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Department of
Agriculture

Forest
Service

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Draft

Environmental Impact Statement

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

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Abstract: This Draft Environmental Impact Statement documents the environmental analysis of the Great Basin South Rangeland Management 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.

Reviewers should provide the Forest Service with their comments during the review period of the draft environmental impact statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decision making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. Vermont Yankee Nuclear Power Corp. v. NRDC, 435 US 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. City of Angoon v. Hodel (9th Circuit, l986) and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the draft environmental impact statement should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

Send Comments to: Cheryl Probert, District Ranger, HC 62 Box 1000 Bridgeport, CA 93517. FAX: 760-932-5899. email: comments-intermtn-humboldt-toiyabe-bridgeport@fs.fed.us.

Comments must be received within 45 days of the publication of the notice of availability in the *Federal Register*.

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

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.

This analysis is being conducted at this time because the *Rescission Act* of 1995 (Public Law 504) requires the development of a schedule to complete the *National Environmental Policy Act* (NEPA) analysis. 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 this action is to align livestock grazing practices, where needed, to maintain natural resources in a desired condition as described in the Toiyabe Forest Plan.

The need for the project is to update grazing management practices. Since the Forest Plan 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. 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.

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: The 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.

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.

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

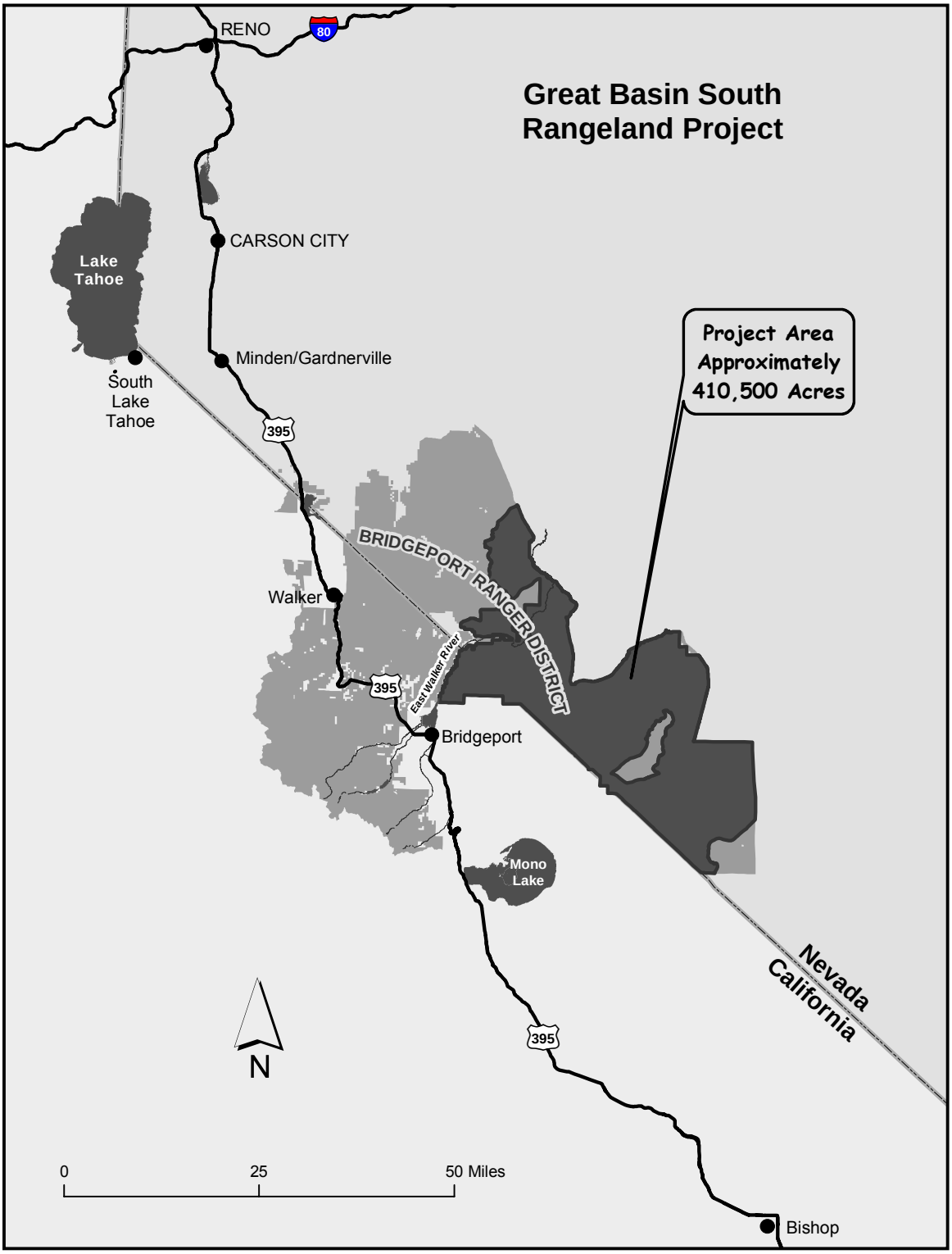
Cattle are currently authorized to graze 10 of the 12 allotments; two are vacant. The project area lies within Management Area #6, Bridgeport

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.

This analysis is being conducted at this time because the *Rescission Act* of 1995 (Public Law 504) requires the development of a schedule to complete the *National Environmental Policy Act* (NEPA) analysis. 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.


Great Basin South
Rangeland Project
RENO
80
CARSON CITY
Lake
Tahoe
South
Lake
Tahoe
Minden/Gardnerville
395
Project Area
Approximately
410,500 Acres
BRIDGEPORT RANGER DISTRICT
Walker
East Walker River
395
Bridgeport
Mono
Lake
Nevada
California
N
395
0
25
50 Miles
Bishop

Purpose and Need for Action

The purpose of this action is to align livestock grazing practices, where needed, to maintain natural resources in a desired condition as described in the Toiyabe Forest Plan.

The need for the project is to update grazing management practices. Since the Forest Plan 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. 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.

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. The Forest Plan describes forest-wide goals, standards and guidelines, and desired conditions for rangeland management. It also provides more specific direction for the Management Prescription Area #6, which includes this project area. Relevant Forest Plan sections follow:

- 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).
- 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 will have been brought to satisfactory condition (pg IV-4).

Proposed Action

The action proposed by the Forest Service to meet the purpose and need is to authorize continued domestic livestock grazing in the Great Basin South project area under updated grazing management direction in order to move existing rangeland resource conditions within the project area toward desired condition. The project includes closing the vacant Squaw Creek Allotment, shifting the Aurora Allotment from sheep to cattle, reducing utilization on upland vegetation, and eliminating grazing on portions of the Huntoon Allotment that can no longer support grazing use. The updated direction will be incorporated in attendant 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 grazing on the allotments, either on an individual basis or as a group, and if the decision is to continue grazing, then under what conditions.

Public Involvement

An initial environmental assessment level of scoping for the project proposal began August 16, 2002 and ended September 20, 2002. Letters were mailed to interested parties. Articles to inform the public of the proposed action were published in the Mammoth Times, the official newspaper of record for the Bridgeport Ranger District, 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 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, 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, and the University of Nevada.

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

Issues

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

1. 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 entire 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 will be plant composition (percent of plants that indicate the riparian areas are functioning as desired) and percent of bare ground. For aspen, the indicators will be the numbers of seedling and sapling trees.

2. 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 it's 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, salt desert shrub, and mountain brush communities are important to many species of wildlife.

   Indicators for comparing effects to rangeland health by alternative will be species composition (percent of plants that indicate the plant communities are functioning as

desired), and percent of bare ground. Other components will also be discussed, but these will be the main ones used to compare alternatives.

3. 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 (MIS) in the Toiyabe National Forest Land and Resource Management Plan.

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

4. 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 will be soil compaction and erosion.

Other Resource Concerns

Other resource concerns that will be analyzed in this document include wildlife, rare plant, and fishery habitat; heritage resources; 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. 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. The following table is a list of those TES species and why they are not discussed here.

Threatened, Endangered and Sensitive Species not discussed further in this EIS.		
Species Name	Scientific Name	Reason for not discussing further
Endangered		
Sierra Nevada bighorn sheep	Ovis canadensis californiana	Only occurs in the southwestern most area of the District and there is no potential habitat within the project area.
Threatened		
Bald eagle	Haliaeetus leucocephalus	No potential nesting habitat
Sensitive		
North American wolverine	Gulo gulo	No potential habitat
Fisher	Martes pennanti	No potential habitat
Flammulated owl	Otus flammeoulus	No potential habitat
Great gray owl	Strix nebulosa	No potential habitat
California spotted owl	Strix occidentalis occidentalis	No potential habitat

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 interaction with this project is its prohibition of 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)
- *Forest and Rangeland Renewable Resources Planning Act* of 1874 (as amended)
- *Magnuson-Stevens Fishery Conservation and Management Act* of 1996
- *National Environmental Policy Act* (NEPA) of 1969 (as amended)
- *Native American Graves Protection and Repatriation Act* of 1990
- *National Historic Preservation Act of 1966, As Amended*
- *Wilderness Act of 1964*

CHAPTER TWO. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter describes and compares the alternatives considered for the Great Basin South Rangeland 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. These three alternatives are described in detail in the following sections.

Alternative One: No Action

Under the No Action alternative, current management plans 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 1990 and would be closed as part of the Proposed Action. No new range improvements are being proposed as part of this project.

The Proposed Action is based on allotment-by-allotment direction developed to address site-specific ecological and livestock management needs.

On the **Conway** Allotment, grazing would be authorized primarily for winter use.

The **Nine Mile, Wildhorse, Larkin Lake, Powell Mountain** and the northern part of **Masonic** Allotments would be authorized for grazing with rest

for one year out of three. On **Wildhorse** and **Larkin Lake** Allotments, the rest would be for the entire allotment at once. On **Nine Mile**, and parts of **Powell Mountain** and **Masonic** Allotments, the rest would be on portions of the allotments in any given year and all acres would be rested one of three years. This would be accomplished through more intensive livestock management rather than extensive fencing. Season of use would be primarily as identified in the Proposed Seasons of Use Table below.

The southern part of **Masonic** and all of **Rough Creek** Allotments would be authorized for grazing during the summer. Utilization standards for both herbaceous and browse plant species are proposed for vegetative communities within the **Masonic** and **Rough Creek** allotments (summer use). These standards are dependent on the functioning condition of that community. These utilization standards vary from zero to 45 percent. Livestock would be moved to the next pasture or removed from an allotment once any of the utilization standards are reached. As described in Chapter 1, matrices have been developed that will help determine the functioning condition of specific vegetative communities.

Each matrix contains several components and attributes that can be measured to determine a functioning level. The attributes are guidelines and may be used in conjunction with each other or singly to determine the functioning level. Examples of these matrices are in Appendix one along with a detailed description of each vegetative group.

The following utilization standards would be implemented for vegetation types found within the **Masonic** and **Rough Creek** allotments (summer use):

Utilization Standards Table				
Vegetative Group	Ecological Site	Maximum Allowable Utilization (In %) By Ecological Status		
		Below Threshold	Does Not Function As Desired	Functions As Desired
Aspen	Riparian Browse	0	0-10	0-20
	Riparian Herbaceous	0-20	0-30	0-45
	Stream Bank Disturbance	0-10	0-20	0-20
Dry To Moist Meadow	Riparian Browse	0	0-10	0-20
	Riparian Herbaceous	0-20	0-30	0-45
	Stream Bank Disturbance	0-10	0-20	0-20

Utilization Standards Table				
Vegetative Group	Ecological Site	Maximum Allowable Utilization (In %) By Ecological Status		
		Below Threshold	Does Not Function As Desired	Functions As Desired
Mountain Big Sagebrush	Upland Herbaceous	0-20	0-30	0-45
	Upland Browse	0-10	0-20	0-20
Wet Meadow	Riparian Browse	0	0-10	0-20
	Riparian Herbaceous	0-20	0-30	0-45
	Stream Bank Disturbance	0-10	0-20	0-20
Wyoming Big Sagebrush/ Basin Big Sagebrush/ Black Sagebrush	Upland Herbaceous	0-20	0-30	0-45
	Upland Browse	0-10	0-20	0-20

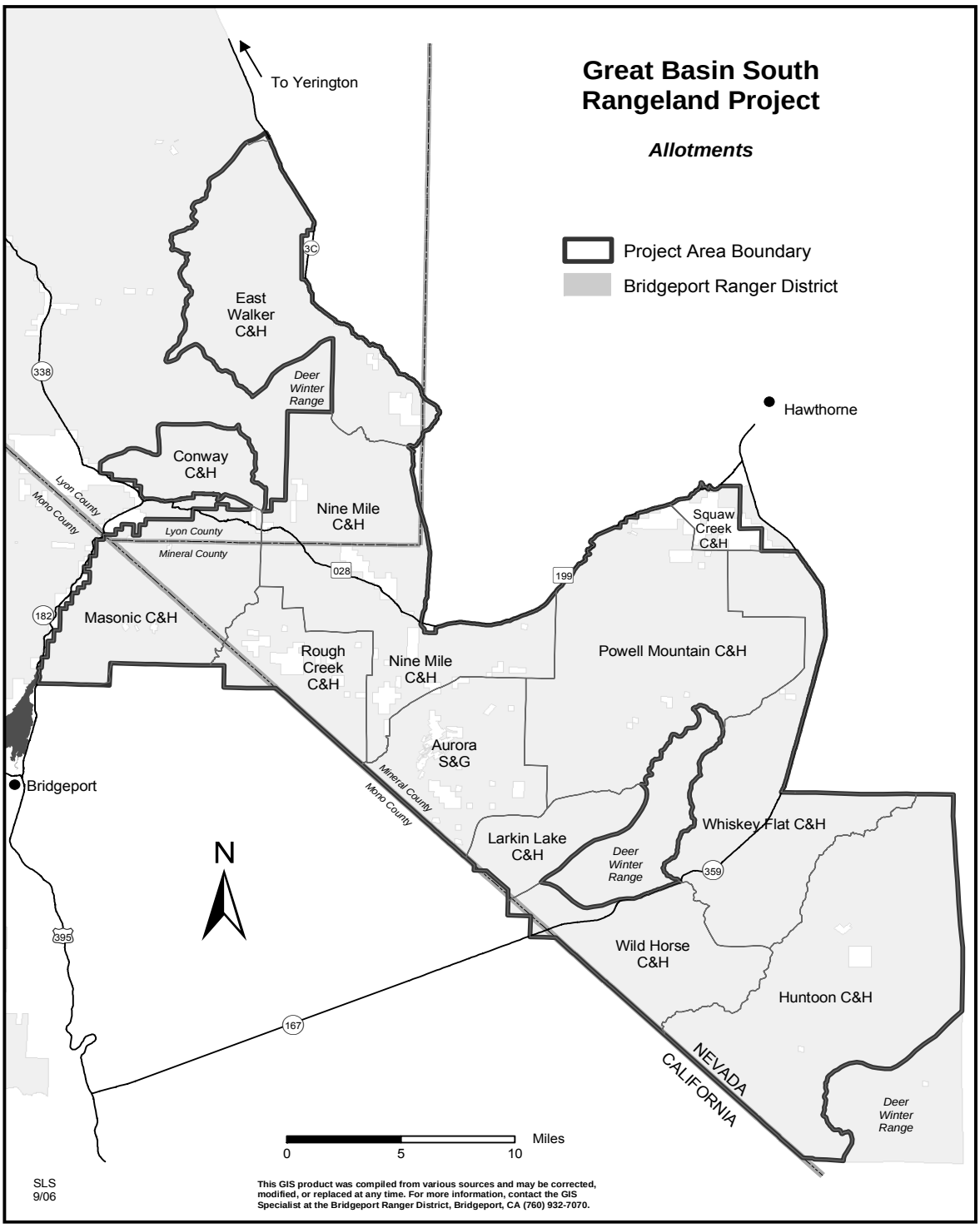
The **Whiskey Flat** and **East Walker** Allotments would be authorized for grazing on a four year rotation with two years dormant-season use and two years early- season use (Proposed Seasons of Use Table).

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.

The **Huntoon** Allotment would be authorized for grazing on the foothills and upper elevations only. No grazing would be authorized in Huntoon Valley (See Huntoon Allotment Proposed Action Map). This proposal was based in part on the capability and suitability analysis described in Appendix 2.

Figure 1: Huntoon Valley - note sparse vegetation

Endpoint indicators for all allotments except for **Rough Creek** and the southern part of **Masonic** would be 45 percent utilization on upland herbaceous species and 40 percent on shrub species. The endpoint indicators for riparian areas would continue to be 20 percent on shrubs and 45 percent for herbaceous species. Livestock would be moved to the next pasture or removed from an allotment once any of the endpoint indicators are reached.


Great Basin South Rangeland Project
Allotments
Project Area Boundary
Bridgeport Ranger District
To Yerington
East Walker C&H
Deer Winter Range
Conway C&H
Nine Mile C&H
Lyon County
Mono County
Mineral County
Hawthorne
Squaw Creek C&H
Masonic C&H
Rough Creek C&H
Powell Mountain C&H
Aurora S&G
Bridgeport
Larkin Lake C&H
Whiskey Flat C&H
Wild Horse C&H
Huntoon C&H
NEVADA
CALIFORNIA
N
Miles
0
5
10
SLS
9/06
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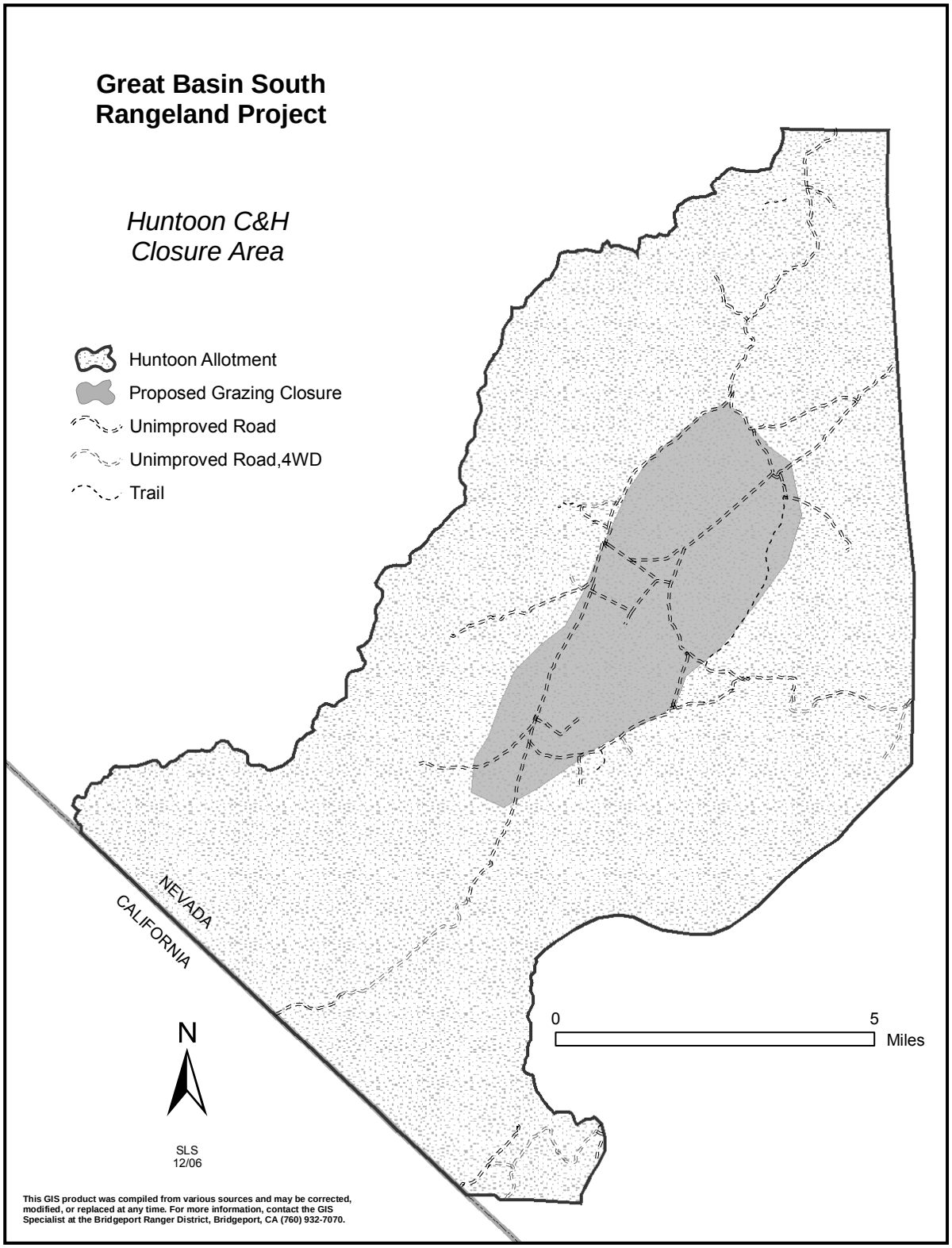
Proposed seasons of use on these allotments are in the following table.

Proposed Season of Use Table	
Allotment Name	**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
Nine Mile	Oct-Nov
Powell Mountain	April-Oct
Rough Creek	Jun-Oct
Squaw Creek	No Use
Wild Horse	Dec-May
Whiskey Flat	Nov-Apr


Great Basin South
Rangeland Project
Huntoon C&H
Closure Area
Huntoon Allotment
Proposed Grazing Closure
Unimproved Road
Unimproved Road,4WD
Trail
NEVADA
CALIFORNIA
N
0
5
Miles
SLS
12/06
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.

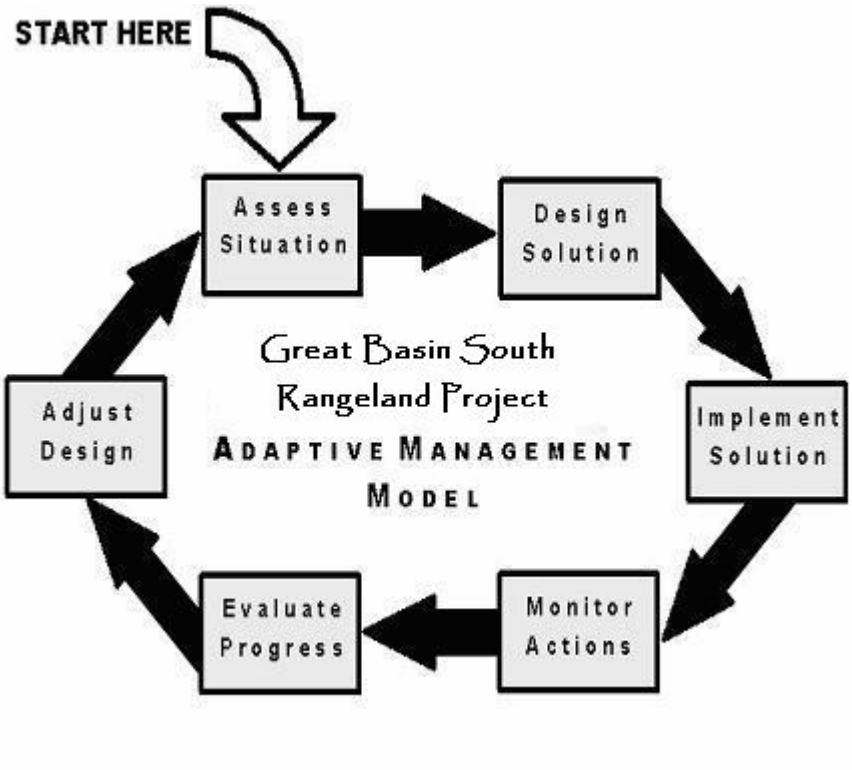
Proposed design features to protect important resources would be:

- 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 will be surveyed for denning areas. If dens are found, no new livestock concentration activities would occur in their vicinity.
- Precipitation data would be analyzed prior to the beginning of the grazing season in order to determine drought status. If drought conditions exist, adjustments might be made to numbers of animals or length of time on the allotments.
- The amount of browsing on aspen by livestock would be limited to 20 percent or less. Maximum utilization limit on herbaceous vegetation within the aspen stands would be limited to a range of zero to 45 percent based upon functioning condition. The aspen stands located in the **Masonic** Allotment would have utilization standards based upon the Matrices (See Appendix One). Occasional rest may also be prescribed, depending on condition and location of the aspen stand. The aspen stands located in the **Ninemile**, **Aurora**, and **Powell Mountain** Allotments would have periods of rest written into the equation as well as limits on the amount of browsing and herbaceous utilization.

Any of these design features that would result in ground disturbing activities would be subject to a subsequent environmental review.

Adaptive management and monitoring

The Proposed Action incorporates an adaptive management process that would guide livestock management. This adaptive management process provides land managers and permittees the ability to adjust management based on monitoring results. The process is based on a six step cycle that requires managers and permittees to work through all six steps, identified in the figure below:



Allotment Management Plan Development

Allotment Management Plans (AMP's) would be developed over time for all allotments. The AMPs would include site-specific desired conditions, objectives, and strategies to meet or move existing conditions towards these desired conditions. Annual operating instructions would be used to implement the grazing strategies. This would include annual use indicators and seasonal grazing triggers.

Inventory/Assessment

To develop an AMP, the process begins with assessing the existing and desired condition of specific areas on the allotments.

Inventories would be completed in vegetation communities in each allotment. The number and location of these inventories would be based on site-specific conditions in each allotment. The conditions would 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 this project area, vegetation community information has been gathered and was used in developing the proposed action. The proposed action also sets up monitoring which would be used to assess progress towards desired conditions. Additional data may be collected, as needed.

Key areas would be established in areas that are most likely to be affected by livestock grazing. Monitoring data from these areas would be used to evaluate current conditions, validate desired conditions, and determine triggers or annual use indicators most effective in reaching those desired conditions.

Grazing strategies and annual use indicators

Based on the desired conditions and inventory results, within-season triggers, endpoint indicators, and other management strategies would be identified and used in development of the AMP. Determining the annual use indicators and strategies that would be used to achieve the desired conditions would be a coordinated effort with permittees and any other interested parties. The line officer may modify these 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.

Long term trend studies

Long-term trend monitoring sites would be established in key areas to allow assessment of progress towards the desired condition. Trend studies would be developed to best measure change for each area of concern. These studies would address objectives for reaching desired conditions. The studies are an important part of the AMP's to be developed under the Proposed Action. Over an extended period of time, the conditions on the allotments would be resurveyed using long-term trend data, as appropriate.

Annual implementation

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

Evaluate progress

This adaptive management strategy would allow flexibility during implementation to make adjustments due to changing conditions or results from the long- and short-term monitoring. Discussions between the Forest Service and the grazing permittee would 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.

Monitoring Plan

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.

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.

A long-term trend monitoring schedule would be established and incorporated into each AMP. Sage grouse brood-rearing meadows on National Forest System lands would be monitored in this schedule as well.

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

An alternative that would establish long-term monitoring and adaptive management, but make no short-term adjustments in seasons-of-use was considered, but eliminated from detailed study. This alternative was dropped because sufficient information is available to show the need for the adjustments in the Proposed Action.

Comparison of Alternatives

The comparison of alternatives draws together the conclusions from the information and discussion presented for the issues throughout this DEIS 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.

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 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 EIS.

Livestock Grazing

Affected Environment

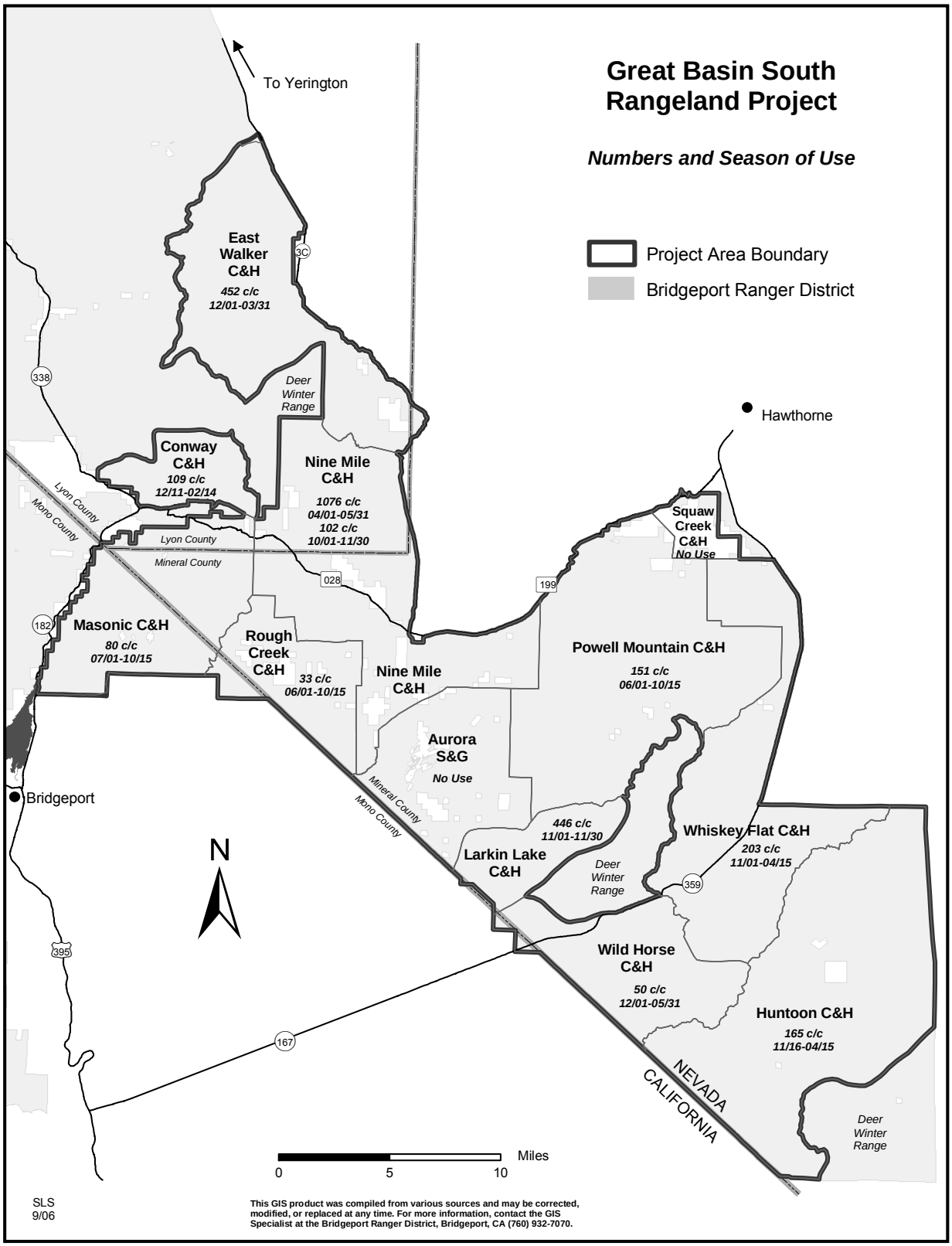
Ranchers historically used National Forest System land for cattle and sheep grazing during the summer months and

moved their stock to the home ranch or other public lands for winter feeding. 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 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). The Nine Mile and Whiskey Flat allotments both contain public lands under the jurisdiction of the Bureau of Land Management (BLM) that are administered by the Forest Service.

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. 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.

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


Great Basin South Rangeland Project
Numbers and Season of Use
Project Area Boundary
Bridgeport Ranger District
To Yerington
East Walker C&H
452 c/c
12/01-03/31
Deer Winter Range
Conway C&H
109 c/c
12/11-02/14
Nine Mile C&H
1076 c/c
04/01-05/31
102 c/c
10/01-11/30
Lyon County
Mono County
Lyon County
Mineral County
Hawthorne
Squaw Creek C&H
No Use
Masonic C&H
80 c/c
07/01-10/15
Rough Creek C&H
33 c/c
06/01-10/15
Nine Mile C&H
Powell Mountain C&H
151 c/c
06/01-10/15
Aurora S&G
No Use
Bridgeport
Mineral County
Mono County
446 c/c
11/01-11/30
Larkin Lake C&H
Deer Winter Range
Whiskey Flat C&H
203 c/c
11/01-04/15
N
Wild Horse C&H
50 c/c
12/01-05/31
Huntoon C&H
165 c/c
11/16-04/15
NEVADA
CALIFORNIA
Deer Winter Range
Miles
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SLS
9/06
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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.

Many techniques are available for developing and implementing an appropriate prescription for any given ecosystem. The only required ingredients are a serious commitment and personal involvement on the part of the livestock operators and land managers. The manager is often more important than the particular approach (Ehrhardt 1998, Clary and Webster 1989).

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. Timing or numbers of livestock may need to change in order to develop an upward trend toward meeting the desired conditions.

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. Ranchers that use allotments during the plant-growing season, may experience a large impact to their operations. 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 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 from the 1960’s was used to fill in this information. No vegetation data was available for a very limited portion of the project area. 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, which lies within Mineral and Lyon Counties, Nevada, and Mono County, California.

Vegetation Type Table		
Vegetation Type	**% of project area**	**Acres**
Aspen	<1.0	280
Meadow	<1.0	250
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	189,000
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 280 acres which is less than one percent of the area. Aspen is located on the Masonic, Ninemile, 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)

The community type aspen/sweet cicely has been noted on the Masonic allotment. Understory of this type is dominated by roundleaf snowberry, Sierran tansy mustard, twincrest onion, and nodding brome. The dominance of these plant species in an aspen community indicates low ecological status or functioning at risk, according to the attributes in the aspen matrices in Appendix One.

The community type aspen/dandelion has been noted on the Masonic allotment. Understory of this type is dominated by Booth willow, white-stemmed gooseberry, western yarrow, bigleaf avens, Nebraska sedge, smallwing sedge, and Kentucky bluegrass. The dominance of these plant species in an aspen community indicates moderate ecological status or functioning at risk, according to the attributes in the aspen matrices (Appendix One).

Currently aspen types are managed similarly to riparian communities. Riparian herbaceous utilization is limited to 65 percent or lower. Eight allotments are managed at 45 percent and the remaining two allotments are managed at 55 percent and 65 percent respectively, with the remaining two allotments being vacant. Riparian shrub utilization is limited to 35 percent or less. Eight allotments are managed at 20 percent and the remaining two allotments are managed at 25 percent and 35 percent respectively, with the remaining two allotments being vacant.

Current Riparian Utilization Table

Allotment Name	Riparian Grass Utilization	Riparian Shrub Utilization
Aurora	No Use	No Use
Conway	55%	25%
East Walker	45%	20%
Huntoon	45%	20%
Larkin Lake	45%	20%
Masonic	45%	20%
Nine Mile	45%	20%
Powell Mountain	45%	20%
Rough Creek	45%	20%
Squaw Creek	No Use	No Use

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).

Heavy 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.

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.

Smaller stands, less than five acres in size, tend to be the most heavily impacted. The majority of the aspen stands in the project area are less than five acres in size, therefore impacts from domestic livestock grazing can be very distinct within the project area.

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

No Action

By continuing the use of current utilization levels on the shrub (25-35%) and understory vegetation (45-65%), browsing on seedling and saplings of aspen may result. Grazing of young trees at this level can impact the tree to the point where the tree's growth may be stunted or to the point where it can not grow back. This can cause reduced 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, 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.

On a cumulative basis, aspen stands are popular areas for dispersed camping. Uses associated with recreation can be detrimental to an aspen stand by damaging vegetation through creation of roads and parking areas, trampling seedling and sapling trees, and carving and cutting of trees. These impacts would likely be reduced over time due to implementation of sustainable motor vehicle management by the Forest Service route designation project. Wild horses present in the project area should not affect the aspen stands because utilization level of herbaceous and woody species is predetermined. When that use level is met, the domestic livestock move to the next pasture or off of the allotment.

Proposed Action

This alternative would limit the amount of browsing on aspen by livestock to 20 percent or less. Maximum utilization limit on herbaceous vegetation within the aspen stands would be limited to a range of zero to 45 percent based upon functioning condition. The aspen stands located in the Masonic allotment would have utilization standards based upon the Matrices. Occasional rest may also be implemented, depending on condition and location of the aspen stand.

For aspen stands located in the Ninemile, Aurora, and Powell Mountain allotments, the Proposed Action would prescribe periods of rest as well as limits on amounts of browsing and herbaceous utilization. These provisions should allow for aspen regeneration to maintain stands at a desired functioning level. Those stands that are currently not functioning should move toward functioning as desired. 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.

On a cumulative basis, aspen stands are popular areas for dispersed camping. Uses associated with recreation can be detrimental to an aspen stand by damaging vegetation through creation of roads and parking areas, trampling seedling and sapling trees, and carving and cutting of trees. These impacts would likely be reduced over time due to implementation of sustainable motor vehicle management by the Forest Service route designation project. Wild horses present in the project area should not affect the aspen stands because utilization level of herbaceous and woody species is predetermined. When that use level is met, the domestic livestock move to the next pasture or off of the allotment.

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 would be in a different steady state than previously identified.

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.

On a cumulative basis, there are no effects anticipated because livestock grazing would not occur.

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 250 acres, which is less than one 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.

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.

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, less than one percent of the total project area.

Under optimal conditions these meadows should be occupied by species such as Sandberg's bluegrass, slender wheatgrass, Great Basin wildrye, tufted hairgrass, oatgrass, and Douglas sedge. 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).

Forb and shrub species that are present in dry to moist meadows which have been altered due to management include Kentucky bluegrass, redtop, dandelion, Western yarrow, aster, and wild iris.

A dry meadow, Kentucky bluegrass site on the Masonic allotment, is rated as high ecological status 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. 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. 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. 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. 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).

Environmental Consequences

The effects of livestock grazing on meadows vary depending on the intensity of grazing more than on the timing and duration of grazing. Excessive grazing, especially season-long, would weaken the desirable fibrous heavy-rooted grasses and grass-like species. Under heavy 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 severe 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. In addition, various forbs increase cover under heavy cattle grazing. 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 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.

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, environment. 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.

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, light to moderate grazing 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 current maximum allowable utilization levels listed below, along with other environmental factors, have contributed to the existing condition. The physical conditions of the riparian areas would remain relatively unchanged throughout the project area.

Riparian shrub utilization is limited to 35 percent or less. Eight allotments are managed at a maximum utilization of 20 percent and the remaining two allotments are managed at maximum utilization levels of 25 percent and 35 percent respectively, with two allotments vacant.

Current riparian herbaceous utilization is 65 percent or lower. Eight allotments are managed at 45 percent. The remaining two allotments are managed at 55 percent and 65 percent respectively, and two allotments are vacant.

No Action Riparian Utilization Table

Allotment Name	Riparian Grass Utilization	Riparian Shrub Utilization
Aurora	No use	No use
Conway	55%	25%
East Walker	45%	20%
Huntoon	45%	20%
Larkin Lake	45%	20%
Masonic	45%	20%
Nine Mile	45%	20%
Powell Mountain	45%	20%
Rough Creek	45%	20%
Squaw Creek	No use	No use
Wild Horse	45%	20%
Whiskey Flat	65%	35%

Meadow systems that are functioning as desired 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. The two allotments that have greater than 20 percent utilization on the riparian shrubs and greater than 45 percent utilization on riparian vegetation would be expected to remain static. Browsing on seedling willows may result. Willow

stands may become hedged and take on a mushroom like shape. When meadow areas are grazed at levels near 60-65 percent, bare ground becomes evident. Increased bare ground can aid in the establishment of invasive weeds.

Riparian areas that are currently not meeting desired function or are non-functioning (have crossed below threshold) are more susceptible to disturbance events. 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 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.

On a cumulative basis, wild horses present in the project area could affect the meadows; however it is unlikely because utilization levels of herbaceous and woody species are predetermined. When the use level is met, the domestic livestock move to the next pasture or off of the allotment.

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 lowering utilization standards, livestock would likely be spending less time in riparian areas and progress would be made toward desired condition.

In meadow systems that are functioning as desired, maximum utilization levels would be 45 percent at the end of the grazing season. Areas that already have structural range improvements in place, such as the Masonic allotment would be used to 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. 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.

For meadow systems that are functioning at risk or have crossed below the threshold, utilization levels would be less than 35 percent. 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 functioning at risk with a downward trend. Meadow systems functioning at risk with an upward trend would be allowed higher utilization levels than a system functioning at risk with a downward trend rating.

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 should begin a slow recovery with reduced utilization levels and prescriptive rest.

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 45 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. 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. Consequently, changes may never be noted or 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.

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.

On a cumulative basis, wild horses present in the project area should not affect the meadows because utilization level of herbaceous and woody species is predetermined. When that use level is met, the domestic livestock move to the next pasture or off of the allotment.

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. Recovery would be in a different steady state than previously identified. 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. It may not be ecologically or economically feasible to restore meadow areas that have crossed below threshold.

Consequently, changes may never be noted or 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.

On a cumulative basis, there are no effects anticipated because livestock grazing would not occur.

Issue 2: 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 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 one of 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. 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. 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 (Vavra et al, 1999). This trend can be observed throughout the project area.

Basin Big Sagebrush

Basin big sagebrush 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 2300 acres, less than one percent of the project area.

The plant community is dominated by basin big sagebrush, with an understory of Great Basin wildrye, Indian ricegrass, Thuber's needlegrass, needle and thread, squirreltail, and some antelope bitterbrush. As ecological condition declines, black greasewood, basin big sagebrush, and inland saltgrass 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 can also become dominant. Species most likely to invade this site are

annuals (USDA Natural Resource Conservation Service, rev 1992, rev 2000).

Currently there are no rapid assessment data to apply to the matrices in Appendix one to evaluate current condition. Field observations have noted that the basin big sagebrush communities are in similar condition to the Wyoming big sagebrush communities. 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 26,500 acres, five percent of the project area.

This plant community is dominated by needlegrasses, mountain big sagebrush and antelope bitterbrush. As ecological condition declines, mountain big sagebrush, snowberry, currant, and rabbitbrush would increase as needlegrasses decrease. Species most likely to invade this site are cheatgrass, mustards, and other annual forbs. Singleleaf pinyon and Utah juniper 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.

A rapid assessment plot on the Aurora allotment west of Mount Hicks does not function as desired (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),

A rapid 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),

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 One.

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 200 acres, less than one percent of the project area.

The plant community is dominated by silver sagebrush, Nevada bluegrass, Letterman or California needlegrass, mat muhly, and creeping wildrye. When livestock overuses the site, needlegrasses, western wheatgrass, and forbs decline while mat muhly and silver sagebrush increase. Lupine 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).

Field observations have noted that the basin big sagebrush communities are in similar condition to the mountain big sagebrush communities. Indicators for this type are percent bare ground and species composition.

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 144,500 acres or 31 percent of the project area.

The plant community is dominated by needlegrasses, bluegrasses, Wyoming big sagebrush, low sagebrush, antelope bitterbrush, green ephedra, spiny hopsage, Indian ricegrass, prairie junegrass, and bottlebrush squirreltail. When livestock and wild horses overuse this vegetation type, big sagebrush, low sagebrush, currant, Anderson peachbrush, spiny hopsage, littleleaf horsebrush, 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, filaree, pinyon/juniper, and other annual forbs. Singleleaf pinyon and Utah juniper would invade this site where it occurs adjacent to these woodlands. 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).

A rapid assessment plot on the Conway allotment north of the East Walker River does not function as desired. Bare ground is 65 percent (greater than 50 percent has crossed below a threshold) and there was zero percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment plot on the Larkin Lake allotment in Alkali Valley does not function as desired. Bare ground is 85 percent and there was seven percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment plot on the Nine Mile allotment in Nine Mile Flat does not function as desired. Bare ground is 74 percent and there was zero percent

cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment plot on the Powell Mountain allotment near Alkali Lake does not function as desired. Bare ground is 48 percent and there was eight percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment plot on the Powell Mountain allotment in Upper Powell Flat does not function as desired. Bare ground is 57 percent and there was six percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment plot on the Whiskey Flat allotment in Little Whiskey Flat does not function as desired. Bare ground is 79 percent and there was one percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment plot on the Whiskey Flat allotment in Whiskey Flat does not function as desired. Bare ground is 60 percent and there was one percent cover of the grasses, forbs, and shrubs that indicate management problems (USDA Forest Service, 2004),

A rapid assessment black sage plot on the East Walker allotment near Twin Springs functions as desired. Bare ground is 14 percent, 62 percent rock, (less than 60 percent is functioning) and there was zero percent cover of the grasses, forbs, and shrubs that indicate management problems (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 grasses, especially cool-season species, and forb reductions within the Wyoming sagebrush communities that are grazed during the 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.

Figure 2: Salt desert shrub lands

A rapid 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),

A rapid 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 grasses, 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 and ephedra are other important shrubs in the understory community. Needlegrasses, Indian ricegrass, muttongrass, 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).

Figure 3: Pinyon juniper woodland near Mt. Hicks in the Aurora Allotment

Field observations have noted that the Basin big sagebrush communities are in similar condition to the Wyoming big sagebrush communities. Indicators for this type are percent bare ground and species composition.

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

Livestock grazing can cause alteration of species composition, ecosystem function, and ecosystem structure (Fleischner 1994; Huntly 1991). Unmanaged or improperly managed grazing can be detrimental to vegetation communities. 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. 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).

Figure 4: Active wind erosion on damaged cryptogamic crusts in Huntoon Valley

Over time, if desired plants are weakened through repeated heavy 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 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 (Vavra et al. 1999).

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 grazing management may not restore them to some previous condition (Vavra, et al. 1999).

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 about 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.

Maximum Allowable Utilization Level Table

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%

Under this alternative, condition of upland vegetation would remain the same in those areas with a 40 percent utilization level and may deteriorate in areas used at utilization levels higher than 40 percent on an annual basis. Particularly in areas where historical heavy grazing has impacted the condition of the vegetative communities, the transition to a desired condition would be slow or possibly may not move toward the desired condition. Effects of past heavy grazing use remain today, and have contributed to grasses, especially cool-season species, and forb reductions within many parts of the project area (USDA Forest Service, 2006; USDA Forest Service, 2004).

Steeper slopes and increased distance to water usually result in less livestock use. Utilization levels are almost always reached first in 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 possibly 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.

On a cumulative basis, wild horses present in the project area can affect the upland vegetation conditions if they are in the area after the livestock have been removed. They could then utilize all of 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. Allowable use levels would be met sooner and when that use level is met, the domestic livestock would move to the next pasture or off of the allotment.

Proposed Action

Moderate grazing use of 40-45 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 past heavy grazing 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.

The seed bank for cool-season grasses and forbs has not been lost at this point. 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. 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.

Figure 5: Upland sagebrush community, Wildhorse Allotment

Upland shrub utilization would be limited to 20 percent or less. Upland herbaceous utilization would be limited to 45 percent, regardless of functioning condition in some areas; in other areas the matrices would be applied. By allowing 45 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 will have rest incorporated into the system so that not

every acre is grazed at the same time every year or grazed every year.

Proposed maximum utilization, for the most part, is less than the current utilization levels, resulting in a minimal overall forage utilization reduction. A decrease in forage utilization would likely help increase plant vigor and root biomass. The areas where forage utilization is decreased would likely recover to a desired function, while continuing to be grazed. 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 functioning 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 Huntoon Valley, removal of livestock would result in improved plant vigor and root biomass. However, due to the limited rainfall, poor 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 functioning at risk or have crossed the threshold; it may be slower than the no grazing alternative, but should be faster than continuing current management.

On a cumulative basis, wild horses can affect the upland vegetation conditions if they are in the area after the livestock have been removed. They could then utilize all of 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. Allowable use levels would be met sooner and when that use level is met, the domestic livestock would move to the next pasture or off of the allotment.

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. Recovery would be in a different steady state than previously identified. 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. It may not be ecologically or economically feasible to restore meadow areas that have crossed below threshold. Consequently, changes may never be noted or 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.

On a cumulative basis, there are no effects anticipated because livestock grazing would not occur.

Issue Three: Sage Grouse

Affected Environment

Sage grouse breeding, nesting and brood-rearing habitats occur throughout the project 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 (Sage Grouse Habitat Map). Lek and nesting areas are critical components of sage grouse habitat. The nesting areas generally occur within two miles of the leks.

Sage grouse population numbers for the analysis area are between 200-280 birds. Lek attendance monitoring in this area began in 1969; however, monitoring has been irregular over the years. 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, although collected sporadically and with possibly low effort, 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 private property riparian areas southeast of the Aurora Mine on the Aurora allotment (Nevada Department of Wildlife, 2004).

Late brood and fall-use habitat in Nevada has low-growing sagebrush and Wyoming big sagebrush. 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.

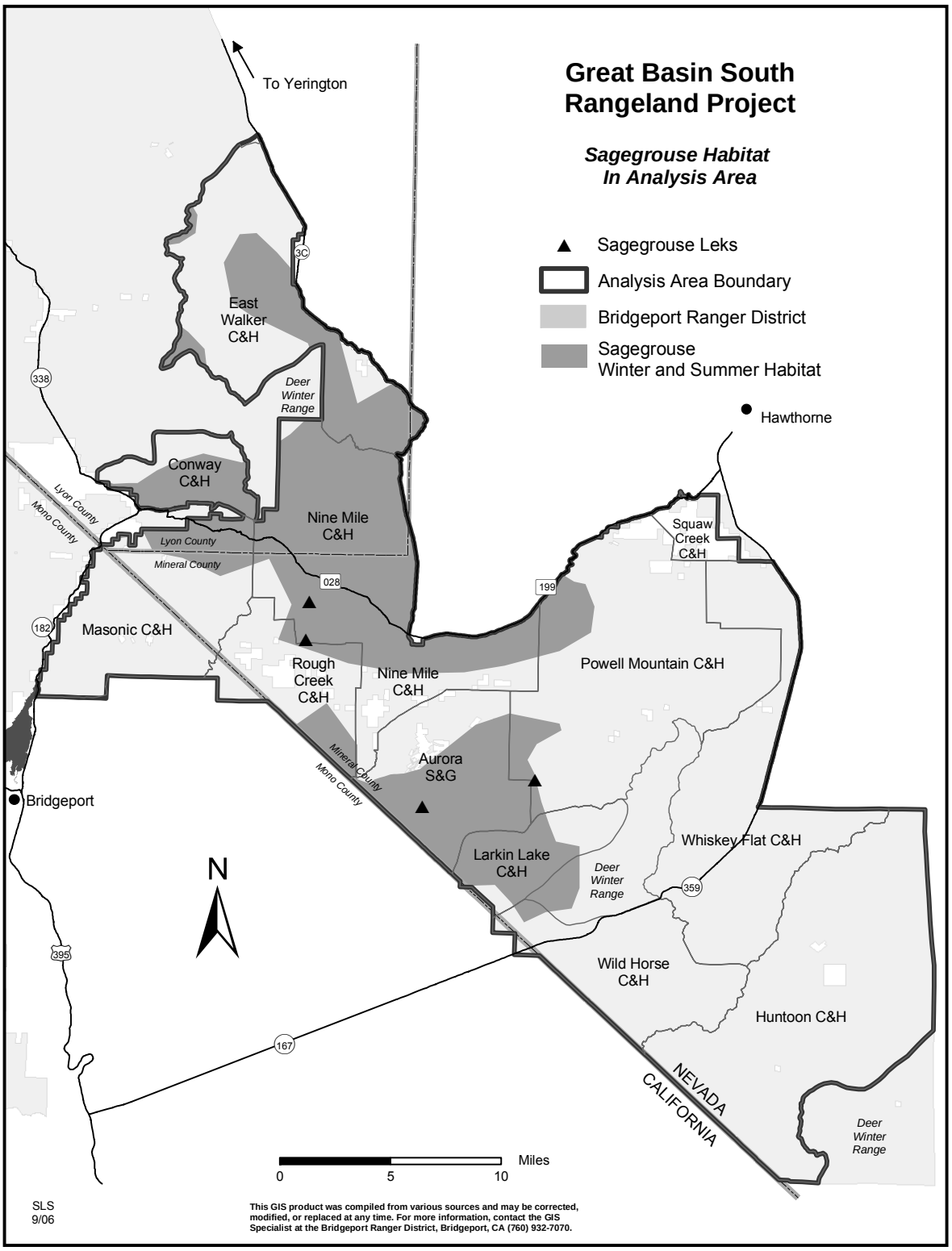
A combined summer/winter habitat range has been identified by the Nevada Department of Wildlife. It accounts for 26 percent of the analysis area, and includes several sagebrush communities: Wyoming big sagebrush/low sagebrush, mountain big sagebrush, and basin big sagebrush (Sage Grouse Habitat Map). All sagebrushes 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 based on monitoring from 2004. 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.

Current Condition Table			
Allotment Name	Status	Bare Ground	Sagebrush Canopy Cover
Aurora	Does Not Function as Desired	28%	33%
	Functions as Desired	48%	18%
Nine Mile	Does Not Function as Desired	74%	8%
Powell	Does Not	48%	11%

Current Condition Table			
Allotment Name	Status	Bare Ground	Sagebrush Canopy Cover
Mountain	Function as Desired		
	Does Not Function as Desired	57%	6%

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 in Chapter Two. 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.


Great Basin South
Rangeland Project
Sagegrouse Habitat
In Analysis Area
Sagegrouse Leks
Analysis Area Boundary
Bridgeport Ranger District
Sagegrouse
Winter and Summer Habitat
To Yerington
Hawthorne
Bridgeport
East
Walker
C&H
Deer
Winter
Range
Conway
C&H
Nine Mile
C&H
Lyon County
Mono County
Lyon County
Mineral County
Masonic C&H
Rough
Creek
C&H
Nine Mile
C&H
Squaw
Creek
C&H
Powell Mountain C&H
Aurora
S&G
Mineral County
Mono County
Larkin Lake
C&H
Deer
Winter
Range
Whiskey Flat C&H
Wild Horse
C&H
Huntoon C&H
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Environmental Consequences

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. Livestock have been known to destroy or damage sage grouse nests (Beck and Mitchell, 2000). 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.

Under this alternative, livestock grazing in the uplands may have a continued effect on sage grouse nesting habitat. 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 limited within the project area, although the allotments are grazed during this time of year. 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. On a cumulative basis, mining and motor vehicle activities can reduce the available nesting habitat for sage grouse. In addition, fences can be used as perches for predator species such as raptors and ravens, which can affect nesting sage grouse.

Proposed Action

Under the proposed action, livestock grazing would be affecting nesting, early- and late-brood and wintering sage grouse habitat. Livestock use has the potential to damage or destroy sage grouse nests and can also affect the quality and quantity of nesting and brood-rearing habitat within riparian areas, wet meadows and springs.

Under the proposed action, livestock grazing in the uplands may have a continued effect on sage grouse nesting habitat. 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). Incorporating rest would allow for understory grass cover to be maintained within sage grouse nesting habitat. Meadows critical for sage grouse brood rearing that are not functioning as desired would not be grazed from May 15 to July 30. 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.

Wintering habitat for sage grouse is also limited within the analysis area, although the 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 from October to February; reducing the impacts to sage grouse winter range.

On cumulative basis, mining, recreation, and fencing can adversely affect sage grouse populations. Mining activities, road construction, exploration activities, and pit development can cause a negative effect on sage grouse using the area. Current mining activities have been concentrated in the Borealis area. Recreation use is limited due to the absence of designated campsites within the analysis area. Motor vehicle use is common in the Aurora area. Surprise encounters cause sage grouse to flee secure types of areas, thereby increasing their vulnerability. Fences may pose a threat to sage grouse populations, although it is limited. 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. Fences also can be used as perches for predator species such as raptors and ravens.

No Grazing

Under the no grazing alternative, livestock grazing would be completely removed from the analysis area. Riparian meadow habitats would recover at the fastest pace 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 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.

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.

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.

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.

Erosion Hazard Table

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. 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. 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.

Elimination of livestock grazing in Huntoon Valley would reduce wind erosion over tine 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. 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.

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.

Other Resource Concerns

Invasive Weeds

Affected Environment

Invasive weeds are very limited within the project area. There is one known population of perennial pepperweed 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, 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.

One other weed that is not identified as invasive on the Nevada Department of Agriculture list, bull thistle, 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 a known vector 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. 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

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.

On a cumulative basis there are populations of several weedy species on National Forest System lands on the property commonly known as Rosaschi Ranch. This land is along the East Walker River, upstream from where the river flows through the project area. This area has the potential to be a source for potential seed spread into the project area. The No Action alternative does not project an increase in overall

resource condition; there is a greater risk of weedy species establishment in the project area. Under this alternative, invasive species numbers would be expected to increase or remain static.

Proposed Action

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.

On a cumulative basis, there are populations of several weedy species on National Forest System lands on the property commonly known as Rosaschi Ranch. This land is along the East Walker River, upstream from where the river flows through the project area. This area has the potential to be a source for potential seed spread into the project area. The Proposed Action alternative projects an increase in resource conditions where they are not functioning as desired and would maintain resource conditions as functioning where they already are; risk of weedy species establishment in the project area would be lower. Under this alternative, invasive species numbers would be expected to remain static.

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.

On a cumulative basis, invasive weeds can be affected by wildlife, wild horses, and recreation. Seeds can become attached to fur/hair of wildlife 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. Recreation can affect invasive species; people, motorized vehicles, and domesticated horses can spread seeds in the same manner as wildlife.

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.

Bodie Hills rockcress is found in dry, open, rocky, high or north-facing slopes. In these areas it prefers small damp areas in sagebrush types.

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. However, salting practices and sheep bedding areas are unknown and could impact this species if they were in occupied habitat.

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.

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 *Phlox longiloba* as associated plant species. The population trend for this species is unknown.

Threats to the species are poorly understood. 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 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.

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).

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.

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 (Moorefield 2005). 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. 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. 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.

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. It occurs less frequently in naturally eroding badland features or undisturbed soils. 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, 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.

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.

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. 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. 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.

Alkali tansy-sage (*Sphaeromeria potentilloides var. nitrophila*)

Alkali tansy-sage has been identified as a watchlist species by the California Native Plant Society. It is an uncommon species documented from the Sierra Nevada east slope highlands in California, and Elko, White Pine, Eureka, Lander, Nye, Mineral and Esmeralda counties in Nevada. A disjunct occurrence is documented on the Snake River Plains in Elmore and Camas counties in Idaho. Alkali tansy-sage is a perennial, highly aromatic herb in the composite family. The plant grows from two to 12 inches tall with distinctive silky herbage.

Within the Great Basin South analysis area, Alkali tansy-sage is found in the Masonic allotment. It occurs in association with distinctly alkaline meadow, seep or playa habitats. Livestock grazing and off-road vehicle impacts to plants and within occupied habitat have been documented. Population trend is unknown for this species.

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.

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).

Sagebrush Habitats

No Action

Effects to these eight rare plant species: Bodie Hill rockcress, Bodie Hills draba, Lavin's egg vetch, Masonic Mountain jewel flower, Long Valley milkvetch, Mono phacelia, Mono buckwheat, and Nevada suncup, from livestock grazing would continue to occur at current utilization levels to both individual plants and the habitat as a result of impacts related to trampling, soil compaction, and habitat conversion.

In general, the impacts to species in sagebrush habitats from herbivory are low as a result of the sparse vegetation in the rare plant habitat. In these areas the dominant impact to the species is from trampling and the indirect impacts associated with conversion of habitat that can be a result of soil compaction and introduction of invasive species.

Proposed Action

Under the Proposed Action, impacts to Bodie Hills rockcress, Bodie Hills draba, Lavin's egg vetch, Masonic Mountain jewel flower, Long Valley milkvetch, Mono phacelia, Mono buckwheat, and Nevada suncup would be reduced compared to current management,

given that use would be lowered and rest would be incorporated into livestock management. These differences are likely to benefit the rare plant species compared to current management. Activities that gather cattle together would not occur within 0.25 miles of any known site for sensitive species or rare species habitat. In general, congregating activities such as supplement placement and water troughs should not occur in meadows, seeps, springs, fens, bogs, riparian areas, aspen, or cottonwood. Volcanic outcrops or hills that lack dense vegetation and have shallow soils should also be avoided, as should ridgelines usually with low and black sagebrush, as per the 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. The long-term benefits of no grazing within the analysis area would improve the viability of the habitat for rare and sensitive plant species.

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. The current management utilization levels may cause these habitats to decline. Grazing on individual plants or trampling prior to maturation and release of spores limits the sexual reproduction of these species.

Proposed Action

Activities congregating livestock, such as the placement of water developments, would be reduced in rare plant habitats. Use would be reduced and rest would be increased compared to current management. Livestock grazing would be managed to achieve a desired condition that would provide for these species.

Only dispersed grazing activity would occur in and near known populations of sensitive plant species in wet and moist meadow habitats. 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 should not occur in these habitats.

Livestock grazing would affect the potential and occupied habitats of the moonwort species, however, the effects would be less than under current management. Potential and occupied habitat would improve, allowing for the continued viability of the species. Soil compaction and bare ground are likely to decrease compared to the No Action alternative.

No Grazing

Effects of domestic livestock grazing on moonworts would be eliminated and the direct and indirect impacts for livestock grazing would not occur. This should allow potential and occupied habitats that are functioning as desired to continue in existing condition or improve. Potential and occupied habitats that are not functioning as desired or have crossed a threshold

should begin to recover faster than under the Proposed Action.

Soil compaction and bare ground from livestock grazing would be eliminated compared to current management and the Proposed Action. However, some habitats have declined (such as from a moist to a dry meadow) and would not recover after the removal of livestock alone. The riparian and aspen community types would maintain or improve if they are functioning as desired.

Ephemeral Lake Habitats

No Action

Under current management, livestock grazing would continue to affect the potential habitat of ephemeral lake dependant species such as William's combleaf and Alkali tansy-sage at the current level. Direct and indirect effects from livestock grazing include trampling and habitat modification, by the introduction of noxious weeds or other invasive species.

Proposed Action

Activities congregating livestock, such as the placement of water developments, would be reduced in rare plant habitat. Use would be reduced and rest would be increased compared to current management. 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 should not occur in these habitats. Livestock grazing would not occur during the March to July growing season for William's combleaf. This would allow for the continuation of this species within occupied habitat.

No Grazing

This alternative would provide the greatest protection for sensitive and rare plant habitat for the long-term viability of these rare populations. The long-term benefits of no grazing within the analysis area would improve the viability of the habitats for rare and sensitive plant species.

Pinyon/Juniper Habitats

No Action

Effects to rare plants located within the pinyon/juniper habitats under current management include impacts related to trampling, soil compaction, and habitat conversion. In general, the impacts to species in the pinyon/juniper habitats resulting from herbivory are low as a result of the sparse vegetation found within the pinyon/juniper stands. Typically, livestock activities within the pinyon/juniper habitats include trailing through or resting. With these activities the dominant impact to the species is from trampling and the indirect impacts associated with conversion of habitat that can be a result of soil compaction and introduction of invasive species.

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. Activities that gather cattle together would not occur within 0.25 miles of any known site for sensitive species or rare species habitat. These differences are likely to benefit the rare plant species compared to the No Action alternative.

No Grazing

This alternative would provide the greatest protection for sensitive and rare

plant habitat for the long-term viability of these rare populations. The long-term benefits of no grazing within the analysis area would improve the viability of the habitats for rare and sensitive plant species.

Cumulative Effects

Cumulative effects include motor vehicle use, road-maintenance, wild horses, and mineral exploration. Currently the Bridgeport Ranger District is working on a Travel Management/Route Designation plan which would designate travel routes within the analysis area and would address impacts to sensitive and rare plant habitats from motor vehicle activities.

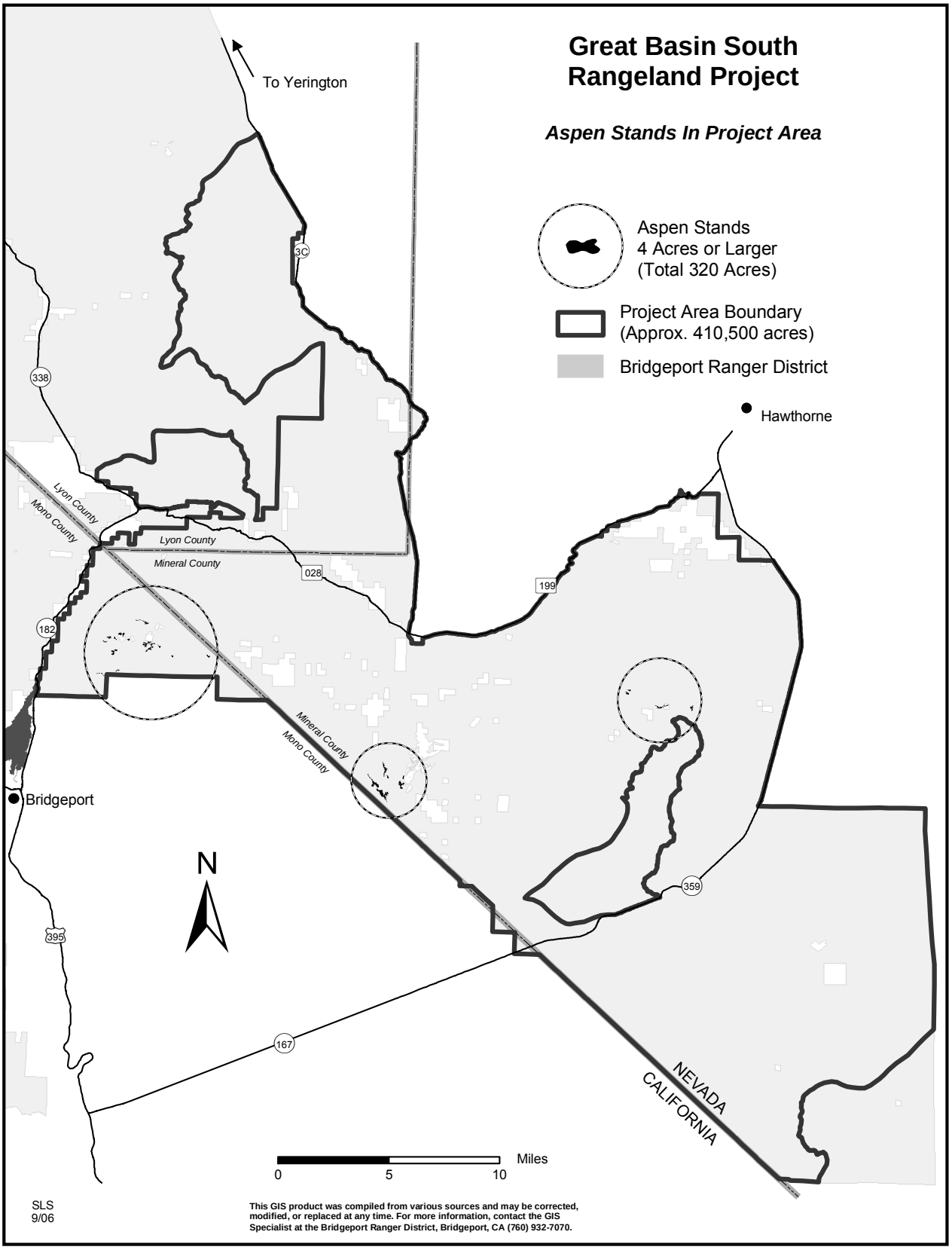
Wild horse use currently occurs within the Huntoon, Powell Mountain, Aurora, Whiskey and Larkin allotments. These are located within the Powell Mountain Wild Horse and Burro Territory. Wild horses are located outside of this territory in the Nine Mile allotment. Use would be addressed, since an Appropriate Management Level has been established for this territory and is controlled by removing animals when this limit is reached.

Current mineral exploration activities occur within the East Walker, Powell Mountain and Aurora allotments. Impacts from these activities have been addressed during planning for these activities.

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).


Great Basin South
Rangeland Project
Aspen Stands In Project Area
Aspen Stands
4 Acres or Larger
(Total 320 Acres)
Project Area Boundary
(Approx. 410,500 acres)
Bridgeport Ranger District
To Yerington
Hawthorne
Bridgeport
Lyon County
Mono County
Mineral County
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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.

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.

Threatened and Endangered Species

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.

Bald eagles, a threatened species, have been observed foraging along the East Walker River, which borders the analysis area. If cottonwood are restored along the East Walker River, as is suggested in the Rosaschi Ranch Environmental Assessment, potential nesting habitat would exist within the analysis area for bald eagles. In 2006, cottonwood seedlings were planted along the south side of the river.

Although Lahontan cutthroat trout (LCT) do not occur within the analysis area, there have been historic populations in the East Walker River, Bodie and Rough Creeks. The East Walker River is currently occupied by non-native species of trout. Bodie Creek is occupied by hybridized Lahontan cutthroat trout and other non-native fish species. USFWS is conducting further conservation/ recovery efforts for this species within the East Walker watershed. Bodie and Rough Creeks and the East Walker River were identified as potential streams for reintroduction of Lahontan cutthroat trout in the 1995 Recovery Plan for this species (USDI Fish and Wildlife Service, 1995), but specific actions were not identified. Recovery criteria include: 1) A self-sustaining, networked LCT population composed of wild, indigenous strains, established in interconnected streams, lakes, the main stem and tributaries of the Walker River basin, and 2) Connectivity between suitable spawning and rearing habitats to support natural reproduction and recruitment, to restore self-sustaining populations in lakes, main stem and tributaries of the Walker River basin (USDI Fish and Wildlife Service, 2003).

The length of streams and rivers in the analysis area on lands administered by the Forest Service which have the potential for LCT are a total of 37 miles. 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.

Sensitive Species

Eleven species of wildlife on the Region four Sensitive Species list have the potential to occur on the District, however, only five occur, or have the potential to occur, within the analysis area. These are 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. Except for sage grouse, which is discussed under Issue Three above, these are discussed below.

Sagebrush Habitats

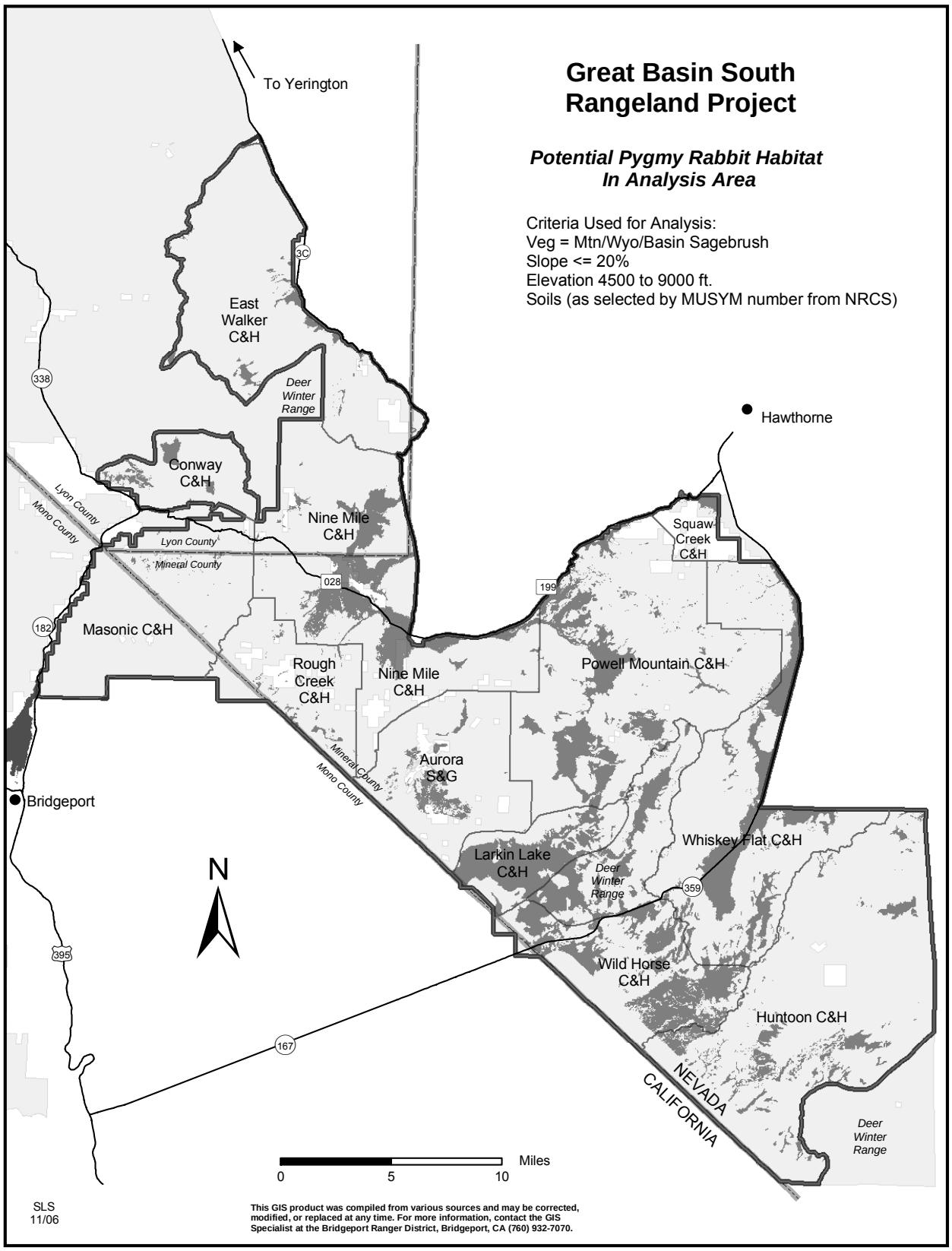
Pygmy rabbit

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

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).


Great Basin South Rangeland Project
Potential Pygmy Rabbit Habitat In Analysis Area
Criteria Used for Analysis:
Veg = Mtn/Wyo/Basin Sagebrush
Slope <= 20%
Elevation 4500 to 9000 ft.
Soils (as selected by MUSYM number from NRCS)
To Yerington
Hawthorne
Bridgeport
East Walker C&H
Deer Winter Range
Conway C&H
Nine Mile C&H
Lyon County
Mono County
Mineral 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
Wild Horse C&H
Huntoon C&H
NEVADA
CALIFORNIA
N
Miles
0
5
10
SLS
11/06
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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. There are incidental sightings for the historic Aurora, NV area in the Aurora allotment. Great Basin Bird Observatory 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.

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. Two Townsend's big-eared bats were recorded for this area (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. JBR Environmental Consultants, Inc. conducted an 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.

The Nevada Department of Wildlife has conducted bat and site visits to several adits and shafts in the Borealis mining area. 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; however bat species were not identified during this visit.

The analysis area includes potential 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 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).

Management Indicator Species

Management Indicator Species were required in the expired planning regulations which were in effect during the preparation of the 1986 Toiyabe Forest Plan. The Plan identified 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. Sage grouse have been described under the Sensitive Species section of this chapter.

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 A General Aquatic Wildlife Survey done in Rough and Bodie Creeks in 1980 by the Nevada Department of Fish and Game sited several species, including species from the Orders Trichoptera, Plecoptera, Ephemeroptera, Coleoptera and Diptera.

Riparian and Meadow Habitats

Yellow-rumped warbler

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. It was not listed as breeding.

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. 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.

Breeding Bird Survey data shows an increase throughout the yellow-rumped warbler's range between 1966 and 1994. In Nevada the trend is listed as 9.7; however this is based off two transects within the state at which yellow-rumped warblers have been observed (Saurer, Hines and Fallon, 2005).

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. 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.

Breeding Bird Survey data on yellow warbler shows no statistically significant, long-term trend for the United States; however for Nevada the trend is listed at 12.0 with 15 routes located in the state (Saurer, Hines and Fallon 2005).

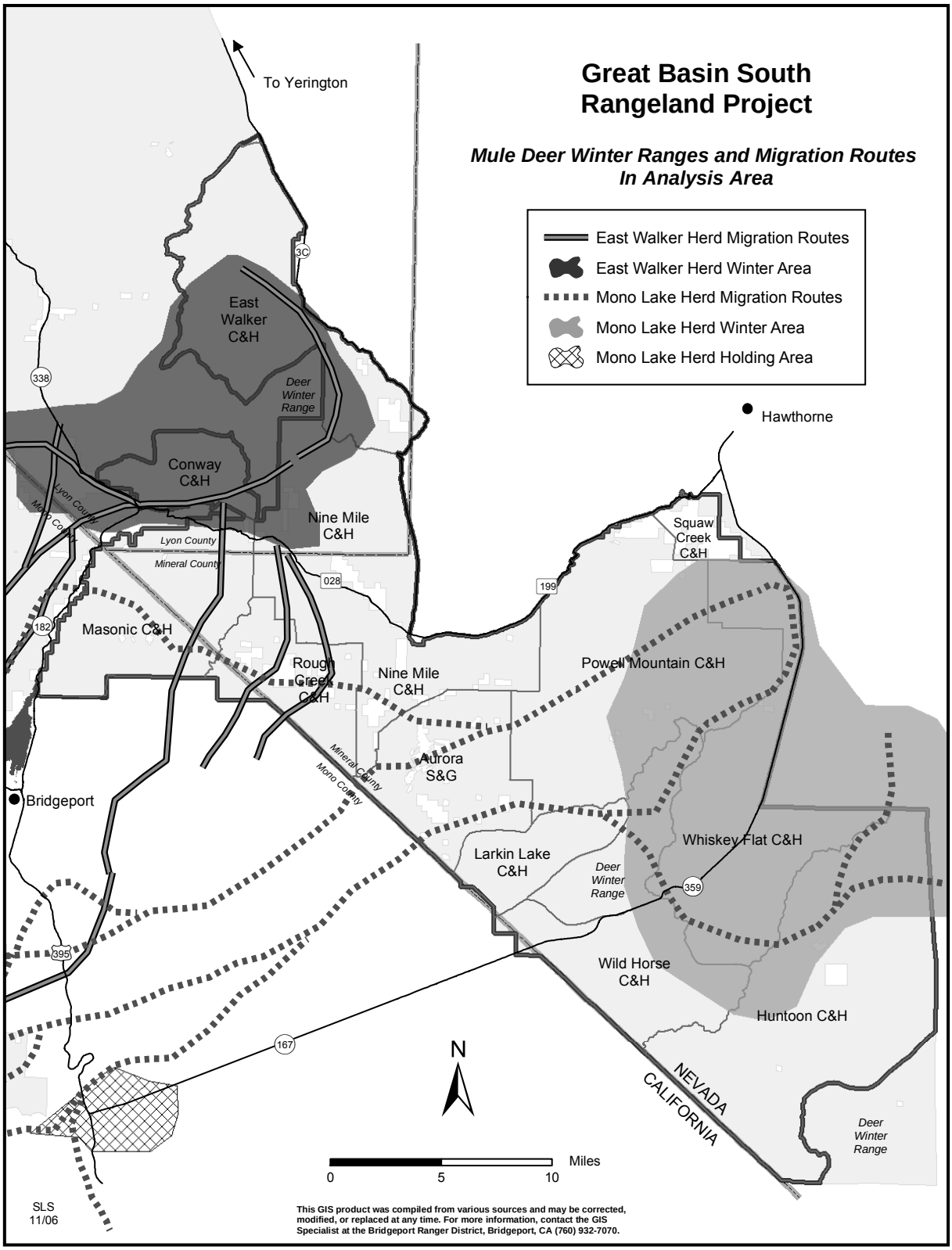
Pinyon-Juniper Habitats

Mule Deer

Three designated winter ranges border several allotments in the analysis area. 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 to the west and Powell Mountain to the north (Allotment Map).

These traditional winter ranges are a small portion of the larger wintering ranges described in a California Department of Fish and Game East Walker and Mono Lake Deer Herd Study (1991). 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 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) (Mule Deer Map). Vegetation in these wintering areas includes sagebrush scrub type and pinyon pine woodlands.

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).


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
Squaw Creek C&H
Powell Mountain C&H
Aurora S&G
Larkin Lake C&H
Whiskey Flat C&H
Wild Horse C&H
Huntoon C&H
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Hairy woodpecker

The hairy woodpecker is a fairly common, permanent resident of mixed conifer and riparian deciduous habitats from sea level to 9000 feet. 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.

Breeding Bird Survey data for hairy woodpecker shows steady declines in populations. In Nevada the trend is listed at 19.3 with 3 routes located in the state (Saurer, Hines and Fallon, 2005).

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. These species use all habitats of the analysis area during the breeding season while livestock are present. A list of these species with suitable nesting habitat in the analysis area is present in the project file.

Priority species identified in the Nevada Partners in Flight Conservation Plan (Neel 1999), is listed in the table below. 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 and the following table outlines if this species was observed during these surveys.

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					

No Action

Threatened and Endangered Species

Lahontan Cutthroat Trout

Potential habitat occurs within the analysis area in Bodie Creek and Rough Creek. Currently a hybrid population of LCT occupies Bodie Creek, but this population is not protected under the Endangered Species Act. Impacts to fisheries and stream habitats associated with improperly grazed livestock have been well documented in scientific literature and by state and federal agencies (Clary and Webster 1989, Platts 1979). Grazing can affect all components of the aquatic system: riparian vegetation, channel morphology, quality and shape of water column, and structure of the soil portion of the stream bank (Platts 1979). Impacts from livestock to streams and fisheries habitat include, but are not limited to:

- Manipulation of channel morphology (bank shearing, increased

width/depth ratio, channel incision, unstable stream banks due to loss of riparian vegetation and erosion, loss of undercut banks);

- Changes in riparian vegetation types and overall loss of riparian vegetation;
- Increased water temperatures;
- Increased fine sediment levels; and
- Loss of riparian areas from channel degradation, channel incision, and loss of water table.

Manipulation of channel morphology results in the direct loss of habitat features that are important to trout, such as undercut banks, shorewater depth, and quality pool habitat. The ability of the stream to transport sediment, withstand flood events, and maintain local water table is reduced by the alteration of morphology. Changes in channel morphology caused by bank shearing and bank instability would increase the width to depth ratio of the channel, creating a wide and shallow stream and a corresponding increase in water temperature during the summer. 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.

Under current management, improvement in existing stream and fisheries habitat conditions would take the longest to occur. Current existing conditions and trends would continue. Downstream impacts to potential LCT streams could occur under the current utilization standards. These impacts would include: increased sedimentation, vertical instability related to changes in channel morphology upstream, increased water temperature, and decreased water quality.

The majority of impacts to fisheries and LCT occur from the alteration of stream habitat. Livestock trample stream banks and reduce crucial bank vegetation, and channel morphology is altered. With unstable stream banks, erosion occurs, fine sediment enters the stream channel, the channel is widened, and water temperatures rise with shallow water and decreased riparian vegetation. In some cases, the stream forms a headcut, and the channel becomes incised, resulting in lowered water tables and loss of entire riparian areas.

This alternative would not preclude the recovery of LCT within Bodie Creek, Rough Creek or the East Walker River.

Cumulative effects to LCT include effects mainly from motor vehicle use along Bodie and Rough Creeks; however this use is minimal and there have been no documented negative effects from motor vehicle use noted along these creeks. 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.

Sensitive Species

Pygmy rabbit

Livestock grazing can effect pygmy rabbit habitats by reducing the summer

grass and forb forage available to the rabbits (USDA Forest Service 2001). 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. On a cumulative basis mining activities can reduce the available denning habitat for pygmy rabbits.

A potential downward trend in population would be the result of numerous factors, but this trend would be due primarily to the impacts from wildfires, or lack of wildfires, and extensive drought rather than from livestock grazing.

Mountain quail

The effects of livestock grazing on mountain quail under current management may be limited. Livestock grazing tends to be outside of the suitable nesting habitat for mountain quail, so the impact of livestock by trampling nests is minimal. In areas were livestock are trailing through allotments within occupied nesting habitats the impact from trampling is increased. On a cumulative basis, mining and motor vehicle activities can displace mountain quail from nesting areas due to disturbance. In addition, fences can be used as perches for predator species such as raptos and ravens, which can affect nesting mountain quail.

Spotted bat and Townsend's big-eared bat

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 does not allow for suitable habitat for prey forage species for bats. This alternative would not effect roosting or hibernating sites.. On a cumulative basis, mining activities, road construction, exploration activities and pit development can cause a cumulative effect on sensitive species using 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.

Management Indicator Species

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. 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.

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.

Macroinvertebrates

Livestock grazing under current management may continue to affect macroinvertebrates located in Bodie and Rough Creeks. Livestock grazing has a direct effect on water quality, which in turn can affect macroinvertebrate habitat. “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.

Hairy woodpecker

Livestock grazing under current management would affect the amount of aspen saplings that could become mature stands of aspen with the potential of being suitable habitat for nesting and foraging areas for hairy woodpeckers. Under this alternative, there is potential for greater impacts to aspen regeneration, which could affect the long-term potential of these stands to provide nesting habitat.

Livestock grazing under current management may result in impacts to the quality of foraging and nesting habitats for hairy woodpeckers within riparian and aspen communities. The impacts include alteration of vegetation communities, which can impact forage habitat and future nesting.

On a cumulative basis, mining and motor vehicle activities may also reduce suitable nesting habitat for hairy woodpeckers.

Yellow-rumped warbler

The affects of livestock grazing under this alternative on yellow-rumped warbler may be limited. Livestock grazing tends to be outside of the suitable nesting habitat for yellow-rumped warbler, so the impact of livestock by trampling nests is minimal. In areas where livestock are trailing through allotments within occupied nesting habitats, the impact from trampling is increased. Livestock grazing under current management may also continue to reduce the shrub or ground cover needed for suitable nesting habitat. On a cumulative basis, mining and motor vehicle activities may also reduce suitable nesting habitat for yellow-rumped warbler.

Yellow warbler

Livestock grazing under current management would continue to affect species requiring heavy shrub or herbaceous ground cover for nesting and foraging, mainly in riparian areas and aspen stands. Livestock may affect nesting sites by disturbing nest areas while moving through a nesting area. Livestock also attract nest parasite

species such as the brown-headed cowbird.

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. Implementation of current management would continue to benefit species that increase with grazing such as mountain bluebird, robin, and brown-headed cowbird. Species that have been shown to possibly respond negatively to grazing include the Vesper sparrow and Ferruginous hawk. Species that have been shown to be unresponsive or show mixed responses to grazing include loggerhead shrike and sage thrasher.

On a cumulative basis, mining, recreation, and fencing can affect neo-tropical migrants. Mining activities, road construction, exploration activities and pit development can cause a negative effect on migratory bird species using the area. Current mining activities have been concentrated in the Borealis area in Nevada. Mining activities can displace neo-tropical migrants from nesting areas due to disturbance. Mining activities can also reduce the available nesting habitat for migratory bird species. However, mining operations on National Forest System lands are subject to Forest Service required mitigation measures.

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.

Surprise encounters can cause these species to flee secure types of areas, thereby increasing their vulnerability. Fences can be used as perches for predator species such as raptors and ravens, which can affect nesting neo-tropical migratory birds.

A potential downward trend in population would be the result of numerous factors, but this trend would be due primarily to the impacts from wildfires, or lack of wildfires, and extensive drought rather than from livestock grazing.

Proposed Action

Threatened and Endangered Species

Lahontan Cutthroat Trout

Improvement 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 an acceptable level. Fine sediment levels are expected to be lower under this 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.

Cumulative effects to potential LCT habitat include effects mainly from motor vehicle use along Bodie and Rough Creeks; however this use is minimal and there have been no documented negative effects from motor vehicle use noted along these creeks. 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. On a cumulative basis, mining activities, road construction, exploration activities and pit development can cause a negative effect on water quality in potential LCT streams. Current mining activities have been concentrated in the Aurora and Borealis area in Nevada. Metallic Ventures Inc. near Aurora is currently conducting exploration activities.

Sensitive Species

Pygmy rabbit

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 would be lowered and allow for suitable pygmy rabbit habitat to improve.

Spotted bat and Townsend's big-eared bat

Under this alternative 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. Improved condition of the riparian areas, wetlands, and springs would provide for suitable habitat for prey foraging species of bats. This alternative would not affect roosting or hibernating sites. Cumulative effects could include negative effects from mining activities, although mining operations are subject to Forest Service required mitigating measures.

Mountain quail

The affects of livestock grazing under the proposed action on mountain quail may be limited. Livestock grazing tends to be outside of the suitable nesting habitat for mountain quail, so the impact of livestock by trampling nests is minimal. In areas were livestock are trailing through allotments within occupied nesting habitats the impact from trampling is increased. Incorporating rest into the allotments with potential nesting habitat may decrease the likelihood of trailing through nesting areas.

On a cumulative basis, vehicle use poses a threat to suitable habitat for mountain quail, although its impacts are expected to be minimized through implementation of the Forest Service route designation process currently underway. Surprise encounters can cause these sensitive species to flee secure types of areas, thereby increasing their vulnerability. Fences can be used as perches for predator species such as raptors and ravens, which can affect nesting mountain quail.

Management Indicator Species

Mule deer

Under the Proposed Action, livestock grazing would continue with utilization standards at a maximum of 45 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. No livestock grazing occurs within the designated deer winter ranges.

Riparian and meadow habitats are important for deer foraging and water sources. Under the proposed action, rest would be incorporated, which would allow for riparian and meadow habitats to be maintained and provide foraging and water opportunities for mule deer.

Macroinvertebrates

Livestock grazing under this alternative may continue to affect macroinvertebrates located in Bodie and Rough Creeks. Livestock grazing has a direct effect on water quality, which in turn can affect macroinvertebrate habitat. However, impacts would be reduced from continuing current management, as rest would be incorporated, which would allow for a decrease in disturbances to stream bank stability and water quality.

Hairy woodpecker

Livestock grazing under the proposed action would affect the amount of aspen saplings that could become mature stands of aspen with the potential of being suitable habitat for nesting and foraging areas for hairy woodpeckers. Under the Proposed Action, incorporating rest would allow for aspen regeneration and would maintain the suitable habitat available for nesting and foraging.

Livestock grazing under the Proposed Action may result in impacts to the quality of foraging and nesting habitats for hairy woodpeckers within riparian and aspen communities. The impacts include alteration of vegetation communities, which can impact forage habitat and future nesting. Cumulatively, mining activities may also reduce suitable nesting habitat for some hairy woodpeckers. Vehicle use also poses a threat to suitable habitat for hairy woodpeckers, although its impacts are expected to be minimized through implementation of the Forest Service route designation process currently underway.

Yellow-rumped warbler

Livestock grazing may continue to affect shrub and ground cover needed for suitable nesting habitat. However, rest would be incorporated, and use within these areas may be reduced during this time, allowing for the continuation of suitable nesting and foraging habitats. On a cumulative basis, mining activities may also reduce suitable nesting habitat for yellow-rumped warblers. Vehicle use also poses a threat to suitable habitat for yellow-rumped warblers, although its impacts are expected to be minimized through implementation of the Forest Service route designation process currently underway.

Yellow warbler

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. Under the Proposed Action rest would be incorporated and this would

allow for maintaining cover for nesting and foraging. On a cumulative basis, mining activities may also reduce suitable nesting habitat for yellow warblers. Vehicle use also poses a threat to suitable habitat for yellow warblers, although its impacts are expected to be minimized through implementation of the Forest Service route designation process currently underway.

Neotropical Migratory Birds

Livestock grazing under the Proposed Action would continue to affect species requiring heavy shrub or herbaceous ground cover for nesting and foraging. Potential effects would be less than under current management; 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 natural resources. This alternative would allow for a faster recovery of these habitats 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. On a cumulative basis, mining, recreation, and fencing can affect neo-tropical migrants. Mining activities, road construction, exploration activities and pit development can cause a negative effect on migratory bird species using the area. Current mining activities have been concentrated in the Borealis area in Nevada. Mining activities can displace neo-tropical migrants from nesting areas due to disturbance. Mining activities can also reduce the available nesting habitat for migratory bird species.

Recreation use is limited, since there are no designated campsites within the analysis area. Motor vehicle use in this area is predominant in the Aurora area. Vehicle use also 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. Surprise encounters can cause these species to flee secure types of areas, thereby increasing their vulnerability. Fences can be used as perches for predator species such as raptors and ravens, which can affect nesting neo-tropical migratory birds.

A potential downward trend in population would be the result of numerous factors, but due primarily to the impacts from wildfires, or lack of wildfires, and extensive drought, rather than from livestock grazing.

No Grazing

Threatened and Endangered Species

Lahontan Cutthroat Trout

The No Grazing Alternative would likely see the most immediate improvement in stream and fisheries habitat conditions, as the direct and indirect effects of livestock would be removed from the project area. With the removal of livestock grazing, stream and riparian areas would be restored more quickly than with the other alternatives.

This alternative would not preclude the recovery of LCT within Bodie Creek, Rough Creek or the East Walker River.

Cumulative effects to LCT include effects mainly from motor vehicle use along Bodie and Rough Creeks; however this use is minimal and there have been no documented negative effects from motor vehicle use noted along these creeks. Mining operations within the analysis area have occurred upstream of Bodie Creek; however there have been no documented effects from this activity on the creek.

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. Under this alternative there would be no negative impacts to this species.

Mountain quail

No livestock grazing within the analysis area would allow for a decrease in the trampling of nest sites. This would also allow for foraging areas to increase in the necessary forbs needed to attract insects for young chicks during the brooding season. Under this alternative there would be no negative impacts to this species.

Spotted bat and Townsend's big-eared bat

Under this alternative, the exclusion of livestock grazing would allow foraging habitats for bats to improve, by allowing maximum forb and flower production that would attract insects. Additionally, springs, riparian areas and wet meadows that have been affected by grazing impacts would recover at the fastest pace.

Management Indicator Species

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.

Possible increased grazing use of private lands may result in degraded habitats on private lands, which could affect mule deer populations.
Macroinvertebrates

Livestock grazing under this alternative would be removed from the project area. This would allow for a more rapid pace of recovery than the Proposed Action. Sedimentation would be decreased and impacts to suitable macroinvertebrate habitat would be increased.

Hairy woodpecker

Livestock grazing under this alternative would be removed from this project area. Riparian and aspen stands that are not at functioning as desired condition would be restored at a faster pace than under the Proposed Action..

Yellow-rumped warbler

Livestock grazing under this alternative would be removed from this project area. Riparian and aspen stands that are not at functioning as desired condition would be restored at a faster pace than with the Proposed Action.

Yellow warbler

Livestock grazing under this alternative would be removed from the project area. Riparian habitats that are at not functioning as desired condition would be restored at a faster pace than with

the Proposed Action. There would no longer be a risk that livestock may trample nests or chicks of birds within the analysis area.

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.

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.

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 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.

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.

Social Economics

Affected Environment

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 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. On a cumulative 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.

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 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.

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 cumulative 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.

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. The results of these consultations are available in the project record.

National Historic Preservation Act

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)

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 Mesa Verdi 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.

CHAPTER FOUR. CONSULTATION AND COORDINATION

List of Preparers			
Name	**Primary Responsibility**	**Education:**	**Years Experience**
Cheryl Probert	**District Ranger**	**BS Forestry, Range Mgmt.**	**18**
David Loomis	**Project Manager, Social Economics**	**MS Land Use Planning** **BA Economics**	**28**
Amy Baumer	**Vegetation**	**BS Range Mgmt, Land Rehab.**	**6**
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 Resources**	**MA Anthropology**	**17**
Diane Weaver	**Range Mgmt.**	**BS Range Mgmt.**	**18**
Sherry Sorensen	**GIS / Mapping**	**Qualified by Experience**	**24**

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

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

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 Commissioners
Walker River Tribe
Bridgeport Indian Colony
Bridgeport Library
Hawthorne Library
Smith Valley Library
Grazing Permitees
Western Watersheds

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APPENDIX 1

Matrices to Guide
the Determination of
Vegetative Condition

Appendix A-1: Aspen Group

Elevation:	Slope:	Depth to groundwater:
6,100 to 9,000 feet	2 to 40%	Generally >100 cm., often variable

			Attribute description	Functions as desired	Does not meet desired function	Crosses 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%	5-30%	>30%
Vegetation		4	Absolute canopy cover of aspen	>40%	10-40%	<10%
		5	Absolute conifer canopy cover	<15%	15-40%	>40%
		6	Age of dominant aspen trees	Multiple age classes.	<100 years	Dominate trees >100 years.
	⇨	7	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 suckers / saplings per acre
	⇨	8	Relative cover forbs in group “C”	≤2%	2-25%	>25%

	⇨	9	Relative cover of graminoids in Group "D"	≤5%	5-25%	>25%
	⇨	10	Relative cover of shrub species in Group "E"	≤5%	5-30%	>30%
	⇨	11	Relative cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology		12	Presence of head-cutting resulting in incision.	No head-cutting present	Head-cutting present, incision < 50cm.	Head-cutting present, incision ≥ 50cm.
Disturbance		13	% of aspen stand affected by roads, campsites or other disturbance	Roads or campsites <10% of stand	Campsites or roads 10-50% of stand	Campsites and roads >50% of stand

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and any priority attributes do not meet desired function, then the site is classified as "does not meet desired function."

If a majority of attributes or attributes 7, 11 or 13 are at crosses below threshold, then the site has "crossed below threshold" and may not be ecologically or economically feasible to restore.

Group A – Shrub Species Indicative of Desired Function

Shrub species with up to 50% understory cover may include:

Symphoricarpos oreophilus (snowberry)

Amalanchier 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)

Acer glabrum (vine maple)

Group B – Associated Species Indicative of Desired Function

Forb - Annual forbs are less than 2% of the understory cover.

Achillea millefolium (yarrow)

Aconitum columbianum (monkshood)

Actea rubra (baneberry)

Agastache urticifolia (horsemint)	Galium spp. (bedstraw)	Osmorhiza berteroi (sweet anise)
Aquilegia Formosa (columbine)	Geranium spp. (wild geranium)	Rudbeckia occidentalis (coneflower)
Delphinium spp. (larkspur)	Ligusticum grayi (licorice root)	Senecio spp. (groundsel)
	Lupinus argenteus (silver lupine)	Sidalcea oregano (checker mallow)
	Maianthemum stellatum (False Solomon's seal)	Thalictrum spp. (meadowrue)
	Mertensia oblongifolia (mountain bluebells)	Valeriana spp. (valerian)

Graminoid:

Bromus carinatus (mountain brome)	Deschampsia elongate (slender hairgrass)	Juncus ensifolius (swordleaf rush)
Calamagrostis Canadensis (bluejoint)	Elymus glaucus (blue wildrye)	Melica spectabilis (purple oniongrass)
Carex microptera (smallwing sedge)	Elymus lanceolatus (streambank wheatgrass)	Poa wheeleri (Wheeler bluegrass)
Carex pellita (woolly sedge)	Elymus trachycaulus (slender wheatgrass)	Poa palustris (fowl bluegrass)
Carex rossii (Ross' sedge)	Glyceria striata (fowl mannagrass)	

Group C – Forb Species Indicative of Management Problems

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

Group D – Graminiod Species Indicative of Management Problems

Poa pratensis (Kentucky bluegrass)	Arhenatherum elatius (tall oatgrass),	Bromus tectorum (cheatgrass)
Agrostis stolonifera (redtop)	Bromus inermis (smooth brome)	

Poa bulbosa (bulbous bluegrass)	Eleocharis spp. (spikerush)

Group E – Shrub Species Indicative of Management Problems

Rosa woodsii (Woods' rose)	Artemesia tridentata (any subspecies big sagebrush)

Appendix A-2: Sagebrush Group / Low Sagebrush

Elevation:	Slope:	Precipitation:
5,000 to 10,000 feet	2 to 50%	8 – 20 inches

		Attribute description	Functions as desired	Does not meet desired function	Crosses below threshold
Soil	⇨1	Bare ground/pavement	< 60%	60-80%	> 80%
	2	Soil surface horizon structure	Loosely granular to granular	Loose, lacks structure or is hard and crusted	Surface horizon not apparent
	⇨3	Soil surface decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	⇨4	Terracing of hill slopes	≤ five terraces evident on hillslopes	> five terraces evident on hillslopes	Terracing extensive, < five ft. apart
Vegetation	⇨5	Black sagebrush canopy cover	10-30%	5-10%	< 5%
	⇨6	Relative cover of grasses in Group “B”	15-40%	<15%	<5%
	⇨7	Relative cover of Bromus tectorum or Bromus rubens	< 5%	5-20%	≥ 20%
	8	Relative cover of grasses in Group “C”	<20%	20-30%	>30%

	⇨9	Relative cover of shrubs or trees in Group "E"	<5%	5-15%	>15%
	⇨10	Relative cover of forbs in Group "F"	< 1%	≥ 1%	≥ 25%
	⇨11	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	⇨12	Presence of rills/ rill formation	No recent formation, old rills with muted features	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	100+ years	10-30 years	<10 years
	15	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and priority attributes do not meet the desired function, then the site is classified as "does not meet desired function."

If a majority attributes or attributes 5, 7, 10, 11 or 15 are at crosses below threshold, then the site has "crossed below threshold" and may not be ecologically or economically feasible to restore.

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 viridis (mormon tea)	Grayia spinosa (spiny hopsage)
Ephedra nevadensis (Nevada jointfir)	Atriplex confertifolia (shadscale)	Krascheninnikovia lanata (winterfat)

Atriplex confertifolia (shadscale)	Eriogonum ovalifolium (cushion buckwheat)	Cowania mexicana (cliffrose).
Eriogonum microthecum (slender buckwheat)	Eriogonum caespitosum (matted buckwheat)	

Group B – Grass/Forb Species Indicative of Desired Function

Graminiods:

Achnatherum hymenoides (Indian ricegrass)	Hesperostipa comata (needle and thread)	Psuedoroegneria spicata (bluebunch wheatgrass)
Achnatherum thurberianum (Thuber's needlegrass)	Achnatherum pinetorum (pine needlegrass)	Poa fendleriana (muttongrass)

Graminoid species indicating desired function that may be present in smaller amounts include:

Elymus elymoides (squirreltail)	Pascopyron smithii (western wheatgrass)	Achnatherum speciosum (desert needlegrass)
Poa secunda (Sandberg bluegrass)	Koeleria macrantha (Junegrass)	Achnatherum scribneri (Scribners needlegrass)
	Pleuraphis jamesii (galleta)	

Forbs:

Sphaeralcea coccinea (scarlet globemallow)	Astragalus spp. (milkvetch or locoweed)	Penstemon spp. (penstemon)
Phlox hoodii (Hood's phlox)	Arabis spp. (rockcress)	Comandra umbellata (toadflax)
Phlox longifolia (longleaf phlox)	Stanleya pinnata (Prince's plume)	Erysium capitatum (wallflower)
Opuntia polyacantha (pricklypear)	Castilleja angustifolia (Indian paintbrush)	Arenaria kingii (King's sandwort)
Erigeron spp. (fleabane/daisy)	Packera multilobata (groundsel)	Stenotus acaulis (goldenweed)
Lupinus spp. (lupine)		

Group C – Non-Native Grass Species Indicative of Management Problems

Agropyron fragile (Siberian wheatgrass)	Agropyron desertorum (desert wheatgrass)	Other seeded, non-native species

Group D – Annual Grass Species Indicative of Management Problems

Bromus tectorum (cheatgrass)	Bromus rubens (red brome)	Other annual grasses
	Vulpia octoflora (six-week fescue)	

Group E – Shrub/Tree Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush)	Juniperus oesteosperma (Utah juniper)	Juniperus occidentalis (western juniper)
		Pinus monphylla (pinyon pine)

Group F – Forb Species Indicative of Management Problems

Leptodachtylon pungens (prickly phlox)	Descurainia spp. (tansymustard)	Halogeton glomeratus (halogeton)
Annual forbs	Sisymbrium spp. (tumblemustard)	Salsola tragus (Russian thistle).

Appendix A-3: Sagebrush Group / Mountain Big Sagebrush

Elevation:	Slope:	Precipitation:
6,000 to 10,000 feet	2 to 50%	10 - 25 inches

		Attribute description	Functions as desired	Does not meet desired function	Crosses below threshold
Soil	⇨1	Bare ground	< 20%	> 20%	> 50%
	2	Soil surface horizon structure	Loosely granular to granular	Loose, lacks structure or is hard and crusted	Surface horizon not apparent
	⇨3	Soil surface decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	⇨4	Terracing of hill slopes	≤ five terraces evident on hillslopes	> five terraces evident on hillslopes	Terracing extensive, < five ft. apart
	⇨5	Erosion pavement	< 10%	10-35%	> 35%
Vegetation	⇨6	Mountain or sub-alpine big sagebrush absolute canopy cover	10-25%	< 10% or >25%	< 5% and has been for ≥10 years.
	7	Relative cover of non-native grasses in Group "C"	≤ 30%	30-50%	> 50%

	⇨8	Relative cover of annual grass species in Group "D"	≤ 5%	5-30%	≥ 30%
	⇨9	Canopy cover of shrubs or trees in Group "E"	0-5%	5-30%	>30%
	⇨10	Relative cover of perennial forbs/perennial grasses	5-50% forbs 15-65% grasses	<5% forbs <10% grasses	<5% forbs <10% grasses
	⇨11	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	⇨12	Presence of rills/ rill formation	No recent formation, old rills with muted features	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	10-40 years	<10 or >40 years	<10 years
	15	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and any priority attributes do not meet desired function, then the site is classified as “does not meet desired function.”

If a majority of attributes or attributes 1, 6, 8, 11 or 15 are at crosses below threshold, then the site has “crossed below threshold” and may not be ecologically or economically feasible to restore.

Group A – Shrub Species Indicative of Desired Function

Artemisia tridentata spp. vaseyana (Mountain big sagebrush) or Artemisia tridentata spp. spiciformis (subalpine big sagebrush) dominate the shrub canopy cover component.

Chrysothamnus viscidiflorus (yellow rabbitbrush)	Amelanchier alnifolia / Amelanchier utahensis (serviceberry)	Tetradymia canescens (horsebrush)
Ericameria nauseosa (rubber rabbitbrush)	Ceanothus velutinus (snowbrush)	Rosa woodsii (wild rose)
Purshia tridentata (bitterbrush)	Artemisia arbuscula (low sagebrush)	Ribes spp. (currant/gooseberry)
Symphoricarpos oreophilus (snowberry)	Eriogonum spp. (shrubby buckwheat)	Ephedra viridis (Mormon tea)
		Atriplex canescens (four-wing saltbush)

Group B – Grass/Forb Species Indicative of Desired Function

Graminoids:

Leymus cinereus (basin wildrye)	Achnatherum nevadense (Nevada needlegrass)	Pascopyron smithii (Western wheatgrass)
Festuca idahoensis (Idaho fescue)	Achnatherum pinetorum (pine needlegrass)	Koeleria macrantha (Junegrass)
Psuedoroegneria spicata (bluebunch wheatgrass)	Carex exserta (shortawn sedge)	Hesperostipa comata (needle and thread grass)
Elymus trachycaulus (slender wheatgrass)	Elymus elymoides (squirreltail)	Melica bulbosa (oniongrass)
Achnatherum thurberianum (Thuber’s needlegrass)	Poa secunda (Sandberg’s bluegrass)	Melica spectabilis (purple oniongrass)
Achnatherum occidentale (western needlegrass)	Poa fendleriana (muttongrass)	Achnatherum hymenoides (Indian ricegrass)
Achnatherum lettermanii (Letterman’s needlegrass)	Leucopoa kingii (spike fescue)	
Achnatherum nelsonii (Columbia needlegrass)	Bromus carinatus (mountain brome)	

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)

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)

Other annuals

Group E – Shrub/Tree Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush)

Tetradymia canescens (horsebrush)

Pinus monophylla (singleleaf pinyon)

Juniperus occidentalis (Western juniper)

Juniperus oesteosperma (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 ovalifoium (cushion buckwheat)

Eriogonum racemosium (redroot buckwheat)	Eriogonum umbellatum (sulpher buckwheat)

Appendix A-4: Mountain Brush Group

Elevation:	Slope:	Precipitation:
6,000 to 10,000 feet	4 to 50%	12 - 22 inches

		Attribute description	Functions as desired	Does not meet desired function	Crosses below threshold
Soil	⇨1	Bare ground	< 20%	20-30%	> 30%
	2	Soil surface horizon structure	Loosely granular to granular	Loose, lacks structure or is hard and crusted	Surface horizon not apparent
	⇨3	Soil surface decomposing organic matter or biological crust	Present, acting to stabilize soil	Diminished, found where protected	Absent from soil surface
	⇨4	Terracing of hill slopes	≤ five terraces evident on hillslopes	> five terraces evident on hillslopes	Terracing extensive, < five ft. apart
	⇨5	Erosion pavement	< 10%	10-30%	> 30%
Vegetation	⇨6	Canopy cover of shrubs in Group "A"	25-60%	10-25%	< 10%
	⇨7	Relative cover of forbs and grasses in Group "B"	>10% forbs 30-65% grasses	5-10% forbs 10-30% grasses	<5% forbs <10% grasses
	⇨8	Relative cover of grasses in Group "C"	≤ 30%	30-50%	> 50%
	⇨9	Relative cover of annual grass species in Group "D"	≤ 5%	5-30%	≥ 30%
	⇨10	Relative cover of shrubs or trees in Group "E"	0-5%	5-40%	>40%

	⇨11	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	⇨12	Presence of rills/ rill formation	No recent formation, old rills with muted features	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	30-100 years	<30 years	<5 years
	15	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and any priority attributes do not meet desired function, then the site is classified as "does not meet desired function."

If a majority of attributes or attributes 9, 10, 11 or 15 are at crosses below threshold, then the site has "crossed below threshold" and may not be ecologically or economically feasible to restore.

Group A – Shrub Species Indicative of Desired Function

Purshia tridentata (bitterbrush)

Amelanchier utahensis (serviceberry)

Ribes cereum (wax currant)

Ribes montigenum (gooseberry currant)

Holodiscus dumosus (rockspirea)

Arctostaphylos uva-ursi (kinnikinnick)

Artemisia tridentata spp. vaseyana (mountain big sagebrush)

Artemisia tridentata spp. spiciformis (subalpine big sagebrush) or Artemisia arbuscula (low sagebrush)

Other common shrubs that may occur in the stand with a cover generally less than 5% each are:

Symphoricarpos oreophilus (snowberry)

Crataegus douglasii (hawthorne)

Rhus trilobata (sumac)

Mahonia repens (Oregon grape)

Shepherdia argentea (buffaloberry)

Shepherdia canadensis (buffaloberry)

Chamaebatiara millefolium (fernbush)

Parthenosissus vitacea (woodbine)

Sambucus nigra (elderberry)

Sambucus racemosa (elderberry)	Artemisia frigida (prairie sagewort)	Ephedra viridis (Mormon tea)
Ceanothus velutinus (snowbrush)	Eriogonum spp. (shrubby buckwheat)	

Group B – Associated Species Indicative of Desired Function

Graminiods:

Leymus cinereus (basin wildrye)	Achnatherum nevadense (Nevada needlegrass)	Poa fendleriana (muttongrass)
Festuca idahoensis (Idaho fescue)	Achnatherum pinetorum (pine needlegrass)	Poa canbyi (canby bluegrass)
Psuedoroegneria spicata (bluebunch wheatgrass)	Achnatherum hymeniodes (Indian ricegrass)	Leucopoa kingii (spike fescue)
Elymus trachycaulus (slender wheatgrass)	Carex exserta (shortawn sedge)	Hesperostipa comata (needle and thread)
Achnatherum occidentale (western needlegrass)	Elymus multisetus (tall squirreltail)	Bromus carinatus (mountain brome)
Achnatherum lettermanii (Letterman's needlegrass)	Elymus elymoides (squirreltail)	
Achnatherum nelsonii (Columbia needlegrass)	Poa secunda (Sandberg's bluegrass)	

At higher elevations:

Carex rossii (Ross's sedge)	Carex phaeocephala (dunhead sedge)	Calamagrostis rubescens

may be found.

Forbs:

Balsamorhiza sagittata (arrowleaf balsamroot)	Lithospermum ruderale (stoneseed)	Agastache urticifolia (giant hyssop)
Hydrophyllum capitatum (dwarf waterleaf)	Potentilla spp. (cinquefoil)	Castilleja flava (yellow paintbrush)
Linum lewisii (Lewis flax)	Achillea millefolium (yarrow)	Castilleja angustifolia (Indian paintbrush)
Hackelia floribunda (wild forget-me-not)	Erigeron spp. (fleabane/daisy)	Mertensia ciliata and Mertensia longifolia (bluebells)
Hackelia patens (spotted stickseed)	Lupinus spp. (lupine)	Penstemon spp. (penstemon)
Phlox longifolia (longleaf phlox)	Astragalus spp. (milkvetch or locoweed)	
	Lomatium spp. (biscuitroot)	

Helianthella uniflora (one-flowered sunflower)

Crepis acuminata (hawksbeard)

Senecio spp. (groundsel)

Delphinium spp. (larkspur)

Geranium viscosissimum (geranium)

Lithophragma spp. (woodland star)

Solidago canadensis (Canada goldenrod)

Group C – Non-native Grass Species Indicative of Management Problems

Agropyron cristatum (crested wheatgrass)	Thinopyrum intermedium (intermediate wheatgrass)	Poa compressa (Canada bluegrass)
Agropyron desertorum (desert wheatgrass)	Bromus inermis (smooth brome)	Poa bulbosa (bulbous bluegrass)
Agropyron fragile (Siberian wheatgrass)	Poa pratensis (Kentucky bluegrass)	Other seeded, non-native species

Group D – Annual Grass Species Indicative of Management Problems

Bromus tectorum (cheatgrass), Bromus rubens (red brome), Bromus japonicus (Japanese brome), Bromus briziformis (rattlesnake brome), Vulpia octoflora (six-week fescue) or other annuals.

Group E – Shrub/Tree Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush)	Tetradymia glabrata (horsebrush)	Juniperus occidentalis (Western juniper)
Rosa woodsii (wild rose)	Tetradymia canescens (horsebrush)	Juniperus oesteosperma (Utah juniper)
Symphoricarpos oreophilus (snowberry)	Pinus monophylla (singleleaf pinyon)	

Appendix A-5: Cottonwood Group

Elevation:	Slope:	Depth to groundwater:
5,000 to 7,600 feet	2 to 15%	Generally >100 cm., often variable

		Attribute Description	Functions as desired	Does not meet desired function	Crosses below threshold
Soil	1	Root depth	> 15 cm.	10-15 cm.	< 10 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	50-100 cm.	>100 cm	>100 cm.
	⇨ 4	Bare ground	<2%	2-20%	>20%
Vegetation	⇨ 5	Absolute canopy cover of cottonwood	20-60%	10-20%	< 10%
	⇨ 6	% understory cover of cottonwood saplings or suckers less than 60 in.	5-70%	<5%	None
	7	Cottonwood w/disease	0-30%	30-50%	>50%
	8	Relative cover of understory shrubs in Group "A"	20-50%	5-20%	< 5%
	⇨ 9	Relative understory cover forbs in group "C"	≤ 2%	2-25%	>25%

	⇨ 10	Relative understory cover of graminoids in Group "D"	<5%	5-25%	>25%
	⇨ 11	Canopy cover of shrub species in Group "E"	< 5%	5-30%	>30%
	⇨ 12	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	13	Presence of head-cutting resulting in incision.	No head-cutting present	Head-cutting present, incision < 50cm.	Head-cutting present, incision ≥ 50cm.
Disturbance	14	% of cottonwood stand affected by roads, campsites or other disturbance	Roads or campsites <10% of stand	Campsites or roads 10-50% of stand	Campsites and roads >50% of stand

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and any priority attributes do not meet desired function, then the site is classified as "does not meet desired function."

If a majority of attributes or attributes 5, 6, 12 or 14 are at crosses below threshold, then the site has "crossed below threshold" and may not be ecologically or economically feasible to restore.

⇨ Priority attributes.

Group A – Shrub Species Indicative of Desired Function

Shrub species with 0 to 50% understory cover may include:

Amalanchier alnifolia (serviceberry)	Prunus virginiana (chokecherry)	Salix species (willow)
Ribes species (currant or gooseberry)	Alnus incana (alder)	Cornus sericea (dogwood)
	Betula occidentalis (birch)	Rhus trilobata (skunkbush sumac)

Shrub species with 0-10% understory cover include:

Artemesia tridentata tridentata (basin big sagebrush)	Artemesia tridentata vaseyana (mountain big sagebrush)	Rosa woodsii ultramontana (wild rose)
	Symphoricarpos oreophilus (snowberry)	Mahonia repens (Oregon grape)

Group B – Associated Species Indicative of Desired Function

Graminiods:

Elymus glaucus (blue wildrye)	Poa secunda (Sandberg's bluegrass)	Melica spectabilis (purple oniongrass)
Leymus cinereus (basin wildrye)	Poa fendleriana (muttongrass)	Carex microptera (smallwing sedge)
Elymus trachycaulus (slender wheatgrass)	Poa cusickii (Cusick's bluegrass)	Carex vesicaria (blister sedge)
Leymus triticoides (beardless wildrye)	Agrostis pallens (shore bentgrass)	Scirpus micocarpus (bulrush)
Elymus lanceolatus (streambank wheatgrass)	Koeleria macrantha (Junegrass)	Carex praegracilis (field sedge)
Bromus carinatus (mountain brome)	Calamagrostis canadensis (bluejoint)	

Forbs/shrubs:

Thalictrum spp. (meadowrue)	Osmorhiza berteroi (sweet anise)	Viola palustris (marsh violet)
Aquilegia formosa (columbine)	Geranium richardsonii or Geranium viscosissimum (wild geranium)	Epilobium angustifolium (fireweed)
Aconitum columbianum (monkshood)	Paeonia brownii (wild peony)	Clematis ligusticifolia (western white clematis)
Maianthemum stellatum (False Solomon's seal)		Galium boreale (bedstraw)

Lupinus caudatus (tailcup lupine)	Senecio spp. (groundsel)	Cicuta douglasii (water hemlock)
Lupinus argenteus (silver lupine) or Lupinus leucophyllus (velvet lupine)	Allium spp. (wild onion)	Solidago canadensis (goldenrod)
	Achillea millefolium (yarrow)	

Group C – Forb Species Indicative of Manage

ment Problems	Artemesia ludoviciana (herbaceous sage)	Potentilla spp. (cinquefoil, any species)
Rumex spp. (sorrel or dock)	Symphyotrichum spp. (aster, any species)	Tragopogon dubius (yellow salsify)
Circium spp. (thistle, any species)	Urtica dioica (stinging nettle)	Hackelia floribunda (stickseed or forget-me-not)
Taraxacom officinale (dandelion)	Chorispora tenella (cross flower)	Nemophila pedunculata (littlefoot nemophila)
Achillea millefolium (yarrow)	Thlaspi arvense (pennycress)	
Descurainia pinnata (tansy mustard)		

Group D – Graminiod Species Indicative of Management Problems

Poa pratensis (Kentucky bluegrass)	Bromus inermis (smooth brome)	Poa bulbosa (bulbous bluegrass)
Arhenatherum elatius (tall oatgrass)	Bromus tectorum (cheatgrass)	Carex douglasii (Douglas sedge)

Group E – Shrub Species Indicative of Management Problems

Rosa woodsii (Woods' rose)	Chrysothamnus vicidiflorus (yellow rabbitbrush)	Artemesia tridentata (any subspecies big sagebrush)
	Ericameria nauseosa (rubber rabbitbrush)	

Appendix A-5: Meadow Group / Dry-to-Moist Meadows

Elevation:	Slope:	Depth to groundwater:
5,200 to 10,500 feet	1 to 10%	55 – 100 cm. for moist meadow; 100+ cm. for dry meadow

		Attribute Description	Functions as desired	Does not meet desired function	Crosses below threshold
Soil	⇨1	Root depth	> 10 cm.	5-10 cm.	< five 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"	≥ 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 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 present

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and any priority attributes do not meet desired function, then the site is classified as "does not meet desired function."

If a majority of attributes or attributes 9, 10 or 11 are at crosses below threshold, then the site has "crossed below threshold" and may not be ecologically or economically feasible to restore.

Group A – Species Indicative of Desired Function

Species with 0-70% cover may include:

Poa secunda (Sandberg's or Nevada bluegrass)	Deschampsia caespitosa (tufted hairgrass)	Carex douglasii (Douglas sedge)
Elymus trachycaulus (Slender wheatgrass)	Danthonia spp. (oatgrass, any species)	
Leymus cinereus (Great Basin wildrye)	Carex exserta (shorthair 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)	Bromus carinatus (Mountain brome)	Achnatherum lettermanii (Letterman's needlegrass)
Poa palustris (fowl bluegrass)	Muhlenbergia richardsonis (mat muhly)	Carex praegracilis (field sedge)
Carex athrostachya (slender beaked sedge)	Achnatherum nelsonii (Columbia needlegrass)	Juncus balticus (Baltic rush)
		Juncus ensifolius (swordleaf rush)

Group C – Graminoid Species Indicative of Management Problems

Poa pratensis (Kentucky bluegrass)	Hordeum jubatum (foxtail barley)	Carex douglasii (Douglas sedge)
Hordeum brachyantherum (meadow foxtail)	Agrostis stolonifera (redtop)	

in moist meadows.

Group D – Forb/Shrub Species Indicative of Management Problems

Ceratocephala testiculata (Bur buttercup)	Symphyotrichum spp. (aster, any species)	Urtica dioica (stinging nettle)
Circium spp. (thistle, any species)	Potentilla spp. (cinquefoil, any species)	Equisetum spp. (horsetail)
Taraxacum officinale (dandelion)	Rumex spp. (sorrel or dock)	Nemophila brevifolia (basin blue eyes)
Achillea millefolium (yarrow)	Penstemon (any species)	Artemesia 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)	Chrysothamnus viscidiflorus (green rabbitbrush)
Iris missouriensis (wild iris)	Rosa woodsii (Woods' rose)

Appendix A-6: Meadow Group / Wet Meadows

Elevation:	Slope:	Depth to groundwater:
5,200 to 10,500 feet	0 to 12%	10-100 cm.

		Attribute description	Functions as desired	Does not meet desired function	Crosses 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.	20-100 cm	50-100+ cm.
	⇨4	Bare ground	<5%	5-10%	>10%
Vegetation	⇨5	Relative cover of perennial grasses or grasslikes in Group "A"	≥ 80%	< 80%	< 80%
	⇨6	Relative forb cover	≤ 20%	> 20%	> 20%
	7	Relative cover of Juncus balticus.	≤ 20%	> 20%	≥ 40%
	⇨8	Relative cover of the graminoids in Group "C"	0-5%	>5%	>5%

	⇨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 ≥ 50 cm.
	⇨12	Presence of hummocks	None	Hummocks present	Hummocks present

If a majority of non-priority and all priority attributes meet functions as desired, then the site is classified as "functions as desired."

If a majority of non-priority and any priority attributes do not meet desired function, then the site is classified as "does not meet desired function."

If a majority of attributes or attributes 10 or 11 are at crosses below threshold, then the site has "crossed below threshold" and may not be ecologically or economically feasible to restore.

⇨ Priority attributes.

Group A – Species Indicative of Desired Function

Species with 0-80% cover may include:

Deschampsia caespitosa (tufted hairgrass)	Carex microptera (smallwing sedge)	Carex scopulorum (mountain sedge)
Calamagrostis canadensis (bluejoint)	Carex aquatalis (water sedge)	Carex simulata (analogue sedge)
Carex nebrascensis (Nebraska sedge)	Carex utriculata or Carex rostrata (beaked sedge)	Carex pellita (woolly sedge.

Group B – Associated Species Indicative of Desired Function

Graminoids:

Poa secunda (Sandberg's or Nevada bluegrass)	Phleum alpinum (alpine timothy)	Juncus balticus (Baltic rush)
Deschampsia spp. (hairgrass)	Poa palustris (fowl bluegrass)	Juncus ensifolius (swordleaf rush)
Calamagrostis scopulorum (reedgrass)	Carex praegracilis (field sedge)	Juncus nevadensis (Nevada rush)
Glyceria striata (fowl mannagrass)	Carex athrostachya (slender beaked sedge)	Scirpus microcarpus (bulrush)
Glyceria grandis (American mannagrass)	Carex aurea (golden sedge)	

(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)	Stellaria longipes (longstalk starwort)	Sidalcea spp. (checker mallow)
Dodecatheon alpinum (alpine shooting stars)	Pedicularis groenlandica (elephants head)	Polygonum bistortoides (American bistort)
Caltha leptosepala (marsh marigold)	Viola spp. (violets)	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)	Hordeum brachyantherum (meadow barley)	Agrostis exarata (spike bentgrass)
Alopecurus aequalis (short-awn foxtail)	Hordeum jubatum (foxtail barley)	Agrostis scabra (rough bentgrass)
Alopecurus pratense (meadow foxtail)	Agrostis stolonifera (redtop)	Arhenatherum elatius (tall oatgrass)

Bromus inermis (smooth brome)	Poa bulbosa (bulbous bluegrass)	Carex douglasii (Douglas sedge)
Bromus tectorum (cheatgrass)	Muhlenbergia filiformis (pull-up muhly)	Eleocharis spp. (spikerush)

Appendix A-6: Stream / Riparian Group

Elevation:	Slope:	Depth to groundwater:
4,500 to 10,000 feet	0 to 40%	0 – 50 cm.

		Attribute Description	Functions as desired	Does not meet desired function	Crosses below threshold
Stream Water Quality 1	⇨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	<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)
	⇨6	Streambank stability	>80% (>90% TES streams)	70%-80% (70-90% TES streams)	<70%
Stream Condition	⇨7	Head cuts	None present	<50 cm depth	>50 cm depth
	8	Relative cover of species in Group "A"	>80%	40-80%	<40%
Vegetation	9	Relative cover of species in Group "B"	<20%	20-60%	>60%

	⇨10	Cover of noxious weeds	None	<5%	>5%

For a site to be classified as “functions as desired,” attributes #1 through #7 and #10 must meet “functions as desired.”

If any of attributes #1 through #7 and #10 do not meet desired function, then the site is classified as “does not meet desired function.”

Management problems are indicated when any one of the attributes “does not meet desired function.”

If a majority of attributes and attributes #6 and #7 are at “crosses below threshold,” then the site has crossed an ecological threshold and may not be ecologically or economically feasible to restore.

⇨ Priority attributes.

1 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 monitored. In locations where there is only a narrative standard (no numerical standards) for a water quality parameter, numerical data are collected to monitor trend.

Group A – Species Indicative of Desired Function

Willows	Salix lemmonii (Lemmon willow)	Salix eastwoodiae (mountain willow)
Salix lucida lasiandra (Pacific willow)	Salix scouleriana (Scouler willow)	Salix lasiolepsis (arroyo willow)
Salix boothii (Booth willow)	Salix wolfii (Wolf willow)	Salix bebbiana (Bebb willow)
Salix geyeriana (Geyer's willow)	Salix orestera (Sierra willow)	Salix drummondiana (Drummond willow)
Salix lutea (yellow willow)	Salix commutata (undergreen willow)	
Salix exigua (coyote willow) at low elevations		
Other shrubs/trees:		
Cornus sericea (dogwood)	Ledum glandulosum (Labrador tea)	Mahonia repens (Oregon grape)
Ribes inerme (currant)	Lonicera involucrata (twinberry)	Populus angustifolia (narrowleaf cottonwood)
Ribes aureum (golden currant)	Artemesia cana (silver sagebrush)	Populus balsamifera trichocarpa (black cottonwood)
Alnus incana (alder)	Chamaebatiaria millefolium (fernbush)	Populus fremontii (Fremont cottonwood)
Betula occidentalis (birch)	Shepherdia argentea (silver buffaloberry)	Populus tremuloides (aspen)
Prunus virginiana (chokecherry)		
Rhus trilobata (skunkbush)		
Graminoids:		
Deschampsia caespitosa (tufted hairgrass)	Carex scopulorum (mountain sedge)	Glyceria grandis (American mannagrass)
Calamagrostis canadensis (bluejoint)	Carex simulata (analogue sedge)	Juncus ensifolius (swordleaf rush)
Calamagrostis scopulorum (reedgrass)	Carex pellita (woolly sedge)	Juncus nevadensis (Nevada rush)
Carex nebrascensis (Nebraska sedge)	Carex aurea (golden sedge)	Phleum alpinum (alpine timothy)
Carex microptera (smallwing sedge)	Carex vesicaria (blister sedge)	Poa palustris (fowl bluegrass)
Carex aquatalis (water sedge)	Carex microptera (ballhead sedge)	Poa secunda (Sandberg's or Nevada bluegrass)
Carex utriculata or Carex rostrata (beaked sedge)	Carex athrostachya (slender beaked sedge)	Scirpus microcarpus (bulrush)
	Glyceria striata (fowl mannagrass)	

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 Parnassis), Pedicularis groenlandica (elephantshead), 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)

Arhenatherum 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)

Eleocharis spp. (spikerush).

Forbs:

Rumex spp. (sorrel or dock)

Circium 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 verticillum (water milfoil)

Lemna spp. (duckweed)

Arnica chamissonis (arnica)

Shrubs:

Rosa woodsii (Woods' rose)
Artemesia tridentata (any subspecies big sagebrush)

Group D – Forb/Shrub Species Indicative of Management Problems

Rumex spp. (sorrel or dock)
Achillea millefolium (yarrow)
Penstemon (any species)

Circium spp. (thistle, any species)
Symphyotrichum spp. (aster, any species)
Urtica dioica (stinging nettle)

Cicuta douglasii (water hemlock)
Veratrum californicum (false hellebore)
Equisetum spp. (horsetail)

Thermopsis rhombifolia (yellow pea)
Iris missouriensis (wild iris)
Nemophila brevifolia (basin blue eyes)

Taraxacum officinale (dandelion)
Potentilla spp. (cinquefoil, any species)
Rosa woodsii (Woods' rose)

Epilobium spp. (willow herb)
Artemesia tridentata (any subspecies big sagebrush).

Appendix A-7: Mahogany Group

Elevation:	Slope:	Precipitation:
6,500 to 9,500 feet	4 to 75%	14 – 22 in.

	No.	Attribute description	Functioning	Functioning at Risk	Functioning below threshold
Soil	⇨1	Bare ground/pavement	< 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	≤ five terraces evident on hillslopes	> five terraces evident on hillslopes	Terracing extensive, < five ft. apart
Vegetation	⇨4	Mountain mahogany canopy cover	10-50%	<10% or >50%	< 5%
	5	Mahogany hedged or highlined, availability of leader growth to ungulates	Leader growth available	Leader growth mostly unavailable	Leader growth completely unavailable
	⇨6	Absolute cover of grasses in Group "A"	5-50%	<5%	absent
	⇨7	Absolute cover of annuals in Group "D"	none	< 5%	≥ 5%
	⇨8	Absolute cover of shrubs in Group "E"	<5%	5-15%	>15%

	⇨9	Cover of Noxious Weeds	None	≤ 5%	>5%
Hydrology	⇨10	Presence of rills/ rill formation	No rills present	Active rills formation in exposed areas	Rill formation is severe and well-defined
	11	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	12	Fire frequency	50-70 years	> 70 years	<10 or > 100 years
	13	Roads, powerlines, fences, mining or other disturbance	Affects <5% of area	Affects 5-40% of area	Affect > 40% of area

If a majority of non-priority and all priority attributes are functioning, then the site is classified as “functioning.”

If a majority of non-priority and priority attributes do are functioning at risk, then the site is classified as “functioning at risk.”

If a majority attributes or attributes 4, 6, 9 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.

⇨ = Priority attributes.

Group A – Shrub and Tree Species Indicative of Desired Function

Shrubs:

Artemisia tridentata ssp. vaseyana (mountain big sagebrush)

Artemisia arbuscula (low sagebrush)

Artemisia nova (black sagebrush)

Purshia tridentata or glandulosa (bitterbrush)

Ribes spp. (currant)

Amelanchier alnifolia (serviceberry)

Symphoricarpos oreophilus (snowberry)

Trees:

Abies concolor (white fir)

Juniperus scopulorum (Rocky Mountain juniper)

Juniperus osteosperma (Utah juniper)

Populus tremuloides (aspen)

Pinus flexilis (limber pine)

Pinus jeffreyi (Jeffrey pine)

Pinus monophylla (pinyon pine)

Group B – Dominant Grass Species Indicative of Desired Function

Graminiods:

Psuedoroegneria spicata (bluebunch wheatgrass), the dominant grass on limestone soils

Festuca idahoensis (Idaho fescue), the dominant grass on most volcanic soils

Achnatherum nelsonii (Columbia needlegrass)

Hesperostipa comata (needle and thread)

Achnatherum hymenoides (Indian ricegrass)

Achnatherum lettermanii (Letterman's needlegrass)

Achnatherum pinetorum (pine needlegrass)

Poa fendleriana (muttongrass)

Group C – Other Graminoids and Forbs Indicative of Desired Function

Graminoids:

Achnatherum thurberianum (Thuber's needlegrass)

Carex rossii (Ross's sedge)

Carex exserta (shortawn sedge)

Elymus elymoides (squirreltail)

Poa secunda (Sandberg bluegrass)

Poa wheeleri (Wheeler's bluegrass)

Pascopyron smithii (western wheatgrass)

Koeleria macrantha (Junegrass)

Bromus carinatus (mountain brome)

Leucopoa kingii (spikefescue)

Leymus cinereus (basin wildrye)

Melica bulbosa (oniongrass)

Elymus trachycaulum (slender wheatgrass)

Forbs:

Balsamorhiza sagittata (arrowleaf balsamroot)	Sedum lanceolatum (stonecrop)	Helianthella uniflora (one-flower sunflower)
Lithospermum ruderale (stoneseed)	Phlox hoodii (Hood's phlox)	Linum lewisii (blue flax)
Crepis acuminata (tapertip hawksbeard)	Phlox longifolia (longleaf phlox)	
Erigeron spp. (fleabane/daisy)	Streptanthus spp. (jewelflower),	Penstemon spp. (penstemon),
Lupinus spp. (lupine)	Mahonia repens (Oregon grape),	Comandra umbellata (toadflax),
Astragalus spp. (milkvetch or locoweed)	Eriogonum spp. (shrubby buckwheat),	Ipomopsis spp. (gilia),
Arabis spp. (rockcress)	Castilleja spp. (Indian paintbrush),	Arenaria spp. (sandwort)
Petrophyton caespitosum (rock spirea)	Packera/Senecio spp. (groundsel),	Symphyotrichum spp.

Group D – Annual Species Indicative of Management Problems

Bromus tectorum (cheatgrass)	Vulpia octoflora (six-week fescue)	Halogeton glomeratus (halogeton)
Bromus rubens (red brome)	Descurainia spp. (tansymustard)	Tragopogon dubius (salsify)
Bromus japonicus (Japanese brome)	Sisymbrium spp. (tumblemustard)	Salsola tragus (Russian thistle)

Group E – Shrub Species Indicative of Management Problems

Chrysothamnus viscidiflorus (yellow rabbitbrush

Ericameria nauseosus (rubber rabbitbrush)

Ephedra viridis (Mormon tea)

Gutierrezia sarothrae (broom snakeweed)

APPENDIX 2

Capability/Suitability

All eleven allotments within the project area are available for authorization to graze domestic livestock. Ten of the eleven are active allotments with grazing authorized under term grazing permits; one of the allotments is vacant with no livestock currently permitted. The Forest Service has managed livestock grazing on 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.

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

Capability and suitability was analyzed for the AMS using criteria established in the 1981 Range Analysis Handbook. 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. The 1981 Range Analysis Handbook suggested 50 pounds per acre, and the criterion in the 1998 regional direction was 200 pounds per acre. 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.

As part of the Great Basin South analysis, 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 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". These maps are part of the project record.

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. Discussion were held 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.

The outcome was that the mapping exercise might 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 may actually be capable with different seasons of grazing, or changes in the erodibilty information. It was also agreed that there were areas that were not capable of sustaining livestock grazing on the long term, but that these areas were dispersed throughout the allotments, and that livestock would not be dependent on any of these areas. It was felt that for the most part, none of the areas that mapped out as not capable were large enough to affect the ability to properly graze livestock on the entire allotment. It was understood that the capacity of any allotment would not be based on those areas considered not capable. But, as is stated in the 1998 Regional Direction, “the capability and suitability analysis and determination in Forest Plans is not a decision to graze livestock on any specific area of land nor are they decision on livestock grazing capacity.”

The question was asked 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 authorized within the allotments in the project area with the exception of those areas listed 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 authorized for domestic livestock grazing. This area is part of a wild horse territory and is the only grazing activity that should be authorized.

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.

The Proposed Action reflects the ID Team’s conclusions regarding the capability and suitability of grazing livestock within the project area, and proposes not authorizing grazing in the areas listed above.

REFERENCES

Allen, Edith Bach, and Dennis H. Knight. 1984. The Effects of Introduced Annuals on Secondary Succession in Sagebrush-Grassland, Wyoming.

Beck, Jeffrey L. and Dean L. Mitchell, 2000, Influences of livestock grazing on sage grouse habitat. Published in Wildlife Society Bulletin 2000, 28. ,pages 993-1002.

Bedell, T.E.,, Range Management-Dealing with Drought. Published in Great Plains Beef Cattle Handbook. pages 9402.1-9402.2.

Block, Morrison, Reiser, 1994, The Northern Goshawk: Ecology and Management. Published in Studies in Avian Biology No. 16. pages 119-121.

Bradford, et al. 2002. "Livestock Grazing on the National Forests-Why continue to do it?" Rangelands 24(2) (2002). 3-11.

California Department of Fish and Game. 2003. Nesting Bald Eagle Surveys of the East Walker River.

Campbell, Robert B. Jr. and Dale L. Bartos. 2000. Aspen Ecosystems: Objectives for Sustaining Biodiversity. Symposium Proceedings; 13-15 June 2000; Grand Junction, CO. Proceedings RMRS-P-18. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Clary, W. and W. Leininger, 2000, Stubble height as a tool for management of riparian areas.

Clary, Warren P.; Webster, Bert F. 1989. Managing Grazing of Riparian Areas in the Intermountain Region. Gen. Tech. Rep. INT-263. Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Research Station. 11 p.

Connelly, John W., Michael A. Schroeder, Alan R. Sands, and Clait E. Braun. 2000. Guidelines to Manage Sage Grouse Populations and their Habitats. Wildlife Society Bulletin.

Cook, C. Wayne and R. Dennis Child, 1971, Recovery of Desert Plants in Various States of Vigor.

Cook,C. Wayne and L.A. Stoddart, 1963, The Effect of Intensity and Season of Use on the Vigor of Desert Range Plants.

Cosgrove, Dennis, Dan Undersander, and James Cropper. 2001. Guide to Pasture Condition Scoring. US Department of Agriculture, Natural Resources Conservation Service, Grazing Lands Technology Institute. eight p.

Eyre, F.H., Editor, 1980, Pinyon-Juniper. Forest Cover Types of the United States and Canada. pages 116-117.

Farrar, D. 2004. *Botrychium searches and collections in Nevada and Utah in 2003.* Unpublished report to the Humboldt-Toiyabe National Forest. Submitted January 21, 2004.

Fleischner, Thomas L., 1994, Ecological Costs of Livestock Grazing in Western North America. Published in Conservation Biology, Volume 8, Issue 3, pages 629-644.

Glover, Brett. 2003. [Personal Communication regarding noxious weed invasions]. U. S. Department of Agriculture, Forest Service, Humboldt-Toiyabe National Forest, Elko, NV.

Goodrich, Sherel. [Date Unknown] Classification, and Capabilities of Woody Sagebrush (*Artemesia*) Communities of Western North America With Emphasis on Sage

Grouse (*Centrocercus urophasianus*) Habitat. Vernal, UT. US Department of Agriculture, Forest Service, Ashley National Forest.

Green, J. S., JT Flinders 1980a. *Brachylagus idahoensis*. Amer. Soc. Mammal. Mammalian Species No. 125:1-4.

Green, J. S., JT Flinders 1980b. *Habitat and dietary relationships of the pygmy rabbit*. J. Range Manage. 33(2):136-142.

Gruell, George E., 1997, Historic Roll of Fire in Pinyon-Juniper Woodlands, Walker River Watershed Project.

Gutiérrez, R. J. and D. J. Delehanty. 1999. Mountain Quail (*Oreortyx pictus*). Poole, A. and F. Gill (eds.). The Birds of North America, No. 457. Academy of Natural Sciences, Philadelphia, Pennsylvania, USA.

Gutierrez, R.J. 1977. Comparative ecology of the mountain and California quail in Carmel Valley, CA. California Living Bird 18:71-93.

Hamilton, Ron. 1992. Aspen in the State of Nevada. U. S. Department Of Agriculture, Forest Service, Intermountain Region. Ogden, UT

Holechek, et al. "Stocking Desert Rangelands: What We've Learned." Rangelands 21(6) (1999): 8-12.

Houston, Walter R. 1954. A Condition Guide for Aspen Ranges of Utah, Nevada, Southern Idaho, and Western Wyoming. Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.

Huntly, Nancy, 1991, Herbivores and the Dynamics of Communities and Ecosystems. Published in the Annual Review of Ecology and Systematics, Volume 22. pages 477-503.

Johnson, Curt. Dec. 2002. [Written Comments to Cheri Howell]. On file at: US Department of Agriculture, Humboldt-Toiyabe National Forest, Santa Rosa Ranger District, Winnemucca, NV. 3 p.

Johnson, Curtis M. and Van Elsbernd.1997. Memorandum to Director of Vegetation Management. "Subject: Regional Rangeland Inventory and Assessment." Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Region. 13 p.

Johnson-Groh, C.L., and J. M. Lee 2002a. *Phenology and demography of two species of Botrychium (Ophioglossaceae)*. American Journal of Botany 89(10):1624-1633.

Johnson-Groh, C.L., C. Riedel, L. Schoesslet, and K. Skogen. 2002b. *Belowground distribution and abundance of Botrychium gametophytes and juvenile sporophytes*. American Fern Journal 92(2):80-92.

Kay, Charles E. 2001. The Condition and Trend of Aspen Communities on BLM Administered Lands in Central Nevada--with Recommendations for Management. Providence, UT: Wildlife Management Services.

Kay, Charles E. 2002. The Condition and Trend of Aspen Communities on BLM Administered Lands in North-Central Nevada--with Recommendations for Management. Providence, UT: Wildlife Management Services.

Kindschy, Robert R. 1994. Part Two: Crested Wheatgrass in the Ecosystem. Vale, OR.

Knick, Dobkin, Rotenberry, Schroeder, Wander Haegen, Van Riper III, 2003, Conservation and Research Issues for Avifauna of Sagebrush Habitats.

pages 611-634. Published by the Cooper Ornithological Society 2003.

Kuenzi, Amy J et al. 1999. Bat Distribution and Hibernacula use in West Central Nevada. Great Basin Naturalist. 59(3): 213-220.

Linne, James M. 1978. BLM Guidelines for Sagebrush/Grass and Pinyon-Juniper Plant Communities to Incorporate Fire Use/Management into Activity Plans and Fire Use Plans- Draft. Bureau of Land Management.

Longhurst, et al, 1983, Livestock and Wild Ungulates. pages 42-64.

Manning, Mary E., and Wayne G. Padgett. 1995. Riparian Community Type Classification for Humboldt and Toiyabe National Forests, Nevada and Eastern California. US Department of Agriculture, Forest Service, Intermountain Region.

Memmott, K., V. anderson, S. Monsen, 1998, Seasonal grazing impact on cryptogamic crusts in a cold desert ecosystem.

Miller, Richard F. 2002. [Notes from] Restoration and Management of Sagebrush/Grass Communities Workshop. Elko, NV. US Department of Interior, Bureau of Land Management.

Miller, Richard F. and Lee L. Eddleman. 2001. Spatial and Temporal Changes of Sage Grouse Habitat in the Sagebrush Biome. Technical Bulletin 151. Corvallis, OR. Oregon State University Agricultural Experiment Station.

Monsen, Stephen B., Nancy L. Shaw, and Scott L. Jensen. 2002. Workshop Restoration and Management of Sagebrush/Grass Communities Elko, Nevada - Features and Planting Attributes of Select Native Species for Big Sagebrush and Related Plant Communities.

Mooney, Melissa Jane. 1985. A Preliminary Classification of High-Elevation Sagebrush-Grass Vegetation in Northern and Central Nevada, A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Natural Resource Management.

Morefield, J. D. (ed.). 2001. Nevada Rare Plant Atlas. Carson City: Nevada Natural Heritage Program, compiled for the US Department of Interior, Fish and Wildlife Service, Portland, Oregon and Reno, Nevada.

Mueggler, Walter F. 1988. Aspen community types of the Intermountain Region. Gen. Tech. Rep. INT-250. Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Research Station. 135 p.

Neel, Larry A. editor. Nevada Partners in Flight Bird Conservation Plan. November 29, 1999.

Nelson, Lynda Peck, and Mark E. Jensen. 1987. Sagebrush-Grass Community Types of the Humboldt National Forest. NV: US Department of Agriculture, Forest Service.

Nevada Department of Wildlife. 2003 Sage grouse population numbers.

Nevada Department of Wildlife, 1980, GAWS Survey, Bodie and Rough Creeks.

Nevada Department of Wildlife, 2002, 2001-2002 Big Game Status, pages 17, 18.

Nevada Governor's Conservation Strategy. 2001. Nevada Sage Grouse Conservation Strategy. Sage Grouse Conservation Planning Team.

Nevada Weed Action Committee,, Downloaded Noxious Weed List including Hoary cress. www.agri.state.nv.us/nwac

Nevada, State of, 1994, Livestock, BMP 7-8 Planned Grazing System. Nevada Best Management Practices. 7-21 thru 7-32.

Parsons, C., P. Momont, T. Delcurto, M. Mcinnis, M. Porath, 2003, Cattle distribution patterns and vegetation use in mountain riparian areas.

Pope, M. 2003. Mountain Quail Biology. Talk presented at Quail Unlimited Symposium in Reno, Nevada, July 22, 2003.

Pope, M. and J. Crawford. 1999. Mountain Quail Research: Annual Report 1999. Oregon State Univeristy.

Platts, W.S. 1979. Livestock grazing and riparian/stream ecosystems—an overview.

Rivers, Ira La, Ph.D., FAZ, FOMS, University of Nevada, Reno, 1962, Fishes and Fisheries of Nevada, Nevada State Fish and Game Commission, page 103.

Saab, V., C. Bock, T. Rich and D. Dobkin, 1995, Livestock Grazing Effects in Western North America. Published in Ecology and Management of Neotropical Migratory Birds: A syntheses and Review of Critical Issues. pages 311-353.

Sauer, J.R, J.E. Hines and J. Fallon. 2003. The North American Breeding Bird Survey, Results and Analysis 1966-2001. Version 2002.1, USGS Patuxent Wildlife Research Center. Laurel, MD.

Tart, David L. 2003. [Personal Communication regarding sagebrush cover and fire frequency]. Ogden UT. U. S. Department of Agriculture, Forest Service, Intermountain Region

Taylor Tim, CA Department of Fish and Game, 1991. Ecology and Productivity of Two Interstate Deer Herds in the Eastern Sierra Nevada, page 27.

Taylor, Tim CA Department of Fish and Game, 2003. Email correspondence on East Walker deer herd population. August, 2003.

Taylor, Tim CA Department of Fish and Game. 2006, Personal Communication.

University of Connecticut. Lecture Notes - Habitat Fragmentation. Available: http://darwin.eeb.uconn.edu/eeb310/lecture-notes/fragamentation/fragmentation.html [2003].

University of Ottawa. 1998. Habitat Loss and Fragmentation. Available: http://course web.edtech.uottawa.ca/BIO3115/lect998.pdf. [2003].

US Census Bureau, Profile of selected economic characteristics for Mono Co. CA

US Census Bureau, 1999, County Estimates for Median Household Income for NV, 1999

US Census Bureau, 2005, Social Science Data Analysis Network, webpage www.censusscope.org/us/s6/c51/chart_work.html, 10/18/2005.

US Census Bureau, 2006, http://www.census.gov/Press-Release/www/releases/archives/population/006563.html 8/26/2006.

US Census Bureau, Occupation and Industry table of Mineral and Lyon Co. NV

US Department of Agriculture, 2005 b. http://www.ers.usda.gov/Data/Unemployment/RDList2.asp?ST=CA 10/18/2005.

US Department of Agriculture, 2005 c. http://www.nass.usda.gov/census/census02/profiles/nv/cp32019.PDF. 10/18/2005.

US Department of Agriculture, 2005a. http://www.ers.usda.gov/Data/Population/PopList.asp?ST=NV&LongName=Nevada, 10/18/2005 .

US Department of Agriculture, Agricultural Research Service, Journal of Experimental Range. 1999. Rangeland Monitoring Manual. Las Cruces, NM: US Department of Agriculture.

US Department of Agriculture, Agricultural Research Service. Invaders Database System. [http://invader.dbs.umt.edu/Noxious_Weeds/] 1998.

US Department of Agriculture, Animal and Plant Health Inspection Service. Available: http://www.aphis.usda.gov/npb/statenw.html

US Department of Agriculture, Natural Resources Conservation Service. National Plant Data Center Plants Database. [http://plants.usda.gov]. 2003a.

US Department of Agriculture, Natural Resources Conservation Service. 1987-1999. Range Ecological Sites - Southern Nevada Basin & Range, Major Land Resource Area 29. Nye/Lincoln and Esmeralda Counties.

US Department of Agriculture, Natural Resources Conservation Service. 2001. Rangeland Soil Quality-Information Sheets 1-10.

US Department of Agriculture, Soil Conservation Service. 1988. Range Inventory Worksheet.

US Department of Interior, Fish and Wildlife Service, Region 1, 1995, Recovery Plan for the Lahontan Cutthroat Trout, pages E1, E2,and E3.

US Department of Agriculture Forest Service Draft Bi-State Sage Grouse Conservation Plan. Mt. Grant PMU. 2003.Forest Service Web, Boise National Forest.

USDA Forest Service, 2001, Personal Use Fuelwood Program Map, Bridgeport Ranger District.

US Department of Agriculture, Forest Service, 2004 Ecology Team Data and 2210 Files. Bridgeport Ranger District.

US Department of Agriculture, Forest Service, 2006 Interdisciplinary Team Notes, Bridgeport Ranger District.

US Department of Agriculture, Forest Service, 1991, WO Amendment 2200-91-3, Effective 3/1/91. pages five and 6.

US Department of Agriculture, Forest Service, Intermountain Region.1969. Range Environmental Analysis Handbook, Amendment No. 4, Chapter 40 – Site and Ocular Analysis.

US Department of Agriculture, Forest Service, Pacific Southwest Region, Sierra Nevada National Forests. 2001. Rapid Assessment to Select and Establish Monitoring Benchmarks on Key Use Grazing Areas For Meadow and Riparian Rangelands.

US Department of Agriculture, Forest Service.1989.Visual Indicators of Soil Compaction and Puddling. Ogden, UT.

US Department of Agriculture, Forest Service.1996. Proposed Plan-Appendix IX-Landscape Scale Structure and Pattern for Covertypes that Occur on the Wasache-Cache

National Forest. Salt Lake City, UT. Wasatch–Cache National Forest.

US Department of Agriculture, Natural Resources Conservation Service. ”Major Land Resource Area 26 – Carson Basin and Mountains. Various Revisions.

US Department of Agriculture, Bridgeport Ranger District, HTNF, 2002, Biological Evaluation/Assessment for Metallic Ventures, Inc, Esmeralda Project

US Department of Agriculture, Forest Service Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement, January, 2001.

US Department of Agriculture, Natural Resources Conservation Service, 1992, Major Land Resource Area 26, Carson Basin & Mountains, Ecological Site Descriptions.

US Department of Interior, Park Service National Wild and Scenic Rivers System, Downloaded article on Wild and Scenic Rivers Act. pages 1-2. www.nps.gov,

US Department of Agriculture,, Soil Conservation Service, Soil Survey of Mineral County Area, Nevada, 1991.

US Department of Interior Bureau of Land Management. 2002. Management Considerations for Sagebrush (Artemisia) in the Western United States: a Selective Summary of Current Information About the Ecology and Biology of Woody North American Sagebrush Taxa. Washington, D.C.

US Department of Interior. Fish and Wildlife Service, 1986. Recovery Plan for the Pacific Bald Eagle. Portland, Oregon.

US Department of Interior. Fish and Wildlife Service, 1995. Recovery Plan for the Lahontan Cutthroat Trout. Portland, Oregon.

Weixelman, D.A., D.C. Zamudio and K. Zamudio. 1999. Sierra Nevada Riparian Field Guide. US Department of Agriculture, Humboldt-Toiyabe National Forest, Sparks, NV

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