as livestock do not enter mines and caves where bats occur.

Under current management livestock grazing may affect foraging habitats for these two species. Riparian areas, wetlands and springs are essential in foraging for these bat species. Vegetation can be reduced in these areas from livestock grazing and trampling. Utilization standards in these areas can be as high as 65 percent, which can result in drying of the meadows and springs, which may impact the quality of foraging habitats. This condition likely reduces suitable habitat for prey forage species for bats. This alternative would not affect roosting or hibernating sites.

Under the No Action Alternative, grazing management would stay the same and impacts to Townsend's big-eared bat and spotted bat foraging habitat would continue to occur.

Management Indicator Species

YELLOW-RUMPED WARBLER

Under current management impacts to yellow-warbler habitat are expected to be minimal as the majority of livestock grazing occurs outside of suitable yellow-warbler nesting habitat. The risk of livestock trampling yellow-rumped warbler nest locations is minimal as yellow-rumped warblers nest in the mid- to upper-levels of trees. Some minor impacts may occur as livestock move through nesting habitat, as this may cause warblers to disperse from the area; however, this impact is expected to only occur when livestock are moving through suitable nesting habitat, such as in the Powell Mountain allotment. The impacts will be minor and will not effect yellow-rumped warbler habitat or cause a downward trend in their population.

SAGE GROUSE

See impacts under the Issues Section.

MULE DEER

Under current management, livestock grazing would continue with the current utilization standards within mule deer winter and transition range. These ranges consist mainly of sagebrush and bitterbrush communities and riparian habitats. Deer relatively consume more browse and forbs than livestock, but if a preferred forage species is reduced or eliminated from the range, livestock can shift their diets so that competition with deer for food sources increases (Longhurst et al. 1983). Livestock grazing within the analysis area occurs in some areas concurrently with deer during the winter, or in late summer before deer arrive for the winter. Livestock grazing occurs on the Conway, East Walker, and Wild Horse allotments during the winter. The Powell Mountain, Whiskey Flat, and Huntoon allotments are grazed during the late summer or fall. No livestock grazing occurs within the designated deer winter ranges.

Riparian and meadow habitats are important for deer foraging and water sources. These riparian meadows that are not at functioning as desired would continue in this trend, decreasing the suitable habitat for deer.

Although livestock grazing under this alternative would impact mule deer habitat, this impact will not lead to a decrease in mule deer populations or trend.

HAIRY WOODPECKER

Livestock grazing impacts to hairy woodpeckers can include disturbance during the nesting season, leading to dispersal or abandonment of nest sites; however, within the analysis area this risk is restricted to the small aspen stands within the Masonic, Aurora, and Powell Mountain allotments. Under current management livestock grazing within accessable, small, aspen stands may continue to reduce or eliminate regeneration and reduce the health of the stand (See Aspen Issue Section). This may reduce future suitable nesting and foraging stands for hairy woodpeckers within these allotments.

Within the pinyon-juniper communities of the Nine Mile and Powell Mountain allotments livestock grazing occurrs outside of suitable hairy woodpecker nesting habitat, and the impact to nesting sites by trampling is minimal. Furthermore hairy woodpeckers tend to nest in the mid-to upper levels of trees; this reduces the risk of trampling by livestock moving through the area.

Although livestock grazing uner this alternative may impact hairy woodpecker habitat, this impact would be minimal and will not lead to a decrease in hairy woodpecker populations or a change in trend.

MACROINVERTEBRATES

In general, livestock grazing has a direct effect on water quality, which in turn can affect macroinvertebrate habitat and community composition. Livestock grazing can affect the water quality characteristics of runoff in a watershed, especially by increasing a stream's turbidity and sedimentation. Photosynthesis is decreased by stream turbidity and primary productivity is reduced. Aquatic insect food production for native trout species is reduced by removal of stream bank vegetation. Bank erosion causes sedimentation in streambed gravel. Macroinvertebrate communities can change from one primarily compose of taxa indicating good water quality to ones more tolerant of degraded conditions. Recent monitoring of macroinvertebrate communities have not been completed for Bodie and Rough creeks or in others perennial waters in the project area. However, according to the stream habitat survey reports for these areas, overall habitat quality for LCT appeared to be good indicating similar conditions likely occur for macroinvertebrates. It is estimated that over 90 percent of perennial waters in the project area provide satisfactory habitat conditions for macroinvertebrates. The survey reports also noted that some impacts to vegetation and soil stability were occurring due to livestock. Compared to the other alternatives, the no action alternative would still allow grazing yet would not provide for improved riparian management or increased rest rotation. Therefore, under the no action alternative, the current impacts to vegetation and soil would likely continue at existing levels or increase.

Other Wildlife Species

PRONGHORN ANTELOPE

Under current management the utilization on upland shrubs within occupied pronghorn antelope habitat will remain at 40%. Effects from this can include the reduction of available forage for antelope if understory utilization is met and livestock begin foraging on shrub species suitable for antelope. The Rough Creek, Nine Mile and East

Walker allotments are also grazed concurrently with pronghorn; this may increase the competition of forage within these areas and may lead to pronghorn dispersing from the area.

NEOTROPICAL MIGRATORY BIRDS

Livestock grazing under this alternative would continue to affect species requiring heavy shrub or herbaceous ground cover for nesting and foraging, mainly in riparian areas and aspen stands. Ground-nesting birds within these habitats would continue to be vulnerable to livestock grazing through loss of nest cover and the potential for trampling of nests.

As aspen stands continue to decline without adequate regeneration, this would result in many impacts to neotropical migratory birds and their habitats (Bock, Saab, Rich, and Dobkin, 1993). Implementation of current management would continue to benefit species that increase with grazing such as mountain bluebird, robin, and brown-headed cowbird (Ibid.). Species that have been shown to possibly respond negatively to grazing include the yellow-rumped warbler and MacGillivray's warbler (Ibid). Species that have been shown to be unresponsive or show mixed responses to grazing include yellow warbler and song sparrow (Ibid).

Fences can be used as perches for predator species such as raptors and ravens, which can affect nesting neo-tropical migratory birds.

Livestock grazing may also lead to an increase in brown-headed cowbirds. This may increase the risk of nest parasitism in Neotropical migratory birds. No brown-headed cowbirds have been observed within the anlaysis area (GBBO, 2002).

Proposed Action

Threatened and Endangered Species

LAHONTAN CUTTHROAT TROUT

As discussed above, LCT are not present within the project area. Improvement of in-stream conditions and potential LCT habitat under the Proposed Action would occur more rapidly than under current management. The Proposed Action allows for streams that are not functioning at desired condition to be grazed at lower utilization levels in order to achieve improved conditions. With improved stream conditions, the amount of available habitat would increase.

Overall, fisheries habitat conditions under the Proposed Action are expected to be maintained at a level suitable to sustain both present and future fish populations. Fine sediment levels are expected to be lower and vegetative cover is expected to be higher compared to the No Action alternative due to improved stream bank condition and riparian vegetation. This alternative would not preclude the recovery of LCT within Bodie Creek, Rough Creek or the East Walker River.

Sensitive Species

PYGMY RABBIT

Trampling of denning locations by livestock can impact pygmy rabbits; however, under the proposed action, new livestock concentrating activity sites will be surveyed for pygmy rabbit dens. This will reduce potential trampling impacts to pygmy rabbit habitat.

Livestock grazing can have an affect on the available forage of grasses and

forbs for pygmy rabbits (USDA Forest Service 2001). Under the Proposed Action, livestock utilization standards for upland grass species would be lowered and allow for suitable pygmy rabbit habitat to be maintained or improve overtime. A rest rotation system will also be established, allowing for native vegetation to be rested and improve overtime. Suitable sagebrush habitat within areas which are not functioning as desired would reach the functioning condition overtime; improving pgmy rabbit habitat.

Under the Proposed Action suitable pygmy rabbit habitat may improve overtime. Individual pymgy rabbits may be impacted, but it would not lead toward a trend toward federal listing or a loss of viability.

MOUNTAIN QUAIL

Under the proposed action direct impacts to mountain quail nesting will be reduced due to the establishment of a rest rotation system within suitable mountain quail habitat, such as the Aurora allotment. This will decrease the potential for livestock trampling or flushing mountain quail from their nesting sites as livestock traii through the area. Although there is a potential for livestock to trample nest locations, this risk is minimal as mountain quail nest in higher canopy cover areas, such as pinyon-juniper, were livestock generally do not forage.

Suitable nesting and foraging habitats include dense understory needed for cover, as livestock graze through these areas, cover maybe reduced. However, under the proposed action the utilization levels on upland grass species will be reduced, allowing for the continuation of suitable cover for nesting.

Under the Proposed Action Alternative impacts to mountain quail habitat will be minimal and individuals may be impacted, however, this will not lead toward a federal listing or a loss of viability.

SPOTTED BAT AND TOWNSEND'S BIG-EARED BAT

Under this alternative there would be no direct impacts to Townsend's big-eared bat and spotted bat hibernation habitats (mines and caves), as livestock do not enter these areas

Under this alternative livestock grazing impacts to foraging habitats for these species would be reduced. Utilization standards on riparian grasses and shrubs would be reduced, allowing for the continuation of suitable foraging habitat to provide for prey species such as insects. With the incorporation of rest, foraging habitats would recover overtime, and continue to provide for foaging habitat..

Under the Proposed Action, suitable hibernating habitat will not be impacted and impacts to foraging habitat would be reduced overtime. Individual species may be impacted, however it will not lead toward federal listing or a loss of viability.

Management Indicator Species

YELLOW-RUMPED WARBLER

Under the proposed action impacts to yellow-rumped warbler habitat are expected to be minimal as the majority of livestock grazing occurs outside of suitable yellow-warbler nesting habitat. The risk of livestock trampling yellow-rumped warbler nest locations is minimal as yellow-rumped warblers nest in the mid-to upper-levels of trees.

Some minor impacts may occur as livestock move through nesting habitat, as this may cause warblers to disperse from the area; however, this impact is expected to only occur when livestock are moving through suitable nesting habitat, such as in the Powell Mountain allotment. The risk of this impact will be reduce further as a rest rotation system will be established and this decrease the risk to yellow-rumped warblers in the Powell Mountain allotment. Although there are impacts, these will be minor and will not effect yellow-rumped warbler habitat or cause a downward trend in their population.

SAGE GROUSE

See impacts in the Issues Section.

MULE DEER

Under the Proposed Action, livestock grazing would continue with utilization standards at a maximum of 20 percent in upland habitats, within mule deer winter and transition range. These winter ranges consist mainly of sagebrush and bitterbrush communities and riparian habitats. Deer relatively consume more browse and forbs than livestock, but if a preferred forage species is reduced or eliminated from the range, livestock can shift their diets so that competition with deer for food sources increases (Longhurst et al. 1983). Livestock grazing within the analysis area occurs in some areas concurrently with deer during the winter or in late summer before deer arrive in the winter.

Under the Proposed Action, rest will be incorporated within those allotments with suitable wintering habitat for mule deer. Incorporating rest will allow for the continuation of forage production for both livestock and mule deer. On the Huntoon allotment, livestock grazing will be closed within the Huntoon Valley area. This will allow for foraging shrub species to recover and increase overtime; providing mule deer within suitable foraging habitat. The change of the class of livestock from sheep to cattle on the Aurora allotment will provide for less forage competition between mule deer and livestock. Furthermore the meadow systems in the Aurora area will be protected from livestock grazing following the project design features for sage grouse. This will allow for the vegetation within these communities to improve over time and continue to provide forage during the migration seasons. No livestock grazing occurs within the designated deer winter ranges.

The livestock management changes in this alternative would improve the acres in unsatisfactory condition (as modeled in the MIS suitability model), where livestock grazing is influencing the condition. Although livestock grazing under this alternative would impact mule deer habitat, this impact will not lead to a decrease in mule deer populations or trend.

HAIRY WOODPECKER

Livestock grazing impacts to hairy woodpeckers can include disturbance during the nesting season, leading to dispersal or abandonment of nest sites; however, within the analysis area this risk is restricted to the small aspen stands within the Masonic, Aurora, and Powell Mountain allotments. Under the proposed action livestock grazing within accessable, small, aspen stands would be reduced due to the incorporation of rest. This will reduce the use within these stands, especially in the Powell Mountain and Aurora allotments. Aspen

stands within the Masonic allotment will be managed using the matrices. This will improve suitable hairy woodpecker nesting habitat.

Within the pinyon-juniper communities of the Nine Mile and Powell Mountain allotments livestock grazing occurrs outside of suitable hairy woodpecker nesting habitat, and the impact to nesting sites by trampling is minimal. Furthermore hairy woodpeckers tend to nest in the mid-to upper levels of trees; this reduces the risk of trampling by livestock moving through the area.

Although livestock grazing under this alternative may impact hairy woodpecker habitat, this impact would reduced due to the incorporation of rest and reduced impacts to suitable nesting habitats. The Proposed Action will also improve hairy woodpecker nesting habitat within aspen stands, overtime. These impacts will not lead to a decrease in hairy woodpecker populations or a change in trend.

MACROINVERTEBRATES

Compared to the no action alternative, habitat for macroinvertebrates would likely be improved due to increased rest rotation and the reduction in utilization levels in riparian areas. In general, livestock grazing can affect water quality by increasing sediment loading and reducing shade along streams. Under the proposed action, the new grazing management strategy would decrease the potential for erosion and loss of shade in Rough and Bodie creeks. Compared to the No Grazing alternative, the proposed action would still likely impact some habitat quality levels for macroinvertebrates. However, the impact is expected to be minor, resulting in small positive changes to species composition compared to the No Action alternative.

Other Wildlife Species

PRONGHORN ANTELOPE

Under this alternative Rough Creek will be managed using the matrices. The condition within the black sagebrush area on this allotment is functioning as desired. Therefore utilization levels within the Rough Creek allotment will decrease to 20% within the upland shrub category. Lowering the utilization standard within this area will allow for forage to be available to pronghorn throughout the year. Livestock grazing in this area generally utilize upland grass or understory species first and then begin to forage on shrub species. The understory/grass utilization will be reduced to 40% and is typically met before livestock begin to forage on shrub species. This will benefit pronghorn within this area, as forage will be maintained or increased within this allotment.

The Nine Mile allotment's black sagebrush condition is rated as at risk and is close to the threshold. This allotment will be incorporating rest and the upland shrub utilization will be reduced to 20%. This will allow for suitable forage to be available to pronghorn antelope. Incorporating rest will all for competition between livestock and pronghorn to be reduced.

Data gathered on the East Walker allotment listed the black sagebrush condition as functioning as desired. Rest will also be incorporated into this allotment as well as upland shrub utilization lowered to 20%. This will allow for the continued availability of forage for pronghorn antelope within this

area. Incorporating rest will all for competition between livestock and pronghorn to be reduced.

NEOTROPICAL MIGRATORY BIRDS

Livestock grazing may impact shrub or herbaceous species suitable for nesting or foraging. Under the Proposed Action rest would be incorporated as well as lowered use levels on upland shrubs; allow for nesting and foraging cover to be maintained. Incorporating rest would allow for suitable nesting habitat to be maintained. Ground-nesting birds within these habitats would continue to be vulnerable to livestock grazing through loss of nest cover and the potential for trampling of nests.

Under this alternative the maximum riparian utilization allowed would be 45 percent and may by reduced depending upon the condition of the resources. This alternative would allow for recovery of these habitats to occur at a faster rate than current management. The Proposed Action also includes utilization standards for aspen and willow browsing, which would ensure long-term recovery of these habitats and reduced impacts when compared to the No Action alternative.

Fences can be used as perches for predator species such as raptors and ravens, which can affect nesting neo-tropical migratory birds.

Livestock grazing may also lead to an increase in brown-headed cowbirds. This may increase the risk of nest parasitism in Neotropical migratory birds. No brown-headed cowbirds have been observed within the anlaysis area (GBBO, 2002).

No Grazing

Threatened and Endangered Species

LAHONTAN CUTTHROAT TROUT

According to the stream survey reports for Bodie and Rough Creeks, large sections of the streams are considered good to excellent habitat quality for LCT. As discussed above, LCT are not present within the project area. Although impacts from grazing were noted in these surveys, grazing activity did not appear to be affecting habitat quality in most areas. Under the No Grazing Alternative, impacts to soil and vegetation from grazing activity would be allowed to recover, further improving habitat quality. Therefore, under the No Grazing alternative would not preclude the recovery of LCT within Bodie Creek, Rough Creek, or the East Walker River.

Sensitive Species

PYGMY RABBIT

The No Grazing alternative would allow for suitable pygmy rabbit habitat to improve at the fastest rate. Livestock grazing impacts would be reduced or eliminated and summer grasses and forbs would increase in the long-term. Under this alternative there would be no negative impacts to this species from grazing.

MOUNTAIN QUAIL

Under this alternative, suitable understory species used for nesting will be maintained or increase overtime as livestock is removed from the project area. The risk of trampling would be lessened as well.

SPOTTED BAT AND TOWNSEND'S BIG-EARED BAT

Under this alternative, the exclusion of livestock grazing would allow foraging habitats for bats to improve especially near springs, riparian areas and wet meadows. As livestock grazing is removed, forb and flower production may increase, attracting insects.

Management Indicator Species

YELLOW-RUMPED WARBLER

Livestock grazing will be removed from the analysis area under this alternative. This will reduce the risk of disturbance or dispersal of yellow-rumped warblers during the nesting season. There will be no effects to yello-rumped warbler habitat or populations under this alternative.

SAGE GROUSE

See impacts under the Issue Section.

MULE DEER

Under this alternative, riparian areas and meadows would recover at the fastest pace of the three alternatives. Competition between livestock and deer for winter forage would be eliminated, allowing more browse forage for deer.

Elimination of livestock grazing would improve the acres in unsatisfactory condition (as modeled in the MIS suitability model), where livestock grazing is influencing the condition. Possible increased grazing use of private lands may result in degraded habitats on private lands, which could affect mule deer populations.

HAIRY WOODPECKER

Livestock grazing would be removed within the anaylsis area. This will improve hairy woodpecker nesting habitat within aspen stands, overtime, at a higher rate than the No Action and Proposed Action Alternatives.

MACROINVERTEBRATES

Under the No Grazing alternative, livestock would be removed from the analysis area and no grazing would occur. Compared to the other alternatives, habitat quality for macroinvertebrates would be even more improved as any minor impacts occurring from cattle would be eliminated. However, based on stream habitat surveys conducted in Bodie and Rough creeks habitat quality is currently considered high for LCT indicating high quality habitat for macroinvertebrates as well (HTNF 2006a and 2006b). Therefore, although there would be a greater improvement in habitat quality under the No Grazing alternative compared to the Proposed Action alternative, the small positive changes in species composition are expected to be minor.

Other Wildlife Species

PRONGHORN ANTELOPE

Livestock grazing will be eliminated from the analysis area under this alternative. This will allow for vegetation to recover or increase overtime, and continue to provide suitable forage for pronghorn antelope within occupied areas.

NEOTROPICAL MIGRATORY BIRDS

Under this alternative grazing would be eliminated. This action would result in the fastest recovery of many habitats such as riparian areas, meadows and aspen stands, which are important to many neotropical migratory birds. There would no longer be a risk that livestock may trample nests or chicks of birds within the analysis area. The risk of

nest parasitism by brown-headed cowbirds may be lessened; however, these birds may still be present after livestock are removed. There have been no observations of brown-headed cowbirds within the analysis area (GBBO, 2002).

Heritage Resources

Affected Environment

The Great Basin South area has been occupied by humans for at least 7,000 years before present. Two obsidian sources, Mt. Hicks and Bodie Hills, and the extinct lakes found in the area, were important attractants to these early humans. The Paiute were settled in the area 1350 years ago. Their focus of resource procurement centered on game drives, pinyon nut gathering, and quarrying stone tool material at Mt. Hicks and Bodie Hills.

The first eastern explorer in the area was Jedediah Strong Smith. In 1827, his expedition crossed the Sierra Nevada at Sonora Pass. Other explorers such as Captain Joseph Walker in 1833, Christopher “Kit” Carson around 1839, the Bidwell-Bartleson party, who were credited as the first group of immigrants to cross the Great Basin and the Sierra Nevada in 1841 and John Fremont in 1843 soon followed.

During the 1850s gold brought thousands of people to the area, the first strike was at Dogtown in 1857. Subsequent discoveries led to the founding of Aurora, Bodie, Masonic and other mining camps or towns. With the mines and settlements came an increasingly complex need for transportation, communication, and goods and services. Sawmills appeared in Bridgeport Valley by the 1860’s. In 1863 Bridgeport was established as the Mono County seat (being moved from Aurora after it was discovered that Aurora was in Nevada). Supporting the mines and growing towns, ranching and small farms had become established by 1870. Livestock grazing has occurred on lands now in the allotments in the project area for over a hundred years.

Today the Great Basin South area still supports mining and ranching, with tourism becoming more important.

The Great Basin South Rangeland Management Project covers 410,500 acres. Of these acres, approximately 1,800 (0.44 percent) have been intensively surveyed for Heritage Resources. These surveys have resulted in the discovery of 66 sites with an unknown number of additional sites noted in cursory surveys. The recorded sites include 37 prehistoric sites, four historic sites, and 26 multi-component sites. The prehistoric sites include game drives, quarries, pinyon nut procurement base camps, bow stave trees, petroglyphs, and lithic scatters. The four historic sites are related to mining, one of which, the town site of Aurora, is on the National Register of Historic Places (NRHP). The 26 multi-component sites are related to historic pinyon nut procurement, mining, transportation, and ranching.

It is understood that rangeland management practices may have an adverse impact on historic properties that may be included in or eligible for inclusion in the NRHP. In recognition of this potential impact, the Humboldt-Toiyabe N.F. entered into an agreement in 1995 with the Nevada and California State Historic Preservation Offices on methods to address cultural resources as they pertain to grazing and rangeland

management on the Forest. A Memorandum of Understand (MOU), tiered on the National Programmatic Agreement, was developed that defined several strategies to address the effects of rangeland management practices on historic properties. The MOU was developed pursuant to Section 800.13 and Section 110 of the National Historic Preservation Act. Implementation of this MOU satisfies the Forest's compliance with Section 106 of the National Historic Preservation Act.

The MOU defined a two-tier strategy to address potential effects to historic properties on each forest management unit. The first strategy was to identify an immediate project specific strategy. This includes an assessment of existing information within the area of potential effect. This information includes identifying the types of undertakings that may be affecting historic properties, reviewing existing knowledge of sites that are being impacted, conducting field evaluations of potentially impacted sites, and developing a treatment plan to address impacts to those sites if necessary.

The second strategy to the MOU is a long-term ecosystem planning approach to address effects to historic properties. This strategy includes writing an overview that addresses the current and past environments, prehistory, ethnobotany, ethnography, and history of the management unit. Additionally, all sites and survey data are to be entered into a Geographic Information System (GIS) format, formulation of a predictive model showing site sensitivity locations as they relate to high grazing usage, field testing the model, and the development of treatment plans to address effects to historic properties that are related to grazing management practices. Addressing these two strategies meant that the forest would not be required to complete a 100 percent cultural survey over the entire area used for grazing as stipulated in Section 800.4 of the National Historic Preservation Act.

Environmental Consequences

No Action

Under current management, impacts to historic properties would continue as they have in the past. In areas identified in the predictive model as having both high site density and high livestock usage, sites impacted by trampling, erosion, vertical and horizontal artifact displacement, and artifact breakage would continue to be found. Implementation of the Rangeland MOU, calling for intensive archaeological inventory, would identify sites that are being impacted and address or mitigate these impacts.

Proposed Action

Under the proposed action, with more emphasis on maintaining well functioning vegetative communities, impacts to cultural resources may be lessened if the disturbance to ground vegetation (i.e., increasing allowable utilization, changing the time livestock enter an area, and reducing the number of livestock) is reduced, thereby reducing impacts from erosion and soil compaction. Reducing the number of livestock grazed in an area as well as the number of days grazed may also reduce impacts to cultural resources. However, in areas where livestock tend to gather, there would still be impacts to sites in the form of vertical and horizontal artifact displacement, and breakage to a similar or slightly lesser degree. Implementation of the

Rangeland MOU would identify sites that are being impacted and address or mitigate these impacts.

Before authorizing cattle grazing on the Aurora Allotment, protective measures, which may include drift fencing, would be implemented to protect the town site of Aurora, a National Register of Historic Places Property.

No Grazing

Under no grazing, impacts to cultural resources from livestock grazing would end. Trampling of sites where livestock congregate would no longer occur and vegetation would grow back, resulting in a decrease in soil erosion. Sites would continue to degrade naturally. There would be no archaeological inventorys conducted.

Social Economics

Affected Environment

The Forest Service range management program as defined in the Forest Service Manual (FSM) 220, Section 2202.1, includes an objective to:

Contribute to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood.

This objective fits in with the Multiple-Use Sustained-Yield Act (MUSYA) and other legislation that determines the Forest Service management of these lands for a range of goods and services. The Forest Service provides livestock grazing opportunities to provide economic benefit to permittees and to local communities and regional economies. Numerous legislative mandates including both programmatic legislation as well as annual appropriations language make it clear that this is consistent with Congressional intent. It is also important to note that while the Forest Service grazing program is expected to contribute to local economic stability it cannot necessarily ensure the viability of ranching operations. Macroeconomic and other factors well beyond Forest Service control can be the ultimate determinants of economic return.

The social economic region affected by grazing in the project area includes Lyon and Mineral Counties in Nevada and Mono County in California. Lyon County, with a population of 43,000 (2004 data, US Department of Agriculture, 2005a) is the largest and most rapidly growing of the three counties. Lyon County's growth rate is extraordinary. At 9.6 percent, it ranked second in the nation for 2004-2005 population growth (US Census Bureau, 2006). Most of this growth is occurring in the northern part of the county and is associated with spillover from the urban areas of Reno, Sparks and Carson City. The southern part of the county is growing more slowly. Median income is $42,000 – near the Nevada state average. Mineral County has a population of 5,000 and has been losing population for more than a decade, primarily because of reduction in employment at the Hawthorne Army Ammunition Depot. Median household income is $31,000 – lowest of any county in Nevada. Mono County has a population of 13,000. It grew rapidly from 1990 to 2000 but has leveled off since. Most of the growth occurred in Mammoth Lakes and has been related to tourism. Median income is $46,000 – near the California state average (2002

data, US Department of Agriculture, 2005b).

Livestock ranching has occurred on the allotments in the project area for over a century. Ranching has traditionally been an important part of the social economic structure of all three counties. While its economic importance has declined, it remains an important part of the culture of these counties, particularly in southern Lyon County and northern Mono County, where the base ranches for the allotments in the project area lie. Farming, which includes crop production as well as livestock ranching, accounts for 3.5 percent of employment in Lyon County, 0.6 percent of income in Mineral County, and 2.1 percent of income in Mono County (Census 2000 Data Social Science Data Analysis Network, 2005).

Of the four ranches that use the project area, three are in southern Lyon County and one is in northern Mono County. Altogether they use about 4,000 animal unit months of forage in the project area. This accounts for a fraction of the total forage and feed in the affected counties. For example, ranchers in Lyon County have a total of about 36,000 cattle and 13,000 sheep (Agricultural Census 2002 data, US Department of Agriculture, 2005c). Together these require about 300,000 animal unit months of feed each year, or 75 times as much as is provided by Forest Service grazing allotments in the project area. Based on this small amount of feed base, the economy of the region is not highly dependent on Forest Service forage in the project area. However on an individual basis, Forest Service forage is important to the income of the four ranches that use the allotments in the project area. It should be noted that most of the animal unit months are used by a ranch owned by a large hotel/casino corporation.

Environmental Consequences

No Action

Since no changes in grazing practices or forage availability would occur in the short term, no impacts to ranching income would occur. Over the long term declining range conditions would likely result in reductions in forage availability, which would mean that other, more costly feed sources would be required or herd sizes would have to be reduced. These effects would be most apparent on the Huntoon Allotment because of declining conditions in Huntoon Valley.

Proposed Action

In the short term, the two ranches that use Huntoon Valley for grazing would be adversely affected by the proposed action. Closure of the valley to grazing would result in the need to find alternative feed, either from the upland portions of the Huntoon allotment or from other allotments, pastures, or hay. Any of these alternative feed sources would likely be more costly than grazing in Huntoon Valley. The ranchers may also opt to reduce herd size, which would reduce their income correspondingly. In addition to income effects, the grazing permit for Huntoon Valley has a de facto market value, which would be lost, reducing the value of the ranch's real estate assets. Additional costs could include increased fencing, riding, and water hauling.

Changes in seasonal use patterns on the other allotments would require adjustments for all of the ranches and could increase herding costs. Over the long term, some adjustments in grazing use, upward or downward, could occur and have a corresponding effect on the

income of these ranches. While these allotments are important to each of the four ranches, foreseeable changes in use are unlikely to have major effects on the three ranches that use the Conway, East Walker, Larkin Lake, Masonic, Nine Mile, Powell Mountain, Rough Creek, Whiskey Flat and Wild Horse allotments.

On a region-wide basis, it's unlikely that any economic effects would be noticeable, given the minor percentage of livestock feed resources derived from the subject allotments. From a social perspective, any change in livestock grazing management practices could be seen as a threat to the ranching culture of the region.

No Grazing

Elimination of grazing on the subject allotments would adversely affect all four ranches with grazing permits on those allotments. This would be particularly evident on the Ninemile allotment because it is the largest and it fills a critical role in providing feed in the spring, when other sources of feed are unavailable. Late fall to early spring forage loss would be particularly evident on the Larkin Lake and East Walker allotments, which provide more forage availability than the other allotments during that period.

Closure of the allotments would result in the need to find alternative feed from other allotments, pastures, or hay. Any of these alternative feed sources would likely be more costly than grazing the allotments. The ranchers may also opt to reduce herd size, which would reduce their income correspondingly. Some or all four of the ranches could be forced out of business, although it should be noted that most of the grazing on Forest Service allotments is done by a ranch owned by one of the largest hotel/casino corporations in the world. The bottom-line effect on overall corporate income is likely to be minimal. In addition to income effects, the grazing permits also have a de facto market value, which would be lost, reducing the value of the ranches' real estate assets.

On a region wide basis its unlikely that any economic effects would be noticeable given the minor percentage of livestock feed resources derived from the subject allotments. From a social perspective, elimination of livestock grazing on National Forest System lands could be seen as a threat to the ranching culture of the region.

Cumulative Effects Analysis

Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

Cumulative effects are evaluated along with direct and indirect effects of each alternative. Generally, cumulative effects are considered on a larger scale than the direct and indirect effects. They describe a larger picture across a longer time frame. When analyzing cumulative effects, different temporal and geographic scales may used than for direct and indirect effects. These scales of analysis extend only to where effects can actually be measured (EPA 1997). Determining the cumulative environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources,

ecosystems and human communities of concern. The significance of cumulative effects depends on how they compare with the environmental baseline and relevant resource thresholds. When determining environmental consequences, three principles must be addressed. These are: the additive, countervailing, and synergistic effects; a look beyond the life of the action; and addressing the sustainability of resources, ecosystems and human communities.

For this Final EIS, many of the direct, indirect, and cumulative effects would take a long period of time to become evident due to the projected slow rates of ecological changes in the project area. The project is located in one of the driest areas in the nation with few perennial streams or spring sources and distinct upland vegetation communities. Change occurs slowly in this dry environment. In many cases it would take decades for ecological changes to occur. The current conditions reflect historical uses and past actions on the Forest. Thus, the effects analysis has generally considered past, present, and reasonably foreseeable actions across a long time period.

Unless otherwise noted, the time frame for the cumulative effects outlined below coincides with the decades long time frame for direct and indirect impacts. Spatial analysis for cumulative effects also coincides with the project area boundaries, unless otherwise noted below.

Whatever their label, the important point is that the incremental effects of the proposed action and alternatives are disclosed. As part of this process, the ID Team identified past, present, and reasonably foreseeable future actions within the project area.

Cumulative Activities

Relevant past, present, and reasonably foreseeable future actions within the Great Basin South area are:

Vehicle and recreation use in the area has been, is currently, and is projected to be relatively light. The area does not attract major recreational use, due in part to the lack of rainfall and limited availability of water in the area. Dry conditions have meant an absence of designated campsites within the analysis area. Much heavier use occurs on National Forest System lands, private lands, BLM administered lands, and California State Park land to the west of the project area. Vehicle management in the project area is expected to be enhanced in the future through the Forest Service Route Designation process, which is expected to be implemented in 2009.

Substantial mineral development has occurred in the past, particularly in the Borealis and Aurora areas. Current mining disturbance totals 180 acres. It is projected that mining activity would continue in the future. Project proposals have been developed for an additional 475 acres, primarily in the Borealis area on the Powell Mountain Allotment. All future mining developments on National Forest System lands would be subject to mitigating measures to minimize impacts on watersheds, wildlife, heritage resource, vegetation, rare plants and, other resource values. No oil and gas or other energy development projects have occurred in the area or are expected to occur in the future.

Wild horses have inhabited the area for a hundred and fifty years, but have been

more prevalent since World War One when Perry Morgan, once owner of the Flying M Ranch, turned his horses loose when he joined the Army. Two wild horse territories are included in the area, the Powell Mountain Territory in the Powell Mountain, Aurora, Larkin Lake, Wild Horse, and Whiskey Flat allotments and the Montgomery Pass Territory in the Huntoon allotment. The Powell Mountain herd is managed for 29 head and the Montgomery Pass herd is managed for 57 head, which is 31% of a total of 184 head on the Humboldt-Toiyabe National Forest. Reasonably foreseeable management of wild horses in the area would be at these appropriate management levels that were developed to ensure that wild horse management would be compatible with long term ecosystem sustainability.

The Powell Mountain territory was gathered during the summer of 2007. Eighty head of horses were removed from the territory. Horses that were using areas outside of the territory boundary were removed as well as horses within the territory boundary. The Montgomery Pass horses are broken into three distinct population groups. The majority of the use within this territory is outside of the project area.

There are two designated Personal Use Fuelwood areas within the project area. Area A provides for harvest of dead and/or down pinyon pine and juniper. This area covers the approximately 340,000 acres of the project area. Area C provides for harvest of green, dead, and/or down pinyon pine and juniper. This area covers less than 3,000 acres. The areas in the Excelsior Range are closed to woodcutting, unless otherwise authorized. Reasonably foreseeable management of the Personal Use Fuelwood program would be attuned to long-term ecosystem sustainability.

One vegetation improvement project is proposed within the project area. This project is located in the China Camp area, in the Rough Creek allotment. The purpose of this project is to improve sage grouse brood-rearing habitat by enhancing the meadow systems present in the area. This project will also include the removal of pinyon pine around the meadow system.

Nearby projects include the Bald Mountain Fuels Reduction project and the Sweetwater/Desert Creek Sage Grouse Habitat Improvement Project. The goal of the Bald Mountain Project is to return pinyon/juniper woodlands to the Fire Regime Condition Class 1 level. The goal of the Sweetwater/Desert Creek Sage Grouse Habitat Improvement Project is to remove pinyon trees from Phase I and Phase II Pinyon types in critical sage grouse habitat. Both projects are to the west of the Great Basin South Rangeland project area. These projects will provide for long-term ecosystem sustainability. The Humboldt-Toiyabe National Forest is currently revising the 1986 LRMP. In order to address fuel build-up and ecosystem changes in the forested and woodland areas, the District will try to implement 5000 acres of vegetation treatments per year. This is less than 1% of the pinyon-juniper on the Bridgeport District per year.

The incremental effects of the proposed action when added to these other past present and reasonably foreseeable future action are described below.

Cumulative Effects Analysis

Vegetation

The beneficial direct and indirect impacts of the proposed action and no grazing alternatives on riparian and upland vegetation would be slowed by the relatively light past, present, and future recreation and motor vehicle uses in the area. Recreation and motor vehicle use can damage vegetation through creation of roads and parking areas, trampling, and cutting or removal of trees and other vegetation. Such impacts would be most evident in areas with vegetation or other features attractive to recreationists including aspen stands and historical sightseeing areas such as found in the Aurora allotment. These impacts would likely be reduced over time due to implementation of sustainable motor vehicle management by the Forest Service route designation project.

Cumulative impacts on vegetation from wild horses could occur in areas where the wild horses graze after the domestic livestock have been removed. In these areas the wild horses could use the remaining plant material. If they are in the area before the livestock move in, they could reduce the amount of forage available to cattle. Cumulative impacts on vegetation should be limited because when utilization levels of herbaceous and woody species are met, the domestic livestock would be required to move to the next pasture or off of the allotment. Reasonably foreseeable management of wild horses at their appropriate management levels would also limit the potential for any cumulative impacts since those levels were developed to ensure that wild horse management is compatible with long term ecosystem sustainability.

Projected enhancement of livestock rest periods in the proposed action would likely benefit wild horse habitat in the project area.

Since the no grazing alternative would eliminate current grazing impacts, it would contribute the least to cumulative impacts on vegetation. The proposed action would reduce the contribution to cumulative impacts as compared to the current management alternative.

Wildlife

Sage Grouse

On a cumulative basis, mining and recreation activities could slow the potential beneficial direct and indirect impacts from the proposed action and the no grazing alternative. These activities can reduce the available nesting habitat for sage grouse. The cumulative impacts would be most prevalent in the Powell Mountain allotment around the Borealis area, which includes much of the current and projected mining activity and around the Aurora area, which includes past and current mining activity and reasonably foreseeable future recreation activity related primarily to historic sightseeing. Surprise encounters can cause sage grouse to flee secure types of areas, thereby increasing their vulnerability.

In addition, fences related to mining activies and or management of livestock grazing, can be used as perches for predator species such as raptors and ravens, which can affect nesting sage grouse. Sage grouse have been observed flying into fences during the early dawn and late dusk hours when flying to and from roosting sites to water sources.

Under the no grazing alternative, fences may be removed as livestock is removed. This would reduce the risk of sage grouse flying into fences and reduce the predation of sage grouse by perched raptors or ravens. Under the No Action and Proposed Action Alternatives fences will remain on the landscape and may contribute to mortality of sage grouse by collisions or predation.

Cumulative activities in the analysis area and elsewhere in the Mono Basin sage grouse population's range may be affecting the bird's persistence in the area. The proposed action and no grazing alternatives would reduce cumulative effects. Current management would continue to negatively contribute to impacts on brood-rearing habitat in the analysis area.

Lahontan Cutthroat Trout

Although there are no Lahontan cutthroat trout in the project area, potential habitat exists. On a cumulative basis, mining and recreation activities could slow the potential beneficial direct and indirect impacts from the proposed action and alternatives. Cumulative effects to LCT include streambank erosion and degradation of riparian vegetation mainly from motor vehicle use along Bodie and Rough Creeks; however this use is minimal. In 2007 it was observed that there are two plugged or undersized culverts along Bodie Creek which have caused the stream to run along the road prism. This could contribute sediment into the stream (Probert, pers. comm. 2007). Over the long term is is reasonably foreseeable that such impacts would decrease due to implementation of the proposed travel management plan and improved maintenance on the open roads. That plan will likely close the area to cross country motor vehicle travel and enhance travel on authorized routes. Consideration of LCT habitat will be included in the travel management planning process.

Mining operations within the analysis area have occurred upstream of Bodie Creek; however there have been no known documented effects from this activity on the creek. The potential for cumulative impacts from future mining operations would be limited on National Forest System lands through mitigating measures to protect potential LCT habitat. Past mining activities has affected water quality in Bodie Creek. In addition to human impacts, Bodie Creek was not perennial throughout its length in 2007 due to drought conditions (Probert pers. comm. 2007). When combined with cumulative activities, the limited grazing in potential LCT habitat allowed under both action alternatives would not cause those streams to be unsuitable.

Pygmy Rabbit

Although no pygmy rabbits have been found in the project area, potential habitat exists. On a cumulative basis, mining and recreation activities could slow the potential beneficial direct and indirect impacts from the proposed action. Cumulative effects to potential pygmy rabbit habitat include physical disruption of potential denning areas and alteration of habitat through changes in vegetation. Recreation and mining activities could result in alteration of potential denning areas and in vegetation changes.

These effects under the No Action Alternative may continue or contribute to the loss of suitable pymgy rabbit habitats. Under the Proposed Action

and No Grazing Alternatives pygmy rabbit habitat may improve over time; however, cumulative effects may still occur and may hinder the improvement of vegetation suitable for pygmy rabbit foraging or cover. Pygmy rabbits are expected to continue to persist in the analysis area in all alternatives.

Pronghorn

Cumulative effects to pronghorn antelope within the analysis area include off-road vehicles and fences. Off-road vehicles can lead reduce suitable foraging species as new roads or trails are made within suitable foraging habitats. Off-road vehicle impacts are expected to be minimized through implementation of the Forest Service route designation process currently underway. Fences fragment pronghorn habitat and restrict movement within occupied ranges. Under the No Grazing Alternative, fences may be removed as livestock is removed. This would reduce fragmentation and movements of pronghorn. Under the No Action and Proposed Action Alteratives fences will remain on the landscape and may contribute to the dispersal of antelope from the area. The effects of the alternatives when combined with cumulative activities would not trigger a major change in pronghorn populations in the analysis area.

Neotropical Birds

A wide variety of direct and indirect impacts to various bird species have been disclosed in Chapter 3. Many are related to the beneficial effects of incorporating rest into livestock grazing management practices. This would enhance vegetation needed for nesting and foraging by various bird species, including neotropical migratory birds, hairy woodpeckers, and yellow warblers. Due to the minimal precipitation in the area these effects would take several decades to become evident and could be slowed by the cumulative effects of recreation and mining activities in the area. Recreational activities, specifically off-road vehicle use, can cause surprise encounters, leading to these species fleeing secure types of areas, thereby increasing their vulnerability. Motor vehicle use is common in the Aurora area. It poses a threat to suitable habitat for migratory birds, although its impacts are expected to be minimized through implementation of the Forest Service route designation process currently underway. A potential downward trend in population would be the result of numerous factors, but this trend would be due primarily to the cumulative impacts from wildfires, or lack of wildfires, and extensive drought rather than from livestock grazing. Mining can reduce suitable habitat areas and displace birds from nesting areas due to disturbance. These effects would be reduced through implementation of the mitigation of mining development impacts. These effects under the No Action Alternative may continue or contribute to the loss of suitable bird nesting and foraging habitats. Under the Proposed Action and No Grazing Alternatives bird habitats may improve over time; however, cumulative effects may still occur and may hinder the improvement of vegetation suitable for foraging or nesting. The contribution of this project to cumulative effects would not cause a measurable population decline in the analysis area.

Bats

Cumulative effects from mining can have mixed effects on bats in the area. Current mining activities have been concentrated in the Borealis area in

Nevada. Historic mining shafts in this area provide suitable roosting habitat for Townsend's big-eared bats. Potential future mining in these areas could reduce the habitat for these bats. However, it is reasonably foreseeable that proper mitigations would be established to protect the bats. These effects under the No Action, Proposed Action, and No Grazing Alternatives may continue to impact bat hibernating habitat but would not cause a major decline in bat populations.

Mule Deer

On a cumulative basis, mining can affect mule deer habitat. The Borealis mining area is located outside of mule deer winter ranges; however mule deer can be located within the area during the winter months. Mining activities may disrupt foraging or migration in the area. These effects under the No Action Alternative may continue or contribute to the loss of suitable foraging habitats. Under the Proposed Action and No Grazing Alternatives deer habitats may improve over time; however, cumulative effects may still occur and may hinder the improvement of vegetation suitable for foraging or cover. When combined with cumulative activities, the action alternatives would not cause a major decline in mule deer populations in the analysis area.

Invasive Weeds

On a cumulative basis, invasive weeds can be affected by wild horses, mining, and recreation. Seeds can become attached to the hair of wild horses and any number of wildlife species or be consumed by these animals. The animals then move around the analysis area, the seeds fall off the animals or are excreted in feces and can establish at new locations. Mining and recreation can affect invasive species; people, motorized vehicles, and domesticated horses can spread seeds in the same manner as wild horses. Bridgeport Ranger District decisions for mining projects address invasive weeds by requiring that the mines wash their equipment before the equipment moves to a new location.

The proposed action and current management would contribute to cumulative impacts due to the presence of livestock. This will be mitigated, in part, by having permittees on the range who often spot populations early. While the no grazing alternative would eliminate contributions from livestock, it would reduce the people on the range to observe new infestations. None of the alternatives combined with other cumulative actions are expected to cause a major increase in invasive plant infestations.

Rare Plants

The beneficial effects of the proposed action on rare plants could be slowed by the effects of recreation/motor vehicle use, wild horses, and mineral exploration. These uses can result in direct trampling and removal of plants as well as habitat fragmentation and degradation. These cumulative effects would be limited because the travel management project currently underway would eliminate motorized cross country travel and enhance management of authorized travel routes, including consideration of rare plant populations. Cumulative impacts would be further limited because appropriate management levels for wild horses have been established and populations would continue to be controlled by removing wild horses when this limit is reached. In addition, any future minerals

development on National Forest System lands in the area would be subject to mitigation activities to protect rare plants.

None of the alternatives would cause cumulative impacts on rare plants to cause local or regional population changes.

Social Economics

On a cumulative region-wide basis, it's unlikely that any economic effects would be noticeable, given the minor percentage of livestock feed resources derived from the subject allotments. From a social perspective, any change in livestock grazing management practices could be seen as a threat to the ranching culture of the region.

Short-term Uses and Long-term Productivity

The National Environmental Policy Act requires consideration of the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity. This includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

For the Great Basin South Rangeland Project, both short-term uses and long-term productivity are explicitly considered in the monitoring program. Monitoring includes both short-term implementation items and long-term ecosystem sustainability. The project proposes to enhance both short- and long-term livestock grazing practices in order to sustain the long-term productivity of the National Forest System lands for livestock grazing, wildlife habitat, watershed values and other resource uses.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

The only irreversible or irretrievable commitment of resources associated with this project is the closure of Huntoon Valley to livestock grazing use. The impacts of this commitment are fully addressed in the environmental consequences sections of Chapter Three.

Other Required Disclosures

For this project the Forest Service has consulted with the US Fish and Wildlife Service the Nevada and California State Historic Preservation Officers, and the Lahontan Water Quality Control Board.

Executive Order 13175 (consultation and coordination with Indian Tribal Governments)

The Forest Service has also consulted with Indian tribes with an interest in the project area, including the Tuolumne Mi-Wuk, Washoe Tribe, Yerington Piute Tribe, Bridgeport Indian Colony, and the Walker River Piute. The results of these

consultations are available in the project record.

National Historic Preservation Act and Archeological Resource Protection Act of 1979

Heritage Resource surveys of various intensities have been conducted on National Forest Land in the Great Basin South Rangeland Management Project Area. The forest is also complying with the 1995 Memorandum of Understanding between the Humboldt Toiyabe N.F. and the California and Nevada State Historic Preservation Offices regarding the effects of livestock management on historic properties.

Executive Order 13007 (American Indian Sacred Sites) and American Indian Religious Freedom Act of 1978

Executive Order 13007 directs Federal agencies to accommodate access to and ceremonial use of American Indian sacred sites by Indian religious practioners and to avoid adversely affecting the physical integrity of such sites. The Tunna' Nosi' Kaiva' Gwaa area is probably a sacred area to the Northern Paiute. It is possible that Mt. Hicks, a source of obsidian, and other high peaks in the area are sacred. The American Indians in the area have yet to identify any other specific sacred sites. This project will not adversely impact the physical integrity of these areas.

Rescission Act of 1995 (PL 104-19 as amended)

This Act directed the National Forest System to evaluate the impacts of re-authorizing grazing on allotments according to a schedule agreed to with Congress and the Forest Service. This analysis complies with the Recission Act in that it has analyzed the impacts of grazing in 12 allotments.

Clean Air Act of 1979 (as amended)

The proposed action and alternatives will not impact air quality therefore the analysis is in compliance with the Clean Air Act.

Clean Water Act of 1977 (as amended)

The selected alternative will improve riparian conditions and thereby not negatively affect water quality in the analysis area.

Endangered Species Act of 1973 (as amended)

There are no species listed under the Endangered Species Act in the project area. The FEIS addresses grazing impacts to potential Lahontan cutthroat trout habitat. With the selected alternative, conditions are expected to improve in the two streams capable of providing LCT habitat.

Executive Order 11988 (floodplains), Executive Order 11990 (wetlands), Magnuson-Stevens Fishery Conservation and Management Act of 1996, and Executive Order 12962 (aquatic systems and recreational fisheries)

The alternatives analyzed in the FEIS would not impact floodplains or wetlands as defined in these Orders. Riparian conditions are expected to improve with the implementation of the proposed action. The proposed action would improve fish habitat conditions and would not preclude future management for the threatened Lahontan cutthroat trout.

Executive Order 12898 (environmental justice)

The socio-economic analysis did not predict significant effects to any minority or under-represented ethnic group.

Mineral County is the poorest county in Nevada but even the no grazing alternative is not expected to have an impact at the county level. The permittees could be affected at a personal level but none of them are of an ethnic or economic group identified in this Executive Order. None of the alternatives would have an impact on the economic well-being of local Indian tribal members.

National Environmental Policy Act (NEPA) of 1969 (as amended)

This project analysis fully discloses the expected impacts of the alternatives on the relevant natural and human resources. The FEIS and the project record contain the best available scientific information. The deciding official has adequate information in the FEIS and project record to base an informed decision upon.

National Forest Management Act of 1976 (as amended)

This site-specific analysis is in compliance with the 1986 Toiyabe Land and Resource Management Plan. The 1986 LRMP rangeland capability analysis has been reviewed and analyzed. Impacts to habitat and viability of Management Indicator Species have been analyzed at the Forest level and that analysis was recreated at the site-specific level. The selected alternative includes specific direction and management changes to improve degraded rangelands such as those found in Huntoon Valley. The selected alternative also includes project design features to improve MIS habitat where necessary. The selected alternative includes changes to grazing management needed to insure that the resource conditions are moving towards desired conditions in the 1986 LRMP.

Nevada Enhancement Act of 1989

Approximately 35 percent of the project area includes lands transferred from the Bureau of Land Management (BLM) to the National Forest System in the Nevada Enhancement Act of 1989 (P.L. 100-550). These lands are to be managed under the existing BLM Resource Management Plan until the Toiyabe LRMP is amended or revised. The 1986 Walker Resource Area RMP emphasizes improving rangeland and watershed conditions, maintaining wildlife habitat, and protecting and maintaining existing and potential fisheries and riparian habitats (BLM 1986). Specifically, the Walker RMP includes direction to “develop and implement AMPs” and “continue rangeland and watershed monitoring to determine if management objectives are being met” and adjust grazing use if necessary. The changes to grazing management in the selected alternative are necessary to maintain and improve rangeland and watershed health on the lands acquired in the Nevada Enhancement Act. Thus, this decision is consistent with the goals and objectives in the Walker Resource Area RMP.

Executive Order 13186 (Migratory Bird Treaty Act)

The FEIS contains analysis of the direct, indirect and cumulative impacts of the proposed action and alternatives on migratory birds. This analysis states that with the selected alternative, impacts to habitat will be reduced. The selected alternative will enhance neotropical habitat by reducing livestock impacts. This is in compliance with the MBTA.

Federal Land Policy Management Act and the Public Rangeland Improvement Act

The selected alternative will be used as a basis for the Allotment Management Plans (AMP) required by FLPMA and PRIA. AMPs are a long-term plan of how each allotment will be managed to achieve desired future conditions and goals from the Forest Plan and those developed at the site-specific level during the AMP process. The AMPs will be updated or created when the selected alternative can be implemented. The Term Grazing Permits will also be modified to reflect the changes in the selected alternative. (FSH 2209.21, Chapter 14)

Executive Order 13443 (Facilitation of Hunting Heritage and Wildlife Conservation)

The FEIS contains analysis of the direct, indirect, and cumulative impacts of the proposed action and alternatives on the two big-game species within the project area, mule deer and pronghorn antelope. This anlaysis states that with the selected alternative, impacts to these habitats will be reduced. The selected alternative will enhance mule deer and pronghorn habitat by reducing livestock impacts. The three alternatives discussed will not impact or reduce hunting opportunities or reduce big-game populations within the project area.

CHAPTER FOUR: CONSULTATION AND COORDINATION

List of Preparers			
Name	**Primary Responsibility**	**Education:**	**Years Experience**
David Loomis	**Project Mgr., Economics**	**MS Land Use Planning Policy** **BA Economics**	**28**
Amy Baumer	**Vegetation**	**BS Range Science, BS Abused Land Rehab.**	**8**
Sally Champion	**Watershed**	**MS Watershed Science** **BS Wildlife Biology**	**17**
Jason Kling	**Fisheries**	**BS Fisheries/Wildlife**	**4**
Leeann Murphy	**Wildlife/Plants**	**BS Wildlife**	**6**
Jack Scott	**Heritage Res.**	**MA Anthropology**	**17**
Diane Weaver	**Range Mgmt.**	**BS Range Management**	**19**
Sherry Sorensen	**GIS / Mapping**	**Qualified by Experience**	**24**
Cheryl Probert	**District Ranger**	**BS Forestry, Range Management**	**19**

Agencies Consulted

US Fish and Wildlife Service

US Bureau of Land Management

US Environmental Protection Agency

Nevada Department of Agriculture

Nevada State Historic Preservation Office

Nevada Department of Wildlife

California Lahontan Water Quality Control Board

Nevada Division of Environmental Protection

Distribution of the Environmental Impact Statement

The Draft EIS was sent to the following agencies, organizations, and individuals:

US Bureau of Land Management
US Army Corps of Engineers
US Environmental Protection Agency
US Fish & Wildlife Service
California State Clearinghouse
Nevada State Clearinghouse
Lahontan Water Quality Control Board
Nevada Department of Agriculture
Mineral County Commissioners
Lyon County Commissioners
Mono County Board of Supervisors
Walker River Tribe
Bridgeport Indian Colony
Bridgeport Library
Hawthorne Library
Smith Valley Library
Hilton Ranches c/o Ernie Payne
McKay Brothers, c/o Bob McKay
Sceirene-Fredrickson Ranches c/o Mike Sceirene and Todd Sceirene
Western Watersheds

The Final EIS is being sent to the following agencies, organizations, and individuals:

US Bureau of Land Management
US Army Corps of Engineers
US Environmental Protection Agency
US Fish & Wildlife Service
US Natural Resources Conservation Service
California State Clearinghouse
Nevada State Clearinghouse
Lahontan Water Quality Control Board

Nevada Department of Agriculture

Nevada Department of Wildlife

Mineral County Commissioners

Lyon County Commissioners

Mono County Board of Supervisors

Bridgeport Library

Hawthorne Library

Smith Valley Library

Western Watersheds

Sagebrush Sea Campaign

Hilton Ranches c/o Ernie Payne

McKay Brothers, c/o Bob McKay

Sceirene-Fredrickson Ranches c/o Mike Sceirene and Todd Sceirene

The FEIS and Record of Decision will also be posted on the Humboldt-Toiyabe National Forest webpage under Projects and Publications.

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APPENDIX 1: VEGETATION MATRICES

Determination of Vegetative Condition for the Great Basin South Rangeland Project

Range Condition

The term “range condition” is difficult to define, because it has had different meanings over time and was applied in different ways by land management agencies. Several approaches by land management agencies have been used to evaluate the past and present condition of rangelands. These evaluations generally are complex technical concepts that rely on professional judgment and the ability to recognize indicators and their significance (SRM 1989). Much of the controversy surrounding the status of range conditions today stems from the use of different and sometimes subjective assessment terminology, such as “good,” “fair,” or “poor,” to describe rangeland conditions.

Generally, the term “range condition” is used to describe the status of lands in relation to something (vegetation succession, watershed conditions, livestock grazing, wildlife habitat), and generally, it refers to “the state of range health” (USDA-FS 1951; SRM 1989). In 1989 the Society of Range Management (SRM) defined range condition as “the present status of a unit of range relative to specific values or potentials. Inherent in this concept is that range condition must be interpreted in terms of potential of the site.”

Early evaluations of range condition were based on the concepts of succession developed by Clements in the early part of the twentieth century. Clements’ concepts were further refined into operational procedures by Dyksterhuis (1949) and Parker (1954). Over time, land management agencies developed their own procedures. Generally, the method involved comparing the existing vegetation species composition to the expected “climax” or “potential vegetation” for a particular site. The site was then rated as excellent, good, fair, or poor, depending on its similarity to the climax. This whole approach was based on the assumption that “climax” vegetation is the **best** in terms of stability, diversity, and productivity, and that succession is a linear process that is predictable and reverts the site to the original vegetation type (Willoughby and Alexander 2000; Joyce 1993; Walker 1993).

Several researchers recognized problems with this traditional approach when sites did not recover following disturbances other than grazing, or when removal of livestock did not produce the expected vegetation changes. Others recognized the lack of a relationship between soil protection, wildlife habitat, and productivity with the “climax” vegetation (Task Group on Unity in Concepts and Terminology 1995; Laycock 1991; Walker 1993).

Shrub communities typically evolved with some level of grazing. Over time, it is believed that a balance was achieved between the overstory shrub layer and the understory herbaceous layer. This balance was disrupted by the arrival of large herds of livestock trailing through with the emigrants. Later, large wintering herds of cattle and summering

tramp bands of sheep overused the rangelands, which led to a depleted understory, created bare soil in some areas, and allowed the deep-rooted overstory to become denser, as competition from the understory was reduced. The cycle of naturally occurring wildfire, which also helped to keep the overstory in balance, was reduced as fine fuels were grazed away, litter was reduced, and herders and homesteaders suppressed fires.

As early as 1941, Ellison observed that lessening the intensity of grazing was sometimes "conspicuously ineffective" in improving poor condition rangelands. He observed a watershed that continued to erode excessively even after 25 years of no grazing. He went on to speculate that soil quality often lags behind vegetation improvement and certain processes may be put into motion through grazing but continue independently until they have run their course (Ellison 1941). This is the same concept being discussed and expanded today in that there may be more than one threshold of stabilization, and once degraded, the original state may not be obtainable again.

In the 1980s the Forest Service adopted the concept of "Ecological Condition." Ecological Condition is defined as "the relative capacity of a system to: 1) perform selected functions, and 2) to maintain these functions following disturbance through processes of resistance and recovery" (Herrick *et al* 1996). This definition emphasizes **selected** functions. Since ecosystems perform many functions, optimizing one function may reduce another function for a certain period of time. For example, restoration of mining sites with non-native grasses may optimize soil recovery, but the use of non-native grasses slows the reestablishment of the diverse native vegetation.

During the 1990s new models were developed for range condition and trend assessments. Land managers and researchers came to realize that multiple steady states for vegetation types could occur (Laycock 1991). They suggested that drastic changes to a site could cause a "threshold" to be crossed that would prevent the site from following the linear succession familiar to, or assumed, by most people. The former state would not be attainable without significant management actions (Friedel 1991; Tausch *et al* 1993). The state and threshold model implies that some vegetation types can be stabilized by invading plants and do not succeed to the original vegetation (Willoughby and Alexander 2000).

This model recognizes that rangeland vegetation is determined primarily by climate and soil, and that one site may support several different plant community types at different locations or times. In this model, keeping communities capable of occurring on the site and protecting it from crossing a threshold are acceptable management goals, because these communities provide sufficient site protection to maintain future management options. The choice of the community type on a particular site is the "desired future condition," and it is identified through a management plan to best meet the plan's objectives for the site. The desired plant community should meet two basic objectives:

- "To conserve to the extent practicable, the long-term potential of the site to produce vegetation;"
- "To produce in the shorter term those combinations of goods and services desired from the land" (Task Group 1995).

In summary, “rangeland condition” is a rating of the existing vegetation on a site against the desired vegetation conditions. “Condition” is rated as satisfactory or unsatisfactory, depending on whether the site being rated is meeting current management objectives. Desired vegetation conditions are achieved over time by implementing management objectives to protect and sustain site capabilities and to produce desired goods and services.

Rangeland Trend

Trend is defined as “the direction of change in ecological status.” “Ecological Status” is defined as the degree of similarity between the present community and the potential natural community of a site. It considers only secondary succession. Four categories are considered: the potential natural community or PNC, late seral, mid seral and early seral. Trend is characterized as “toward potential,” “away from potential,” or “static” (SRM 1989) or “direction of change over time” (FSH 2209.21). Trend monitoring verifies if management actions are achieving desired conditions over time. The appraisal of trend is simply the recognition of the nature, rapidity, and direction of ecological change (USDA-FS 1951).

Long-term trend is the direction of change in range condition. It is determined over many years and reflects changes between condition classes or the decline or improvement in plant communities compared to the potential or desired conditions for a particular site. Long-term trend is determined through permanent transects or quantitative studies on-the-ground in representative plant communities. In some cases, only long-term photographs are recorded (qualitative).

Apparent trend is an evaluation of a single observation at one point in time. Itis an on-the-ground evaluation of what appears to be happening under current management. It is useful for gauging needed changes in management (SRM 1989). **Apparent** trend is an interpretation of the direction of change, based on the evidence obtained by an experienced observer at a single observation (FSH 2209.21).

Recognizing the balance between ecosystem components and a normal rate of succession is important to judging condition and trend (W.K. Lauenroth and W. A. Laycock, 1989). As is recognizing when destructive change has caused the crossing of a critical threshold which makes it impossible to achieve the previous condition even after many years of no disturbance. It may take human interference or another catastrophic event to stimulate the system or cause changes that would lead to a more desirable direction (Friedel 1991; Laycock 1991; Tausch *et al* 1993).

Indicators are one tool that can provide early warning signs of resource problems that could then trigger changes in management actions before degradation reaches a nonfunctioning or unhealthy situation. Currently, interpretation of condition and trend is an art and a science, requiring professional judgment as well as data (Pellant 1995). The many indicators of condition and trend should be interpreted together, not individually. Arid and desert lands, subject to variable rainfall, produce vegetation that is dynamic and often reacts to factors other than disturbances, such as annual or seasonal precipitation patterns, especially moisture patterns, because once the occasion passes it is difficult to reconstruct past events.

Humboldt-Toiyabe NF Matrices

Nationally, different land management agencies use different protocols and methods of assessing condition and trend. There have been no specific scorecards to assess rangeland conditions developed for the Great Basin vegetation community types in Nevada. The Natural Resources Conservation Service's (NRCS) ecological site descriptions provide information on rangeland sites that are fully meeting their potential. They do not address specific parameters below potential or in a degraded state. Without specific parameters at different stages in succession, it becomes difficult to measure desired future conditions or measure progress towards meeting desired conditions. To address this, the Humboldt-Toiyabe National Forest ecology and resources staffs developed the following "Matrices" to assist in determining vegetative conditions on the Forest. The desired conditions for the vegetative community types are generally to have the communities meeting the parameters described as "functioning as desired". The matrices are based on field research, literature reviews, NRCS ecological site descriptions, and peer reviews. They provide quantitative measures for field personnel to use when determining whether the community type is functioning as desired. The matrices use the concept of steady states and thresholds that was described above. Field reviews with personnel from the NRCS, Forest Service, Nevada Department of Agriculture and University researchers has shown that the Humboldt-Toiyabe NF's Matrices are very comparable to other condition assessments in the project area.

The quantitative measurements enable resource managers to identify the indicator or parameter(s) that is/are not functioning and address those in management. All of the indicators are reviewed together to assess overall condition. The Humboldt-Toiyabe matrices identify which indicators contribute most to the condition assessment. As described above, the indicators can show managers which attribute of a system or community to target. For instance, in the Great Basin South analysis, many sites in Wyoming big sagebrush communities were labeled as not functioning as desired due to lack of cool season plant diversity and too much bare ground. This information was used to design the part of the proposed action which incorporates rest in five allotments. The rest would allow cool season grasses to recuperate from early season grazing. In this way the matrices are helpful in adjusting the grazing management program to improve the specific parameters needing improvement.

The matrices do not specifically address trend but repeat measurements can be used to assess actual trend. Many of the qualitative indicators can be used to determine apparent trend, especially in riparian systems. Apparent trend is more difficult to ascertain in upland systems due to the slow and incremental nature of changes. If the parameters or attributes are getting closer to "functioning as desired" then the management is moving resource conditions toward the desired condition and adjustments are not necessary. Conversely, if long-term monitoring shows no progress towards "functioning as desired" or movement away then management changes may be necessary.

1-1 Aspen Group

Elevation: 6100 to 9000 feet

Slope: 2 to 40%

Depth to groundwater: generally >100cm., often variable

- For a site to be classified as "functioning," attributes #3 and #6 through #10 must be functioning.
- If any of attributes #3 and #6 through #11 are functioning at risk, then the site is classified as "functioning at risk."
- If the majority of attributes and attributes #6, #10 or #11 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Aspen	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	1	Root depth	> 20 cm.	10-20 cm.	< 20 cm.
	2	Soil structure is blocky or platy in the rooting zone (0-30 cm)	Structure soft, granular	Structure firm, blocky to platy	Structure hard, platy
	3	Bare ground	<5%	5-20%	>20%
Vegetation	4	Absolute canopy cover of aspen	>40%	10-40%	<10%
	5	Absolute conifer canopy cover	<15%	15-40%	>40%
	6	Aspen suckers/saplings less than 150 centimeters (60 in)	Multiple age classes or at least one young age class >500 stems per ac	≥50 parent trees & <500suckers/ saplings per acre.	<50 parent trees & <500 saplings/suckers per acre
	7	Relative cover forbs in group "C"	≤2%	2-25%	>25%
	8	Relative cover of graminoids in Group "D"	≤5%	5-25%	>25%
	9	Relative cover of shrub species in Group "E"	≤5%	5-30%	>30%
	10	Relative cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	11	Presence of head-cutting resulting in incision.	No head-cutting present	Head-cutting present, incision < 50cm.	Head-cutting present, incision ≥ 50cm.
Disturbance	12	% of aspen stand affected by roads, campsites or other disturbance	Roads or campsites <5% of stand	Campsites or roads 5-40% of stand	Campsites and roads >40% of stand

Group A – Shrub Species Indicative of Desired Function

Shrub species with up to 50 percent understory cover may include Symphoricarpos oreophilus (snowberry), Amelanchier alnifolia (serviceberry), Ribes species (currant or gooseberry) Prunus virginiana (chokecherry), Alnus incana (alder), Betula occidentalis (birch), Salix species (willow), Cornus sericea (dogwood), Rubus parviflora (thimbleberry), Mahonia repens (Oregon grape) and Acer glabrum (vine maple).

Group B – Associated Species Indicative of Desired Function

Forb: Thalictrum spp. (meadowrue), Aquilegia formosa (columbine), Aconitum columbianum (monkshood), Maianthemum stellatum (False Solomon's seal), Osmorhiza occidentalis (sweet anise), Mertensia oblongifolia (mountain bluebells), Geranium spp.(wild geranium), Achillea millefolium (yarrow), Delphinium spp. (larkspur), Galium spp. (bedstraw), Lupinus argenteus (silver lupine), Rudbeckia occidentalis (coneflower), Valeriana spp. (valerian), Sidalcea oregana (checker mallow), Ligusticum grayi (licorice root), Actea rubra (baneberry) and Agastache urticifolia (horsemint). Annual forbs are less than 2% of the understory cover.

Graminoid: Elymus trachycaulus (slender wheatgrass), Elymus glaucus (blue wildrye), Elymus lanceolatus (streambank wheatgrass), Bromus marginatus (mountain brome), Glyceria striata (fowl mannagrass), Calamagrostis canadensis (bluejoint), Melica spectabilis (purple oniongrass), Poa wheeleri (Wheeler bluegrass), Deschampsia elongata (slender hairgrass), Carex microptera (smallwing sedge), Carex rossii (Ross' sedge), Carex pellita (woolly sedge) and Juncus ensifolius (swordleaf rush).

Group C – Forb Species Indicative of Management Problems

Rumex spp. (sorrel or dock), Cirsium spp. (thistle, any species), Cicuta douglasii (water hemlock), Taraxacum officinale (dandelion), Symphyotrichum spp. (aster, any species), Veratrum californicum (false hellebore), Urtica dioica (stinging nettle), Wyethia amplexicaulis (mulesears), Potentilla spp. (cinquefoil, any species), Equisetum spp. (horsetail), Descurainia pinnata (Western tansymustard), Senecio spp. (groundsel), and Nemophila brevifolia (basin blue eyes).

Group D – Graminiod Species Indicative of Management Problems

Poa pratensis (Kentucky bluegrass), Agrostis stolonifera (redtop), Arrhenatherum elatius (tall oatgrass), Bromus inermis (smooth brome), Bromus tectorum (cheatgrass), Poa palustris (fowl bluegrass), Poa bulbosa (bulbous bluegrass), and Eleocharis spp. (spikerush).

Group E – Shrub Species Indicative of Management Problems

Rosa woodsii (Woods' rose) or Artemisia tridentata (any subspecies big sagebrush).

1-2: Dry to Moist Meadow Group

Elevation: 5200 to 10,500 feet

Slope: 1 to 10%

Depth to ground water: 55 to 100 cm. for moist meadow, 100+ cm for dry meadow

Dry to Moist Meadow	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	1	Root depth	> 10 cm.	5-10 cm.	< 5 cm.
	2	Soil structure is blocky or platy in the rooting zone (0-30 cm)	Structure soft, granular	Structure firm, blocky to platy	Structure hard, platy
	3	Bare ground	<5%	5-10%	>10%
Vegetation	4	Relative cover of perennial grasses or grasslikes in Group "A or B"	≥ 75%	60-75%	< 60%
	5	Relative forb cover	≤ 25%	25-40%	> 40%
	6	If moist meadow, relative cover of Douglas sedge	≤ 20%	20-50%	> 50%
	7	Relative cover of the graminoids in Group "C"	<3%	3-30%	>30%
	8	Relative cover of forb and/or shrub species in Group "D"	< 3%	3-20%	>20%
	9	Cover of Noxious Weeds	None	≤ 5%	>5%
	10	Relative cover of species in Group "E"	< 3%	3-40%	≥ 40%
Hydrology	11	Presence of head-cutting resulting in incision.	No head-cutting present	Head-cutting present, incision < 50 cm.	Head-cutting present, incision ≥ 50cm.
	12	Presence of hummocks	None	Hummocks present	Hummocks abundant

- For a site to be classified as "functioning," attributes #1, #3 through #5 and #9 through #11 must be functioning.
- If any of attributes #1 and #7 through #11 are functioning at risk, the site is classified as "functioning at risk."
- If a majority of attributes or attributes #9, #10 or #11 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Group A – Species Indicative of Desired Function

Species with 0-70 percent cover may include Poa secunda (Sandberg's or Nevada bluegrass), Elymus trachycaulus (Slender wheatgrass), Leymus cinereus (Great Basin wildrye), Deschampsia caespitosa (tufted hairgrass), Danthonia spp. (oatgrass, any species), Carex nebrascensis (Nebraska sedge), Carex exserta (shorthair sedge) and Carex douglasii (Douglas sedge). (Note: Douglas sedge may dominate a dry site in functioning condition, but also tend to indicate a drying trend in a moist meadow.)

Group B – Associated Species Indicative of Desired Function

Graminiods: Phleum alpinum (alpine timothy), Carex athrostachya (slender beaked sedge), Bromus marginatus (Mountain brome), Muhlenbergia richardsonis (mat muhly), Achnatherum nelsonii (Columbia needlegrass), Achnatherum lettermanii (Letterman's needlegrass), Carex praegracilis (field sedge), Juncus balticus (Baltic rush) and Juncus ensifolius (swordleaf rush).

Group C – Graminoid Species Indicative of Management Problems

Poa pratensis (Kentucky bluegrass), Hordeum brachyantherum (meadow foxtail), Hordeum jubatum (foxtail barley), Poa palustris (fowl bluegrass), Agrostis stolonifera (redtop) and Carex douglasii (Douglas sedge) in moist meadows.

Group D – Forb/Shrub Species Indicative of Management Problems

Ceratocephala testiculata (Bur buttercup), Cirsium spp. (thistle, any species), Taraxacum officinale (dandelion), Achillea millefolium (yarrow), Symphyotrichum spp. (aster, any species), Potentilla spp. (cinquefoil, any species) Rumex spp. (sorrel or dock), Penstemon (any species), Urtica dioica (stinging nettle), Equisetum spp. (horsetail), Nemophila brevifolia (basin blue eyes) and Artemisia tridentata (any subspecies big sagebrush).

Group E – Species Indicating a Breach of Ecological Threshold

More than 40% Bromus inermis (smooth brome), Bromus tectorum (cheatgrass), Poa bulbosa (bulbous bluegrass), Wyethia spp. (mulesears, any species), Iris missouriensis (wild iris), Chrysothamnus viscidiflorus (green rabbitbrush) and Rosa woodsii (Woods' rose).

1-3: Wet Meadow Group

Elevation: 5200 to 10,000 feet

Slope: 0 to 12%

Depth to groundwater: 10 to 100 centimeters

Wet Meadow	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	1	Root depth	> 20 cm.	15-20 cm.	< 15 cm.
	2	Soil structure is blocky or platy in the rooting zone (0-30 cm)	Structure soft, granular	Structure firm, blocky to platy	Structure hard, platy
	3	Soil saturation	0-50 cm.	20-50 cm	50-100+ cm.
	4	Bare ground	<5%	5-10%	>10%
Vegetation	5	Relative cover of perennial grasses or grasslikes in Group "A"	≥ 80%	20-80%	< 20%
	6	Relative forb cover	≤ 20%	20-80%	> 80%
	7	Relative cover of Juncus balticus.	≤ 20%	> 20%	≥ 40%
	8	Relative cover of the graminoids in Group "C"	0-5%	>5-20%	>20%
	9	Relative cover of forb or shrub species in Group "D"	< 2%	≥ 2%	≥ 5%
	10	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	11	Presence of head-cutting resulting in incision.	No head-cutting present	Head-cutting present, incision < 50 cm.	Head-cutting present, incision ≥ 50cm.
	12	Presence of hummocks	None	Hummocks present	Hummocks abundant

- For a site to be classified as "functioning," attributes #1 and #7 through #11 must be functioning.
- If any of attributes #1 and #7 through #11 are functioning at risk, the site is classified as "functioning at risk."
- If a majority of attributes or attributes #10 or #11 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Group A – Species Indicative of Desired Function

Species with 0-80 percent cover may include Deschampsia caespitosa (tufted hairgrass), Calamagrostis canadensis (bluejoint), Carex nebrascensis (Nebraska sedge), Carex microptera (smallwing sedge), Carex aquatalis (water sedge), Carex utriculata or Carex rostrata (beaked sedge), Carex scopulorum (mountain sedge), Carex simulata (analogue sedge) and Carex pellita (woolly sedge).

Group B – Associated Species Indicative of Desired Function

Graminiods: Poa secunda (Sandberg's or Nevada bluegrass), Deschampsia spp. (hairgrass), Calamagrostis scopulorum (reedgrass), Glyceria striata (fowl mannagrass), Glyceria grandis (American mannagrass), Phleum alpinum (alpine timothy), Carex praegracilis (field sedge), Carex athrostachya (slender beaked sedge), Carex aurea (golden sedge), Juncus ensifolius (swordleaf rush), Juncus nevadensis (Nevada rush) and Scirpus microcarpus (bulrush).(In a moist meadow type, any of the graminoid species listed above could dominate the site and indicate desirable conditions.)

Forbs/shrubs: Mimulus primuloides (little yellow monkeyflower), Dodecatheon alpinum (alpine shooting stars), Caltha leptosepala (marsh marigold), Stellaria longipes (longstalk starwort), Pedicularis groenlandica (elephants head), Viola spp. (violets), Sidalcea spp. (checker mallow), Polygonum bistortoides (American bistort) and Equisetum spp. (horsetail). Salix spp. (Willows) may be present where water is flowing or in wet depressions.

Group C – Graminoid Species Indicative of Management Problems

Poa pratensis (Kentucky bluegrass), Poa palustris (fowl bluegrass), Alopecurus aequalis (short-awn foxtail), Alopecurus pratense (meadow foxtail), Hordeum brachyantherum (meadow barley), Hordeum jubatum (foxtail barley) Agrostis stolonifera (redtop), Agrostis exarata (spike bentgrass), Agrostis scabra (rough bentgrass), Arrhenatherum elatius (tall oatgrass), Bromus inermis (smooth brome), Bromus tectorum (cheatgrass), Poa bulbosa (bulbous bluegrass), Muhlenbergia filiformis (pull-up muhly), Carex douglasii (Douglas sedge) and Eleocharis spp. (spikerush). Also Juncus balticus (Baltic rush) in amounts greater than 20%.

Group D – Forb/Shrub Species Indicative of Management Problems

Rumex spp. (sorrel or dock), Cirsium spp. (thistle, any species), Cicuta douglasii (water hemlock), Thermopsis rhombifolia (yellow pea), Taraxacum officinale (dandelion), Achillea millefolium (yarrow), Symphyotrichum spp. (aster, any species), Veratrum californicum (false hellebore), Iris missouriensis (wild iris), Potentilla spp. (cinquefoil, any species), Epilobium spp. (willow herb), Penstemon (any species), Urtica dioica (stinging nettle), Equisetum spp. (horsetail), Nemophila brevifolia (basin blue eyes), Rosa woodsii (Woods' rose) and Artemisia tridentata (any subspecies big sagebrush).

1-4: Stream Group

Elevation: 4500 to 10,000 feet

Slope: 0 to 40%

Depth to groundwater: 0 to 50 centimeters

Stream		Attribute Description	Functioning	Functioning at Risk	Functioning below threshold
Stream Water Quality[†4]	1	Temperature	≤20ºC (≤16°C bull trout streams)	20 to 22ºC (>16°C bull trout streams)	>22ºC (>16°C bull trout streams)
	2	pH	6.5 to 8.5 pH units	<6.5 or >8.5 pH units	<6.5 or >8.5 pH units
	3	Dissolved oxygen	≥6 mg/l	<6 mg/l	<6 mg/l
	4	Fecal coliform E. coli	≤200/400 per 100 ml	>200/400 per 100 ml	>200/400 per 100 ml
	5	Turbidity	≤State standard (if applicable)	>State standard (if applicable)	>State standard (if applicable)
Stream Condition	6	Streambank stability	≥80% (≥90% TES streams)	70%-80% (70-90% TES streams)	<70%
	7	Head cuts	None present	<50 cm depth	>50 cm depth
Vegetation	8	Relative cover of species in Group "A"	>80%	40-80%	<40%
	9	Relative cover of species in Group "B"	<20%	20-60%	>60%
	10	Cover of noxious weeds	None	≤5%	>5%

[4] Nevada water quality standards shown in the matrix are for class A waters and, therefore, are not applicable to all surface waters. The applicable standard, if any, in NAC 445A should be used for each surface water assessed. In locations were there is only a narrative standard (no numerical standard) for a water quality parameter, numerical data are collected to assess condition.

- For a site to be classified as "functioning," attributes #1 through #7 and #10 must be functioning.
- If any of attributes #1 through #7 and #10 are functioning at risk, then the site is classified as "functioning at risk."
- Management problems are indicated when any one of the attributes is "functioning at risk."
- If a majority of attributes and attributes #6 and #7 are "functioning below threshold," then the site has crossed an ecological threshold and may not be ecologically or economically feasible to restore.

Group A – Species Indicative of Desired Function

Willows: *Salix lucida lasiandra* (Pacific willow), *Salix boothii* (Booth willow), *Salix geyeriana* (Geyer's willow), *Salix lutea* (yellow willow), Salix exigua (coyote willow) at low elevations, Salix lemmonii (Lemmon willow), *Salix scouleriana* (Scouler willow), *Salix wolfii* (Wolf willow), *Salix orestera* (Sierra willow), *Salix commutata* (undergreen willow), *Salix eastwoodiae* (mountain willow), *Salix lasiolepis* (arroyo willow), *Salix bebbiana* (Bebb willow) and *Salix drummondiana* (Drummond willow).

Other shrubs/trees: Cornus sericea (dogwood), Ribes inerme (currant), *Ribes aureum* (golden currant), *Alnus incana* (alder), *Betula occidentalis* (birch), *Prunus virginiana* (chokecherry), *Rhus trilobata* (skunkbush), *Ledum glandulosum* (Labrador tea), *Lonicera involucrata* (twinberry), *Artemisia cana* (silver sagebrush), *Chamaebatiaria millefolium* (fernbush), *Shepherdia argentea* (silver buffaloberry), *Mahonia repens* (Oregon grape*), Populus angustifolia* (narrowleaf cottonwood), *Populus balsamifera trichocarpa* (black cottonwood), *Populus fremontii* (Fremont cottonwood) and *Populus tremuloides* (aspen).

Graminoids: *Deschampsia caespitosa* (tufted hairgrass), *Calamagrostis canadensis* (bluejoint), *Calamagrostis scopulorum* (reedgrass), *Carex nebrascensis* (Nebraska sedge), *Carex microptera* (smallwing sedge), *Carex aquatalis* (water sedge), *Carex utriculata* or *Carex rostrata* (beaked sedge), *Carex scopulorum* (mountain sedge), *Carex simulata* (analogue sedge), *Carex pellita* (woolly sedge), *Carex aurea* (golden sedge), *Carex vesicaria* (blister sedge), *Carex microptera* (ballhead sedge), *Carex athrostachya* (slender beaked sedge), *Glyceria striata* (fowl mannagrass), *Glyceria grandis* (American mannagrass), *Juncus ensifolius* (swordleaf rush), *Juncus nevadensis* (Nevada rush), *Phleum alpinum* (alpine timothy), *Poa palustris* (fowl bluegrass), *Poa secunda* (Sandberg's or Nevada bluegrass) and *Scirpus microcarpus* (bulrush).

Forbs: *Mimulus primuloides* (little yellow monkeyflower), *Mimulus guttatus* (yellow monkeyflower), *Allium validum* (swamp onion), *Dodecatheon alpinum* (alpine shooting stars), *Caltha leptosepala* (marsh marigold), *Polemonium occidentale* (Western polemonium), *Heracleum lanatum* (cow parsnip), *Angelica kingii* (King's angelica), *Ligusticum grayi* (Gray's licorice-root), *Mertensia ciliata* (tall bluebells), *Veronica americana* (speedwell), *Maianthemum stellatum* (false Solomon's seal), *Sphenosciadium capitellatum* (woollyhead parsnip), *Aconitum*

columbianum (monkshood), *Saxifraga odontoloma* (brook saxifrage), *Parnassia palustris* (grass of Parnassus), *Pedicularis groenlandica* (elephants' head), *Viola* spp. (violets), *Sidalcea* spp. (checker mallow), *Polygonum bistortoides* (American bistort) and *Platanthera stricta* (slender bog orchid).

Group B –Species Indicative of Management Problems

Graminoids: *Poa pratensis* (Kentucky bluegrass), *Alopecurus aequalis* (short-awn foxtail), *Alopecurus pratense* (meadow foxtail), *Hordeum brachyantherum* (meadow barley), *Hordeum jubatum* (foxtail barley) *Agrostis stolonifera* (redtop), *Agrostis exarata* (spike bentgrass), *Agrostis scabra* (rough bentgrass), *Arrhenatherum elatius* (tall oatgrass), *Bromus inermis* (smooth brome), *Bromus tectorum* (cheatgrass), *Poa bulbosa* (bulbous bluegrass), *Muhlenbergia filiformis* (pull-up muhly), *Juncus balticus* (Baltic rush), *Carex douglasii* (Douglas sedge) and *Eleocharis* spp. (spikerush).

Forbs: *Rumex* spp. (sorrel or dock), *Cirsium* spp. (thistle, any species), *Cicuta douglasii* (water hemlock), *Thermopsis rhombifolia* (yellow pea), *Taraxacum officinale* (dandelion), *Achillea millefolium* (yarrow), *Symphyotrichum* spp. (aster, any species), *Veratrum californicum* (false hellebore), *Iris missouriensis* (wild iris), *Potentilla* spp. (cinquefoil, any species), *Epilobium* spp. (willow herb), *Penstemon* (any species), *Urtica dioica* (stinging nettle), *Equisetum* spp. (horsetail), *Nemophila brevifolia* (basin blue eyes), *Rorippa nasturtium-aquaticum* (watercress), *Myriophyllum verticillatum* (water milfoil), *Lemna* spp. (duckweed) and *Arnica chamissonis* (arnica).

Shrubs: *Rosa woodsii* (Woods' rose) and *Artemisia tridentata* (any subspecies big sagebrush).

1-5: Mountain Big Sagebrush Group

Elevation: 6000 to 10,000 feet

Slope: 2 to 50%

Precipitation: 10 to 25 inches

Mountain Big Sagebrush	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	1	Bare ground	< 20%	> 20%	> 50%
	2	Soil surface of decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	3	Terracing of hill slopes	≤ 5 terraces evident on hillslopes	> 5 terraces evident on hillslopes	Terracing extensive, < 5 ft. apart
	4	Erosion pavement	< 10%	10-35%	> 35%
Vegetation	5	Mountain or sub-alpine big sagebrush absolute canopy cover	10-25%	< 10% or >25%	< 5% and has been for ≥10 years.
	6	Relative cover of non-native grasses in Group "C"	≤ 30%	30-50%	> 50%
	7	Relative cover of annual grass species in Group "D"	≤ 5%	5-30%	≥ 30%
	8	Canopy cover of shrubs or trees in Group "E"	0-5%	5-30%	>30%
	9	Relative cover of perennial forbs/perennial grasses	5-50% forbs 15-65% grasses	<5% forbs <10% grasses	<5% forbs <10% grasses
	10	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	11	Presence of rills/ rill formation	No rills present	Active rills formation in exposed areas	Rill formation is severe and well-defined
	12	Presence of pedestalling behind plants and rocks	No build-up of soil or litter evident	Recent build-up of soil or litter evident	Build-up of soil or litter extensive, roots exposed
Disturbance	13	Fire frequency	10-40 years	<10 or >40 years	<10 years
	14	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

- For a site to be classified as "functioning," attributes #1, #5, #6, #7 #9 and #10 must be functioning.
- If any of attributes #1, #5, #6, #7, #8, #9, #10 or #13 are functioning at risk, the site is classified as "functioning at risk."
- If a majority of attributes or attributes #1, #5, #7 or #10 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Group A – Shrub Species Indicative of Desired Function

Artemisia tridentata spp. vaseyana (Mountain big sagebrush) and/or Artemisia tridentata spp. spiciformis (subalpine big sagebrush) dominate the shrub canopy cover component. Chrysothamnus viscidiflorus (yellow rabbitbrush), Ericameria nauseosa (rubber rabbitbrush), Purshia spp. (bitterbrush), Symphoricarpos oreophilus (snowberry), Amelanchier alnifolia/Amelanchier utahensis (serviceberry), Ceanothus velutinus (snowbrush), Artemisia arbuscula (low sagebrush), Eriogonum spp. (shrubby buckwheat), Tetradymia canescens (horsebrush), Rosa woodsii (wild rose), Ribes spp. (currant/gooseberry), Ephedra viridis (Mormon tea) and Atriplex canescens (four-wing saltbush).

Group B – Grass/Forb Species Indicative of Desired Function

Graminiods: Leymus cinereus (basin wildrye), Festuca idahoensis (Idaho fescue), Pseudoroegneria spicata (bluebunch wheatgrass), Elymus trachycaulus (slender wheatgrass), Achnatherum thurberianum (Thuber's needlegrass), Achnatherum occidentale (western needlegrass), Achnatherum lettermanii (Letterman's needlegrass), Achnatherum nelsonii (Columbia needlegrass), Achnatherum nevadense (Nevada needlegrass), Achnatherum pinetorum (pine needlegrass), Carex exserta (shortawn sedge), Elymus elymoides (squirreltail), Poa secunda (Sandberg's bluegrass), Poa fendleriana (muttongrass), Leucopoa kingii (spike fescue), Bromus marginatus (mountain brome), Pascopyrum smithii (Western wheatgrass), Koeleria macrantha (Junegrass), Hesperostipa comata (needle and thread grass), Melica bulbosa (oniongrass), Melica spectabilis (purple oniongrass) and Achnatherum hymenoides (Indian ricegrass)

Forbs: Balsamorhiza sagittata (arrowleaf balsamroot), Hackelia floribunda (wild forget-me-not), Hackelia patens (spotted stickseed), Phlox longifolia (longleaf phlox), Lithospermum ruderale (stoneseed), Potentilla spp. (cinquefoil), Achillea millefolium (yarrow), Erigeron spp. (fleabane/daisy), Lupinus spp. (lupine), Astragalus spp. (milkvetch/locoweed), Lomatium spp. (biscuitroot), Agastache urticifolia (giant hyssop), Calochortus spp. (mariposa and sego lily), Castilleja spp. (Indian paintbrush), Antennaria rosea (rosy pussytoes), Frasera speciosa (elkweed), Penstemon spp. (penstemon), Helianthella uniflora (one-flowered sunflower), Crepis acuminata (hawksbeard), Senecio spp. (groundsel), Delphinium spp. (larkspur), Allium spp. (wild onion), Geranium viscosissimum (geranium), Geum spp. (avens) and Euthamia occidentalis (western goldentop).

Group C – Grass Species Indicative of Management Problems

Agropyron cristatum (crested wheatgrass), Agropyron desertorum (desert wheatgrass), Agropyron fragile (Siberian wheatgrass), Thinopyrum intermedium (intermediate wheatgrass), Poa bulbosa (bulbous bluegrass), Bromus inermis (smooth brome) or other seeded or non-native graminiod species.

Group D – Annual Grass Species Indicative of Management Problems

Bromus tectorum (cheatgrass), Bromus japonicus (Japanese brome), Bromus briziformis (rattlesnake brome), Bromus rubens (red brome), Vulpia octoflora (six-week fescue) or other annuals.

Group E – Shrub/Tree Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush), Ericameria nauseosa (rubber rabbitbrush, Tetradymia canescens (horsebrush), Pinus monophylla (singleleaf pinyon), Juniperus occidentalis (Western juniper) or Juniperus osteosperma (Utah juniper).

Group F – Eriogonum Species Indicative of Desired Function

Eriogonum caespitosum (matted buckwheat), Eriogonum brevicaule (shortstem buckwheat), Eriogonum heracleoides (parsnipflower buckwheat), Eriogonum microthecum (slender buckwheat), Eriogonum ovalifolium (cushion buckwheat), Eriogonum racemosum (redroot buckwheat) and Eriogonum umbellatum (sulpher buckwheat).

1-6: Wyoming Big Sagebrush

Elevation: 4500 to 6800 feet

Slope: 0 to 45%

Precipitation: 6 to 13 inches

Wyoming Big Sagebrush	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	1	Bare ground	< 20%	> 20-50%	> 50%
	2	Soil surface decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	3	Terracing of hill slopes	≤ 5 terraces evident on hillslopes	> 5 terraces evident on hillslopes	Terracing extensive, < 5 ft. apart
	4	Erosion pavement	< 5%	5-20%	> 20%
Vegetation	5	Wyoming big sagebrush canopy cover	10-30%	< 10%	< 5% and has been for ≥10 years
	6	Relative cover of non-native grasses in Group "C"	≤ 30%	30-50%	> 50%
	7	Relative cover of annual grass species in Group "D"	≤ 5%	5-30%	≥ 30%
	8	Canopy cover of shrubs or trees in Group "E"	0-5%	5-40%	>40%
	9	Relative cover of forbs in Group "F"	< 1%	≥ 1%	≥ 5%
	10	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	11	Presence of rills/ rill formation	No rills present	Active rills formation in exposed areas	Rill formation is severe and well-defined
	12	Presence of pedestalling behind plants and rocks	No build-up of soil or litter evident	Recent build-up of soil or litter evident	Build-up of soil or litter extensive, roots exposed
Disturbance	13	Fire frequency	20-60+ years	10-20 years	<10 years
	14	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

- For a site to be classified as "functioning," attributes #1, #5, #6, #7 #9 and #10 must be functioning.
- If any of attributes #1, #5, #6, #7, #8, #9, #10 or #13 are functioning at risk, the site is classified as "functioning at risk."
- If a majority of attributes or attributes #5, #7, #10 or #13 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Group A – Shrub Species Indicative of Desired Function

Artemisia tridentata ssp. wyomingensis (Wyoming big sagebrush) is the dominant shrub canopy cover component. Other overstory shrubs may include Chrysothamnus viscidiflorus (yellow rabbitbrush), Ericameria nauseosa (rubber rabbitbrush), Atriplex canescens (four-wing saltbush), Grayia spinosa (spiny hopsage), Krascheninnikovia lanata (winterfat), Atriplex confertifolia (shadscale), Eriogonum spp. (shrubby buckwheat) and Tetradymia canescens (gray horsebrush).

Group B – Grass/Forb Species Indicative of Desired Function

Graminiods: Leymus cinereus (Great Basin wildrye), Achnatherum hymenoides (Indian ricegrass), Achnatherum thurberianum (Thuber's needlegrass), Hesperostipa comata (needle and thread), Carex exserta (shorthair sedge), Pseudoroegneria spicata (bluebunch wheatgrass), Elymus elymoides (squirreltail) and Poa secunda (Sandberg bluegrass). Graminoid species indicating desired function that may be present in smaller amounts include Pascopyrum smithii (western wheatgrass), Koeleria macrantha (Junegrass), Pleuraphis jamesii (galleta) and Festuca idahoensis (Idaho fescue).

Forbs: Sphaeralcea coccinea (scarlet globemallow), Phlox hoodii (Hood's phlox), Phlox longifolia (longleaf phlox), Opuntia polyacantha (pricklypear), Chaenactis douglasii (pincushion), Erigeron spp. (fleabane/daisy), Lupinus spp. (lupine), Astragalus spp. (milkvetch or locoweed), Lomatium spp. (biscuitroot), Stanleya pinnata (Prince's plume), Calochortus spp. (mariposa and sego lily), Castilleja spp. (Indian paintbrush), Ranunculus glaberrimus (sagebrush buttercup), Packera & Senecio spp. (groundsel), Delphinium spp. (larkspur) and Stenotus acaulis (goldenweed).

Group C – Non-Native Grass Species Indicative of Management Problems

Agropyron cristatum (crested wheatgrass), Agropyron fragile (Siberian wheatgrass), Agropyron desertorum (desert wheatgrass) or other seeded, non-native species.

Group D – Annual Grass Species Indicative of Management Problems

Bromus tectorum (cheatgrass), Bromus rubens (red brome), Vulpia octoflora (six-week fescue), or other annual grasses.

Group E – Shrub/Tree Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush) Juniperus occidentalis (Western juniper) or Juniperus osteosperma (Utah juniper).

Group F – Forb Species Indicative of Management Problems

Linanthus pungens (prickly phlox) or annual forbs such as Descurainia spp. (tansymustard), Halogeton glomeratus (halogeton) and Salsola tragus (Russian thistle) exceed 1% of canopy cover.

Group G – Eriogonum Species Indicative of Desired Function

Eriogonum caespitosum (matted buckwheat), Eriogonum brevicaule (shortstem buckwheat), Eriogonum heracleoides (parsnipflower buckwheat), Eriogonum microthecum (slender buckwheat),

Eriogonum ovalifolium (cushion buckwheat), Eriogonum racemosum (redroot buckwheat) and Eriogonum umbellatum (sulpher buckwheat).

1-7: Black Sagebrush Group

Elevation: 5000 to 10,000 feet

Slope: 2 to 50%

Precipitation: 8 to 20 inches

Black Sagebrush	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	1	Bare ground/pavement	< 60%	60-80%	> 80%
	2	Soil surface of decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	3	Terracing of hill slopes	≤ 5 terraces evident on hillslopes	> 5 terraces evident on hillslopes	Terracing extensive, < 5 ft. apart
Vegetation	4	Black sagebrush canopy cover	10-30%	5-10%	< 5%
	5	Relative cover of grasses in Group "B"	15-40%	<15%	<5%
	6	Relative cover of Bromus tectorum or Bromus rubens	< 5%	5-20%	≥ 20%
	7	Relative cover of grasses in Group "C"	<20%	20-30%	>30%
	8	Relative cover of shrubs or trees in Group "E"	<10%	10-40%	>40%
	9	Relative cover of forbs in Group "F"	< 1%	≥ 1%	≥ 25%
	10	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	11	Presence of rills/ rill formation	No rills present	Active rills formation in exposed areas	Rill formation is severe and well-defined
	12	Presence of pedestalling behind plants and rocks	No build-up of soil or litter evident	Recent build-up of soil or litter evident	Build-up of soil or litter extensive, roots exposed
Disturbance	13	Fire frequency	100+ years	10-30 years	<10 years
	14	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

- For a site to be classified as "functioning," attributes #1 and #4 through #10 must be functioning.
- If any of attributes #1, #4 through #10 or #13 is functioning at risk, the site is classified as "functioning at risk."
- If a majority of attributes or attributes #6, #8, #9, #10 or #13 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Group A – Shrub Species Indicative of Desired Function

Artemisia nova (black sagebrush) is the dominant shrubs species. Other shrubs that may occur to a lesser extent are Chrysothamnus viscidiflorus (yellow rabbitbrush), Ephedra nevadensis (Nevada jointfir), Ephedra viridis (mormon tea), Atriplex confertifolia (shadscale), Grayia spinosa (spiny hopsage), Krascheninnikovia lanata (winterfat), Atriplex confertifolia (shadscale), Eriogonum microthecum (slender buckwheat), Eriogonum ovalifolium (cushion buckwheat), Eriogonum caespitosum (matted buckwheat) and Purshia stansburiana (cliffrose).

Group B – Grass/Forb Species Indicative of Desired Function

Graminiods: Achnatherum hymenoides (Indian ricegrass), Achnatherum thurberianum (Thuber's needlegrass), Hesperostipa comata (needle and thread), Achnatherum pinetorum (pine needlegrass), Pseudoroegneria spicata (bluebunch wheatgrass) and Poa fendleriana (muttongrass). Graminoid species indicating desired function that may be present in smaller amounts include Elymus elymoides (squirreltail), Poa secunda (Sandberg bluegrass), Pascopyrum smithii (western wheatgrass), Koeleria macrantha (Junegrass), Pleuraphis jamesii (galleta), Achnatherum speciosum (desert needlegrass) and Achnatherum scribneri (Scribner's needlegrass)

Forbs: Sphaeralcea coccinea (scarlet globemallow), Phlox hoodii (Hood's phlox), Phlox longifolia (longleaf phlox), Opuntia polyacantha (pricklypear), Erigeron spp. (fleabane/daisy), Lupinus spp. (lupine), Astragalus spp. (milkvetch or locoweed), Arabis spp. (rockcress), Stanleya pinnata (Prince's plume), Castilleja angustifolia (Indian paintbrush), Packera multilobata (groundsel), Penstemon spp. (penstemon), Comandra umbellata (toadflax), Erysium capitatum (wallflower), Arenaria kingii (King's sandwort) and Stenotus acaulis (goldenweed).

Group C – Non-Native Grass Species Indicative of Management Problems

Agropyron fragile (Siberian wheatgrass), Agropyron desertorum (desert wheatgrass) or other seeded, non-native species.

Group D – Annual Grass Species Indicative of Management Problems

Bromus tectorum (cheatgrass), Bromus rubens (red brome), Vulpia octoflora (six-week fescue), or other annual grasses.

Group E – Shrub/Tree Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush), Juniperus osteosperma (Utah juniper), Juniperus occidentalis (western juniper) and Pinus monophylla (pinyon pine).

Group F – Forb Species Indicative of Management Problems

Linanthus pungens (prickly phlox) or annual forbs such as Descurainia spp. (tansymustard), Sisymbrium spp. (tumblemustard), Halogeton glomeratus (halogeton) and Salsola tragus (Russian thistle).

1-8: Pinyon-Juniper Woodland Group

Elevation: 5000 to 8000 feet
Slope: 5 to 60%
Precipitation: 10 to 20 inches

Pinyon-Juniper Woodland	No.	Attribute description	Functional	Functioning at Risk	Functioning below threshold
Soil	1	Bare ground	< 25%	25-50%	> 50%
	2	Soil surface of decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	3	Terracing of hill slopes	≤ 5 terraces evident on hillslopes	> 5 terraces evident on hillslopes	Terracing extensive, < 5 ft. apart
	4	Litter accumulation	< 2.5 cm.	> 2.5 cm.	> 2.5 cm.
	5	Erosion pavement	< 10%	10-20%	> 20%
Vegetation	6	Pinyon and/or juniper absolute canopy cover	< 15%	15% -45%	>45%
	7	Pinyon-juniper age/height	Majority <10 ft. & <45 yrs.	>50% of trees are > 10 ft. & 45 yrs	>80% of trees are > 10 ft. & 45 yrs
	8	Relative cover of species in Group "E"	≤ 5%	5-20%	≥ 20%
	9	Canopy cover of shrubs or trees in Group "B"	30-60%	5-30%	< 5% and has been for >10 yrs
	10	Relative cover of perennial forbs/perennial grasses	10-20% forbs 30-60% grasses	<5% forbs 10-30% grasses	<10% forbs and grasses
	11	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	12	Presence of rills/ rill formation	No rills present	Active rills formation in exposed areas	Rill formation is severe and well-defined
	13	Presence of pedestalling behind plants and rocks	No build-up of soil or litter evident	Recent build-up of soil or litter evident	Build-up of soil or litter extensive, roots exposed
Disturbance	14	Fire frequency	10-30 years	<10 or >30 years	>80 years
	15	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

- For a site to be classified as "functioning," attributes #1 and #7 through #11 must be functioning.
- If any of attributes #1, #6, #7, #8, #9 or #11 is functioning at risk, the site is classified as "functioning at risk."
- If a majority of attributes or attributes #7, #8, #9 or #11 are functioning below threshold, then the site has crossed below threshold and may not be ecologically or economically feasible to restore.
- Matrices are to be used as guidelines to evaluate functioning level.

Group A – Common Tree Species Found in Pinyon-Juniper Woodlands

Juniperus osteosperma (Utah juniper), Juniperus occidentalis (western juniper), and/or Pinus monophylla (singleleaf pinyon) are the dominant tree species. Other tree species include Cercocarpus ledifolius (mountain mahogany), Pinus ponderosa (Ponderosa pine), Pinus jeffreyi (Jeffrey pine) and Juniperus scopulorum (Rocky Mountain juniper)

Group B – Shrub Species Indicative of Functioning Condition

The most common understory shrubs are sagebrush species: Artemisia tridentata spp. vaseyana (Mountain big sagebrush), Artemisia tridentata spp, tridentata (basin big sagebrush), Artemisia tridentata spp. wyomingensis (Wyoming big sagebrush), Artemisia arbuscula (low sagebrush), Artemisia nova (black sagebrush) and Artemisia frigida (fringed sagebrush). Other common understory shrubs that may occur in the stand are Purshia tridentata/Purshia glandulosa (bitterbrush), Purshia stansburiana (cliffrose), Symphoricarpos oreophilus (snowberry), Amelanchier alnifolia/Amelanchier utahensis (serviceberry), Gutierrezia sarothrae (snakeweed), Ephedra viridis/Ephedra nevadensis (Mormon tea), Chrysothamnus viscidiflorus (yellow rabbitbrush), Ericameria nauseosa (rubber rabbitbrush), Eriogonum caespitosum (mat buckwheat), Eriogonum ovalifolium (cushion buckwheat), Eriogonum microthecum (slender buckwheat), Eriogonum umbellatum (sulfur buckwheat), Prunus andersonii (desert peach), Ericameria & Machaeranthera spp. (goldenweed), Mahonia spp. (barberry), Tetradymia spp. (horsebrush) Ribes spp. (currant/gooseberry), Ephedra viridis (Mormon tea), Dalea spp. (indigo bush) and Rhus trilobata (skunkbush sumac).

Group C – Graminoid Species Indicative of Functioning Condition

Leymus cinereus (basin wildrye), Festuca idahoensis (Idaho fescue), Pseudoroegneria spicata (bluebunch wheatgrass), Koeleria macrantha (Junegrass), Achnatherum thurberianum (Thuber's needlegrass), Hesperostipa comata (needle and thread grass), Achnatherum occidentale (western needlegrass), Elymus elymoides (squirreltail), Poa secunda (Sandberg's bluegrass), Achnatherum hymenoides (Indian ricegrass), Poa fendleriana (muttongrass), and Pleuraphis jamesii (galleta grass), Pascopyrum smithii (Western wheatgrass), Elymus trachycaulus (slender wheatgrass), Achnatherum lettermanii (Letterman's needlegrass), Achnatherum nelsonii (Columbia needlegrass), Achnatherum nevadense (Nevada needlegrass), Achnatherum

pinetorum (pine needlegrass), Carex exserta (shortawn sedge), Bromus marginatus (mountain brome), Aristida spp. (three-awn) Melica bulbosa (oniongrass), Melica spectabilis (purple oniongrass) and Leucopoa kingii (spike fescue).

Group D – Forb Species Indicative of Functioning Condition

Arabis spp. (rockcress), Astragalus purshii (Pursh locoweed), Astragalus spp. (locoweed or milkweed), Antennaria spp. (pussytoes) Balsamorhiza sagittata (arrowleaf balsamroot), Castilleja angustifolia (Indian paintbrush), Chaenactis douglasii (Douglas chaenactis), Collinsia parviflora (blue-eyed Mary), Crepis acuminata (tapertip hawk's beard), Erigeron aphanactis (fleabane daisy), Erigeron compositus (fernleaf daisy), Ipomopsis spp. (gilia), Lepidium spp. (pepperweed), Lupinus spp. (lupine), Machaeranthera spp. (tansyaster), Opuntia spp. (pricklypear), Penstemon spp. (penstemon), Phlox spp. (phlox), Packera or Senecio spp. (groundsel), Sphaeralcea coccinea (globemallow), Gayophytum ramosissimum (pinyon groundsmoke) Linanthus pungens (prickly phlox) and Arenaria spp. (sandwort).

Group E – Herbaceous Species Indicative of Management Problems

Poa bulbosa (bulbous bluegrass), Bromus tectorum (cheatgrass), Bromus japonicus (Japanese brome), Bromus briziformis (rattlesnake brome), Bromus rubens (red brome), Vulpia octoflora (six-week fescue), Ceratocephala testiculata (bur buttercup), Descurainia spp. (tansy mustard), Lepidium spp. (pepperweed), Sisymbrium altissimum (tumble mustard), Nicotiana attenuata (coyote tobacco), Helianthus annuus (sunflower), Salsola spp. (Russian thistle), Halogeton glomerata (halogeton), Iva axillaris (poverty weed)

The Humboldt-Toiyabe range management and ecology personnel determined recommended utilization standards based on functioning condition assessments. These may be used to adjust livestock grazing standards if monitoring indicates that the permit standards are not moving resources towards desired conditions.

In the Proposed Action for the Great Basin South Rangeland Project, this table would be used on the southern part of the Masonic Allotment and all of Rough Creek allotment to adjust use if smaller scale condition assessments indicate that a change in use levels is needed.

Matrices Recommended Utilization Standards Table				
Vegetative Group	**Ecological Site**	**Maximum Allowable Utilization (In %)**		
		Below Threshold	**Does Not Function As Desired**	**Functions As Desired**
Aspen	Riparian Browse	0	10	20
	Riparian Herbaceous	20	30	40
	Stream Bank Disturbance	10	20	20
Dry To Moist Meadow	Riparian Browse	0	10	20
	Riparian Herbaceous	20	30	40
	Stream Bank Disturbance	10	20	20
Wet Meadow	Riparian Browse	0	10	20
	Riparian Herbaceous	20	30	40
	Stream Bank Disturbance	10	20	20
Mountain Big Sagebrush/Wyoming Big Sagebrush/ Basin Big Sagebrush/ Black Sagebrush	Upland Herbaceous	20	30	40
	Upland Browse	10	20	20

APPENDIX 2: CAPABILITY SUITABILITY

Forest-level Capability and Suitability Analysis

What is Rangeland Capability?

The National Forest Management Act requires that Forests assess the capability of rangelands to support livestock grazing and address the suitability of that practice on areas of the Forest (1982 regulations at 36 CFR 219.20). The 1982 implementing regulations of NFMA also require that National Forests determine rangeland conditions and trends during the planning process. These Forest level determinations are then validated at the site specific level. This Appendix described the Capability and Suitability validation for the Great Basin South Rangeland Project.

Rangeland capability represents the biophysical determination of those areas that can sustain grazing but it is not a decision to graze livestock nor is it a capacity decision. Determining capability requires the assessment of biophysical characteristics conducive to livestock grazing. Prior to the 1982 planning regulations, the Forest Service mapped rangeland capability at a site-specific level by grazing allotment during range analysis in the 1960s and 1970s.

The 1982 planning regulations, under which the 1986 Toiyabe LRMP was developed, require the mapping of capable lands for grazing, even though rangeland capability is no longer used to set livestock permit numbers. Permits have an established number and season of use that has been determined over time, and any adjustments are based on short- or long-term monitoring.

Capability is defined in the 1998 Intermountain Region Protocol as:

"The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current conditions and site conditions, such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease."

The characteristics suggested in the Regional protocol for consideration in determining capability include areas:

- with less than 30 percent slopes for cattle and less than 45 percent slopes for sheep
- producing more than or having the potential to produce an average of 200 lbs. of forage/acre on an air-dry basis over the planning period
- with naturally resilient soils
- where ground cover vegetation, litter, rock is greater than 3/4 inches) is sufficient to protect soil from erosion
- accessible to livestock
- within one mile of water or where the ability to provide water exists.

Capability is determined using all these criteria together, but they may be modified if documented data indicates changes are warranted, or

additional criteria may be developed if local conditions warrant. National Forest System lands meeting these criteria are considered capable of being grazed by domestic livestock with management.

Toiyabe LRMP Analysis

The Toiyabe LRMP capability/suitability analysis was conducted following the criteria established in the 1981 Range Analysis Handbook. At that time, capability and suitability were synonymous. In 1998, the Intermountain Region developed criteria determining capability and suitability for Forest Plan revision efforts. These criteria were described in "Rangeland Capability and Suitability Determinations for Forest Plan Revision R-4 Revised 2/20/98", and were somewhat different from the criteria in the 1981 Range Analysis Handbook. The most significant difference was a change in production or pounds per acre of forage and the addition of soils criteria. The 1981 Range Analysis Handbook suggested 50 pounds per acre, and the criterion in the 1998 regional direction was 200 pounds per acre. The 1981 handbook did not include soils criteria. An in-depth description of the information in the AMS, Forest Plan, Range Analysis Handbook and the 1998 Regional direction are included in the Capability/Suitability Specialist Report in the project record.

What is Rangeland Suitability?

Rangeland suitability represents the integration of capability and the appropriateness of grazing livestock on a particular area of land, considering such things as economics, social concerns, and grazing compatibility with other land uses. It is defined in the Intermountain Region's Protocol as:

"The appropriateness of applying certain resource management practices to a particular area of land as determined by an analysis of the economic and environmental consequences and alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices."

Suitability is assessed by alternative and determines whether livestock grazing is compatible with management direction for a management area's other uses and values. Some situations or conflicts can often be resolved through mitigation measures, such as fencing, which can make an area suitable for livestock when it would not be otherwise. Suitable and nonsuitable lands may appear within a single allotment. Non-suitable lands will not be fenced to keep livestock out in most cases.

Suitable acres can change over time or under different management options. For example, the Aurora allotment would not be suitable for livestock grazing until protective measures are in place to prevent impacts to historic resources. Once those measures are in place, the allotment would be suitable.

As mentioned above, the Toiyabe LRMP did not evaluate rangeland suitability separately. Under the 1981 Rangeland Analysis Handbook, capable and suitable acres were identical.

Great Basin South Capability and Suitability

Capability Validation

All twelve allotments within the project area are available for authorization to graze domestic livestock. Ten of the twelve are active allotments with grazing authorized under term grazing permits; two of the allotments are vacant with no livestock currently permitted. The Forest Service has managed livestock grazing on approximately 267,400 acres of the project area since establishment of the Forest in 1911. The Bureau of Land Management managed livestock grazing on the remaining 143,100 (approximate) acres of the project area until 1989. In 1989, as part of the Nevada Enhancement Act, the allotments on the BLM became part of the Toiyabe National Forest and administered by the Bridgeport Ranger District.

As mentioned earlier, determinations for capability and suitability were initially conducted on the Forest allotments as part of the 1981 Analysis of Management Situation (AMS) for the 1986 Forest Plan. The remaining allotments were administered by the BLM in 1986, and therefore were not included in the analysis for the Forest Plan. Court decisions have determined that site-specific range analyses should validate the capability analysis conducted at the Forest level. In this case, the recommended criteria for capability analysis has changed. Because of this change, capability was reviewed using the 1981 criteria and some of the 1998 criteria in this validation analysis. The ID Team and deciding official reviewed maps with individual components as well as maps with combined components.

The Interdisciplinary Team reviewed the capability and suitability determinations from the Forest Plan, and discussed whether this was still valid, or if there were changes since the Forest Plan was signed that would indicate a change in suitability of livestock grazing. The team also reviewed the allotments that were transferred to Forest Service administration through the Nevada Enhancement Act.

A GIS exercise was completed creating maps that displayed capable acres with the same criteria used in the 1986 Forest Plan. Maps were generated that displayed the results of each individual and several combinations of the criteria – one mile to water, greater than 30% slope, highly erodible soils, and greater than 50 pounds per acre of forage production. Additional GIS maps were generated using some of the 1998 criteria for Forest Plan revision efforts that were described in “Rangeland Capability and Suitability Determinations for Forest Plan Revision R-4 Revised 2/20/98” and described previously. These maps are part of the project record.

The GIS analysis indicated that over half of the project area did not meet the combined capability criteria. This was due, to the combination of criteria, not to any one criteria by itself. To determine if this was accurate, members of the ID Team went out to various locations within the project area with the permittees, Regional personnel, and personnel from other government agencies and the University of Nevada Reno that have experience in these high desert

environments. Personnel from the Natural Resource Conservation Service were able to provide background relative to the criteria for the soils and production information that was used for the capability analysis.

The experts involved held many discussions regarding the capability criteria and the suitability of grazing livestock in the project area. Some points of conversation were regarding plants that are important forage on winter and spring allotments differ from the plants on summer allotments, which affect the values used in the forage production criteria. There was discussion regarding the criteria for distance to water relative to winter and spring allotments where snow or hauling water are the main sources of water.

As a result of these field meetings and other discussions, the Nevada Department of Agriculture provided a report and synopsis of information regarding the Forest Service Capability model as applied to the Great Basin Project. "*This report addresses site specific ecological sites within the Great Basin Project area that we visited and provides information on soils, soil erodibility, production, slope, and distance from water. Patti Novak-Echenique and Gary Brackley from the USDA-Natural Resources Conservation Service; Dr. James A. Young, Agricultural Research Service, Reno Laboratory; and Dr. Barry Perryman and Dr. Sherman Swanson of the University of Nevada, Reno, have all contributed and reviewed this report for accuracy and content. The information provided is based on the USDA-NRCS Soil Surveys for Lyon and Mineral counties; the USDA-NRCS National Range and Pasture Handbook; journal articles from professional range and animal science publications, and the 2001 Arizona Governor's Report by the Rangeland Technical Advisory Council on Assessment of U.S. Forest Service Methods for Determining Livestock Grazing Capacity on National Forests in Arizona.*" (Nevada Department of Agriculture 2006).

The outcome of this analysis was that the mapping exercise did not accurately display the true capability of many of the areas within the project area. Some areas that map as not capable due to distance to water, production or soil erodibilty were verified to be capable because of different seasons of grazing, or changes in the erodibilty information.

Specifically, the experts determined that the capability analysis did not apply the soil erosion hazard ratings as intended in the Ecological Site Guides. According to the NRCS, "the erosion hazard ratings listed in the soil surveys are not predictions or statements regarding measured erosion. The ratings are a relative statement about a soil's susceptibility to erosion, independent of variables such as cover and management practices that are used in actual erosion prediction equations." In the project area, the group noted that most of "the soils are also well armored with rock fragments, which reduce the amount of bare ground exposed to erosive measures." (Nevada Department of Agriculture, 2006).

Regarding slope and distance to water, there is anecdotal evidence and research which demonstrates that these are variable criteria. Cattle use in Great Basin rangelands "is

controlled by an interaction of factors including topography, vegetation type, climate, availability of water, and livestock behavior." In several studies, distance to water and slope only explained a fraction of the variation in livestock forage use patterns. This demonstrates that "forage use by grazing animals is strongly influenced by factors that operate at the plant community level and individual plant species and plant part level, thus limiting the predictive ability of landscape level forage allocation models (Bailey et al. 1989). Factors such as season, precipitation, breed of cattle, and differences within breeds of cattle all contribute to differing degrees of use of rangelands in relation to slope and distance from water." (Nevada Dept. of Agriculture, 2006).

This review demonstrated that a Forest level capability analysis did not adequately reflect the site-specific conditions in the analysis area. The expert review also indicated that the capability criteria determined at the National Forest System level were not applicable to all areas. Upon more critical review, the team determined that another reason the capability analysis did not reflect actual conditions was that many of the allotments were grazed in the dormant season (winter). The Intermountain Region criteria were developed for summer grazing in the more production Intermountain west habitats. The conditions in much of the Great Basin South analysis area are more comparable to southwest desert types. In the Southwest Region, 50 pounds per acre is still used as one of the capability criterion.

In this site-specific review, the Interdisciplinary team and expert panel also agreed that there were areas that were not capable of sustaining livestock grazing on the long term. Largely, these were small areas dispersed throughout the allotments and livestock would not be dependent on any of these areas. The group determined only one of areas that mapped out as not capable were large enough to affect the ability to properly graze livestock on the entire allotment. This was either due to the dispersed nature of the locations or because the mapping exercise did not reflect actual conditions. Huntoon Valley, in the Huntoon Allotment mapped as not capable and site-specific review validated this. The permittees and the Forest have yet to determine if the allotment is still viable without grazing the valley bottom.

The information from the capability validation exercise was used in developing the proposed action but was not "a decision to graze livestock on any specific area of land" nor was it used to determine grazing capacity (USFS 1998). It is merely an analysis used to inform the decision.

Suitabilty Analysis

As mentioned previously, the 1986 Toiyabe LRMP did not analyze suitability as described in the 1998 protocol. In this validation, the ID team looked at the suitability criteria to determine if there was new, better, or additional information or changed conditions since the Forest Plan was implemented that would make livestock grazing incompatible with another use or resource. The ID Team determined that most of the capable areas were also suitable for livestock grazing if managed correctly, therefore livestock grazing can be re-

authorized within the allotments in the project area. There were a few exceptions to this, described below.

Huntoon Allotment

Vegetative conditions in the valley of this allotment are such that it is neither capable nor suitable for grazing livestock, and should not be re-authorized for domestic livestock grazing. This area is part of a wild horse territory and is the only grazing activity that should be authorized in the valley. This recommendation is reflected in the proposed action. The lands outside of the valley itself are capable of sustaining grazing and could but utilized. This would require additional management emphasis. After a field review with permittees and other interested parties, the group determined that water distribution and intensive riding could be effective in keeping cattle out of the valley bottom. See Huntoon Closure Map.

Squaw Creek Allotment

Due to the large amount of private lands interspersed throughout this allotment, it was determined to not be suitable nor practical for authorizing domestic livestock grazing. This is reflected in the proposed action.

Aurora Allotment

This allotment was formerly a sheep allotment. The capability analysis determined that it was capable of sustaining cattle grazing. In the suitability review, however, the ID Team identified issues that would need to be addressed prior to authorizing cattle in the allotment. Specifically, the townsite of Aurora is located in the allotment. This area is on the National Register of Historic Places and is one of the most important towns in the settlement of the eastern Sierra and western Nevada. Most of the historic features are laying on the ground and could be adversely affected by cattle congregation in the area. Trespass cattle and wild horses have impacted the old brewery site. Based on these issues, the analysis recommended that cattle not be authorized in the Aurora allotment until protection measures are in place. Thus, the area is not suitable until those measures are in place. After that time, cattle could be authorized in the area. This is reflected in the proposed action.

In addition to the historic values needing protection, there are degraded meadows in the allotment which are critical to sage grouse brood-rearing. The proposed action reflects the determination that these areas should not be grazed until they are in an improved condition.

Rough Creek Allotment

There are degraded meadows in the China Camp area of this allotment which are critical to sage grouse brood-rearing. The proposed action reflects the determination that these areas should not be grazed until they are in an improved condition.

Conclusion

The site-specific analysis did validate the 1986 Toiyabe LRMP in that the allotments are capable of sustaining livestock grazing with the exception of the Huntoon Allotment where a portion of the allotment is not capable. The proposed action addresses this degraded rangeland. The Great Basin South Rangeland Project is consistent with direction and assumptions used in the 1986 Toiyabe LRMP regarding grazing capability.

APPENDIX 3: RESPONSE TO COMMENTS

Comments were reviewed and categorized into the issues listed below. Due to the voluminous size of several of the comment letters, they are not reprinted in their entirety. Rather the comments are grouped with appropriate responses per direction in the Council on Environmental Quality Regulations. Responses to comments specific to specific parts of the Great Basin South EIS are more specific whereas responses to general comments are necessarily more general. In many cases the comments were so general that it was difficult to determine their applicability to on-the-ground conditions in the project area. In other cases it was difficult to determine the applicability of vague requests for additional information.

As required by the Forest Service Environmental Policy and Procedures Handbook, letters from Federal, State and local agencies and elected officials have been scanned and are reprinted here (FSH 1909.15, 24). The response to the comments in these letters follow along with letters from other interested parties.

Comment categories

Grazing Management Policy

Planning Process

Purpose And Need

Public Involvement

Proposed Action

Alternatives

Affected Environment/Environmental Consequences

- Livestock Grazing

Vegetation

- Wildlife/Plant Habitat
- Watershed
- Heritage Resources
- Social Economics

Editorial Comments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

A

March 5, 2007

Cheryl Probert
District Ranger
Bridgeport Ranger District
Humboldt-Toiyabe National Forest
HC 62 Box 1000
Bridgeport, CA 93517

Subject: Draft Environmental Impact Statement for Great Basin South Rangeland Management Project (CEQ # 20070008)

Dear Ms. Probert:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

EPA supports the effort to move rangeland conditions of the Great Basin South grazing allotments towards desired functioning conditions. The need for action is clear given preliminary rangeland assessments that indicate areas are not capable of sustaining long term livestock grazing (Appendix 2) or have crossed below ecosystem functional thresholds. Of note are proposed actions to reduce the maximum allowable vegetation utilization rates, implement rest-rotation systems, provide specific Aspen management thresholds, and close Huntoon Valley and the Squaw Creek allotment. 1

However, the draft environmental impact statement (DEIS) does not provide enough specificity regarding existing conditions, proposed management actions, and the potential environmental impacts of these actions. Site- and allotment-specific conditions, resource problems, and management measures to fix these problems are not disclosed. We recommend the final EIS (FEIS) provide more specific information so that the public, decision-makers, and permittees fully understand the exact resource problems that need to be addressed, proposed management measures to address these problems, and the impacts of these measures. 2
Furthermore, the DEIS does not provide specific information concerning future planning actions. We recommend the FEIS include a schedule for development of revised allotment management plans and a commitment to tiered environmental documentation for these plans. 3

The Proposed Action would authorize continued cattle grazing and development of new Allotment Management Plans over time (p. 18). Permitted livestock numbers and season-of-use would be modified as necessary to meet properly functioning condition standards. Given the lack of specificity in the DEIS, we are concerned that further resource declines will occur unless immediate rangeland management changes are made. EPA recommends consideration of 4

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expedited implementation of reduced utilization rates, animal numbers, and modified season-of-use where ecosystem and rangeland functions are known to be impaired.

Because of the above concerns and lack of specific information, we have rated the Proposed Action as Environmental Concerns - Insufficient Information (EC-2). EPA's rating and a summary of our comments will be published in the *Federal Register*. Please see the enclosed Rating Factors for a description of EPA's rating system.

We appreciate the opportunity to review this DEIS. When the FEIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact Laura Fujii, the lead reviewer for this project, at 415-972-3852 or fujii.laura@epa.gov.

Sincerely,

Connell Dunning

for Nova Blazej, Manager
Environmental Review Office

Enclosures: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: David Loomis, Project Manager, Carson City

2

MAR-05-2007 MON 02:17 PM U.S.E.P.A. FAX NO. 4159478026 P. 03

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FEB 06 2007

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
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KENNY C. GUINN
Governor

TERRY R. CRAWFORTH
Director

DOUG HUNT
Deputy Director

February 2, 2007

Ms. Cheryl Probert
Bridgeport Ranger District
HC 62 Box 1000
Bridgeport, California 93517

RE: Draft EIS-Great Basin South Rangeland Management Project

Dear Cheryl:

The Nevada Department of Wildlife has reviewed the Draft EIS and support the Proposed Action. This document best represents a resource based approach and management strategy necessary to protect and restore Nevada rangelands. (1)

Our agency appreciates the Forest Service's inclusion of state resource planning goals and objectives that affect the Bi-State Sage Grouse Conservation Plan, Nevada Partners in Flight Conservation and Nevada Wildlife Action Plan. We look forward to the Final Environmental Impact Statement and Forest Plan Amendment. (2)

Please forward our agency hard copies of the final documents for our files.

Sincerely,

Roy Leach
Western Region

FED & S 3/9/07
Amy
Lucan

(E)

JIM GIBBONS
Governor

STATE OF NEVADA

ANDREW K. CLINGER
Director
Dave L.

DEPARTMENT OF ADMINISTRATION
209 E. Musser Street, Room 200
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(775) 684-0222
Fax (775) 684-0260
http://www.budget.state.nv.us/

February 20, 2007

Cheryl Probert
US Department of Agriculture
US Forest Service
Bridgeport Ranger District
HCR1
Box 1000
Bridgeport, CA 93517

draft EA
Comment.

Re: SAI NV # **E2007-201** Reference:

Project: **Great Basin South Rangeland Management Project**

Dear Cheryl Probert:

Enclosed are comments from the agencies listed below regarding the above referenced document. Please address these comments or concerns in your final decision.

Division of State Lands

Division of Water Resources

This constitutes the State Clearinghouse review of this proposal as per Executive Order 12372. If you have questions, please contact me at (775) 684-0209.

Sincerely,

for Gosia Sylwestrzak
Nevada State Clearinghouse

Enclosure

Within in the State of Nevada: All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of Chapters 533 and 534 of the Nevada Revised Statutes (NRS), and not otherwise. No use of surface water or groundwater for a beneficial use such as stockwatering is to occur unless a permit is granted by this office. Any water or monitor wells, or boreholes that are proposed to be drilled within the described lands are the ultimate responsibility of the entity allowing the drilling to occur and must be plugged and abandoned as required in Chapter 534 of the Nevada Administrative Code. If artesian water is encountered in any well or borehole it shall be controlled as required in NRS § 534.060(3).

Thanks

Rob

-----Original Message-----

From: Clearinghouse [mailto:clearinghouse@budget.state.nv.us]

Sent: Friday, January 19, 2007 3:19 PM

To: Robert K. Martinez

Subject: E2007-201 Great Basin South Rangeland Management Project - Bridgeport Ranger District

NEVADA STATE CLEARINGHOUSE

Department of Administration, Budget and Planning Division

209 East Musser Street, Room 200, Carson City, Nevada 89701-4298

(775) 684-0209 Fax (775) 684-0260

DATE: January 19, 2007

Division of Water Resources

Nevada SAI # E2007-201

Project: Great Basin South Rangeland Management Project

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://www.fs.fed.us/r4/htnf/projects/bridgeport/2007/GBS-DEIS-121706.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Tuesday, February 20, 2007.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Gosia Sylwestrzak, (775) 684-0209 or mailto:clearinghouse@budget.state.nv.us.

____No comment on this project _x___Proposal supported as written

AGENCY COMMENTS:

Within in the State of Nevada: All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of Chapters 533 and 534 of the Nevada Revised Statutes (NRS), and not otherwise. No use of surface water or groundwater for a beneficial use such as stockwatering is to occur unless a permit is granted by this office. Any water or monitor wells, or boreholes that are proposed to be drilled within the described lands are the ultimate responsibility of the entity allowing the drilling to occur and must be plugged and abandoned as required in Chapter 534 of the Nevada Administrative Code. If artesian water is encountered in any well or borehole it shall be controlled as required in NRS § 534.060(3).

Signature: Robert K. Martinez, P.E. Date: 1/31/2007

Distribution:

Gary McCuin, Department of Agriculture

Sandy Quilici, Department of Conservation & Natural Resources Stan Marshall, State Health Division Cathy Barcomb, Commission for the Preservation of Wild Horses Sherry Rupert, Indian Commission Skip Canfield, AICP, Division of State Lands Pete Anderson, Division of Forestry Mike Dondero, Division of Forestry Rich Harvey, Division of Forestry Anthony Grossman, Department of Wildlife, Director's Office Roy Leach, Department of Wildlife, Fallon Robert Martinez, Division of Water Resources James D. Morefield, Natural Heritage Program Steve Weaver, Division of State Parks Gosia Sylwestrzak, zzClearinghouse Reese Tietje, zzClearinghouse -Reese Maud Naroll, zzClearinghouse-Maud Gosia Sylwestrzak, zzClearinghouse -Gosia

The Nevada Division of State Lans has no comment on this proposal.

-Skip Canfield, AICP

-----Original Message-----
From: Clearinghouse [mailto:clearinghouse@budget.state.nv.us]
Sent: Friday, January 19, 2007 3:19 PM
To: Skip Canfield
Subject: E2007-201 Great Basin South Rangeland Management Project - Bridgeport Ranger District

NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260
DATE: January 19, 2007

Division of State Lands

Nevada SAI # E2007-201
Project: Great Basin South Rangeland Management Project

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://www.fs.fed.us/r4/htnf/projects/bridgeport/2007/GBS-DEIS-121706.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Tuesday, February 20, 2007.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Gosia Sylwestrzak, (775) 684-0209 or mailto:clearinghouse@budget.state.nv.us.

____No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

Signature: Date:

Distribution:
Gary McCuin, Department of Agriculture
Sandy Quilici, Department of Conservation & Natural Resources Stan Marshall, State Health Division Cathy

Barcomb, Commission for the Preservation of Wild Horses Sherry Rupert, Indian Commission Skip Canfield, AICP, Division of State Lands Pete Anderson, Division of Forestry Mike Dondero, Division of Forestry Rich Harvey, Division of Forestry Anthony Grossman, Department of Wildlife, Director's Office Roy Leach, Department of Wildlife, Fallon Robert Martinez, Division of Water Resources James D. Morefield, Natural Heritage Program Steve Weaver, Division of State Parks Gosia Sylwestrzak, zzClearinghouse Reese Tietje, zzClearinghouse -Reese Maud Naroll, zzClearinghouse-Maud Gosia Sylwestrzak, zzClearinghouse -Gosia

COMMENTS	***RESPONSES***
GRAZING MANAGEMENT POLICY	
The U.S. Environmental Protection Agency supports the effort. The proposed action reduces the maximum allowable vegetation utilization rates, implements rest-rotation systems, provides specific Aspen management thresholds, and closes Huntoon Valley and the Squaw Creek allotment. (EPA, A-1).	***Support for the effort in developing the proposed action is appreciated. The EIS analysis clearly indicates the benefits of implementing the proposal.***
The Nevada Department of Wildlife has reviewed the Draft EIS and supports the Proposed Action. This document best represents a resource based approach and management strategy necessary to protect and restore Nevada rangelands (NDOW, B-1).	***Support for the resource based approach and management strategies is appreciated. The EIS analysis indicates these measures would help to protect and restore Nevada's rangelands.***
Grazing permitees should be allowed to relinquish permits and those allotments should be retired, such as the BLM Prineville District does (Salvo, E-10).	***Permittees that hold a Term Grazing permit have discretion to waive their permits back in favor of the government.***
Grazing management should not be lax and should maximize insulation from the political tampering. Political bias will pervade land management decisions and unaccountable grazing will occur (Fite, C/D-15, C/D-26)	***The purpose of an EIS is to evaluate and disclose the social economic and environmental impacts of a proposed action and alternatives. It is not intended to evaluate political bias charges. Please refer to FEIS Chapter 3: Affected Environment and Environmental Consequences for a full disclosure of social, economic, and environmental consequences.***
Annual operating meetings should open to the public and limited in scope (Fite, C/D-29, C/D-95).	***The description of annual operating plan meetings is consistent with Forest Service policies and regulations (FSH 2209.13_90). Please see FEIS Chapter 2: Adaptive Management for a description of how these actions would be taken to correct problems, take advantage of successes and adjust for changing conditions or events such as drought.***
The Forest must conduct new capability and suitability studies related to sustainability. These studies should include a variety of factors including wildlife habitat, economics, production, soils, etc (Fite, C/D-41, C/D-42, C/D-47, C/D-51, C/D-52, C/D-78, F-3, F-6).	***A suitability and capability validation analysis was completed as part of this project. The analysis considered criteria used in the 1981 AMS for the 1986 Toiyabe LRMP as well as the 1998 Intermountain Region Criteria. The analysis also included field reviews in addition to the GIS analysis. The FEIS includes an expanded explanation of this process in Appendix 2. Maps of***

COMMENTS	***RESPONSES***
	capability and suitability have been provided to the commenter.
The Forest must establish a mandatory five years rest from grazing following a fire and any other vegetation treatment it undertakes (Fite, C/D-31).	***Information on the rest after fire provision of the Toiyabe Forest Plan has been added to the FEIS. Please see FEIS Chapter 1, Purpose and Need for Action for a description of Forest Plan conformance.***
The EIS must provide information on allotments meeting, not meeting, and moving towards Forest Plan objectives (Fite, C/D-75).	***Please see FEIS Chapter 3, Affected Environment and Environmental Consequences.***
All livestock should be required to have ear tags (Fite, C/D-93).	***Livestock to be placed on National Forest System lands under a term grazing permit must be branded (FSH 2209.13_90).***
PLANNING PROCESS	
What has become of the other Grazing EIS being prepared in Bridgeport? (Fite, C/D-1, F-1)	***No other Grazing EISs have been initiated in Bridgeport. This project was initiated as an Environmental Assessment, but it was later determined that an EIS was more appropriate. Please see FEIS public involvement section***
The Scoping Notice was greatly devoid of information – such as a current species list – needed to effectively comment on the proposed action (Fite, C/D-81).	***The scoping notice for this project met all requirements and guidance for content. It was not intended to provide detailed information on all species. The DEIS also included detailed information on predicted effects to wildlife species. For a detailed discussion of species in the project area, please see the wildlife section of the FEIS, Chapter 3, Affected Environment and Environmental Consequences.***
The Range of Issues must be expanded to include other factors (Fite, F-9, F-31).	***More information on the issue identification process has been added to the FEIS. Please refer to the issues section of Chapter 1.***
The Range of Indicators Table must include additional natural resources (Fite, F-10, F-33).	***There is no Range of Indicators Table as none is required by the CEQ regulations. However, appropriate indicators for the issues are included in the FEIS. Please refer to the issues section of Chapter 1.***
The issues section states that sage grouse occurs around the end of June, which is too late (Fite,F-34).	***Reference to the end of June has been removed from the issues section of the EIS.***

COMMENTS	***RESPONSES***
PUBLIC INVOLVEMENT	
There should be open public involvement in the EIS and subsequent grazing-related actions for this project, including EAs (Fite, C/D-16, C/D-27, F-20, F-74).	***Substantial public involvement has been included throughout preparation of this EIS. Please refer to the public involvement section in Chapter 1 of the FEIS for more information. All future grazing-related actions for this project will be conducted with full conformance to existing public involvement policies and regulations for grazing management (See FS 2209.13_90).***
EDITORIAL COMMENTS	
The Forest must provide the public with detailed maps (Fite, F-4).	***More maps have been added for the FEIS. Additional maps were provided directly to the commenter when requested.***
PROPOSED ACTION	
The U.S. Environmental Protection Agency supports the effort. The proposed action reduces the maximum allowable vegetation utilization rates, implements rest-rotation systems, provides specific Aspen management thresholds, and closes Huntoon Valley and the Squaw Creek allotment. (EPA, A-1).	***Support for the effort in developing the proposed action is appreciated.***
We fully support closure of the vacant allotment and portions of the Huntoon Valley allotment (Fite, F-2, F-70).	***Support for the proposed action is appreciated. It includes closure of Huntoon Valley to livestock grazing.***
The proposal to use rest/discontinuous use will help to protect wildlife habitats and should be used in all areas (Fite, F-15).	***Agree, the proposed action includes periods of rest/discontinuous use on all allotments. Please refer to the description of the proposed action in Chapter 2 of the FEIS.***
The Nevada Department of Wildlife has reviewed the Draft EIS and supports the Proposed Action. This document best represents a resource based approach and management strategy necessary to protect and restore Nevada rangelands (NDOW, B-1).	***Support for the proposed action is appreciated. The EIS analysis indicates the proposal would help to protect and restore Nevada's rangelands.***
Consider expedited implementation of grazing management adjustment where ecosystem functions are known to be impaired (EPA, A-4, A-15).	***The proposed action in the FEIS has been modified to include additional resource protection measures. In addition it includes specific measures to adjust grazing where***

COMMENTS	***RESPONSES***
	ecosystem conditions are known to be impaired, such as in Huntoon Valley. Please refer to the proposed action description in Chapter 2 of the FEIS.
Describe the link between existing conditions and the proposed management measures, including why summer grazing is proposed for the Masonic and Rough Creek allotments (EPA, A-6).	***Additional information on the link between existing conditions and proposed measures has been added to the proposed action for the FEIS. This includes specific discussion of the Masonic and Rough Creek allotments.***
Include a table comparing current and proposed action livestock management measures (EPA, A-7, A-10).	***A new table has been added to the description of the proposed action for the FEIS.***
Describe potential restoration opportunities to improve rangeland conditions and wildlife habitat (EPA, A-8).	***The proposed action includes management changes such as incorporating rest and not authorizing livestock in some areas. This is specifically designed to improve rangeland conditions and thereby wildlife habitat. These expected changes are described in Chapter 3 of the FEIS and the wildlife and rare plant Biological Evaluations, available in the project record.***
Monitoring, mitigation and management measures common to all allotments need to be included (EPA, A-9).	***Please refer to the description of the proposed action in Chapter 2 of the FEIS which describes proposed resource protection, management, and monitoring.***
Triggers for livestock movement and removal on an annual basis should be included. (Fite, C/D-4, C/D-87)	***Criteria for annual adjustments of livestock management are included in the proposed action. Please refer to Chapter 2 – Proposed Action and Alternatives.***
Describe grazing use and specific actions, including seasons of use, livestock numbers, and rest from grazing. Minimize flexibility and do not rely on adaptive management (Fite, C/D-12, C/D-13, F-44).	***The Proposed Action includes specific changes in seasons of use, livestock numbers, and rest from grazing to address current resource conditions. Chapter 3, Vegetation, includes more descriptions of the site-specific resource conditions measured. Building adaptive management flexibility into management allows for future changes that are responsive to needed adjustments in permitted actions. Chapter 2, Adaptive Management, has been updated to better explain the concept. Historically, decisions have been too narrowly focused, such as deciding to re-authorize a specific number, kind, or class of livestock with specific on- and off-dates under a specific***

COMMENTS	***RESPONSES***
	type of grazing system. These kinds of decisions have restricted management flexibility in meeting desired conditions and project objectives. Adaptive management proposals have been developed in full conformance to Forest Service Range Management Handbook 2209.13.
The EIS analysis indicates that new fences and water developments may be required, yet the proposed action says no new range improvements are proposed (Salvo, E-8).	***No new range improvements are proposed as a part of this analysis and decision. The project design feature specific to the Aurora Allotment does contemplate future structural range improvements. It also states that those would require additional analysis and documentation. After implementation of this project, it is possible that other new range improvements may be identified, particularly to address sage grouse and/or rare plants. The appropriate level of environmental analysis would be completed at that time.***
We greatly support the lessening of grazing on moonwort and other rare plant habitats. Consider long-term rest to better ensure their survival (Fite, F-72)	***Support for the proposed action is appreciated. More protective measures for rare plants have been added to the proposed action for the FEIS. Please refer to the proposed action section of Chapter 2.***
All vacant allotments must remain vacant (Fite, C/D-88).	***Please refer to the FEIS Chapter 2, Proposed Action section for information on the proposal for the vacant allotments.***
Sage grouse habitat should be managed to protect these birds, including curtailing livestock grazing in the spring, waiting for additional lek location studies and eliminating grazing in all areas with springs, seeps, and meadows and all areas with low functioning conditions (Salvo, E-1, E-3, E-4, E-6, E-7).	***Additional measures to protect sage grouse have been included in the proposed action for the FEIS. In addition, the changes in riparian use levels in the proposed action will address this somewhat. Please refer to the resource protection measures for the Proposed Action in Chapter 2 which address critical brood-rearing habitat. These effects of these design features are disclosed in Chapter 3 and the Biological Evaluation.***
The Nevada Department of Wildlife appreciates the Forest Service's inclusion of state resource planning goals and objectives that affect the Bi-State Grouse Conservation Plan, Nevada Partners in Flight Conservation and Nevada Wildlife Action Plan. We look forward to the Final Environmental Impact Statement (NDOW, B-2).	***Support for the proposed action is appreciated. The analysis in Chapter 3 of the FEIS supports the conclusion that the proposal would benefit sage grouse, important bird species, and wildlife.***

COMMENTS	***RESPONSES***
The FEIS should include a schedule for development of allotment management plans and a commitment to tiered environmental documentation for these plans (EPA, A-3, A-14).	***Allotment management plans will be developed in accordance with the Range Management Handbook and will be based on the selected alternative therefore additional NEPA analysis is not required. Livestock grazing permits will be modified to reflect the changes in the selected alternative as soon as it can be implemented.***
Add more steps to the adaptive management process and consider that agency personnel lack experience. Plus the forest service claims it can't do enough on the ground monitoring (Fite, C/D-18, C/D-94).	***Appropriate steps have been built into the process in conformance to Forest Service Range Management Handbook 2209.13. The explanation of Adaptive Management in Chapter 2 has been expanded.*** ***The Bridgeport Ranger District has a very experienced and effective staff fully capable of carrying out the adaptive management process. Please refer to Chapter 4 of the FEIS for a description of the experience and education of the EIS team, which includes over 140 years of natural resource management experience. Nowhere in the EIS or in any other notice does the Bridgeport Ranger District claim it cannot do enough on the ground monitoring.***
Adaptive management monitoring should be formally structured including periodic regimes, specific actions, triggers, and sideboards to limit facilities and livestock rotation. This monitoring should be long term and include water quality and quantity (Fite, C/D-20, C/D-92, F-73, F-78, F-82, D-107).	***Monitoring is included as a key component of the proposed action. It would follow formal Forest Service Handbook accepted methodologies. This monitoring would be used to trigger specific actions as outlined in the resource protection measures in the proposed action. Please see Chapter 2, Resource Protection Measures and Monitoring Plan for expanded description. Also refer to Chapter 3, Livestock Grazing for a table showing anticipated management changes that would be made if monitoring determines it is necessary.***
Unanticipated or unforeseen uncertainties, including chemical spills or West Nile virus must trigger public notification, specific action, or new NEPA (Fite, C/D-21, F-79).	***Any uncertainties that fall within the scope of the decision documented in the Record of Decision would be addressed as appropriate and would not require additional NEPA analysis. Uncertainties outside the scope of the decision such as chemical spills or West Nile virus would be addressed per appropriate laws, regulations, guidance, and***

COMMENTS	***RESPONSES***
	policies, including public notification, specific actions, or new decisions that would be subject to review under NEPA.
If funds are insufficient for monitoring or there are floods, weeds, drought, or declining species or new actions such as Oil and Gas exploration, mining, or power lines occur, then significant cuts in livestock use should be imposed (Fite, C/D-22, C/D-23, C/D-28, F-75).	***Clarification regarding projected funding levels has been added to the FEIS. Please refer to Chapter 2, Introduction. Adaptive management measures would be used to adjust to changing ecological conditions. In the event of a new action the related NEPA document would be the process through which management would be changed.***
You can no longer view each activity that it may authorize on public lands as separate. Effects of mining, energy, roads, fences etc. must be fully assessed (Fite, C/D-24, F-28).	***The Bridgeport Ranger District follows Council on Environmental Quality Regulations to determine if activities are separate or connected. See 36 CFR 1508.25. In addition, the connected nature of land management decisions and the cumulative effect they may have on the environment is why the Forest includes a cumulative effects analysis of the past, present and reasonably foreseeable future actions in the NEPA documents. Please refer to the FEIS, Chapter 3, cumulative effects section which has been augmented and reorganized.***
The hideous spring development and solar panel in the “Diamond A” Allotment is a classic example of how the Forest killed a spring in a harmful attempt to force cattle to hills. The District continues to develop and gut springs. All such harmful projects should be removed (Fite, C/D-44, D-101).	***There is no Diamond A Allotment in the project area or in the entire Bridgeport Ranger District. There is no spring development and solar panel killing springs or forcing cattle to hills in the project area. The proposed action includes no proposals to develop or gut springs. Please refer to the FEIS, Chapter 2, Alternatives, Including the Proposed Action for further information on project proposals.***
There should be more reduction in livestock grazing because some areas may not have reduced grazing use when they were converted from sheep to cattle (Fite, C/D-45, F-18).	***Stocking rates were considered in the development of the proposed action, including the closure of Huntoon Valley to grazing. No cattle AUMs are proposed to be used there. In other areas adjustments were made in periods of use and future adjustments will be made through monitoring and adaptive management. Please refer to FEIS Chapter 2: Alternatives, for further information.***

COMMENTS	***RESPONSES***
The proposal should be based on protection of old and mature communities and avoid vegetation manipulation projects, including fire in sagebrush (Fite C/D-53, C/D-54, C/D-55).	***The proposed action includes no vegetation manipulation of any vegetation communities including old or mature communities or sagebrush communities by any means including fire. Please refer to the description of the proposed action in FEIS Chapter 2: Alternatives, Including the Proposed Action.***
Explain the resource value rating and how it integrates new and current science. (Fite, F-14).	***Inlieu of the older "resource value ratings" this EIS incorporated new and current science through a rapid assessment protocol and applying the data to the matrices in Appendix 1 to determine current conditions. A description of rangeland condition and trend and how the matrices work has been added to Appendix 1.***
We are very concerned about how the conversion from sheep to cattle AUMs on the Aurora allotment will occur, as cattle may significantly increase harmful impacts on flatter areas and any more mesic or shaded sites (Fite, F-19).	***More information on the potential impacts of the conversion of the Aurora allotment from sheep to cattle has been added to the FEIS. Please refer to the vegetation, wildlife, and historic properties sections of Chapter 3. The meadows in Aurora are specifically mentioned in the sage grouse project design features in Chapter 2.***
As part of this process the Forest should apply a series of standards that address, measure, and limit trampling (Fite, F-38).	***The proposed action provides sufficient enhancement of grazing practices. Please refer to the analysis of impacts in Chapter 3 of the FEIS.***
Grazing utilization levels should be reduced because Braun noted that moderate use could deteriorate semi-arid grasslands. Proposed utilization levels on aspen do not address impacts on soils or mechanical injury. (Salvo, E-5; Fite, F-39).	***The beneficial impacts of proposed utilization levels are fully disclosed with proper scientific references in Chapter 3 of the FEIS. Authors such as Braun may prefer different utilization levels, but the primary body of scientific evidence supports the conclusions in the FEIS. The scientific literature clearly supports 40% utilization in desert upland environments.***
Permittees on the Huntoon allotment were concerned with the viability of that allotment without the valley (Oral, M. Sceirene and B. McKay).	***Over half of the acres in the allotment are outside of the valley, however, keeping cows out of the valley without fences would be difficult. There are several water developments around the fringe of the closure area which could be used to control livestock. The FS had a field trip with the permittees to review options.***

COMMENTS	***RESPONSES***
ALTERNATIVES	
Add and assess alternative/mitigation to limit global warming impacts (Fite C/D-2, F-83).	***A global warming alternative was considered, but not carried through for detailed analysis. Please refer to Chapter 2, Alternatives in the FEIS for more information.***
Alternatives should include establishment of large ungrazed scientific reference areas so to serve as a yardstick for measurement (Fite, C/D-9).	***The Jacks Valley Research Natural Area already exists on the extreme south end of the project area, outside of the project area. Establishment of RNAs is outside the scope of this project. The long-term trend monitoring will compare parameters to those in the Matrices to determine trend. The Matrices are based on literature, forest-wide data, and other resource information. The parameters in the Matrices will serve as the "yardstick for measurement."***
Alternatives that focus on eliminating or reducing livestock grazing to restore LCT habitat must be evaluated. Reintroduction of LCT needs to be evaluated (Fite, F-20).	***No decisions have been made to reintroduce LCT into any stream within the project area. If in the future the Nevada Division of Wildlife decides to reintroduce into these areas, the Bridgeport Ranger District would re-consult with the U.S. Fish and Wildlife Service to determine if grazing practices within those specific watersheds would need to be adjusted. Implementation of the proposed action now will not prohibit current LCT restoration goals from occurring.***
Alternatives should also focus on a range of actions to enhance native biota habitat, including sensitive or at risk species and LCT (Fite, C/D-10, F-41).	***Agree, more measures to enhance native biota and protect sensitive/at risk species have been added to the proposed action for the FEIS. Please see the resource protection measures in Chapter 2 – Alternatives, Including the Proposed Action. An LCT enhancement alternative was considered for the FEIS, but not carried forward for detailed analysis. Please see Chapter Two – Alternatives considered but eliminated from detailed study.***
Alternatives should include a methodology and timetable for de-commissioning of facilities; science-based restoration actions; cutting livestock numbers based on stubble height and utilization (Fite, C/D-11, C/D-17, D-100, F-22, F-71, F-77).	***These alternatives were considered for the FEIS, but were not carried forward for detailed analysis. Please see the FEIS, Chapter Two – Alternatives considered but eliminated from detailed study. Livestock***

COMMENTS	***RESPONSES***
	are rotated through the allotment annually based on when the endpoint indicators are reached.
Minimize spread and infestation of weeds as part of all EIS alternatives. Conduct baseline surveys for weeds. Deduct acreage with significant invasive or noxious species presence or infestation. (Fite, C/D-36, C/D-48, C/D-77, F-23).	***Weed management is an important consideration in all Forest activities, including grazing management. Invasive weeds are limited in the area, with only one known population on National Forest System lands. Nonetheless, weeds will be treated in the area pursuant to the Humboldt-Toiyabe Weed Control Program. For more information on weeds please refer to the FEIS Chapter 3, Invasive Weeds section.***
There is a need for reduced use alternatives and those that rest all lands with downward trends, and those that close meadows and important areas to grazing (Fite, F-43, F-58, F-64).	***The range of alternatives include reduced use, additional rest, and closing important areas, which are part of the proposed action. Please refer to the FEIS, Chapter 2.***
An alternative should be included that considers combining the foothills of the Huntoon allotment with the adjacent BLM allotment and set up a rotation (Oral, M. Sceirene and B. McKay).	***That can be done under the proposed action alternative.***
AFFECTED ENVIRONMENT / ENVIRONMENTAL CONSEQUENCES	
General	
We are pleased to see that you are using current and evolving science (Fite, F-8)	***Recognition of the appropriate use of science in this analysis is appreciated (Fite, F-7).***
Recovery in the Great Basin deserts is a slow process and should be discussed for all alternatives (Salvo, E-9).	***Slow or minimal rates of change were identified throughout all alternatives in the DEIS and have been further emphasized in the FEIS. Please see the Summary and the vegetation section of Chapter 3.***
Provide a quantifiable estimate environmental consequences of current management (No Action) and proposed management (action alternatives), including changes in AUMs, soil erosion, recovery periods etc. (EPA, A-13).	***The impact analysis is quantified where appropriate and is subject to the availability of data. Please refer to the environmental consequences section of Chapter 3 of the FEIS.***
The full array of livestock grazing disturbances including economic and ecological costs, watershed effects, and effects on recreation and scientific uses must be considered (Fite, C/D-3, C/D-5, C/D-6, C/D-19, C/D-71, C/D-73, C/D-89, C/D-97, D-106, D-111, F-29, F-35, F-48, F-76, F-	***The full range of environmental consequences of the proposed action and alternatives are described in Chapter 3 of the FEIS. A description of recreation and scientific uses has been added to the FEIS,***

COMMENTS	***RESPONSES***
80,).	***please see Chapter One, Issues section.***
The comparison of alternatives table must include springs and different upland vegetation communities (F-12).	***The comparison of includes a brief comparative summary. More detailed information is found in the FEIS Chapter 3.***
We recommend the final EIS provide more specific information so that resource problems, management measures, and the impacts of those measures can be better understood. Include ecosystem function, meadows, riparian areas, streambed corridors, seeps, springs, sensitive species habitat and the effect of livestock grazing. (EPA, A-2, A-5, A-11, A-12).	***Additional specific information has been added throughout the FEIS to enhance understanding of resource problems, management measures and impacts. Please refer to Chapters 2 and 3 of the FEIS.***
Ecological conditions must be systematically inventoried and be up to date. This should include a wide variety of data on proper functioning condition, other natural resource conditions, and important habitats, including sage grouse, springs and riparian areas and their biota (Fite, C/D-33, C/D-35, C/D-59, D-99, D-102, D-103, D-104, F-49, F-50, F-51, F-52, F-63, D-108).	***Systematic up to date information on ecological conditions and trend were used for this project. Please see the FEIS Chapter 3, Vegetation and Watershed for this information. Also please note that additional protective measures for sage grouse have been added to the proposed action. Please see the description of the proposed action in Chapter 2 of the FEIS.***
Cumulative impacts, including beneficial impacts must be analyzed, including past, proposed, or foreseeable energy/mining development from studies in Wyoming, roads/recreation, and vegetation manipulation projects (Fite, C/D-7, C/D-8, C/D-58, C/D-85, D-109, F-26, F-46).	***Cumulative impact analysis has been enhanced for the FEIS, including roads/recreation, mining and geothermal development and vegetation manipulation projects. Please refer to the cumulative impact analysis section of Chapter 3, Affected Environment and Environmental Consequences.***
Provide data on past status of current cattle allotments, conversion of sheep to cattle, past stream flows, past fish and other aquatic species presence and abundance, year-by-year and pasture-by-pasture data on numbers of livestock by allotment, populations of aquatic species by age class, LCT population recovery goals, LCT habitat and population connectivity, location, condition, and impacts of all prior existing livestock facilities and their condition, details on water rights, review of any NEPA analysis, unplanned/incidental roading, stock ponds, spring gutting projects/developments, fence lines, water haul sites, salting/feeding sites, windmills, pipelines, wells and all other facilities and their repair status, occupied or historic leks on private, BLM, or other ownership lands, leks on other ownership lands in the past, pesticides or other contaminants are found on lands under other ownerships, condition of watersheds on non Forest	***Incorporating encyclopedic information is discouraged in EISs. The Council on Environmental Quality regulations require that environmental impact statements be analytic rather than encyclopedic and that they should be no longer than necessary to comply with the regulations. See CEQ regulation 1502.2. Relevant information necessary to understand the impacts of the proposed action and alternatives is included in the FEIS, Chapter 3. Please note that other background information is available on request from the Bridgeport Ranger District, although much of the requested information on private or other land ownerships would have to be requested from the relevant land owner.***

COMMENTS	***RESPONSES***
System lands, riparian areas on non Forest System lands, spring or stream flows on non Forest System lands, water quality on non Forest System lands, water temperatures, substrates, rheocrene, limnocrene, spring discharge, wetted perimeter, conductivity, emergent cover, bank incision, watercress cover, avalanches, aquifer depletion, diversions/drilling/depletion on lands under other ownership, authorizations, funding agreements, spring provinces/complexes/clusters, coliform, heavy metals or other contaminants, turbidity, algal blooms, grasshopper insecticides, biomass blood meal, hormone implants, Farm Services Agency Loans, U.S. Army Corps programs, weed spraying, drinking water treatment, road maintenance, bank loans, liens, foreign ownerships, wages paid, profits, gas from winter feedlots, historical wetted areas, remnant plant communities, etc. (Fite, C/D-45, C/D-62, C/D-72, C/D-91, D-105, D-106, F-21, F-66, F-67, F-76, F-83).	
LIVESTOCK GRAZING	
Provide very detailed information on all current allotments with AMPs, specific provisions and requirements of those AMPs, and the AMP implementation status, monitoring provisions, and compliance records (Fite, C/D-30).	***None of the allotments in the project area have AMPs. Please refer to the FEIS Chapter 3 for a description of current management and ecological conditions and the consequences of continuing current management.***
In its Martin Basin effort the Forest Service had no mapping provided to show all fences, wells, pipelines, troughs, salting sites, water haul sites, vegetation treatments, post-fire seeding, alien species, crested wheatgrass, intermediate wheatgrass species, smooth brome, forage kochia, and roading (Fite, C/D-46).	***This EIS addresses grazing management in the Great Basin South area of the Bridgeport Ranger District. The Martin Basin effort covered the Santa Rosa Ranger District which is over 200 miles northeast of the project area. Information on potential alien species or range developments in that area would not be appropriate in this EIS.***
Describe the areas in the grazing base and explain circumstances regarding the deer winter ranges (Fite, C/D-76, F-5, F-11).	***In order to protect important deer and wildlife habitat an important deer winter range area has been excluded from the grazing base. Additional information on this area has been included in the wildlife section of the FEIS, Chapter 3, Affected Environment and Environmental Consequences.***
Describe how grazing systems will alter wild horses or important species (Fite, F-45).	***The enhanced rest from livestock in the proposed action would likely improve wild horse habitat. See FEIS, Chapter 3, Cumulative Effects.***

COMMENTS	***RESPONSES***
The Forest makes sweeping claims about a supposed benefit of livestock grazing, but provides no evidence to support this (Fite, F-60).	***No sweeping claims are made. A reference to maintenance of plant health by properly managed grazing is supported by appropriate scientific reference. Please see the vegetation section of the FEIS Chapter 3 for a full disclosure of the effects of the proposed action.***
WILDLIFE	
The Nevada Department of Wildlife appreciates the Forest Service's inclusion of state resource planning goals and objectives that affect the Nevada Wildlife Action Plan. We look forward to the Final Environmental Impact Statement (NDOW, B-2).	***Support for the proposed action is appreciated. The analysis in Chapter 3 of the FEIS supports the conclusion that the proposal would benefit wildlife habitat.***
Evaluate effects of livestock grazing on bighorn sheep and mule deer (Fite, C/D-49, F-7, F-24, F-53).	***Please refer to the wildlife section of the FEIS Chapter 3, Affected Environment and Environmental Consequences for information on bighorn sheep, MIS, mule deer and other species.***
Describe how you will achieve functioning metapopulations of aquatic species and describe projects and facilities that may be altering habitat for important aquatic species (Fite, C/D-60)	***Please refer to the Watershed and Wildlife sections of the FEIS Chapter 3, Affected Environment and Environmental Consequences. This includes important information about current aquatic species habitat and potential impacts from the proposed project.***
The Forest must assess the impacts from past and ongoing habitat degradation to spotted frog habitats on the District. This includes livestock grazing, spring development, agricultural development, urbanization and mining activities. These activities eliminate vegetation necessary to protect frogs from UV-B radiation and other factors affecting the spotted frog food source. This EIS should serve as a basis of specific restoration activities and large-scale changes in livestock grazing impacts to spotted frog habitats. Use data from the Elko Oil and Gas EA and conduct a study of fragmentation of spotted frog habitats and actions needed to restore or reconnect spotted frog habitats (Fite, C/D-63).	***No spotted frogs or spotted frog habitats occur in the project area or anywhere on the entire Bridgeport Ranger District. The Elko Oil and Gas EA refers to habitats that are located 300 miles to the northeast of the project area. No Oil and Gas development is anticipated in the project area.***
Forest proposals would fragment pygmy rabbit habitats through mining exploration, vegetation manipulation, and livestock facility development. This EIS must put an end to these practices (Fite, C/D-65).	***The proposed action includes no mining exploration, vegetation manipulation, or livestock facility development that would impact pygmy rabbit habitat. However, cumulative impacts from other past, present***

COMMENTS	***RESPONSES***
	and reasonably foreseeable action are included in Chapter 3 of the FEIS.
Retention of dense stands of sagebrush must be a management goal for pygmy rabbit. Baseline surveys are needed. Restoring fragmented sagebrush habitats must also be a primary goal. Removal of poorly sited livestock facilities will help restore habitats. Impacts of livestock on pygmy rabbit include trampling and collapse of burrows and alteration of vegetation (Fite, C/D-66, F-19).	***Please refer to the design features of the proposed action in the FEIS, Chapter 2, Alternatives, Including the Proposed Action. They include measures to protect potential pygmy rabbit habitat. For more information on pygmy rabbits please refer to the wildlife section in the FEIS, Chapter 3, Affected Environment and Environmental Consequences.***
The EIS should include history, impacts, habitats, population, viability, and recovery plans for redband trout, Columbia spotted frog, sage grouse, LCT, pygmy rabbit, and MIS species (Fite, C/D-90, F-17, F-32, F-62).	***No populations or habitat exists in the project area for redband trout or Columbia spotted frog. Information on the other species and potential impacts from the proposed action and alternatives is available in the wildlife section of the FEIS, Chapter 3.***
The recent irrational and politically biased decision by the USFWS to deny listing of the Mono Lake sage grouse must be fully assessed in relation to livestock grazing as part of this grazing disturbance EIS process (C/D-98).	***This EIS analyzes the effects of enhanced grazing management in the proposed action as required by the Council on Environmental Quality Regulations. Effects on sage grouse are fully analyzed in the wildlife section of the FEIS, Chapter 3. The EIS is not intended to analyze impacts of listing decisions by the US Fish and Wildlife Service.***
Sage-grouse in the project area are genetically distinct from other sage-grouse and are a segment of Mono Basin sage grouse, habitat should be managed to conserve these birds (Salvo, E-1).	***Please refer to the design features of the proposed action in the FEIS, Chapter 2 and the Affected Environment section in Chapter 3. Design features were included which address the most limiting habitat features in the analysis area.The Biological Evaluation also contains a more in-depth analysis of impacts to sage grouse populations.***
Additional information should be included on the effects of livestock grazing on sage grouse nesting and brood rearing habitats as well as summer and winter habitat (Salvo, E-2).	***Please refer to the design features of the proposed action in the FEIS, Chapter 2, Alternatives, Including the Proposed Action. They include measures to protect potential sage grouse nesting and brood-rearing habitat. Livestock impacts to winter habitat are not an issue in the analysis area. For more information on sage grouse please refer to the wildlife section in the FEIS, Chapter 3, Affected Environment and Environmental Consequences. The Biological Evaluation also contains a more***

COMMENTS	***RESPONSES***
	in-depth analysis of impacts to sage grouse populations.
Describe how past vegetation manipulation, treatment, or wildfires affected sage grouse, pygmy rabbit, or other species (Fite, F-27).	***The current condition of these species and their habitats can be found in the wildlife section of the FEIS in Chapter 3.***
The EIS incorrectly claims that pinyon junipers are invading sage grouse habitats. (Fite, F-56)	***Pinyon-juniper are indeed invading sage grouse habitat in the analysis area and elsewhere on the Bridgeport District. The District has worked cooperatively with Nevada Department of Wildlife to address this with two projects. This is outside the scope of this FEIS, however. Please refer to the sage grouse analysis of the wildlife section in Chapter 3 of the FEIS. Also, the sage grouse habitat enhancement projects that address pinyon juniper encroachment are identified in the cumulative impact analysis section of the EIS, but these projects are not part of the proposed action.***
Sage grouse face accelerated threats in Elko County from mining development and the new threat of Oil and Gas development and may lek and nest on BLM lands in Idaho to the north. Include information from Wyoming on energy development (Fite, C/D-64, F-81).	***The proposed action is not located in or near Elko County or BLM lands in Idaho, which are 300 miles northeast. Sage grouse do not typically travel this far for nesting purposes. Also, there are no reasonably foreseeable Oil and Gas energy development projects in the area of the proposed action. Therefore it does not appear appropriate to analyze such impacts for this project.***
The Nevada Department of Wildlife appreciates the Forest Service's inclusion of state resource planning goals and objectives that affect the Bi-State Grouse Conservation Plan. We look forward to the Final Environmental Impact Statement (NDOW, B-2).	***Support for the proposed action is appreciated. The analysis in Chapter 3 of the FEIS supports the conclusion that the proposal would benefit sage grouse.***
RARE PLANTS	
Many species of importance are not addressed in the EIS, including *Astragalus oophorus lavinii, Streptanthus oliganthus, Cusickiella quadricostata, Polyctenium williamsiae*, and *Goodmania luteola*, which was common west of the highway by Lancaster, CA, but is now covered by housing developments (Fite, C/D-82).	***All of these species have been addressed in the EIS except for Goodmania luteola, which does not occur in the project area. Housing developments in the Lancaster, CA area are located more than 200 miles to the south. Please refer to the Rare Plants section of the FEIS, Chapter 3, for information on rare plants that do occur in the project area.***

COMMENTS	***RESPONSES***
VEGETATION	
The Forest must fully consider the role of livestock in altering fire cycles through spread of flammable invasive species or increased density of woody vegetation and destruction of herbaceous understories (Fite, C/D-40).	***The analysis of the proposed action does not indicate increased potential for invasive species or increased density of woody vegetation and destruction of herbaceous understories. Please refer to the FEIS section on vegetation and invasive species in Chapter 3, Affected Environment and Environmental Consequences.***
The importance and complexity and ecological condition of vegetation communities in the EIS area must be fully described, including old growth and mature communities, riparian areas, forbs, meadows, understory, and interspersion (Fite, C/D-53, C/D-56, C/D-57, F-16, F-30, F-36, F-47, F-54).	***Please refer to the vegetation section of the FEIS Chapter 3, Affected Environment and Environmental Consequences, which includes an enhanced description of important vegetation communities in the project area, including their ecological conditions.***
Provide information on microbiotic crusts and the importance of microbiotic crusts in each vegetation community. Analyze soil health, ground cover, species roots and microbiotic crusts (Fite, F-13, F-55, F-68).	***Please refer to the vegetation and watershed sections of the FEIS, Chapter 3 for a description of microbiotic (cryptogamic) crusts and other soil and vegetation characteristics.***
The EIS should examine vegetation community Research Natural Areas (Fite, C/D-86).	***The Jacks Valley RNA is located adjacent but outside of the extreme south end of the project area. It is closed to livestock grazing. The FEIS includes more information on vegetation conditions in the project area.***
The Calveg mapping and information is lacking in detail and it is not current (Fite, F-25).	***Please refer to the wildlife section of Chapter 3 in the FEIS for an explanation of the Calveg information. For the analysis, GAP data was used on the California side for vegetation. On the Nevada portion of the project area the team started with NRCS soils and dominant vegetation mapping. This was ground-truthed and augmented with range analysis data collection. The FEIS contains more site-specific condition data to augment the geospatial data. The analysis is based on extensive field data which is cited throughout the document.***
Does the Current Riparian Utilization Table contain standards on riparian areas? Does it comply with standards? (Fite, F-37).	***The subject table describes current utilization levels for riparian vegetation in the project area and is in compliance with the Forest Plan.***

COMMENTS	***RESPONSES***
Describe soil erosion that may have affected aspen clones and vegetation thresholds (Fite, F-40, F-57).	***More information on aspen clones has been added to the FEIS. More information on threshold analysis for vegetation has also been added to the FEIS. Please refer to the vegetation analysis in Chapter 3.***
Utilization levels are too high and will only lead to improvement if trampling damage, weed competition and much lowered vigor. Sage grouse, mule deer, and wild horses will use vegetation in the winter (Fite, F-61, F-65).	***The FEIS analysis of the effects of implementing utilization levels in the proposed action is supported by appropriate scientific references as identified in the vegetation analysis of Chapter 3. Cumulative impacts associated with wild horses are found in the cumulative impacts section of Chapter 3. Impacts to sage grouse and mule deer are found in the wildlife section of Chapter 3.***
The Forest has forgotten about mustards, cheatgrass and numerous other invasive species that have exploded (Fite, F-69).	***Analysis of mustards, cheatgrass, and other invasive species are found throughout the vegetation and invasive weeds sections of Chapter 3 of the FEIS.***
Describe past impacts of livestock grazing on riparian vegetation (Fite, D-110)	***The FEIS includes an analysis of current and projected riparian vegetation conditions as they relate to livestock grazing. Please refer to the vegetation section of Chapter 3.***
WATERSHED	
We are alarmed at the small volume of water in most streams, including intermittent and ephemeral drainages. This situation is worse due to cattle grazing. The EIS must provide additional information on watershed and hydrologic conditions (Fite, C/D-61, C/D-62, C/D-67, F-59).	***Additional information on watershed and hydrologic conditions has been included in the FEIS. Please refer to the Watershed section of Chapter 3. The analysis area contains very little water and only two perennial streams due to its desert location.***
This EIS should comply with the Forest Plan and put in place specific measurable standards of trampling for livestock-accessible banks of al riparian areas (Fite, C/D-74).	***The proposed action is in full compliance with the Forest Plan. The Plan does not require project level development of specific measurable standards of trampling for livestock-accessible banks of all riparian areas.***
HERITAGE RESOURCES	
What will be done about all the heritage resource sites that are causing ongoing damage? (Fite, C/D-96).	***We are unaware of any sites that are causing damage. Please refer to the Heritage Resource section of the FEIS, Chapter 3 for more information.***