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Environmental Assessment

LIVESTOCK GRAZING AUTHORIZATION AND WILD HORSE APPROPRIATE MANAGEMENT LEVEL ESTABLISHMENT
MASSACRE LAKES ALLOTMENT AND HERD MANAGEMENT AREA

August 26th, 2013

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Environmental Assessment
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Bureau of Land Management
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Chapter 1. Introduction

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This Environmental Assessment (EA) is being prepared to disclose and analyze the environmental consequences of re-authorizing one livestock grazing permit for 10 years on the Massacre Lakes Allotment and establishing an Appropriate Management Level (AML) for wild horses on the Massacre Lakes Herd Management Area (HMA). The EA is a site-specific analysis of potential impacts that could result with the implementation of each of the alternatives. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), as well as other laws and policies affecting the alternatives. If the field manager determines this project has "significant" impacts following the analysis in the EA, then an Environmental Impact Statement (EIS) would be prepared for the project. If not, one of the alternatives chosen could include a livestock grazing permit being issued and a wild horse AML being established with a decision record accompanied by a Finding of No Significant Impact (FONSI) statement, documenting the reasons why implementation of the selected alternative would not result in "significant" environmental impacts.

1.1. Background

The Massacre Lakes Allotment is located in northwestern Washoe County Nevada at Townships 42- 44 N, Ranges 20 - 21 E (see Map on page 123), and includes approximately 44,480 acres of public and 2,410 acres of private lands; elevation ranges from 4,400 to 7,100 feet (see Map on page 124). Annual precipitation has varied from 2 to 13 inches over the last 24 years, averaging 5.4 inches according to the Catnip Mountain Nevada Remote Automated Weather Station (RAWS) (http://www.raws.dri.edu/).

The 39,888 acre Massacre Lakes Herd Management Area (HMA) lies entirely within the boundaries of the Massacre Lakes Allotment. The HMA is located within the portion of the allotment north of Washoe County Road 8A (see Map on page 125). The Appropriate Management Level (AML) for HMA was estimated at 25 to 35 wild horses in the Surprise Resource Management Plan (RMP, BLM 2008) but is being formally established based on resource monitoring data within this process.

The Massacre Rim Wilderness Study Area (WSA) encompasses 31,080 acres of the northern portion of the Massacre Lakes Allotment, with approximately 78% of the HMA falling within the Massacre Rim WSA (see Map on page 126). The 2008 RMP designated portions of the Massacre Rim WSA as an Area of Critical Environmental Concern (ACEC, see Map on page 126). The ACEC was designated to provide special management actions to the important cultural resources within the ACEC area. The WSA and ACEC are located in the northern portion of the allotment. The southern portion of the allotment includes 3,815 acres of the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) (see Map on page 127).

The 1982 Massacre Lakes Allotment Management Plan (AMP, BLM 1982) states a livestock carrying capacity of 587 cattle from April 16 to August 31 annually for a total of 2,642 Animal Unit Months (AUMs). The AMP also established a rest-rotation/deferred grazing system for the allotment's five pastures: Juniper, Sand Spring, Lake Field, West Seeding and East Seeding see Map on page 128).

In 1993 the Sagehen Allotment was incorporated into the Juniper Pasture of the Massacre Lakes Allotment. The Sagehen Allotment grazing preference of 573 AUMs was added to the Massacre Lakes Allotment preference of 2,642 AUMs, and the season of use was extended to September 30. By 1994, most of the boundary fence between the Sagehen Allotment and the Juniper Pasture had been removed, except for a portion of this fence was merged into the Biebe spring exclosure.

The current grazing permit for the Massacre Lakes Allotment authorizes up to 582 cattle from April 16 to September 30 annually, for 3,215 Active AUMs. The Massacre Lakes Allotment is an "I" (Improve) category allotment, meaning the allotment generally has potential for increasing resource production or conditions but is not producing at that potential. There may be conflicts or controversy involving resource conditions and uses, but there are realistic opportunities to improve resource conditions.

1.2. Purpose and Need for the Action

The purpose of the action is to consider whether to reauthorize livestock grazing on the Massacre Lakes Allotment and to establish an AML for wild horses in the Massacre Lakes HMA. If authorized, grazing would be in accordance with 43 CFR 4100 and consistent with the provisions of the Taylor Grazing Act, Public Rangelands Improvement Act, Federal Land Policy and Management Act, and the Wild and Free Roaming Horse and Burro Act. The action will also ensure that all authorizations implement provisions of, and are in conformance with, the Record of Decision for the Surprise Resource Management Plan approved in April 2008, and the Black Rock Desert – High Rock Canyon Emigrant Trails National Conservation Area (NCA) Resource Management Plan of July 2004.

The BLM has been directed to renew and reissue all 10-year public land livestock grazing permits. The current livestock grazing permit issued under the Appropriations Act requires that all Terms and Conditions would remain the same as the expired permit until such time that the permit is "fully processed." The grazing permit renewal process requires that BLM determine whether current permitted grazing use conforms to the Surprise and NCA RMPs and the Standards for Land Health and Guidelines for Livestock Management (S&G determination). If current management does not conform to these mandates, then alternatives would be developed and analyzed to meet these requirements, along with any alternatives raised during scoping.

The Rangeland Health Assessment (RHA) and Determination were completed in April 2010. The Massacre Lakes Allotment Land Heath Determination found the upland soils standard was not met and not progressing towards being met. The stream health is not applicable and the water quality standard was not assessed. The riparian/wetland standard is not met but progressing towards being met, and the biodiversity standard is not met and not progressing towards being met. Current permitted livestock grazing and wild horse use are considered contributing factors in failure to meet the standards.

The Massacre Lakes Land Health Determination and Monitoring Evaluation identified specific resource issues throughout the allotment. The issues by pasture are as follows:

Juniper Pasture

- Lack of deep-rooted perennial bunchgrass
- Soil pedestalling and surface erosion
- Non-functioning and functioning-at-risk riparian areas

Lake Field

- Lack of deep-rooted perennial bunchgrass

- Areas of heavy cheatgrass invasion
- Heavy grazing use on lake meadows and uplands adjacent to lakebeds

Sand Spring Pasture

- Lack of deep-rooted perennial bunchgrass
- Areas of heavy cheatgrass invasion

East Seeding

- Lack of perennial bunchgrass (native and seeded) in shrub interspaces

West Seeding

- Excessive amounts of bare ground and lack of perennial bunchgrass (native and seeded) in shrub interspaces
- Heavy to severe livestock grazing

The Massacre Lakes Land Health Determination and Monitoring Evaluation are incorporated into this EA by reference; a copy is available at the Surprise Field Office and is posted on the Surprise Field Office web page at: http://www.blm.gov/ca/st/en/fo/surprise.html

This EA will review the environmental and socio-economic impacts of alternatives considered, and determine which grazing changes and adjustments in stocking rates may be needed. The livestock grazing permit that may be issued following this EA would address management changes and the number of livestock authorized within the allotment that would allow the Standards for Land Health to be met. The final decision will also establish an AML for the wild horses within the Massacre Lakes HMA. The BLM may select several different management strategies as means to address land health standard failures.

BLM has considered the following criteria as the basis for re-issuance of grazing permits and setting AMLs for wild horses:

- What grazing practices including level of grazing intensity should be authorized to promote sustainable ranching operations and healthy rangelands?
- What additional rangeland development projects, if any, are necessary to promote sustainable ranching operations and healthy rangelands?
- How will grazing management practices, rangeland developments, and wild horse use affect habitat quality for wildlife including the greater sage-grouse?
- How will BLM grazing management practices and rangeland developments affect the Massacre Lakes HMA wild horses?

1.3. Scoping and Issues

The public was first notified of the project on September 27, 2007, and a scoping letter was sent to 85 interested publics of record. Eight comment letters were received in 2007. On January 17, 2008, a second scoping letter was sent to 66 interested publics of record. Five comment letters

were received in 2008. May 15, 2009, a third Notice of Proposed Action (NOPA) and initiation of public scoping letter was sent to 205 interested publics of record. Thirteen comment letters were received in 2009. April 7, 2010 a fourth NOPA and initiation of public scoping letter was sent to 195 interested publics of record. Approximately 2,900 comments were received in 2010.

BLM met with local tribal groups to discuss this grazing permit renewal. Formal consultation between the BLM and the Fort Bidwell Tribal Council occurred on January 21, 2012, November 14, 2012, and March 9, 2013. Formal consultation between the BLM and the Summit Lake Paiute Tribal Council occurred on February 12, 2012, October 20, 2012, and March 16, 2012. Formal consultation between the BLM and the Cedarville Rancheria occurred on January 7, 2012 and February 26, 2013. This grazing permit renewal was open for discussion at each of these formal consultations.

Grazing permit renewal updates are regularly provided to Northeastern Resource Advisory Committee.

Following the completion of the Land Health Determination and draft monitoring evaluation, the fourth Notice of Proposed Action/Scoping letter was sent out on April 7, 2010 to notify the interested publics of our findings and to provide any additional input.

On May 2, 2012, Modoc-Washoe Experimental Stewardship Program (ESP) established a Technical Review Team

In September of 2012, Ms. Carla Bowers, "Wild Horse Advocate" and "Members of the Cedarville Community" presented BLM with the *Massacre Lakes "Natural" Study Herd Preservation Proposal*. This proposal included management recommendations for wild horses including a maximum AML, range improvements, access improvement, research proposals, and public outreach. The Surprise Field Office staff met with Ms. Bowers in November 2012 and January 2013. Following those meetings, and in follow-up correspondence, Ms. Bowers revised her proposal to better conform to management requirements from the Surprise RMP, management of WSAs, and other policies, regulations and laws. The Surprise Field Office staff has incorporated the revised proposal as Alternative 4 in this EA.

Issues/Concerns/Comments from Public Scoping

The following issues/concerns were raised by the public and state agencies in response to scoping:

- General comments concerning NEPA and a comprehensive impacts analysis of livestock grazing
- Concerns regarding impacts to greater sage-grouse, Carson wandering skipper, pygmy rabbit and bighorn sheep from grazing by livestock and wild horses.
- Impacts to pronghorn and mule deer populations and their habitat
- Many comments and concerns regarding wild horses including:
    - Complete removal of livestock from the HMA.
    - Increase AML based on genetic viability.

- Fertility control to eliminate or reduce the need for round-ups.
- Allocate forage equally between livestock and wild horses.

Based upon comments from the public, available information about resources and conditions within the allotment, and the other regulatory requirements, the following issues were developed related to the livestock grazing permit renewal and establishing a wild horse AML range:

- What grazing management practices should be implemented to:
  - Improve vigor and production of native deep-rooted perennial grasses in all pastures of the allotment.
  - Ensure adequate residual cover for nesting greater sage-grouse.
  - Improve water quality and riparian health at spring meadows in the Juniper Pasture and Lake Fields.
- What actions are needed to manage archaeological resources in the Massacre Rim ACEC and the historic landscape associated with the Applegate-Lassen Emigrant trail within the Black Rock-High Rock NCA?
- What is the Appropriate Management Level for wild horses that provides for a healthy, viable horse herd and healthy rangelands?
- What is the impact of changes in livestock and wild horse grazing practices on local, social and economic conditions?

Five alternatives were developed to respond to the issues identified during the scoping process.

A Technical Review Team is a group of interested members of the public and agency employees sanctioned by the Modoc-Washoe Experimental Stewardship Program to review resource issues related to management of public lands within the Surprise Field Office.

1.4. Relationship to Statutes, Regulations, and Plans

- Taylor Grazing Act of 1934 as amended and supplemented
- Federal Land Policy and Management Act of 1976
- Public Rangelands Improvement Act of 1978
- 43 CFR Part 4100 et al – Grazing Administration
- Noxious Weed Act of 1974
- Agreement between State Director and State Historic Preservation Officer Protocol Amendment for Renewal of Grazing Permit and Leases.
- BLM Instruction Memorandum (IM) No. 2012-043 [Title]
- RMP Amendment for Greater sage-grouse (in progress)
- BLM National Greater Sage-grouse Conservation Measures/Planning Strategy Technical Team

- National Historic Preservation Act (NHPA) (1966), as amended.
- Archaeological Resources Protection Act (1979), as amended
- Executive Order No. 11,593- Protection and Enhancement of the Cultural Environment, 1971
- BLM Manual 8100 – Cultural Resource Management
- American Indian Religious Freedom Act and Executive Order (E.O.) 13007
- Native American Grave Protection and Repatriation Act (NAGPRA)
- State Protocol Agreements between BLM Nevada and Nevada SHPO (2009c)
- State Protocol Agreements between BLM California and California and Nevada SHPO (2012)

The BLM has a responsibility to manage cultural resources on public lands consistent with applicable procedures and agreements. To comply with the National Historic Preservation Act, the BLM is required to assess the condition of cultural resources on each grazing allotment prior to the renewing of grazing allotment permits. In August 2007, the State Director, California Bureau of Land Management, the California State Historic Preservation Officer (SHPO) and the Nevada SHPO addressed the issue of the National Historic Preservation Act (NHPA) Section 106 compliance procedures for processing grazing permit lease renewals for livestock as defined in 43 CFR 4100.0-5. The State Director and the SHPOs amended the 2007 State Protocol Agreement between California Bureau of Land Management and The California State Historic Preservation Officer regarding the 2007 Grazing Amendment, Supplemental Procedures for the Livestock Grazing Permit/Lease Renewal.

The results of grazing allotment assessments may be used to modify grazing permits. If cultural resources are identified as receiving impacts as a result of livestock management or grazing on a specific allotment, the stipulations of the grazing permit will be modified to reflect compliance with the Bureau's responsibility to manage and protect cultural resources. Consultation regarding affected cultural resources will take place with the appropriate Native American tribes and the California and/or Nevada State Historic Preservation Office(s). All cultural resources will be afforded protection consistent with law and policy, including appropriate mitigation measures.

Plan Conformance

Determination:

The Proposed Action and other alternatives except for the No Grazing Alternative are in conformance with the Surprise Resource Management Plan (RMP), as adopted by the Record of Decision (April 2008), and the NW Nevada and NE California Rangeland Health Standards and Guidelines for Livestock Grazing. The Standards and Guidelines for Livestock Grazing are contained within the RMP, available on the Surprise Field Office web site.

The Proposed Action and other alternatives except for the No Grazing Alternative are also in conformance with the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area RMP (USDI, 2004).

The No Grazing Alternative is not in conformance with either RMP. Both RMPs allocated respective portions of the Massacre Lakes Allotment for grazing by livestock and for use by wild

horses. The No Grazing Alternative provides an assessment for comparison purposes, however, if this alternative were selected, BLM would initiate the process to amend the RMPs.

Rationale:

The Proposed Action would occur in an area identified as available for livestock grazing in the Surprise Resource Management Plan and is consistent with the land use decisions and resource management goals and objectives of the RMP in Sections 2.2, 2.8, 2.10 through 2.19, and 2.22; and the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Resource Management Plan in Sections 2.2.2, 2.2.3, 2.2.5, 2.2.7, through 2.2.10, 2.2.13, and 2.2.14.

1.5. Rangeland Health

The Rangeland Health Assessment and Determination were completed in April 2010. Resources within the allotment were assessed in relation to the Secretary of the Interior Approved Rangeland Health Standards; the results of the assessment are as follows:

Table 1.1. Achievement of Rangeland Health Standards Massacre Lakes Allotment

Rangeland Health Standard	Meets Standard	Does Not Meet Standard	Current livestock grazing management practices are a causal factor for not meeting standard (Yes or No)
Upland Soils		X	Yes
Stream Health	N/A	N/A	N/A
Riparian/ Wetland		X	Yes
Water Quality	N/A	N/A	N/A
Bio-diversity		X	Yes

Resource categories determined to not meet Rangeland Health Standards are discussed below. Assessment sites 1 & 4 are located in the Sand Spring Pasture; sites 2 & 5 are located in the Juniper Pasture; and site 3 is located in the Lake Field (see Map 6).

Upland soils

Soil stability test results were low (unstable) for three of the five evaluation sites. Two sites (1 & 4) in the Sand Spring Pasture were unable to be tested due to the sandy soil composition [not unexpected at site 4 (Sandy 8-12) which should have a low stability rating from 1-3]. Although the soil at site 1 is loamy with a soil stability rating of 3-6, the sandy component contributed to the inability to collect a solid fragment to test and the low rating. Both Claypan sites (2 & 5) in the Juniper Pasture showed signs of surface erosion and pedestalling. The moderate departure ratings at these sites for the indicators '*pedestals and/or terracettes'* and '*plant community composition and distribution relative to infiltration'* also contributed to a non-functioning rating for Hydrologic Function.

Riparian/Wetland

The standard for riparian areas is not met but is progressing towards meeting the standard. The majority of riparian habitats within the Allotment/HMA that are fenced are at PFC. Riparian areas within exclosures are providing water and cover for wildlife. Exclosures have effectively

removed cattle and wild horse impacts from four riparian sites with the Post Spring exclosure and riparian habitat are improving. Within the Juniper Pasture, two riparian sites were rated as functional at risk (FAR), one other site is non-functional, and two sites were not rated. Field observations indicate that wild horse impacts contributed the FAR rating, especially those in the vicinity of Sagehen Spring. Based on staff observations, wild horses are the sole contributor to the degraded conditions and non-functional status at Sagehen Spring. Refer to Table 3.3 in the EA for a summary of riparian conditions on the allotment.

Biodiversity

The standard for biodiversity is not met and is not progressing towards meeting the standard. Throughout much of the allotment there is a lack of perennial bunch grasses in shrub interspaces and grass species diversity is low. In the Juniper Pasture, two sites (transects 2 & 5) and in the Sand Spring Pasture two sites (transects 1 & 4) rated functional/structural groups as moderate departures, generally due to lack of deep-rooted perennial grasses, and in some cases forbs are also absent. Utilization is currently heavy on grasses, even under sagebrush plants. While plant vigor rated good, annual production is lower than expected. Annual production was rated as moderate to extreme departure at sites 1 & 2 and moderate departure at sites 4 & 5.

Chapter 2. Proposed Action and Alternatives

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The following alternatives were developed as a result of internal and external scoping, and consultation with the Massacre Lakes Allotment permittee.

Table 2.1. Brief description of alternative components presented in Chapter 2

	1. PROPOSED ACTION	2. NO ACTION	3. TRT	4. ALLOCATION by PASTURE	5. NO GRAZING
Animal Numbers (Dates)	150C (5/15-5/29) 450C (5/30-9/17) 25-45H (12 months)	582C (4/16-9/30) 25-35H (12 months)	582C (4/16-9/30) 25-45H (12 months)	450 C (5/15-8/12) 100-121H (12 months)	0 C 0 H
Initial AUMs	1,693 C 300-540 H	3215 C 300-420 H	2415 C 300-540 H	1,322 C 780-1,452 H	N/A
Pasture Rotation	2 year early season rest rotation; mid/late season deferment	Same as #1	Not defined; Lake Field deferred until 6/15	Same as #1	N/A
Pasture Move Trigger	40% utilization or scheduled date, whichever comes first	Scheduled date	40% utilization	Same as #1	N/A
Turnout Date	5/15	4/16	4/16 or "range ready"	5/15	N/A
AUM Adjust-ments	After 4 years; based on desired stocking rate if short-term objectives not met	None	Annual; based on desired stocking rate	Same as #1	N/A
Upland Utiliza-tion	Light Use (20-40%)	Moderate Use (40-60%)	Light Use (20-40%)	Light Use (20-40%)	N/A
Overuse	>40 and <60% utilization: next use period in pasture would be adjusted;>60% utilization: pasture rested next season of use; >20% utilization in rested pasture: rested another season	None	Annual AUM adjustments	Same as #1	N/A
Reeval-uation	If objectives are not met after 4 years, AUMs adjusted	None	If objectives are not met after 4 years, implement Proposed Action	Same as #1	N/A
Range Improve-ments	Sagehen Spring exclosure (17.2 acres); Sand Spring Well water tank	None	None	Same as #1	N/A

2.1. Description of the Proposed Action:

Reduced Stocking Rate, Rest/Rotation/Deferred Use & 25 – 45 Wild Horse AML

The Proposed Action would authorize cattle grazing on the Massacre Lakes Allotment under a 10-year livestock grazing permit and establish an Appropriate Management Level for wild horses. The livestock grazing permit would authorize a maximum of 450 cattle for 4 months, for a total of 1,693 AUMs of permitted livestock use. Terms and conditions, including allotment-specific short- and long-term objectives and an adaptive management system for adjusting authorized AUMs are included to ensure grazing use conforms to the applicable RMPs and Land Health Standards.

The wild horse AML would be 25 to 45 head to facilitate progress towards achieving rangeland health standards within the HMA. The AML would result in a forage allocation to wild horses of 300 to 540 AUMs per year.

The Proposed Action represents BLM's alternative that conserves, restores or enhances greater sage-grouse habitat as required by BLM policy and direction in the interim period outlined in Instruction Memorandum (IM) No. 2012-043 and the National Greater Sage-grouse Conservation Measures/Planning Strategy Technical Team Report released on December 21, 2011.

Livestock Grazing Management

Mandatory terms and conditions under the Proposed Action are displayed in the table below:

Table 2.2. Mandatory Terms and Conditions

Allotment	Livestock		Grazing Period		% Public Land	AUMs			
	Number	Kind	Begin	End		Active	Sus-pended	Tempo-rary Sus-pended	Total
Massacre Lakes	150 450	Cattle	5/15 5/30	5/29 9/17	100	1,693	803	1,522	4,018

The grazing system would implement a two-year cycle of rest rotation and deferred use (see Table 2.3 and the Map on page 129 for a schematic of the proposed grazing system). For pastures not meeting or making progress toward meeting Standards for Rangeland Health, Guideline 16 would be implemented, which necessitates the maximum allowable utilization levels on key species is 20 - 40% specifically in areas that are not meeting standards. Guideline 16 applies to all pastures in the Massacre Lakes Allotment. Each pasture would be managed individually to address specific resource concerns:

Sand Spring Pasture

In Year 1 of each 2-year cycle, the pasture would be used early in the season, from 5/15 to 6/30. Cattle numbers would increase from 150 to 450 after 5/30. In Year 2, the pasture would receive complete rest from livestock use.

Lake Field

In Year 1, this pasture would receive complete rest from livestock use. Trailing would be allowed to move livestock through this pasture from the Sand Spring to the Juniper Pasture. In Year 2,

this pasture would be used early in the season, from 5/15 to 6/30, in conjunction with the East Seeding. Cattle numbers would increase from 150 to 450 after 5/30.

East Seeding

In Year 1, this pasture would receive complete rest from livestock use. Trailing would be allowed to move livestock through this pasture from the Sand Spring to the Juniper Pasture. In Year 2, this pasture would be used early in the season, from 5/15 to 6/30. Since the East Seeding Pasture has the smallest acreage, it would be used in conjunction with the Lake Field to relieve grazing pressures.

Juniper Pasture

This pasture would be used each year after seed ripe of native perennial grasses, from 7/1 to 8/24.

West Seeding

This pasture would be deferred each year until 8/25 to be used for up to 23 days. This would allow the permittee to have a pasture to gather cattle into at the end of the grazing season.

Table 2.3. Pasture Management under the Proposed Action

Pasture	Year 1			Year 2		
	No. of Livestock	Use Dates	AUMs	No. of Livestock	Use Dates	AUMs
Sand Spring	150C 450C	5/15 – 5/29 5/30 – 6/30	74 474	REST		
East Seeding & Lake Field	REST			150C 450C	5/15 – 5/29 5/30 – 6/30	74 474
Juniper	450C	7/1 – 8/24	805	450C	7/1 – 8/24	805
West	450C	8/25 – 9/17	340	450C	8/25 – 9/17	340
Total			1,693	Total		1,693

Other Livestock Grazing Terms and Conditions

The following terms and conditions would be a requirement of the grazing permit:

1. Grazing use offered or authorized by BLM is subject to all provisions of the grazing regulations (43 CFR Parts 4100) and other applicable law and regulation. Grazing authorizations may be modified in accordance with regulation to attain progress towards achieving rangeland health standards (subpart 4180.1 and 4180.2 Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration).

2. All grazing use will be in accordance with the Field Manager's Final Decision. All other past documents governing livestock use are superseded.

3. Billing will be based on actual use reports submitted 15 days following the last authorized take off date for the permit. If actual use reports are not submitted, the permittee may be financially liable and billed for their full permitted active use and actual use billing may be revoked.

4. A pre-season annual operating meeting will be held with the permittee to discuss previous years use and document current years grazing schedule. Livestock may not be turned out before this meeting has been conducted and without prior written approval from the authorized officer.

5. The scheduled time and period of authorization in each pasture cannot be exceeded without prior approval from the authorized officer. Moving livestock between pastures could occur within a 10 day period beginning five days prior to the scheduled move date.

6. Additional adjustments in livestock use may be required by BLM annually based on utilization, drought, water availability or other conditions.

7. Salt and mineral supplements may be used in the allotment. These supplements must not be located closer than ¼ mile from any natural or artificial water source, archaeological site, aspen stand, riparian area or 0.6 mile of an active sage-grouse lek during the breeding season.

8. Maintenance of all range improvements assigned to the permittee must be maintained prior to livestock turnout and inspected periodically throughout the scheduled use period to ensure livestock are restricted to those areas they are scheduled to be in. All required fence maintenance must be completed annually, even if the permit is not used. Failure to complete required fence maintenance may result in temporary or permanent suspension of the grazing authorization.

9. Maximum allowable use for key upland native and seeded grass species is 40% in all use areas and pastures as measured by approved BLM utilization monitoring protocol as contained in Interagency Technical Reference 1734-3, 1996.

10. Permitted livestock AUMs will be reevaluated on a four-year cycle; if short-term objectives are not being met after four years at the permitted grazing use, authorized AUMs for the next cycle will be adjusted based on the desired stocking rate formula (BLM Technical Reference 4400-7, 1985), using actual use and utilization data.

11. If utilization exceeds 40% by livestock in any pasture, use in the pasture will be adjusted using the Desired Stocking Level formula (BLM Technical Reference 4400-7, 1985); if utilization exceeds 60% the pasture will be rested for the following scheduled season of use. If 20% utilization is exceeded in a pasture that is scheduled for rest, that pasture will be rested the following scheduled season of use. Adjustments related to the Juniper Pasture will be made taking cattle and wild horse use into consideration.

12. Stubble height will not be less than four inches on current year's herbaceous riparian growth at any time during the growing season (or by the end of the growing season) at perennial springs within the allotment; key species include sedges and rushes.

13. Livestock use at Alkaline Meadows would not exceed a four inch stubble height at the end of the grazing season.

14. Permittee is responsible for determining when annual allowable use will be reached and for moving livestock into the next scheduled use area or off the allotment. Permittee is advised that allowable use may be reached before the scheduled move date and should act accordingly. Any adjustments in move dates or numbers must be communicated to BLM within 7 days of the change and shall be recorded accurately on the actual use report. BLM

will monitor the permittee's annual performance in meeting utilization objectives at the end of the grazing season.

15. On Year 1 of the grazing schedule cattle must be trailed from the Sand Spring Pasture to the Juniper Pasture. On Year 2 of the schedule, cattle must be trailed from the Lake Field and East Seeding to the Juniper Pasture. Gates between the Juniper Pasture and West Seeding may be opened (no more than five days prior) to facilitate livestock movement to the next scheduled use area if the permittee determines utilization levels are approached or exceeded.

16. The BLM will coordinate with the permittee to ensure that livestock are not turned out within 6/10th mile of an active sage-grouse lek site.

17. No livestock grazing is authorized within fenced exclosures designed to improve riparian and wildlife habitat or protect cultural resources.

Wild Horse Management

The wild horse Appropriate Management Level (AML) would be set at 25 – 45 head. Historically, wild horses use the Juniper Pasture for most of the year. Some horses tend to move into the East and West Seedings and the Lake Field during winter when snow covers forage in the Juniper Pasture. During the last six population inventories wild horses were not observed outside of the Juniper Pasture. However, some horses have been observed in the remaining pastures during normal ground compliance inspections in the winter. The 20 head difference between the lower and upper limits of the AML would require BLM to conduct regular removals or take other measures to control the population without damaging resources.

Table 2.4. Wild Horse Appropriate Management Level and Forage Allocation

HMA/Pasture*	Appropriate Management Level	Primary Use Period	Estimated AUMs
Massacre Lakes HMA	25 - 45	Yearlong	300 - 540
Juniper Pasture	25 - 45	Yearlong	241 - 432
Lake Field/East Seeding	25 - 45	winter	45 - 80
West Seeding	25 - 45	winter	15 - 27

Sand Spring Pasture is not within the HMA.

RMP Wild Horse Management Objectives

Wild horse management objectives are needed to ensure the Massacre Lakes Allotment/HMA would move towards meeting land health standards and ensuring that a thriving natural ecological balance is met while providing for a healthy and viable wild horse herd.

1. Manage Nut Mountain, Bitner, Wall Canyon, and Massacre Lakes HMAs as a Complex. Currently the combined AML for the Complex is 85-135 horses.

2. Prioritize selection of animals returned to BLM-administered lands after gathers based on traits desirable by public for adoption (color, size, and conformance).

3. Maintain Massacre Lakes HMA population within the established appropriate management level (AML) by conducting periodic gathers.

4. Implement fertility control if needed to assist in maintaining populations at AML.

5. Adjust AMLs when monitoring data indicates wild horse populations are not achieving a thriving natural ecological balance. Remove wild horses found outside HMAs.
6. Maintain a healthy and viable wild, free-roaming horse herd in the Massacre Lakes HMA.
7. Strive to achieve 100% adoptability of all horses that are excessed from this herd through the adoption program.
8. Prevent inbreeding problems from occurring in the Massacre Lakes HMA.

Range Improvements

The following range improvement projects are proposed. Locations of these projects are shown on a Map on page 133:

- Sagehen Spring and the associated meadow complex would be fenced within the Massacre Rim WSA. The purpose of this project is to protect the wet meadow and culture resources from further deterioration due to year round use by wild horses. The project is needed because of impacts to the riparian area by wild horses has resulted in an undesired condition of the meadow habitat for the greater sage-grouse and other wildlife and degradation of prehistoric cultural resources. The fenced area would be approximately 17.2 acres in size enclosed by about 0.66 miles of barbed wire fence. The fence would use rock cribs or steel pipe for corners and braces, and constructed with four wires (3 barbed-1 smooth wire) consistent with specifications for safe antelope passage. The construction period is approximately 3 days. Access to the project site would be with pickup trucks via the existing way next to the eastern boundary fence of the Massacre Lakes Allotment to a staging area nearest to the project location, and then cross country using low impact travel techniques on previously flagged routes approximately 0.5 mile to the spring. Following construction, the fence would be inspected and maintained periodically without motorized vehicle access. Infrequently, major maintenance would require using an ATV to transport tools and materials to the site using the same techniques as during construction.
- A water storage tank would be installed at Sand Spring Well in the Sand Spring Pasture to improve water availability and livestock distribution.

Standard Operating Procedures for construction of range improvement projects can be found in Appendix B. Barbed wire fences would be constructed to meet BLM fencing specifications for wildlife passage.

Monitoring

Annual utilization monitoring will be completed to assess whether the mandatory 40% utilization limits have been exceeded. All monitoring would be performed in accordance with BLM policy following protocols from BLM approved manuals and technical references.

Riparian stubble height would be measured at the end of grazing season on key riparian areas.

Long Term (to be accomplished 10 years after implementation) and Short Term (measurable annually) Allotment Objectives

Vegetation Objectives

Long Term –

- Increase density and cover of deep-rooted perennial grasses in all pastures of the allotment.
- Long term vegetation objectives will be based on DPCs when established.

Short Term –

- Utilization levels for livestock in all areas of the allotment will not exceed 40% on key species of grasses identified for each key area as measured at the end of the grazing season. Utilization data would be collected following removal of cattle from the allotment. Utilization would be read on one or more major ecological sites in each pasture, and resulting data would be used to create use pattern maps.
- Stubble heights in PPH areas measured on key grass species in the drip line of mountain, Wyoming, and basin big sagebrush do not drop below four inches by the end of the grazing season.

Riparian Objectives

Long Term –

- Maintain or progress towards PFC on key riparian areas.
- Improve riparian functionality on Post Spring and Alkaline Meadow from functioning at risk with a downward trend to proper functioning condition.
- Maintain proper functioning conditions at Biebe, Tuffy, and Indian Springs.
- Improve riparian functionality on Sagehen Spring from non-functional to functional at risk with an upward trend.
- Increase the percent meadow vegetation cover at Sagehen Spring to 85%.

Short Term –

- Stubble height will not be less than four inches on current year's herbaceous riparian growth at any time during the growing season (or by the end of the growing season) at perennial springs within the allotment; key species include sedges and rushes.
- Alkaline Meadows riparian objective is not exceed a four inch stubble height at the end of the grazing season.

Soil Objectives

Long Term –

- Improve or maintain soil stability by promoting deep rooted native perennial grasses; and continue progress towards achievement of rangeland health standard for soils at the sites used to evaluate Land Health conditions.

Short Term –

- Continue compliance with utilization guidelines to increase cover and litter for the protection of soils from erosion.

Wildlife Objectives

Long Term –

- Improve grass cover and grass composition for sage-grouse, mule deer, pronghorn antelope, bighorn sheep, and pygmy rabbit within the allotment at the sites used to evaluate Land Health conditions. Monitor objectives using qualitative vegetation monitoring methods.

Short Term –

- Maintain at minimum a 4" stubble height of key upland perennial grass species (measured in the drip line of big sagebrush) at the end of the grazing season in PPH areas.

Management Goals

1. By 2015, in coordination with the permittee and the affected interests, evaluate the location of current key areas to determine if they are properly located to appropriately represent utilization and management in a given pasture.
2. By 2015, establish new key areas for long and short term monitoring in coordination with the permittee and affected interests.
3. Collect annual utilization data at key areas in each pasture. This data collection effort should include both pre- and post-livestock use to discriminate between wild horse and cattle use.

Continue to maintain exclosure fences around Tuffy, Indian, Biebe, and Post Springs so that Proper Functioning Condition is reached or maintained at each spring.

2.2. *No Action (Current Management)*

Livestock Management

This alternative involves issuing a new permit with the same terms and conditions as under the expired authorization. The livestock grazing system and permitted AUMs would not change.

Existing Terms and Conditions

Mandatory terms and conditions from the livestock grazing permit issued in 2009 would apply as indicated in the following table; all other terms and conditions of the existing land use plan, or other source are the same as described for the Proposed Action.

Table 2.5. Current Authorized Use Summary (Mandatory Terms & Conditions)

Allotment	Number of Livestock	Kind	From	To	AUMs
Massacre Lakes	582	Cattle	4/16	9/30	3,215

Livestock Grazing System

The current grazing system is designed to provide the Juniper Pasture, Lake Field, and East and West Seedings at least one growing season of rest every other year and use the Sand Spring Pasture on a deferred basis each year (see Map on page 130 and Table 2.6 below). April 16 is the anticipated date for range readiness on the allotment. Generally after May 1, cattle are turned out from Nelson Well holding corrals between the East and West Seedings directly into one of these seeded pastures for a period of two to six weeks depending on the year. Cattle are then herded to the Lake Field or Juniper Pasture until mid-August before they are moved to the Sand Spring Pasture for the remainder of the season. The East and West Seedings are also used to gather into after August 16. The current utilization limit is Moderate -40-60% on the native pastures (Sand Spring, Juniper and Lake Field), and Heavy 60-80% in the seeded pastures (East & West Seeding).

Table 2.6. Current Grazing System

Pasture	Number of Cattle	Year 1	Year 2
Juniper	582	5/1-8/15	Rest
Lake Field	582	Rest	6/1-8/15
West Seeding	582	Rest	4/16-5/30 8/16-9/30
East Seeding	582	4/16-4/30 8/16-9/30	Rest
Sand Spring	582	8/16-9/30	8/16-9/30

Other Terms and Conditions

1. All grazing use would be in accordance with the Massacre Lakes AMP.
2. Billing would be based on Actual Use Reports submitted 15 days following the last unauthorized take-off date for the permit.
3. Actual Use Reports would be submitted to BLM no later than October 15 for the Massacre Lakes Allotment.
4. Any increases or extensions in grazing use would require prior approval from the authorized officer.
5. The Terms and Conditions of the permit may be modified if additional information indicates that revision is necessary to conform to 43 CFR 4180.
6. This permit is issued pursuant to the Interior and Related Agencies Appropriations Act, 2004, P.L. 108-108, Sec. 325. The terms and conditions of the expiring permit shall continue in effect under this permit until such time as the Bureau of Land Management completes processing of your new permit in compliance with all applicable laws and regulations, at which time your permit may be cancelled, suspended, or modified in whole or in part, to meet the requirements of such applicable laws and regulations.

Wild Horse Management

Under Alternative 2, the wild horse AML would remain at 25 – 35 animals as estimated in the 2008 Surprise RMP. Wild Horse and Burro Goal/Objective (RMP 2.21.3, BLM 2008).

Note current policy requires that AML be estimated based on in-depth evaluation of intensive monitoring data or land health assessment.

Achieve ecological stability so that herds of wild horses can be maintained while making significant progress in achieving BLM land health standards within the life of this RMP. Toward this end, ensure that wild horses are limited to established Herd Management Areas and maintained at appropriate management levels so that vegetation, native wildlife, soils, and archaeological sites are not degraded, but maintained.

Promote and manage wild horses in a manner that will encourage tourism and boost economic development.

Range Improvements

No new range improvements projects are proposed under the No Action Alternative.

Monitoring

Utilization data would be collected following removal of cattle from the allotment. Utilization would be read on one or more major ecological sites in each pasture, and resulting data would be used to create use pattern maps. All monitoring would be performed in accordance with BLM policy following protocols from BLM approved manuals and technical references.

2.3. *Alternative 3 – TRT Recommendations*

Grazing Management

A Technical Review Team (TRT) operating under the Modoc-Washoe Experimental Stewardship Program (ESP) reviewed monitoring information and toured the allotment during May of 2012 and proposed an alternative for livestock grazing and a recommended Wild Horse AML. TRT involvement was at the request of the permittee due to the conditions on the allotment and issues associated with the permit renewal and setting the wild horse AML. The ESP is a local organization chartered under the Public Rangelands Improvement Act of 1978 to foster improved rangeland conditions through implementation of experimental and innovative management developed through a public involvement process that includes a wide range of stakeholders.

The TRT Recommendations alternative would implement a deferred rotation system for cattle with 40% utilization on key perennial grass species being the trigger for pasture movement. Flexibility is the core of this alternative that would allow for rest, deferment, and other management actions to occur to alleviate grazing pressure where appropriate. Under this grazing plan, Mandatory Terms and Conditions would remain the same as the current permit; however, the earliest livestock turnout date would be based upon range readiness and the rotation would be determined at the Annual Operating meeting each spring. The permittee would have use of all pastures within the rotation system throughout the season. Maximum utilization would be 40% in all pastures and would be the permittee's responsibility to move cattle when this limit has occurred.

The allotted AUMs for the next grazing season would be adjusted based on an evaluation of utilization levels at the end of the grazing season. Utilization greater than 45% would result in a reduction of AUMs the following year; 35%-45% utilization would maintain AUMs; less

than 35% would increase the AUMs. The BLM would make adjustments using the Desired Stocking Level formula (BLM Technical Reference 4400-7, 1985). Additional adjustments may be necessary based on climatic conditions and other information.

Table 2.7 below displays the Mandatory Terms and Conditions under Alternative 3.

Table 2.7. Grazing Permit Mandatory Terms & Conditions

Allotment	Number of Livestock	Kind	From	To	Percent Public Land	AUMs
Massacre Lakes	582	Cattle	4/16	9/30	100%	3,215

The grazing system would be evaluated after four years. If the evaluation concludes that this system is not leading to the achievement of land health standards, the grazing management under the Proposed Action would be implemented for the remainder of the permit term.

Other Terms and Conditions

1. Grazing use offered or authorized by BLM is subject to all provisions of the grazing regulations (43 CFR Parts 4100) and other applicable law and regulation. Grazing authorizations may be modified in accordance with regulation to attain progress towards achieving rangeland health standards (subpart 4180.1 and 4180.2 Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration).

2. All use will be in accordance with the Field Manager's Final Decision. All other past documents governing livestock use are suspended.

3. Billing will be based on actual use reports submitted 15 days following the last authorized take off date for the permit. If actual use reports are not submitted the permittee will be billed and liable for their full permitted active use and actual use billing may be revoked.

4. A pre-season Annual Operating meeting will be held with the permittee to discuss previous years use and determine the current years grazing schedule. Livestock may not be turned out before this meeting has been conducted, and without prior written approval from the authorized officer.

5. Additional adjustments in livestock use may be required by BLM annually based on utilization, drought, water availability or other conditions.

6. Salt and mineral supplements may be used in the allotment. These supplements must not be located closer than ¼ mile from any natural or artificial water source, archaeological site, aspen stand, riparian area or active sage-grouse lek identified by the BLM staff.

7. All assigned range improvements must be maintained prior to livestock turnout and inspected periodically throughout the period of scheduled use to ensure livestock are restricted to those areas they are scheduled to be in. All assigned fence maintenance must be completed annually, even if your permit is not activated. Failure to complete assigned fence maintenance may result in suspension of your grazing authorization.

8. Maximum allowable use for key upland native grasses is 40% in all use areas and pastures as measured by approved BLM utilization monitoring protocol as contained in Interagency Technical Reference 1734-3, 1996.

9. If 60% utilization by livestock is exceeded in any pasture, that pasture is rested for the following scheduled season of use.

10. The permittee is responsible for determining when annual allowable use has been reached and for moving livestock into the next scheduled use area or off the allotment within five days. Any adjustments in move dates or numbers must be communicated to BLM within 7 days of the change and shall be recorded accurately on the actual use report. BLM will monitor the permittee's annual performance in meeting utilization objectives at the end of the grazing season.

11. No livestock grazing is authorized within fenced exclosures designed to improve riparian and wildlife habitat or protect cultural resources.

Wild Horse Management

The wild horse AML would be set at 25 – 45 head (same as Proposed Action)

Range Improvements

No range improvement projects are proposed.

Monitoring

Utilization data would be collected each year following removal of all cattle from the allotment. Utilization would be read on one or more major ecological sites in each pasture, and resulting data would be used to create use pattern maps. All monitoring would be performed in accordance with BLM policy following protocols from BLM approved manuals and technical references.

2.4. *Alternative 4 – Allocation by Pasture*

This alternative was developed in response to scoping comments and a submitted proposal from advocates for wild horses that the Massacre Lakes HMA should be managed in a manner that would give priority to wild horses, and could provide opportunities for research into the population dynamics of a herd that had not been gathered for 25 years. The submitted proposal recommended an upper AML for wild horses of 130 animals. Calculations of grazing capacity for the allotment based upon numbers of livestock and wild horses and measured utilization provided a sustainable stocking rate of 121 horses, less than the proposed 130 wild horses.

Alternative 4 would allocate areas of use for cattle and wild horses based upon pastures; the Juniper Pasture would be allocated entirely to wild horse use, along with partial use within the Lake Field and West Seeding. Based on forage production estimates there are currently approximately 2,800 AUMs available on the allotment. An AML of 100-121 wild horses would be established within the HMA with a forage allocation of 1,345 AUMs within the Juniper Pasture. Based upon forage production estimates, there would be 1,322 AUMs of livestock forage initially available in the remaining four pastures. Forage allocation to wild horses outside the

Juniper Pasture would be based on estimated horse use in those pastures that occurs primarily in the winter, but is highly variable based upon weather conditions. The two seedings, and the Lake Field would be allocated primarily for cattle use. Sand Spring Pasture is not within the HMA, and would also allocated for cattle grazing. Table 2.8 below displays forage allocation by pasture:

Table 2.8. Forage allocation (AUMs) by pasture

	Pasture					
	Juniper Pasture	Lake Field	West Seeding	East Seeding	Sand Spring	Total AUMs
Cattle AUMs	0	433	315	105	469	1,322
Wild Horse AUMs	1,345	80	27		0	1,452

Grazing Management

Mandatory terms and conditions under Alternative 4 are displayed in the table below:

Table 2.9. Mandatory Terms & Conditions

Allotment	Number of Livestock	Kind	From	To	Percent Public Land	AUMs
Massacre Lakes	450	Cattle	5/15	8/12	100%	1,322

The grazing system would implement a two year livestock grazing plan that includes growing season deferment every other year for three of the four livestock use pastures: East Seeding, Lake Field and Sand Spring Pasture. The Lake Field and East Seeding would be used at the same time. The West Seeding would be used every year after the growing period for perennial grasses. The Juniper Pasture would not be used by livestock. See Map on page 131 and Table 2.10 below display the grazing system under Alternative 4:

Table 2.10. Grazing System under Alternative 4

Pasture	Year 1			Year 2		
	No. of Livestock	Use Dates	AUMs	No. of Livestock	Use Dates	AUMs
Sand Spring	450C	5/15 – 6/16	469	450C	6/21 – 7/22	469
East Seeding & Lake Field	450C	6/17 – 7/22	538	450C	5/15 – 6/20	538
West Seeding	450C	7/23 – 8/12	315	450C	7/23 – 8/12	315
Total			1,322	Total		1,322

Other Terms and Conditions under the Alternative 4

Terms and Conditions under Alternative 4 would be the same as the Proposed Action, with the exception of number 13 which would not apply under this alternative.

Wild Horse Management

The wild horse AML range would be 100 to 121 head with 1,452 AUMs allocated to horses at the high AML. Although the seeded pastures are included in the HMA, wild horse use occurs infrequently during the winter months in these two pastures. The Lake Field and the two seeding pastures, which are used by wild horses during portions of some winters, would be allocated a total of 107 AUMs. The Juniper Pasture receives the vast majority of use by wild horses and would be allocated 1,345 AUMs.

It has been proposed by advocates for wild horses that the Massacre Lakes HMA be managed in a manner that would allow independent academic research on wild horses that receive minimal "disturbance" to their social structure. The primary research question would be: What are the impacts of a minimum disturbance gather protocol on reproduction and mortality?

If the research proposed above can be implemented, the following additional wild horse management actions would be implemented:

- When the horse population exceeds 100 head, bait or water trapping would be undertaken to remove entire bands, including bachelor bands from the HMA.
- Water trapping would also be utilized to treat mares with PZP and return them to the HMA.

Otherwise, wild horses would be gathered using the most humane and economical methods developed in gather management plans implemented subsequent to any necessary gathers.

Range Improvements

Sagehen Spring and the associated meadow complex would be fenced to prevent heavy use and degradation by wild horses. The fenced area would be approximately 17.2 acres in size with 0.66 miles of barbed wire fence. The fences would be constructed with four wire fencing constructed to meet BLM fencing specifications for wildlife passage.

A water storage tank would be installed at Sand Well in the Sand Spring Pasture to improve livestock distribution and water availability in this part of the pasture.

Monitoring

Monitoring would be the same as described under the Proposed Action.

2.5. *Alternative 5 – No Grazing*

Under this alternative livestock grazing would not be authorized, and the grazing permit would be canceled for the Massacre Lakes Allotment. The Surprise RMP and the Black Rock-High Rock RMP, both allocate respective portions of the Massacre Lakes allotment for livestock grazing. Therefore, if this alternative were selected, BLM would initiate the process in accordance with the 43 CFR parts 4100 and 1600 to eliminate grazing on the allotment and amend the resource management plan to not allocate the Massacre Lakes allotment for livestock grazing.

The Appropriate Management Level would be set to zero and all wild horses would be removed from this HMA. The area currently designated as an HMA would continue to be a wild horse Herd Area (HA) but no longer managed as an HMA.

2.6. Actions common to all Alternatives except No Grazing

Creation of Desired Plant Communities (DPCs)

Alternatives 1, 2, 3 & 4 include establishment of DPCs by BLM in coordination with interested publics. The DPC defines the vegetative community considering the site potential and the desired uses of that site. The DPC may or may not be similar to the potential natural community as stated in the Ecological Site Description (ESD); however the ESD describes the potential capability of a site, as well as some of the inherent limitations, allowing DPCs to be created according to reasonably attainable goals. DPCs would be established for major ecological sites in each pasture.

2.7. Alternatives Considered but Dismissed from Further Analysis

Other alternatives that were considered through internal and external scoping include:

1. **Reseeding previously seeded portions of the East and West Seedings with native grasses.** The reseeding effort would require disturbance and loss of sagebrush that has reestablished on the previously seeded areas. The seeding areas are within the Vya Sage-grouse Population Management Unit (PMU) and a key emphasis for management of sage-grouse is the retention of existing sagebrush cover. Removal of sagebrush to increase native grasses on the scale of the East and West Seedings would not be compatible with retention of sagebrush for sage-grouse populations or consistent with the BLM interim management for sage-grouse outline in BLM IM-2012-043.

2. **Provide an Alternative for livestock management that analyzes the number of livestock that can be grazed without a pasture rotation system including the removal of all existing fencing.** One of the issues associated with grazing of cattle or horses for the Massacre Lakes Allotment is to increase native perennial grass density and production on the allotment. Removal of fences would increase the area of joint livestock and wild horse grazing and eliminate rest from livestock grazing during the critical growing period for native grasses. The allotment and HMA do not share the same boundaries so division fences are required to manage wild horses within the designated HMA. Therefore, the alternative would not meet the purpose and need for this Assessment.

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Chapter 3. Environment Analysis

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A variety of laws, regulations, executive orders, and policy directives mandate the effects of a Proposed Action and alternatives on certain supplemental authorities (formerly known as critical elements) of the human environment and several other resource elements commonly affected by livestock grazing be considered. Not all of the supplemental authorities that require consideration in this EA will be present, or if they are present, may not be affected by the Proposed Action and Alternatives (see Table 3.1 and Table 3.2). Only those mandatory supplemental authorities that are present and affected, or need to be considered, are described in this section.

Background material related to other resources is available on the Surprise Field Office web site and is within the Surprise RMP Final Environmental Impact Statement and Proposed Resource Management Plan. An overview of resources and uses of the NCA area is contained in the Record of Decision and RMP for Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area and Associated Land in Nevada (BLM 2003).

3.1. Supplemental Authorities

To comply with the National Environmental Policy Act (NEPA), the following supplemental authorities of the human environment are subject to requirements specified in statute, regulation or executive order and must be considered:

Table 3.1. Supplemental Authorities of the Human Environment

Supplemental Authority	Not present	Present and Not Affected	Present and Affected & considered in Section:
Air Quality**		X	
Areas of Critical Environmental Concern (ACEC's)			3.1.1
Cultural Resources			3.1.2
Environmental Justice**	X		
Essential Fish Habitat**	X		
Farmlands, Prime and Unique**	X		
Floodplains**	X		
Invasive, Non-native Species			3.1.3
Global Climate Change			3.1.4
Migratory Birds			3.1.5, 3.2.6
Native American Religious Concerns			3.1.6
Threatened and Endangered Species			3.1.7, 3.2.6
Wastes (Hazardous or Solid)**	X		
Water Quality (Surface or Ground)			3.1.8
Wetlands /Riparian Zones			3.1.9
Wild and Scenic Rivers**	X		
Wilderness /Wilderness Study Areas/ Lands with Wilderness Characteristics			3.1.10

Note

** Supplemental Authorities that are either not present or present and not affected will not be discussed further in this document.

Table 3.2. Other Resources Considered for Analysis

Other Resources	Not Present	Present Not Affected	Present and Affected & considered in Section:
Livestock Management			3.2.1
Recreation			3.2.2
Social and Economic Values			3.2.2
Soils			3.2.3
Vegetation (including special status plants)			3.2.4
Wild Horses			3.2.5
Wildlife Resources (including special status animal species)			3.2.6

3.1.1. Areas of Critical Environmental Concern (ACEC)

Affected Environment

The Massacre Rim ACEC is 44,870 acres in size and is located within the Massacre Rim Wilderness WSA. Approximately 25,278 acres of the ACEC are within the Massacre Lakes Allotment. The Massacre Rim ACEC was established the RMP (BLM, 2008). ACECs are designated when existing management actions are not considered adequate to manage important resources or hazards. The ACEC was designated to provide special management actions important to archaeological and wildlife resources found on the Massacre Bench. Impacts to the resources and values that resulted in the ACEC designation are incorporated into the discussion on cultural resources in Section 3.1.2 and wildlife resources in Section 3.2.6.

3.1.2. Cultural Resources

Affected Environment

The consideration of cultural resources is a critical component of Bureau of Land Management practices on Public Lands in the Surprise Field Office (SFO). Cultural resources are locations or objects of human activity, occupation, or use. These resources include archaeological, historic, architectural sites, structures, and places with important public and scientific values; and locations of traditional cultural or religious importance to specific social or cultural groups. Cultural resources discussed in this section include districts, sites, buildings, structures, objects, and traditional cultural properties listed on or eligible to the National Register of Historic Places (NRHP). The cultural resource component of the affected environment is covered by several legislative authorities including Section 106 of the National Historic Preservation Act of 1966 as amended (NHPA), the Archaeological Resources Protection Act (ARPA), the American Indian Religious Freedom Act and Executive Order (E.O.) 13007, and the Native American Grave Protection and Repatriation Act (NAGPRA). Cultural resources within the Nevada portion of lands managed by the SFO also fall under purview of the State Protocol Agreements between

BLM Nevada and Nevada SHPO (2009c), and BLM California and California and Nevada SHPO (2012). Cultural resources within the Nevada portion of the High Rock National Conservation Area are managed by the BLM Winnemucca Field Office.

The Massacre Lake Allotment is located within the area traditionally used by the Northern Paiute or Paviotso. The Allotment area falls within the area identified as being used by the Aga'ipaninadökadö (fish eaters), Moadökadö (wild onion eaters) of Summit Lake, and the Kidütökadö (groundhog eaters) of Surprise Valley. Paiutes from other areas likely passed through on their way to fish at Summit Lake or to hunt. Many members of the Kidütökadö continue to reside at the Fort Bidwell Reservation while many members of the Aga'ipaninadökadö members continue to live at the Summit Lake Paiute Reservation and surrounding areas. Cultural resource inventories within the grazing allotment indicate that the area was used by prehistoric people for resource procurement activities. In addition, seasonal, temporary campsites were established for the purposes of procuring tool stone material, game, and plant resources. Historically, this area has been used for sheep, cattle, and domestic horse grazing by Euro-Americans. Historic resources are associated with livestock grazing activities and early homesteading, emigrant and military trails, and mining.

The Massacre Lakes Allotment is located near the Massacre Bench and Massacre Lakes; an area in which cultural resource site densities are generally considered to be high, especially due to the close proximity of three obsidian sources. The Massacre Rim ACEC was designated in 2008 in part because of the need to manage the high density of cultural resource sites in the area, and the potential for archaeological research within the WSA. The ACEC designation was developed by the Surprise Field Office and is intended to provide heightened awareness of sensitive resources and providing research opportunities for scientific institutions. Approximately 25,278 acres (51%) of the Massacre Lakes Allotment is located in the Massacre Rim ACEC.

The Massacre Lakes Allotment consists of 46,945 acres of public land and 2,658 acres of privately owned land. Of the 49,603 acre allotment, approximately 5,100 acres have been inventoried for cultural resources. Of the surveyed acres, 3,298 acres were surveyed employing a stratified sampling technique using 30 meter-wide transects. The remaining 1,802 acres were surveyed using a stratified sampling technique that employed transects 30 to 100 meters apart. As a result of the inventories, 170 archaeological sites have been discovered and recorded. The cultural resources located in the ACEC span more than 12,000 years and provide invaluable insights into: the prehistoric life-ways of people along extinct pluvial lakes; procurement, selection, and distribution of resources, especially of tool-stone sources; mobility and trade over the past 12,000 years; adaptation to climatic change; religion; relations between Native Americans and Euro-American emigrants; military history; and the expansion and ingenuity of homesteaders. The concentration of such a wide variety of cultural resources provides a unique perspective into the past and the relatively isolated location provides an optimal opportunity for the preservation of these cultural resources.

Cultural resources in approximately 3,767 acres of the Massacre Lakes Allotment are managed by the Winnemucca Field Office. This area is focused around the historic Applegate-Lassen Emigrant Trail. Only the Applegate-Lassen Emigrant Trail has been formally nominated for the National Register of Historic Places (NRHP). The remaining sites have not been formally evaluated for the NRHP; however, all sites are considered eligible to the National Register by the BLM until they are found to be not eligible.

The most sensitive areas for cultural resources are those which have natural water sources, such as springs and streams. Heavy historical livestock grazing (pre-1970s) severely impacted and damaged many cultural sites. Lithic scatters (remnants of stone tool manufacturing), village sites, and quarry sites are especially vulnerable because trampling can break up, displace, and destroy artifacts. Impacts from livestock and wild horses include trailing, trampling, wallowing, rubbing on cultural resources, and digging (typically around springs to access underground water). Additionally, sites damaged by livestock or wild horse grazing begin to erode and can lose their integrity until they are eventually completely destroyed. Natural water sources that have been developed with spring boxes, pipes, and troughs have had and have the potential to impact cultural sites.

The Surprise Field Office (SFO) regularly consults with the Fort Bidwell Tribal Council, Cedarville Rancheria Tribal Council, and the Summit Lake Tribal Council about projects within the Surprise Field Office boundaries. To date there have been no concerns expressed about the renewal of this grazing permit.

In accordance with the 2004 State Protocol Agreement between California Bureau of Land Management and The California State Historic Preservation Officer and the 2004 Grazing Amendment, Supplemental Procedures for Livestock Grazing Permit/Lease Renewal, a Cultural Resource Assessment is scheduled for 2013. In accordance with the protocol the permit may be renewed prior to the cultural resource assessment being completed.

Environmental Consequences

Impacts of Proposed Action

Under the Proposed Action, the livestock AUMs would be reduced by 1,522; therefore the direct and indirect impacts to cultural resources would be less than under Current Management. However, under the Proposed Action cultural resource sites still have the potential to be affected by range management activities including cattle grazing. Sites that are located in areas where cattle tend to congregate are most vulnerable to livestock impacts. Areas of congregation tend to occur at both developed and undeveloped watering locations, salting locations, along fence lines, and in areas where shade is provided. The types of impacts that can occur are: trailing, which can displace and/or break artifacts, and denude vegetation thereby destabilizing the soil causing erosion; wallowing, which causes subsurface disturbance to cultural resources containing buried deposits thereby compromising stratigraphic integrity of a site; and trampling, which causes artifact displacement and breakage. Since the spring at Sagehen Spring is the primary attractant to the area for wild horses, restricting its use should also reduce the use of the area by these animals. The proposed reduction in the number of cattle and shorted grazing period in the Lake Field would reduce the impacts to the cultural resources in that pasture. The range improvement projects at the Sand Spring Well would not impact any cultural resources.

Impacts of Alternative 2 – No Action

AUMS would remain the same therefore the direct and indirect impacts to cultural resources around unfenced springs would continue. The trampling of springs could lead to irregular flow patterns which could impact cultural resources through erosion, artifact dispersion, and artifact breakage by trampling from livestock.

Impacts of Alternative 3 – TRT Recommendations

Under Alternative 3 livestock AUMs would remain the same and the wild horse AUMs would be the same as the Proposed Action. Therefore the direct and indirect impacts to cultural resources would be more than under the Proposed Action, and Alternative 5, about equal to Alternative 2, and less than Alternative 4. Reduced stocking numbers and the pasture rest rotation would promote vegetation recovery, augmenting soil stabilization and reducing erosion that may be occurring in some cultural resource sites. Impacts to cultural resources around unfenced springs would continue and the trampling of the springs could lead to irregular flow patterns which could impact cultural resources by erosion, artifact dispersion, and artifact breakage through trampling.

Impacts of Alternative 4 – Allocation by Pasture

Under Alternative 4, livestock AUMs would decrease by 1,893 and pastures utilized by livestock would be outside the Massacre Rim ACEC. Wild horse AUMs would increase up to 1,032 AUMs and the vast majority of wild horse use would be within Massacre ACEC. Range improvements discussed in the Proposed Action would also be implemented, reducing the direct and indirect impacts to cultural resources at Sagehen Spring. Under this alternative the direct and indirect impacts to cultural resources by livestock would be less than Alternative 2 and Alternative 3, but more than the Proposed Action and Alternative 5. Direct and indirect impacts to cultural resources by wild horses would be more than the Proposed Action (the total AUMs within the Juniper Pasture under the Proposed Action would be 1,585 to 2,041 whereas the total AUMs within the Juniper Pasture under Alternative 4 would be 1,236). Similar to the Proposed Action, impacts to cultural resources around Sagehen Spring would decrease.

Impacts of Alternative 5 – No Grazing

Under this alternative there would be no direct or indirect impacts to cultural resources from range management activities or wild horses.

3.1.3. Invasive, Non-Native Species

Affected Environment

Weeds are plants that are invasive, noxious or non-native. Invasive weeds have the ability to out-compete and replace native plants, often creating their own monotypic plant community. Uncontrolled invasive and noxious weed infestations can result in decreases in native vegetation diversity, reductions in forage and wildlife habitat, and declines in agricultural crop values. Once established, invasive and noxious weeds are extremely difficult to eradicate; and restoring affected plant communities to their native state can be a challenge.

Inventories within the Massacre Lakes Allotment have been conducted yearly along Washoe County Road 8A supplemented by occasional field surveys on other minor roads and tracks within the allotment. This inventory effort has documented one infestation of five Scotch thistle plants which were mechanically removed in 1999 along Washoe County Road 8A on the eastern border of the allotment.

Cheatgrass was found in small amounts at the five evaluation sites during the 2008 rangeland health assessment and appear to be spreading in lower elevation pastures where native bunchgrasses have poor vigor or are nearly absent from the plant community.

Environmental Consequences

Impacts of Proposed Action

Based on weed survey points collected in the last ten years, livestock grazing does not appear to have resulted in the establishment of new invasive or noxious weed sites. One factor is that the permittee trucks his livestock to the allotment from the home ranch is Surprise Valley versus trailing from Surprise Valley. By not trailing livestock they do not travel along roadways that may have infestations of noxious species, the probability of new infestations of noxious weeds into the allotment from livestock grazing is greatly reduced. Properly timed livestock grazing at moderate or lower stocking rates would lower the risk of introduction and spread of invasive, non-native and noxious weed species. Under the Proposed Action, the 40% maximum utilization for livestock and the other grazing management practices including periods of rest or deferment during the critical growth period for native perennial grasses would reduce the risk of noxious or invasive species establishment. These practices would allow deep rooted native grasses to regularly complete their growth cycle, build root masses and set seed. This would allow the native grasses to maintain or increase their density; vigor and productivity in the major livestock use areas and act as a deterrent to the establishment of noxious weeds. This would also decrease the ability of existing invasive annuals to rapidly increase in density and occupation area.

Establishment of a wild horse AML of up to 45 animals would have minimal impact on the establishment and spread of noxious weeds. Wild horses primarily use the Juniper Pasture and there are no known weed sites in this part of the allotment. If weed sites were established in this pasture, there is a chance that wild horses could transport the seeds into remote locations through their droppings or attached to their bodies.

The requirement to wash all equipment before and after entering the allotment for project work would reduce the risk of introduction and/or spread of existing weeds. In the long term, upland areas in less than desired ecological condition are expected to improve under the Proposed Action, making these areas less susceptible to cheatgrass and invasive weed establishment and/or expansion in size.

Installation of the water storage at Sand Spring Well would not increase the risk of introduction or spread of invasive and noxious weeds.

Impacts of Alternative 2 – No Action

Based on current distribution of weeds, livestock grazing in this allotment has not resulted in the establishment of many invasive/noxious weed sites to date. As described above, trucking livestock instead of trailing from the home ranch in Surprise Valley decreases the risk that livestock will bring new weed infestations into the allotment.

Properly timed livestock grazing generally presents a low risk of introduction and spread of invasive, non-native and noxious weed species as the existing composition and productivity of palatable forage species are maintained. However, the current grazing management practices have led to excessive utilization of native plants (often as high as 60%-80% utilization or greater) resulting in a loss of deep rooted native perennial bunchgrasses and poor plant vigor in the remaining plants in areas that receive regular and sustained livestock or wild horse use. Under the No Action Alternative, rangeland health would be expected to deteriorate and the risk of invasive, non-native species spread would increase. Cheatgrass would continue to expand in the lower pastures as native plant vigor continued to decline and native species were lost and open niches

were available for invasion by cheatgrass. Establishing an AML of up to 35 wild horses would result in minimal additional risk of spreading noxious weeds into the Juniper Pasture, but would contribute to the expansion of cheatgrass to the northern portion of the allotment.

Invasive, non-native species which are introduced or become established in the allotment would be expected to be detected early with continued vigilance, and these sites would be expected to be treated under the current weed management program.

Impacts of Alternative 3 –TRT Recommendations

As described previously, trucking cattle to the allotment decreases the risk of noxious weed establishment. The grazing management practices for this alternative would be primarily a monitor and move strategy based upon a requirement of no more than 40% utilization in the major livestock use zones by pasture. Based upon projections of pasture use and move dates as described in Section 3.2.1 TRT Recommendations Alternative, the West Seeding and Sand Spring Pasture would be grazed each year during the critical growth period of deep rooted perennial grasses. The projected grazing period in the Juniper Pasture would occur at the end of the critical growth period. Critical growth period grazing decreases the vigor of deep rooted perennial grasses, and with periods of rest during the critical growth period would lead to decreases in grass density and productivity. This would decrease completion for rooting and would increase the likelihood that infestations of noxious weeds would be established. This would also increase the likelihood that invasive annuals would be able to increase in density in areas they currently occupy. The 40% utilization limit would partially offset impacts of growing season grazing on native perennials.

Establishment of a wild horse AML of up to 45 animals would have minimal impact on the establishment and spread of noxious weeds. Wild horses primarily use the Juniper Pasture and there are no known weed sites in the pasture. If weed sites were established in the Juniper Pasture there is a chance that wild horses could transport weed seeds into remote locations of the pasture through their droppings or attached to their bodies.

Impacts of Alternative 4 – Allocation by Pasture

Under Alternative 4, cattle and wild horse AUMs would be allocated by pasture within the allotment. As described previously, trucking cattle to the allotment decreases the risk of noxious weed establishment. Based on current distribution of weeds, livestock and wild horse grazing in this allotment has not resulted in the establishment of many invasive/noxious weed sites to date. Properly timed livestock grazing and wild horse population numbers that promote a thriving ecological balance in general presents a low risk of introduction and spread of invasive, non-native and noxious weed species; however the 121 wild horses within the Juniper Pasture under this alternative would lead to higher utilization levels on native bunch grasses during the critical growth period with the subsequent loss of native perennial bunchgrasses and poor plant vigor. If weed sites were established in the Juniper Pasture, there is a chance that wild horses could transport weed seeds into remote locations through their droppings or attached to their bodies. Cattle numbers would be reduced in the other four pastures compared to current levels and improvements in vegetation communities would be expected to occur; this would reduce the potential for invasive/noxious weeds to invade the cattle grazing only areas. Under this alternative, rangeland health within the Juniper Pasture would continue to deteriorate and the risk of invasive, non-native species spread would be similar to the No Action Alternative in the pasture.

Cheatgrass would continue to expand in the Juniper Pasture as wild horse populations continued to damage rangeland resources and native plant vigor continued to decline; this would lead

to cheatgrass establishing in higher elevation sites. Invasive, non-native species which are introduced or become established in the allotment would be expected to be detected early with continued vigilance, and these sites would be expected to be treated under the current weed management program.

Impacts of Alternative 5 –No Grazing

Under the No Grazing Alternative, there would be no short term impacts to invasive and noxious weeds from livestock and wild horses because neither one would be on the allotment. In the long term, as native plant communities increased in vigor and composition, the threat of invasive species invasion would be reduced due to no grazing on the allotment and the elimination of cattle and wild horses as vectors for weed dispersal and establishment. The possibility of noxious weed establishment is lowest under the No Grazing Alternative.

3.1.4. Global Climate Change

Affected Environment

Changes in greenhouse gas levels affect global climate. Forster *et al.* (2007) reviewed scientific information on greenhouse gas emissions and climate change and concluded that human-caused increases in greenhouse gas emissions are extremely likely to have exerted a substantial warming effect on global climate. However, there is uncertainty in the scientific community about determining the relationship of local land management activities, including livestock grazing, to future climates. The U.S. Geological Survey, in 2008 memorandum to the U.S. Fish and Wildlife Service (USGS 2008), summarized the latest science on greenhouse gas emissions and concluded that it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate impacts at a specific location.

A number of climate models have been developed that make specific predictions on the future climate of the Great Basin region. The models are relatively consistent in predicting an increase in average temperatures of 2-5o C over the next century, but much less consistent predicting the timing and amounts of precipitation (Folland *et. al.* 2001). Evaluating the precipitation predictions for 10 climate models, Bradley (2009) found that the majority of models predict slight increases in fall and winter precipitation and decreases in spring precipitation. However, there is no consistency with summer precipitation.

Livestock generate greenhouse gases, primarily methane, through two mechanisms. Livestock grazing results in methane emissions as a result of ruminant digestion (enteric fermentation). Methane emission rates from cattle vary widely and depend on many variables (Johnson and Johnson 1995). One variable is the quality of the forage; methane production is inversely related to forage quality. Estimates for grazing cattle typically range from 80 – 101 kilograms of methane per year per animal (EPA 2011) or 6.7 - 9.2 kilograms of methane per month. Methane and nitrous-oxides are also produced from cattle droppings (and urine for ammonia and nitrous oxides) (EPA 2011). Estimates for pastured cattle range from 9 to 42 gm of methane per animal per month (Saggar *et. al*. 2004). Methane production from droppings is highly variable but production in the Great Basin would be expected to be in the lower end of the range due to dry conditions which rapidly desiccate droppings and the low quality of the forages consumed (Saggar *et. al*. 2004). Methane production from cattle droppings are expected to be less than one percent of those from rumen emissions. Conditions necessary to produce ammonia and nitrous

oxides are generally not associated with arid area grazing, so production of these greenhouse gases is expected to be less than those associate with methane production (EPA 2011). Using a methane emission rate of 8 kilograms of methane per animal unit month (AUM) and a CO2 equivalency of one units of methane is equivalent to 21 units of carbon dioxide (EPA 2011, p. ES-3), each AUM results in 0.168 metric tons of carbon dioxide equivalent.

Wild horses are not ruminants and therefore production of greenhouse gases is substantially less than for cattle. A review of the literature indicates that 0.0315 metric tons of carbon dioxide equivalent/ wild horse AUM is appropriate.

Livestock grazing can affect rangeland carbon levels, through changes in plant community and changes in ecosystem processes, but the effects have been variable and inconsistent among the ecosystems studied (Schuman *et. al.* 2009). Some studies have found that grazing can result in increased carbon storage compared to no grazing, because of increased plant turnover and changes in plant species composition (Schuman *et. al.* 2009). Many changes in rangeland carbon from different grazing practices do not result in substantial changes in total ecosystem carbon, but are redistributions of carbon, for example, from above-ground vegetation to root biomass (Derner and Schuman 2007).

Environmental Consequences

Impacts of Proposed Action

Permitting livestock grazing on the Massacre Lakes Allotment at an authorized level of 1,693 AUMs would result in methane emissions of 284 metric tons of carbon dioxide equivalent per year. Current U.S. emissions of methane from beef cattle total approximately 100 million metric tons of carbon dioxide equivalent per year (EPA 2011, p. 6-2); current U.S. emissions of all greenhouse gases total approximately 7 billion metric tons of carbon dioxide equivalent (EPA 2011, p. 2-4); current global emissions of all greenhouse gases total 25 billion metric tons of carbon dioxide equivalent (Denman *et al.* 2007, p. 513). This emission would represent 0.0003% of the annual U.S. methane emissions from beef cattle, and 0.000005 % of the annual U.S. emissions of all greenhouse gases, and 0.000000007 % of the global emissions of all greenhouse gases. An additional 540 AUMs of wild horse use would add another 17.0 metric tons of carbon dioxide equivalent per year. Total carbon dioxide equivalent emissions would be 301 metric tons per year.

Changes in rangeland carbon storage as a result of changes in grazing practices are likely to be small and difficult to predict, especially where a rangeland health assessment has determined that the Standards for Rangeland Health Standards and Guidelines for Livestock Grazing Management are being met. Therefore, this analysis will assume that changes in grazing practices on this allotment would not result in any change in total carbon storage.

Impacts of Alternative 2 – No Action

Permitting livestock grazing on the Massacre Lakes Allotment at an authorized level of 3,215 AUMs would result in methane emissions of 540 metric tons of carbon dioxide equivalent per year. Current U.S. emissions of methane from beef cattle total approximately 100 million metric tons of carbon dioxide equivalent per year (EPA 2011, p. 6-2); current U.S. emissions of all greenhouse gases total approximately 7 billion metric tons of carbon dioxide equivalent (EPA 2011, p. 2-4); current global emissions of all greenhouse gases total 25 billion metric tons of carbon dioxide equivalent (Denman *et. al.* 2007, p. 513). This emission would represent 0.0005% of the annual U.S. methane emissions from beef cattle, and 0.000007% of the annual

U.S. emissions of all greenhouse gases, and 0.0000013 % of the global emissions of all greenhouse gases. An additional 420 AUMs of wild horse use would add another 13.2 metric tons of carbon dioxide equivalent per year. Total carbon dioxide equivalent emissions would be 553.2 metric tons per year.

Changes in rangeland carbon storage as a result of changes in grazing practices are likely to be small and difficult to predict, especially where a rangeland health assessment has determined that the Standards for Rangeland Health Standards and Guidelines for Livestock Grazing Management are being met. Therefore, this analysis will assume that changes in grazing practices on this allotment would not result in any change in total carbon storage.

Impacts of Alternative 3 – TRT Recommendations

Impacts would be similar to the No Action Alternative for cattle because the projected harvest is the same for the two alternatives. Impacts would be similar to the Proposed Action for wild horses because the AMLs would be the same for the two alternatives. Total carbon dioxide equivalent emissions would be 861 metric tons per year.

Impacts of Alternative 4 – Allocation by Pasture

Impacts would be somewhat less than described for the Proposed Action for cattle because the projected harvest would be less than the Proposed Action. Total carbon dioxide equivalent emissions would be 223.7 metric tons per year for livestock. 1,452 AUMs of wild horse use would add another 45.7 metric tons of carbon dioxide equivalent per year. Total carbon dioxide equivalent emissions would be 269.4 metric tons per year.

Impacts of Alternative 5 – No Grazing

There would be no emissions of carbon dioxide equivalents associated with livestock or wild horse grazing on the Massacre Lakes Allotment. However, due to changes in grazing practices by the livestock permittee, the carbon dioxide equivalents currently emitted on the allotment could be moved to other locations on private lands.

3.1.5. Migratory Birds

See Section 3.2.7: Wildlife Resources including Migratory Birds and Threatened and Endangered Species

3.1.6. Native American Religious Concerns

Affected Environment

The BLM Surprise Field Office conducted government to government consultation with the Fort Bidwell Tribal Council and the Cedarville Rancheria regarding the Massacre Lakes Allotment Permit Renewal in January 2012 during which neither tribe expressed concerns regarding the renewal of the Massacre Lakes Allotment grazing permit. In February 2012, the BLM Surprise Field Office conducted government to government consultation with the Summit Lake Paiute Tribe during which time the tribe expressed no concerns regarding the renewal of the Massacre Lakes Allotment grazing permits. In the spring of 2013, the BLM Surprise Field Office conducted formal consultation with the three tribes during which time the tribes expressed no concerns

regarding this grazing permit renewal or the proposed rangeland management projects. Therefore, no known impacts are expected to the tribes, and this issue will not be further discussed in this EA.

3.1.7. Threatened and Endangered Species

There are two species considered as candidates for listing by the US Fish and Wildlife Service (FWS) under the provisions of the Endangered Species Act: Carson Wandering Skipper and Greater Sage-grouse. Consideration of the two species is included in Section 3.2.7: Wildlife Resources including Migratory Birds and Threatened and Endangered Species.

3.1.8. Water Quality - Surface or Ground

Affected Environment

The Massacre Lakes Allotment falls within one USGS Hydrological Unit Code: *Massacre Lake* (#16040204). The watershed area is entirely within north Washoe County, Nevada. There are no identified 303(d) impaired water bodies within the Massacre Lakes Allotment. None of the water sources are currently used as a source of drinking or swimming water and there is no potential for drinking or swimming uses in the future.

Water bodies and sources include two natural playa lakes with poor water quality due to natural accumulations of alkaline minerals, 14 man-made reservoirs, 7 wells with windmills, and approximately 18 springs or spring complexes of two types (see Map on page 132). There are 17 upland springs that occur where ground water intersects a restrictive rock layers located in the Juniper Pasture and 1 in the Sand Spring Pasture. Water quality has not been directly measured at these sources but is presumed to meet state water standards due to the composition of riparian vegetation and macro-invertebrates associated with the spring sources. A complex of alkaline springs (Alkaline Meadows) is located between Middle and Massacre Lakes in the Lake Field. Water quality of these springs is presumed to be poor due to the alkaline sediments the water travels through to reach the surface. Although quantitative water quality monitoring has not been conducted on the Massacre Lakes Allotment riparian areas, photo monitoring of springs has been conducted on riparian sites within the allotment and riparian functional assessments have been completed on 12 springs. This monitoring provides some indication of the changes in water quality below the spring sources.

The 7 wells with associated windmills that require groundwater pumping at low rates to provide livestock water within the allotment. None of these windmills are known to have an effect on groundwater quality due to the small amount of water being removed compared to the size of the aquifer in the area and each well is cased to the surface to prevent surface water contamination. Ground water will not be discussed further.

Environmental Consequences

Grazing by cattle or wild horses affect water quality at springs in several ways: Hoof action in wet meadows increases sediment into the water; and droppings increase bacteria and nutrient loading. Both cattle and wild horses are much more likely to spend time in wet meadows during the hot season (July through September) than other times of the year.

Impacts of Proposed Action

Implementation of the Proposed Action would maintain high water quality at four springs in the Juniper and Sand Spring Pastures that are currently fenced to eliminate grazing by livestock and wild horses. The 6 springs/seeps located in the Juniper Pasture would continue to be subject to hot season use by cattle and horses. Up to 450 cattle would be in the Juniper Pasture for 54 days of the 92 day hot season and up to 45 wild horses for the entire hot season. Impacts to water quality of individual springs would be variable depending upon when the low output springs dried up and the rockiness of the landscape at the spring source. Sagehen Spring which currently does not meet water quality standards due to excessive wild horse use would be fenced and water quality would improve to meet the standard.

Water quality at Alkaline Meadow in the Lake Field would continue to be poor due to the alkaline nature of the spring sources. Livestock and wild horses would not graze in the Lake Field during the hot season, so the water quality at these spring sources would not be further impacted in a manner that would decrease water quality.

Installation of the water storage tank at Sand Spring Well would have no effect on water quality in the allotment.

Impacts of Alternative 2 – No Action

Implementation of the No Action Alternative would maintain high water quality at four springs in the Juniper and Sand Spring Pastures that are currently fenced to eliminate grazing by livestock and wild horses. The 6 springs/seeps located in the Juniper Pasture would continue to be subject to hot season use by cattle and horses every year. Up to 582 cattle would be in the Juniper Pasture for 46 days of the 92 day hot season and up to 35 wild horses for the entire hot season. Impacts to water quality of individual springs would be variable depending upon when the low output springs dried up and the rockiness of the landscape at the spring source. Sagehen Spring would not meet the water quality standard.

Water quality at Alkaline Meadow in the Lake Field would continue to be poor due to the alkaline nature of the spring sources. Up to 450 cattle would graze in the Lake Field during the hot season for 46 days, so these spring sources could be further impacted in a manner that would decrease water quality by increasing turbidity and nutrient loading. Wild horses would not utilize this spring complex during the hot season, but winter use by horses would add to the nutrient loading of the water sources.

Impacts of Alternative 3 – TRT Recommendations

Implementation of TRT Recommendations Alternative would maintain high water quality at four springs in the Juniper and Sand Spring Pastures that are currently fenced to eliminate grazing by livestock and wild horses. The 6 springs/seeps located in the Juniper Pasture would continue to be subject to hot season use by cattle and horses every year. Up to 582 cattle would be in the Juniper Pasture for 51 days of the 92 day hot season and up to 45 wild horses for the entire hot season. Impacts to water quality of individual springs would be variable depending upon when the low output springs dried up and the rockiness of the landscape at the spring source. Sagehen Spring would not meet the water quality standard.

Water quality at Alkaline Meadow in the Lake Field would continue to be poor due to the alkaline nature of the spring sources. Up to 582 cattle would graze in the Lake Field during the hot season for 19 days, so these spring sources could be further impacted in a manner that would decrease water quality by increasing turbidity and nutrient loading. Wild horses would not utilize

this spring complex during the hot season, but winter use by horses would add to the nutrient loading of the water sources.

Impacts of Alternative 4 – Allocation by Pasture

Implementation of Allocation by Pasture Alternative would maintain high water quality at four springs in the Juniper and Sand Spring Pastures that are currently fenced to eliminate grazing by livestock and wild horses. There are an additional six springs in the Juniper Pasture that would continue to be subject to hot season use by horses every year. Although there would be no livestock use during the 92 day hot season, there could be as many as 121 wild horses for the entire hot season. Impacts to water quality of individual springs would be variable depending upon when the low output springs dried up and the rockiness of the landscape at the spring source. Water quality at Sagehen Spring would be expected to improve as construction of a protective fence would eliminate wild horse access, trampling, removal of vegetation and deposition of fecal matter at the spring source. The water quality standard would be met.

Impacts to water quality at Alkaline Meadow in the Lake Field would be similar to those described under the Proposed Action.

Impacts of Alternative 5 –No Grazing

Implementation of the No Grazing Alternative would maintain high water quality at all springs in the Juniper and Sand Spring Pastures because no grazing would occur by either livestock or wild horses.

Water quality at the alkaline spring complex in the Lake Field would continue to be poor due to the alkaline nature of the spring sources even without grazing by livestock or wild horses.

3.1.9. Wetlands/Riparian Zones

There are no perennial streams within the allotment. Water channels within the allotment are ephemeral in nature and only flow during high flow events (e.g. floods and spring snowmelt early in the year). Approximately 18 springs or spring complexes of two types are located within the Lake Field, Juniper and Sand Spring Pastures. Riparian areas within the allotment are associated with the meadows watered by the springs. The size of individual meadows associated with the springs will vary depending upon water yield of each spring and landscape position. Table 3.3 summarizes information on 13 of the spring sources where evaluations of the spring meadows have been completed. There are 6 springs continue to have surface water during dry years, with the 7 remaining spring sources providing water only for a portion of the season. Four springs in the Juniper Pasture have been fenced to protect the spring source and riparian area from concentrated use by livestock and wild horses. The only spring in the Sand Spring Pasture (Sand Spring) has also been fenced but was not rated due to past livestock developments and lack of surface water. There is a large alkaline spring complex on the eastern edge of the Lake Field. About 15% of the complex is on public land located within the allotment. This spring was evaluated in 2013 and heavy livestock use when cattle use the Lake Field during the hot season has been noted in the past. Field visits have documented active surface erosion and substantial hummocking associated with livestock grazing and wild horse use.

The BLM evaluated the functional condition of 13 riparian areas associated with springs in the Juniper Pasture in 2007, 2008 and 2009 using the Riparian Functional Assessments process BLM Technical Reference 1737-16 (see Map on page 132 for the location of the assessed springs).

Table 3.3. Summary of Riparian Functional Assessment Ratings – Juniper Pasture

Source Name	**Rating**1/	Riparian Acres	Exclosure	Comments
Tuffy Spring	Properly Functioning Condition (PFC)	2-3		Six acre exclosure. The spring is developed with a livestock trough placed outside the exclosure.
Post Spring	Functional At Risk (FAR) w/ downward trend	2		29 acre exclosure. Exclosure fence not working at time of rating
Indian Spring	PFC	3-4		55 acre exclosure. Complex of several small seeps and springs. The most dependable spring has been developed and a trough placed outside exclosure.
Biebe Spring	PFC	4-5		1,000 acre exclosure.
Sagehen Spring	Non-functional (NF)	4		Wild horse impacts only. Excessive soil loss
Post Canyon Spring	NF in 1993	2		Associated pit reservoir.
Post Canyon Seep #1	PFC	0.1		In steep, rocky canyon
Post Canyon Seep #2	PFC	0.1		In steep, rocky canyon
Un-named Seep #1	FAR – Trend not apparent	.01		Little water at site.
Un-named Seep #2	Not rated			Similar to un-named seep #1.
Un-named meadow site #3	FAR – Trend not apparent	0.5		Dry meadow site. Juniper encroachment, upland species invading
Un-named Seep #4	PFC			Similar to un-named seeps 1 and 2. Very rocky site.
Alkaline Meadows	FAR-downward trend	20 acres		Large meadow site, highly alkaline water in areas. Severe hoof action from livestock noted at site.

Note

1/ Source: BLM Technical Reference 1737-15

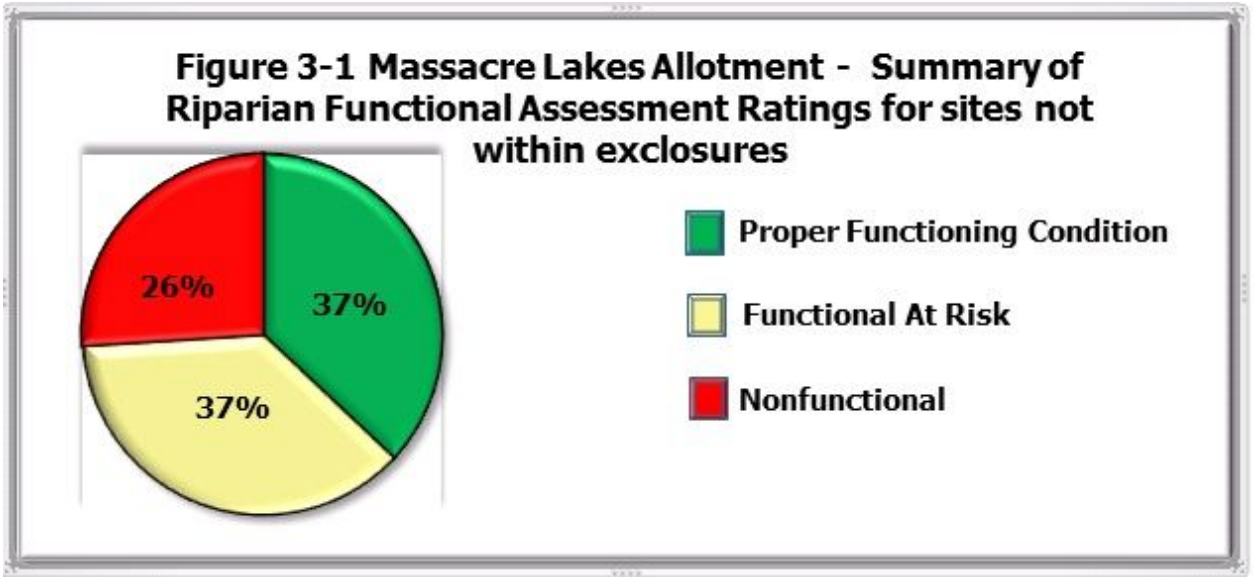

Figure 3.1. Summary of Riparian Functional Assessments

There are approximately 2700 acres of playa lakebed located within the Lake Field. The lakes are flooded during the wet season with water depth dependent upon the amount of seasonal runoff. The lakes dry up during the summer. The drying lakebeds support salt grass, baltic rush on the edges and annual forbs that vary yearly in distribution, composition and production depending upon the amount of water and the timing of drying of each lakebed. Due to the ephemeral nature of the vegetation, the concept of condition or trend is not applicable. During favorable conditions for lakebed vegetation, annual production can be substantial.

Environmental Consequences

Assumption: All exclosure fences providing protection of riparian areas from livestock or wild horse grazing will be functional.

Impacts of Proposed Action

Implementation of the Proposed Action would allow five riparian areas in the Juniper and Sand Spring Pastures that are currently fenced to maintain or improve to properly functioning condition. The 6 springs/seeps located in the Juniper Pasture would continue to be subject to hot season use by cattle and horses. Up to 450 cattle would be in the Juniper Pasture for 54 days of the 92 day hot season and up to 45 wild horses for the entire hot season. During the hot season, livestock and wild horses tend to congregate near water sources and riparian areas for both the water and green forage irrigated by the water. There are an estimated ten acres of riparian area associated with the unfenced meadows producing approximately 25 AUMs of palatable forage. Even before cattle are moved into the Juniper Pasture, the 45 horses (at high AML) would be likely to consume a high percentage of the available meadow forage with utilization exceeding 40% of the current year production before cattle enter the pasture. Additionally, when cattle or wild horses graze spring meadows or seek drinking water, their hoof action would cause pocking of the meadow surface. This pocking would damage the dense root mats, expose bare soil and increase erosion in meadows on slopes. Sagehen Spring in the Juniper Pasture would be expected to improve to PFC and the Riparian/Wetland Land Health Standard would be met meet.

Riparian conditions at Alkaline Meadow in the Lake Field would be expected to improve due to no livestock or wild horse grazing in the Lake Field during the hot season.

Impacts of Alternative 2 – No Action: Continue Present Management

Implementation of the Proposed Action would allow five riparian areas in the Juniper and Sand Spring Pastures that are currently fenced to maintain or improve to properly functioning condition. The 6 springs/seeps located in the Juniper Pasture would continue to be subject to hot season use by cattle and wild horses. Up to 582 cattle would be in the Juniper Pasture for 46 days of the 92 day hot season and up to 35 wild horses for the entire hot season. During the hot season, livestock and wild horses tend to congregate near water sources and riparian areas for both the water and green forage irrigated by the water. An estimated ten acres of riparian area associated with the unfenced meadows produce approximately 25 AUMs of palatable forage. Even before cattle are moved into the Juniper Pasture the 35 horses (at high AML) would be likely to consume a high percentage of the available meadow before cattle enter the pasture. Additionally, when cattle or wild horses graze spring meadows or seek drinking water, their hoof action would cause pocking of the meadow surface. This pocking would damage the dense root mats, expose bare soil and increase erosion in meadows on slopes. Sagehen Spring in the Juniper Pasture would not be expected to improve to PFC and the Riparian/Wetland Land Health Standard would not be met.

Cattle would graze in the Lake Field for up to 46 days of the 92 day hot season. Alkaline Meadow on the eastern edge of the pasture would receive heavy livestock use. Riparian conditions would be expected to be poor with pocking of the meadow surface and erosion along the edges of the meadow areas.

Impacts of Alternative 3 – TRT Recommendations

Implementation of the TRT Recommendations Alternative would result in impacts to riparian and wetland areas similar to those described under the No Action Alternative. Impacts would be similar because cattle would graze 51 days during the hot season in the Juniper Pasture (vs 46 days in the No Action Alternative) with up to 582 cattle. Although the wild horse high AML would be 10 animals less than the No Action Alternative, the wild horses would still congregate on riparian areas during the hot season. Cattle would utilize the Alkaline Meadow in the Lake Field up to 19 days during the hot season (vs. 46 days in the No Action Alternative) but the impacts would be similar to those described for the No Action Alternative due to the behavior of cattle to concentrate on water and green forage found at meadow sites. The riparian standard would not be met.

Impacts of Alternative 4 – Allocation by Pasture

Implementation of the this alternative would allow five riparian areas in the Juniper and Sand Spring pastures that are currently fenced to maintain or improve to properly functioning condition. The 6 springs/seeps located in the Juniper Pasture would continue to be subject to hot season use by cattle and horses. Although no cattle would graze the Juniper Pasture during the 92 day hot season, up to 121 wild horses would utilize the pasture for the entire hot season. During the hot season wild horses tend to congregate near water sources and riparian areas for both the water and green forage irrigated by the water. There are an estimated ten acres of riparian area associated with the unfenced meadows producing approximately 25 AUMs of palatable forage. The 121 horses (at high AML) would be likely to consume a high percentage of the available meadow forage with utilization exceeding 40% of the current year production. Additionally, wild horses graze spring meadows or seek drinking water; their hoof action would cause pocking of the meadow surface. This pocking would damage the dense root mats, expose bare soil and increase

erosion in meadows on slopes. Sagehen Spring in the Juniper Pasture would be expected to improve to PFC and the Riparian/Wetland Land Health Standard would be met within five years of fencing the spring and associated meadow complex.

Riparian conditions at Alkaline Meadow in the Lake Field would be expected to improve due to reductions in livestock or wild horse grazing in the Lake Field during the hot season.

Impacts of Alternative 5 –No Grazing

Under the No Grazing Alternative, riparian wetland areas would improve at a faster rate than under the other alternatives due to no negative impacts from grazing or hoof action on wet riparian soils and no removal of the riparian vegetation that is needed to stabilize soils and trap sediment. With the No Grazing Alternative, riparian wetland areas would provide increased water and improved riparian habitat for wildlife in the long term as impacts that are degrading these resources are eliminated and functionality improved. With this alternative there would be an expected long-term benefit to riparian habitat with increases in age classes of herbaceous vegetation and increased diversity of plants due to no herbivory or grazing pressure. Increases in riparian plant vigor and residual vegetation as a result of no grazing would increase sediment trapping and lower water temperatures. Increases in riparian vegetation and plant production would also result in a higher degree of resiliency within riparian zones as vegetation stabilizes soils and increases the water holding capacity of soil. Achievement of proper functioning condition may occur at some riparian sites, specifically Sagehen Spring, due to the removal of wild horses. Under this alternative, once riparian areas revegetated completely, riparian vegetation in the long term could begin to become decadent and vegetation growth would be slightly decreased due to increased matting from dead vegetation. Overall, this alternative would have positive impacts to riparian resources and the riparian standard would be met.

3.1.10. Wilderness/Land with Wilderness Characteristics/ Wilderness Study Area

Affected Environment

None of the Massacre Lakes Allotment is within or adjacent to designated wilderness areas. Approximately 31,080 acres of the Massacre Lakes Allotment (66.2 % of the allotment) are located in the Massacre Rim WSA which was designated as a WSA in 1979. The entire 25,322 acre Juniper Pasture, 3,819 acres of the Lake Field, and 1,687 acres of the West Seeding are within the WSA. Approximately 78% of the Massacre Lakes HMA falls within the Massacre Rim WSA (see Map on page 126).

The portions of the Massacre Lakes Allotment not designated as WSA in 1979 were re-inventoried in 2009 as required under section 201 of FLPMA. No additional areas within the allotment were found to exhibit wilderness characteristics due to a lack of natural conditions.

Wilderness characteristics are assessed using the definition of wilderness provided in the Wilderness Act of 1964. Listed in order, they include; size, natural condition, outstanding opportunities for solitude or for primitive and unconfined recreation, and special or supplemental values. The Massacre Rim WSA is over 20 times larger than the minimum 5,000 acres, is substantially natural in character, and has opportunities for solitude, primitive and unconfined recreation. Additionally, the WSA contains additional supplemental values associated with important archaeological, scenic and wildlife values.

Environmental Consequences

Impacts of Proposed Action

Implementation of the Proposed Action would result in no cattle grazing during the critical growth period (mid-March through June) for native perennial grasses in the Juniper or West Seeding pastures. The Juniper Pasture is entirely within the WSA, and 34% of the West pasture is within the WSA. Up to 450 cattle would graze in the Lake Field and East Seeding pastures for 46 days every other year during the 107 day critical growth period; approximately 48% of the Lake Field is within the WSA. During the entire critical growth period there would be up to 45 wild horses in the Juniper Pasture and none in the West Seeding or Lake Field. Native perennial grasses would have a high probability of completing their full growth cycle through seed set in the Juniper Pasture and West Seeding. This would allow the existing grass plants to increase in vigor and thereby increase productivity and cover as well as increase seed production which would lead to the establishment of additional grass plants. Grazing by cattle in the WSA portions of the Lake Field would occur every other year with a utilization limit of 40%. This would also allow native perennial grass plants to increase in vigor as well as increase opportunities for seed production. The increase in cover, density and productivity would lead to improved naturalness throughout the portions of the WSA within the allotment.

Grazing by up to 450 cattle for 54 days and up to 45 horses for the entire hot season period would lead to concentrated use of unfenced spring meadows in the Juniper Pasture every year. This would maintain unnatural conditions on a few acres in the pasture.

Opportunities for Primitive and Unconfined Recreation or Solitude would not be impacted by implementation of the Proposed Action. The impact to supplemental values associated with cultural resources and wildlife are discussed in those sections of the assessment. There would be no impacts to visual quality. Changes to wilderness values would be substantially un-noticeable to the WSA as a whole and implementation of the alternative would not impair Congress's ability to designate the Massacre Rim WSA as wilderness.

In the Proposed Action, one new range improvement within the WSA is proposed: a 17.2 acre riparian exclosure would be constructed at Sagehen Spring to protect the site, improve functionality and restore riparian habitat. The project would protect Sagehen Spring and associated meadow complex. The natural condition of the riparian site within the WSA would be improved by protecting the riparian zone from high levels of wild horse use, erosion, and excessive bare ground.

The exclosure fence at Sagehen Spring would be constructed in part for the benefit of the greater sage-grouse, a species considered a candidate for listing under the Endangered Species Act. Additionally, the exclosure would allow for the restoration of habitat deteriorated by the modern human influences of livestock and wild horse use. There is no alternative site outside the WSA that would accomplish riparian or wildlife related objectives for Sagehen Spring. The impacts of the construction of a 0.66 mile barbed wire fence in the WSA would be mitigated by project design methods that ensure minimal length of fence and that locate the fence to be substantially unnoticeable to the casual observer and have no permanent negative impact on wildlife habitats in the WSA. Access to the project site using ATVs on previously flagged locations would ensure that no permanent OHV trails would be created.

Overall, the construction of an exclosure to protect values relating to riparian, cultural, and wildlife resources would have positive impacts to the WSA due to improvements in natural conditions and

protection of supplemental values. The proposed development would be essentially unnoticeable in the WSA as a whole and would not result in impairment of wilderness characteristics. Maintenance of the fence at Sagehen Spring would not require the regular use of motorized vehicles. Infrequently, motorized vehicles would be required to access the fences for maintenance or repair. Vehicles would be restricted to travel on existing primitive routes (ways) as far as possible and then ATVs would be used to transport necessary tools and materials to the exclosure. ATV access would be flagged to ensure than no new permanent OHV trails would be created.

Impacts of Alternative 2 – No Action

Grazing management would remain unchanged from historic practices under this alternative, and no new range improvements are proposed. Implementation of the No Action Alternative would result in up to 582 cattle grazing during approximately 60 days of the 107 day critical growth period (mid-March through June) for native perennial grasses in the Juniper Pasture which is entirely within the WSA, about 29 days every other year with up to 582 cattle in the Lake Field, and about 44 days every other year in the West Seeding, of which portions are within the WSA. During the entire critical growth period there would be up to 35 wild horses in the Juniper Pasture and none in the Lake Field or West Seeding. Native perennial grasses would have a low probability of completing their full growth cycle through seed set in the Juniper Pasture. The ability for plants to complete their growth cycle before being grazed allows existing grass plants to increase in vigor and thereby increase productivity and cover, as well as increase seed production which would lead to the establishment of additional grass plants. Grazing by cattle in the WSA portions of the Lake Field and West Seeding would occur every other year with a utilization limit of 60%. This would decrease the opportunity for native perennial grass plants to increase in vigor as well as increase opportunities for seed production when compared to lower stocking rates and allowable utilization levels under the Proposed Action. The increase in cover, density and productivity would maintain current levels of naturalness throughout the portions of the WSA within the allotment.

Grazing by up to 582 cattle for 46 days and up to 35 horses for the entire hot season period would lead to concentrated use of unfenced spring meadows in the Juniper Pasture every year. This would maintain unnatural conditions on a few acres in the pasture.

Opportunities for Primitive and Unconfined Recreation or Solitude would not be impacted by implementation of the No Action Alternative. The impact to supplemental values associated with cultural resources and wildlife are discussed in those sections of the assessment. There would be no impacts to visual quality. Changes to wilderness values would be substantially un-noticeable to the WSA as a whole and implementation of the alternative would not impair Congress's ability to designate the Massacre Rim WSA as wilderness. There would be no new range improvement projects.

Impacts of Alternative 3 – TRT Recommendations

Under the TRT Recommendation, impacts to wilderness values would be similar to those described under No Action Alternative. Compared to the Proposed Action, the maximum stocking rate by cattle would be higher, and there would be up to 12 days of cattle use in the Juniper Pasture, 13 days of cattle use in the West Seeding, and no use in the Lake Field during the critical growth period; in all pastures, utilization would be limited to 40% of current year grass production. Hot season grazing by cattle in the Juniper Pasture is estimated at 45 days, same as the Proposed Action. There would be no impacts to substantial wilderness attributes from new range improvement projects.

Impacts of Alternative 4 - Allocation by Pasture

Under the Allocation by Pasture alternative, impacts to wilderness values would be similar to those described under the Proposed Action. Compared to the Proposed Action, the maximum stocking rate for cattle would be lower, but there would be an increase in yearlong wild horse use, particularly in the Juniper pasture. There would be no use by cattle in the Juniper Pasture or West Seeding during the critical growth period, and there would be up to 49 days of cattle use in the Lake Field during the critical growth period; utilization would be limited to 40% of current year grass production.

Impacts to wilderness values associated with construction of a 17.2 acre exclosure at Sagehen Spring would be the same as described for the Proposed Action alternative.

Impacts of Alternative 5 – No Grazing

Under the No Grazing Alternative, all livestock grazing would cease and wild horse herds would be removed from the allotment. No new range improvements would be constructed. In the absence of grazing pressure in the WSA, bare ground in both upland and riparian areas would begin to re-vegetate, and erosional processes would be reduced at spring sources. Overall, a rest from high-intensity grazing would have positive impacts to the WSA due to improvements in natural conditions. Existing exclosures fences, and other range improvement would be removed in the long term. No new impacts to the wilderness characteristics of size, opportunities for solitude, or opportunities for primitive/unconfined recreation would be expected. Supplemental values would also be protected from further degradation by improving riparian wildlife habitat and protecting cultural resources. There would be no impacts to Congress's ability to designate the Massacre Rim WSA as wilderness.

3.2. Other Resources

3.2.1. Livestock Management

Affected Environment

The Massacre Lakes allotment is a perennial grazing allotment that is currently authorized for 582 cattle to utilize 3,215 active AUMs from April 16 to September 30 annually. The main components of the current Massacre Lakes Allotment Management Plan are early use (4/16 – 7/15) and rest on the Juniper Pasture; deferred use on the Sand Spring Pasture; rest and utilization limits on the crested wheatgrass seedings (West, East, and Lake Field). The AMP limits utilization to 60% of the current growth on the key perennial native grass species in the Juniper and Sand Spring pastures, and 80% use on crested wheatgrass in the Lake Field, West and East Seedings. The basic grazing plan consists of a rest-rotation/deferred grazing system (see Map on page 129 and Table 3.4 below):

Table 3.4. Current Grazing System

Use Area	Number of Cattle	Year 1	Year 2
Juniper	582	5/1-8/15	Rest
Lake Field	582	Rest	6/1-8/15
West Seeding	582	Rest	4/16-5/30 8/16-9/30

East Seeding	582	4/16-4/30 8/16-9/30	Rest
Sand Spring	582	8/16-9/30	8/16-9/30

The current grazing system is designed to provide four of the five pastures rest every other year. The Sand Spring Pasture receives deferred use each year. April 16 is the anticipated date for range readiness in the allotment.

From mid-April to early May cattle are trucked to Nelson Well holding corrals between the East and West Seedings. Cattle are then turned out directly into a seeded pasture. At the end of the grazing season cattle are gathered into the Sand Spring Pasture and Nelson Well holding corrals before they are transported to winter pasture.

Actual Use

The level of livestock grazing that actually occurred on the allotment is referred to as actual use. This use is reported in animal unit months (AUMs) and is based on Actual Grazing Use Reports submitted by permittee annually at the end of the grazing season. Average actual use on the allotment between 1988 and 2012 has averaged 63% (2,028 AUMs) of permitted use. Table 3.5 below displays actual use on the Massacre Lakes Allotment from 1998 to 2012.

Table 3.5. Massacre Lakes Allotment Actual Use History

Year	**Pasture/AUMs**						**Active AUMs 3,215**		
	Juniper	**Lake Field**	**West Seeding**	**East Seeding**	**Sand Spring**	**All pastures**	**Total use AUMs**	**Percent of Active AUMs**	**Max No. of livestock**
2012	1,288 combined*	1,288 combined*#	1,288 combined *#	42	698		2,028	63%	483
2011		1128	432		493		2,053	64%	448
2010	1,413 combined*		1,413 combined*#	142	725		2,280	71%	493
2009	1,249		725		377	64	2,415	75%	570
2008	1,514 combined*	874	1,514 combined*#		145		2,533	79%	546
2007		924	363/419 combined*		419 combined*		1,706	53%	446
2006		1082		1,347 combined*	1,347 combined*		2,429	75%	558
2005	1,165	513 combined*	442/513 combined*				2,120	66%	521
2004		738		780 combined*	780 combined*		1,518	47%	401
2003		884		258/330 combined*	330 combined*		1,472	45%	377
2002	860		1,098				1,958	61%	491
2001	446		519			504	1,469	45%	388
2000		874		481/374 combined*	146/374 combined*		1,875	58%	554
1999	1,196		987				2,183	68%	551
1998		1,337		685	352		2,374	73%	563
Averages							2,028	63%	493

Note

* Combined means that the pastures were used together and the AUM value that is the same between the columns was shared between the pastures.

Use in this pasture was not scheduled, but the actual number of AUMs harvested in the pasture is unknown.

Range Developments and Improvements

Range developments and improvements (shown in Map on page 133) include developed springs, troughs, reservoirs, catchments, earth pits, earth tanks, wells, windmills, and seedings. Several of these projects are located within the WSA. Existing fences include allotment boundary fences, pasture division fences, and exclosure fences. Range developments on public lands were authorized through BLM permit or cooperative agreement. Most of the authorized range developments are in good condition and generally maintained on an annual basis.

Monitoring

Utilization Information

Use pattern maps have been completed periodically since 1978 in the Massacre Lakes Allotment. Moderate to heavy utilization has occurred throughout each pasture. A composite use pattern map based upon field data from 1979 to 2012 is attached in Map on page 134. Areas not visited were not mapped into a utilization class.

Environmental Consequences

Impacts of Proposed Action

Under the Proposed Action, the authorized season of use would be shortened by 43 days with scheduled turn-out on 5/15 instead of 4/16 and a grazing end date of 9/17 instead of 9/30. The number of cattle permitted in the allotment would be 150 head from 5/15 – 5/29 and 450 head from 5/30 – 9/17; down from 582 cattle. The permitted AUMs would be reduced from 3,215 to 1,693 (a 47% reduction). The decreased AUMs would be temporarily suspended until perennial grass composition on the allotment has increased to desired levels.

The pasture rotation would be changed from historic practices with cattle grazing lower elevations early in the season and being moved to higher elevations as the season progresses. The West Seeding would be grazed after seed ripe each year and used as a gathering pasture. The grazing schedule would combine the Lake Field and East Seeding to be grazed at the same time.

Since the permittee and livestock would not be accustomed to the changes in pasture rotation, additional herding would be required to move cattle between pastures and maintaining good distribution in the pastures scheduled for cattle use.

The permitted livestock turnout date would be delayed one month from April 16 to May 15 each year; however, the actual impact on the permittee would be expected to be minimal because historically cattle turnout has occurred on or about May 15. The staggered turnout, 150 cattle on May 15 and the remaining 300 cattle on May 30 would require the permittee to find forage for the 300 cattle for the two week period. Removal of the livestock 13 days earlier than the current

permit would also require that the permittee find additional forage in late summer. The proposed reduction from 582 cattle presently permitted to a maximum to 450 cattle would be a loss of opportunity for up to 132 cattle. However, based upon historic use, the likely impact would be less on most years. The average number of cattle using the allotment has averaged 493 during the past 15 years. Similarly the 47% reduction in permitted use would be not much different than the voluntary non-use that has averaged 37% during the past 15 years.

The installation of the water storage tank at Sand Spring Well would increase water availability in the Sand Spring Pasture which would improve livestock distribution. Damage to the trough and float valve by livestock would be minimized since cattle would be less likely to stand in a trough that is full.

Impacts of Alternative 2 – No Action

The No Action Alternative would maintain the current stocking rates and season of use. However, it is likely that the permittee would continue to voluntarily delay turnout by about one month and turnout fewer cattle than allowed under the permit. The existing permit would be re-issued under the same terms and conditions and the allotment would be managed under provisions of the 1982 Revised Massacre Lakes Allotment Management Plan (AMP) and Surprise RMP 2008. The permittee would continue his current livestock management practices; and therefore, there would be no new impacts to livestock grazing management.

Impacts of Alternative 3 – TRT Recommendations

Assumptions: The TRT Recommendations did not include a specific grazing system with specific use periods by pasture. For the purpose of analysis in this assessment, the BLM staff has developed a grazing schedule that would be used each year. The schedule was based upon the TRT Recommendations, the recent historic turnout date, the estimated grazing capacities of each pasture at 40% use and other factors.

Table 3.6. TRT Recommendation Assumed Grazing Schedule

Pasture	Number of Cattle	Period of Use	# Days	AUMS
West Seeding	582	5/15 - 5/28	13	260
Sand Spring	582	5/29 - 6/17	20	400
Juniper	582	6/18 - 8/20	64	1,250
Lake Field	582	8/21 - 9/9	20	400
East Seeding	582	9/10 - 9/14	4	90

Impacts of implementing the TRT Recommendations Alternative would be similar to the No Action Alternative; stocking rates and seasons of use would be unchanged. Although the pasture moves would be somewhat different, the assumed grazing schedule would be consistent with historic practices and cattle behavior. The major difference between this alternative and the No Action Alternative would be the requirement that the permittee or someone hired by the permittee to monitor utilization and water conditions within the allotment to determine when to move his cattle in a timely manner to meet utilization objectives. Initially the BLM would work with permittee to establish key areas and provide training for monitoring. However, once the permittee or his agent is comfortable with his monitoring skills, it would then become their responsibility to determine when utilization levels have been reached, thus triggering a pasture move. The

requirement would impact the permittee by either costing him or a part time worker additional labor and mileage to conduct the utilization monitoring.

Impacts of Alternative 4 – Allocation by Pasture

Under the Allocation by Pasture alternative, the authorized season of use would be shortened by 78 days with scheduled turn-out on 5/15 instead of 4/16 and removal of livestock from the allotment on 8/12. The number of cattle permitted in the allotment would be 450 head from 5/15 – 8/12; down from 582 cattle. The permitted AUMs would be reduced from 3,215 to 1,322 (59% reduction).

The grazing strategy would be substantially altered from recent practices as the Juniper Pasture would no longer be available for livestock use. The other four pastures would be used in a rotational scheme.

Since the permittee and livestock would not be accustomed to the changes in pasture rotation, additional herding would be required to move cattle between pastures and maintaining good distribution in the pastures scheduled for cattle use. Loss of the Juniper Pasture for livestock grazing would eliminate the pasture that requires the greatest amount of labor for pasture moves and gathering.

The permitted livestock turnout date would be delayed one month from April 16 to May 15 each year; however, the actual impact on the permittee would be expected to be minimal because historically cattle turnout has occurred on or about May 15. The August removal of livestock would require the permittee to find forage for the 450 cattle for 48 days in August and September. The proposed reduction from 582 cattle presently permitted to a maximum to 450 cattle would be a loss of grazing opportunity for up to 132 cattle. However, based upon historic use, the likely impact would be less on most years. The average number of cattle using the allotment has averaged 493 during the past 15 years.

Impacts of Alternative 5 – No Grazing

Under the No Grazing Alternative, no permit would be issued; the permit would be cancelled. As a result, the permittee would not be authorized to graze livestock on the Massacre Lakes Allotment. The forage available to the permittee would either need to be replaced from private lands or by acquiring new grazing permits on public land.

3.2.2. Social and Economic Values

Affected Environment

The Surprise Valley is a rural community with a strong commitment to the tradition of livestock ranching, which is the dominant element of the local economy. Many of the ranches have been in operation for several generations and rely on livestock for their income. Local agri-business derives income from related goods and services as well. Although the Massacre Lakes Allotment is located in Washoe County, Nevada, the economic benefits of livestock production accrue in Modoc County, California. Agriculture is the 2nd largest economic sector in Modoc County (after government), employing 320 persons in 2010. Livestock production is the largest segment of the agriculture sector within the county, with 2010 livestock sales representing about one-third of the $112.1 million in agriculture cash receipts (US Census 2010). Each $100,000 in direct receipts supports one job in the local economy (JW Associates, 2008).

Federal permits to graze livestock on public land are an important factor of production for livestock ranchers in the West. The permits are linked to privately-owned base property and enhance the productive capacity of private property by providing additional forage during certain seasons. This allows for rest, or production of hay or other forage on private property. A common practice is to produce alfalfa or grass hay on irrigated pastures during the six month season when livestock are on public rangelands. A public land livestock grazing AUM has a current value of $95 in economic activity in the county. There is currently little excess livestock forage capacity in the county (JW Associates, 2008).

The current Massacre Lakes Allotment permittee has been a rancher in the local area for decades and resides in the Surprise Valley. The permittee also employs local ranch hands to help out with day to day ranching operations.

Recreation:

The primary recreation uses in the allotment are wildlife viewing, hunting and camping. Rock hounding, wild horse viewing, photography, mountain biking, hiking, and OHV/pleasure driving is uncommon. Camping is generally associated with hunting activity and usually occurs during the late summer and fall. Pronghorn antelope hunting is especially popular within the Massacre Lakes Allotment due to the large population in the area.

Although there is a diverse mix of recreational uses with the allotment, the level of use is relatively low due to the lack of destination features, the distance to major population centers and the lack of paved roads. Estimated visitor use is 100 to 200 Visitor Use Days (VUD) per year. As population growth continues in California and Nevada, it is expected that demand for recreational opportunities within the Surprise Field Office and the Massacre Lakes Allotment will gradually increase, but not exceed 500 VUD per year in the foreseeable future.

Environmental Consequences

Impacts of Proposed Action

This alternative would reduce the current authorized livestock by 41%. Minor change in the economic value of the authorized AUMs to the ranch operation and local community is expected due to voluntary non-use by the permittee over the past 15 years. Actual use reports show the permittee averaged 493 head cattle over last 15 years. Implementation of the Proposed Action would therefore result in a reduction of 43 head from this average turnout number. However, authorized use would be reduced 132 head, and the season of use would be reduced 1.5 months when compared with the current grazing permit. The impacts to the livestock permittee are described above in Section 3.2.1. A 119 AUM reduction from average use over the past 15 years would be a loss of $11,300 in economic activity in the county and no change is employment. A 1,522 AUM reduction from permitted use could be a $144,600 loss of economic activity and loss of one job.

There would be little if any impacts to social and economic values from the installation of the water storage tank at Sand Spring Well.

There would be no impact to recreational opportunities.

Impacts of Alternative 2 – No Action

Livestock grazing practices would remain unchanged from those in the recent past. Therefore, there would be no economic impacts to the rancher or local community.

There would be no impact to recreational opportunities.

Impacts of Alternative 3 – TRT Recommendations

Under this alternative, permitted use would remain unchanged. However, the maximum 40% utilization criteria imposed for each pasture is expected to result in the removal of cattle from the allotment earlier than September 30. Overall AUM actual use is also expected to be similar to the Proposed Action Alternative. Consequently, the permittee could incur additional expenses for feeding or leasing private pasture. The requirement for the permittee to monitor utilization on a regular basis would increase yearly operational costs. There would be additional labor costs and mileage costs associated with the monitoring for either the permittee or a person employed by the permittee.

There would be no impact to recreational opportunities.

Impacts of Alternative 4 – Allocation by Pasture

Authorized livestock numbers under this alternative would be the same as the Proposed Action, 450 head. However, the authorized season-of-use would be shortened by 58 days. A 706 AUM reduction from average use over the past 15 years would be a loss of $67,000 in economic activity in the county and no change in employment. A 1,893 AUM reduction from permitted use could be a $179,800 loss of economic activity and loss of one job. Employment opportunities for low income and minority groups are expected to remain unchanged.

There would be no impact to recreational opportunities. There would a very limited opportunity for increased tourism to the allotment associated with wild horse viewing. The remoteness and the lack of adequate roads associated with the HMA's Juniper pasture is not expected to attract wild horse viewers.

Because there would be no livestock grazing in the Juniper Pasture, fence maintenance associated with protective spring fences, including the proposed Sagehen Spring fencing, assigned to the livestock permittee would revert to BLM. This would result in a substantial commitment in staff time with commensurate labor costs to maintain the exclosure fencing. The behavior of wild horse studs around key hot season water sources commonly results in damage to fencing as a result of fighting near the fences.

Impacts of Alternative 5 – No Grazing

If livestock grazing were eliminated, the permittee that relies on forage from the allotment would have negative economic impacts because he would have to locate other grazing land and forage for his livestock. A 2,028 AUM loss from average use over the past 15 years would be a loss of $192,660 in economic activity in the county and the loss of two jobs. A 3,215 AUM reduction from permitted use could be a $305,425 loss of economic activity and loss of three jobs. The availability, location and cost of other livestock grazing pastures are unknown, but are likely to cost the operator more than public land forage. With the removal of wild horses, wild horse viewing opportunities would be reduced.

The local economy would sustain small negative economic impacts due to the loss of revenue from tourism and related goods and services. Local ranch hands employed by the operator could be negatively impacted from the loss of seasonal work.

There would be no impact to recreational opportunities.

3.2.3. Soils

Affected Environment

The soil classification for the Massacre Lakes Allotment is contained in the Washoe County North Part Soil Survey, NV #759 (an Order III soil survey). The soil survey has been updated by the Natural Resources Conservation Service (NRCS) Reno State Office to current standards and can be found on the NRCS web site.

Soils on the Massacre Lakes fall into five primary groups based primarily upon landscape position.

1. Soils in the Juniper Pasture are mostly shallow, clay loams often with large amounts of surface rock. Consequently, these soils have very slow permeability and are likely to have surface runoff, particularly during high precipitation events.
2. Lake terraces associated with the Massacre Lakes are silty clays with high saline/alkaline characteristics.
3. Lake deposited fans are generally loamy and deep and well drained.
4. Also associated with the lakes are areas of old dunes dominated by deep sandy soils.
5. Lake bottoms dominated by frequently flooded clays.

There are other soil types that occupy small areas within the allotment including organic soils associated with spring meadows, shallow rocky soils near rim rocks that area dominated by juniper woodlands and deep loams on north facing slopes in the northern portion of the Juniper Pasture.

Microbiotic crusts of the soil surface community include cyanobacteria, green algae, lichens, mosses, microfungi and other bacteria. Soils with these organisms are often referred to as cryptogamic soils and form what is known as biological crusts. The cyanobacteria and microfungal filaments aid in holding loose soil particles together, forming a biological crust which stabilizes and protects soil surfaces. Bryophytes (mosses and liverworts) are the most prevalent in the allotment. The biological crusts benefit soils by increasing moisture retention, fixation of nitrogen, and may discourage the growth of annual weeds. Most biological crust organisms make their growth during cool moist conditions. In addition, soil crust occurrence is inversely related to vascular plant cover. The distribution, shape, and height of vascular plants can either increase or decrease soil crust or influence crust species and composition. Vascular vegetation reduces the amount of soil surface available for colonization. Microbiotic crusts are primarily associated with lower elevation loamy soils.

Soil crust information is a component of the land health assessment process indictor # 8-Soil surface resistant to erosion; the rating was slight-moderate to moderate on the shallow clay soils and none-slight on the loam /fine sand soils.

The BLM completed field assessments on the allotment in 2008 to determine whether rangeland health standards were being met. Based on five sites in three pastures evaluated, soils land health standard is not being met on the allotment. Data from five upland health assessments rated Soil/Site Stability as unstable at 3 of 5 sites. The Rangeland Health determination is described in Section 1.5. Additional soils information is contained in the Massacre Lakes Rangeland Health Determination.

(http://www.blm.gov/ca/st/en/fo/surprise/grazing_permit_renewals.html).

Environmental Consequences

Assumptions

- Soils in the region have been historically impacted by livestock grazing (sheep, cattle and domestic horses) for over 150 years with grazing levels and practices during the late 19th Century and 1st third of the 20th Century, leading to major reductions in soil productivity associated with loss of herbaceous cover and extensive surface erosion.
- Grazing management practices that reduce or eliminate grazing on wet soils, increase litter and lead to higher densities of deep rooted species would allow progress toward meeting the upland soils standard. Some of the desirable grazing management practices include:
    - Turning out livestock after soils have dried; generally after May 1st.
    - Reducing grazing during the critical growth period for perennial grasses
    - Leaving residual herbaceous vegetation at the end of the grazing period.

Impacts of Proposed Action

Implementation of the Proposed Action would result in livestock turnout on or after May 15th with 450 cattle. Grazing use would not be allowed during periods of saturated soils during the spring and a maximum of 548 AUMs of cattle use in the Sand Spring, Lake Field and East Seeding every other year. Additionally, a 40% utilization limit for livestock would ensure that residual herbaceous vegetation remains to become soil litter. Under these grazing management practices, adverse impacts to soils would be reduced and soil stability and productivity would be expected to improve on most of the East and West seedings, Sand Spring Pasture and Lake Field. Soils within these pastures would either meet or make substantial progress toward meeting the Upland Soils Standard within several years of implementing the alternative.

In the Juniper Pasture, cattle grazing use would not be allowed during the normal period for wet soils and there would be no use during the critical growth period for perennial grasses. However, up to 45 head of wild horses would be in the pasture yearlong when soils are saturated and during the entire 107 day critical growth period every year. Upland Soils Standard would not be met where wild horses tend to graze.

Additionally, periodic heavy grazing use would continue; trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Upland Soils Standard.

Impacts of Alternative 2 – No Action

Implementation of the No Action Alternative would result in livestock turnout as early as April 16th with a maximum of 582 cattle. This could result in up to 30 days of use during periods of saturated soils during the spring and a maximum of 582 AUMs of cattle use on alternating years in all pastures except Sand Spring. The 60% utilization limit for livestock would continue to result in decreased residual herbaceous vegetation remaining to become soil litter when compared to the Proposed Action. Impacts to soils related to soil stability and productivity issues are expected to continue on most of the East and West seedings, Sand Spring Pasture and Lake Fields where moderate to severe utilization has been recorded. Soils within these pastures are not expected to make progress toward meeting the Upland Soils Standard.

In the Juniper Pasture, Grazing use would not be allowed during periods of saturated soils during the spring or during the critical growth period for perennial grasses. However, wild horses would be in the pasture yearlong when soils are saturated and during the entire 107 day critical growth period every year. Soils in portions of the pasture favored by wild horses would not meet the Upland Soils Standard.

Additionally, periodic heavy grazing use would continue; trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Upland Soils Standard.

Impacts of Alternative 3 – TRT Recommendations

Implementation of the TRT Recommended Alternative would result in livestock turnout after May 15th with a maximum of 582 cattle. Grazing use would not be allowed during periods of saturated soils during the spring and a maximum of 465 AUMs of cattle use in any pasture. Additionally, a 40% utilization limit for livestock would ensure that residual herbaceous vegetation remains to become soil litter. There would be approximately 12 days of use by cattle during the critical growth period for perennial grasses in the Juniper Pasture, 19 days in the Sand Spring Pasture and 13 days in the West Seeding every year. Under these grazing management practices, impacts to soils would be mixed. Lack of grazing during the wet period and a 40% utilization limit would lead to increased soil stability and productivity. Grazing every year during the critical growth period in three pastures limits the rate at which deep rooted perennial grasses would increase in vigor and density resulting in a slower rate of improvements to soil stability. Soil conditions would be expected to improve at a rate similar to the Proposed Action on the East Seeding and Lake Fields. Soils within these pastures would either meet or make substantial progress toward meeting the Upland Soils Standard within several years of implementing the alternative. In the Sand Spring Pasture and West Seeding, soils would make progress toward meeting the standard but at a slower rate to that expected for the Proposed Action.

In the Juniper Pasture, livestock grazing would not be allowed during periods of saturated soils during the spring, and there would be no use during the critical growth period for perennial grasses. However, wild horses would be in the pasture when soils are saturated and during the entire 107 day critical growth period every year. Soils in portions of the pasture favored by wild horses would continue to not meet the Upland Soils Standard.

Additionally, periodic heavy grazing use would continue; trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Upland Soils Standard.

Impacts of Alternative 4 – Allocation by Pasture

Impacts would be similar to those described for the Proposed Action for the Sand Spring, East and West seedings and Lake Fields due to the post May 15th livestock turnout of up to 450 cattle, the 40% utilization limit and alternative year rest in the Sand Spring, Lake Field and East Seeding. Soils within these pastures would either meet or make substantial progress toward meeting the Upland Soils Standard within several years of implementing the alternative.

In the Juniper Pasture, livestock grazing would not be allowed during the normal period for wet soils, or during the critical growth period for perennial grasses. However, up to 121 head of wild horses would be in the pasture when soils are saturated and during the entire 107 day critical growth period every year. Soils in portions of the pasture favored by wild horses would continue to not meet the Upland Soils Standard. It is anticipated that this area affected by wild horses would cover a substantial portion of the pasture.

Additionally there would continue to be periodic heavy grazing use, trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Upland Soils Standard.

Impacts of Alternative 5 – No Grazing

In the short term, plant vigor and litter would improve rapidly. Soil organic matter would likely increase; with a subsequent improvement in soil stability. Soils within the allotment would either meet or make substantial progress toward meeting the Upland Soils Standard within several years of implementing the alternative.

3.2.4. Vegetation including Special Status Plants

Affected Environment

For the purpose of this analysis, vegetation resources are discussed both at an overall allotment level and at the pasture level. Vegetation cover within the Massacre Lakes Allotment is typical of a sage steppe ecosystem, characterized by an elevation gradient of plant composition. Lower elevation pastures are dominated by big sagebrush (Wyoming and Basin varieties), with a component of greasewood and herbaceous vegetation on basin floors and lake plains. Higher elevation areas of the Juniper Pasture are characterized by a combination of short sagebrushes and juniper woodland/savannah. North facing slopes contain small areas of mountain big sagebrush communities. Some of the plant communities within the allotment have been directly altered by past human activities. In the 1960s, portions of the East and West Seedings and the Lake Field were seeded to crested wheatgrass. The Lake Field Seeding (17% of the pasture) remains in good condition, but decreased production of native grasses has been observed along with increasing sagebrush cover. The East and West seedings (87% and 55% seeded to crested wheatgrass, respectively) are in declining condition, with an increase in shrub cover and bare ground. Portions of the Lake Field and the Sand Spring Pasture were sprayed with herbicides in the 1960s to remove sagebrush cover and increase grass production.

Elsewhere within the allotment, indirect impacts related to livestock and wild horse grazing have caused plant communities to undergo change. Most likely a result of historic heavy grazing,

many plant communities within the allotment have lost their deep-rooted perennial bunchgrass component (e.g. Thurber's needlegrass, Great Basin wildrye, & bluebunch wheatgrass) and are now dominated by less palatable shallow-rooted species such as Sandberg's bluegrass. The presence of seedings is an indicator that the loss of deep rooted perennial grasses occurred more than 50 years ago. In the 1960s standard practices for seedings was to select areas where there was little or no remaining native bunchgrass cover with substantial cover of tall sagebrush varieties. The Rangeland Health Assessment indicated that the Biodiversity Standard is not being met due to reduced density of perennial grasses between shrubs, lower than expected frequencies of deep rooted perennial grasses and reduced annual production of perennial grasses.

Juniper expansion is also a factor within the Juniper Pasture. Increased densities of juniper have been documented throughout sagebrush-steppe communities in the Intermountain West and a variety of factors have been attributed to this expansion (Miller & Rose 1999). Although juniper is native in these ecosystems, the density of juniper found throughout the allotment is greater than would be expected based on soil types and ecological site descriptions. Low sagebrush sites and barren, rocky ridgelines are considered the historic juniper site where periodic fires were infrequent and of mixed severity. Juniper likely occurred only in low densities in big sagebrush sites, where fine fuels facilitated more frequent fires, impeding the establishment of juniper. Research has shown that management actions (including fire suppression) have altered fire regimes, allowing juniper to expand into areas where it previously would not have been present. Although studies have attributed changes in the fire regime to livestock grazing because it causes a reduction in fine fuels (Miller and Rose 1999), there is some evidence that the rate of juniper expansion has been comparable between grazed and ungrazed areas (Soule & Knapp 1999).

Current conditions on the allotment:

Juniper Pasture

This pasture is comprised primarily of short sagebrush communities with shallow rooted bluegrass and forb understories with inclusions of rock outcroppings and rock rims which are the normal location of juniper stands. There are also small areas of deeper soils with mountain big sagebrush communities and small areas of seasonal flooding that support silver sagebrush communities. Based on trend data, observations during rangeland health assessments and utilization monitoring, Sandberg's bluegrass has replaced Thurber's needlegrass, Idaho fescue and bluebunch wheatgrass as the dominant grass species on the short sagebrush sites.

Lake Field

This pasture is dominated by big sagebrush communities with 17% of the pasture seeded to crested wheatgrass. High livestock utilization levels have resulted in decreased production on native grasses such as basin wildrye and Thurber's needlegrass. The crested wheatgrass portion of this pasture is in fair condition. The two large playa lakes in this pasture supply cattle with early season water on wet years, and when the lake beds are dry, there is a variable annual forb production that is utilized by both cattle and wildlife.

West Seeding

Approximately 55 percent of the West Seeding was seeded to crested wheatgrass in the 1960s. This seeding is transitioning toward increased big sagebrush and rabbitbrush cover and decreased crested wheatgrass cover. The Ruby Pipeline passed through this pasture; the disturbed areas of

the right-of-way have now been re-seeded with native species. It is expected that the reseeding process will provide additional production once plants become established.

East Seeding

Approximately 87 percent of the East Seeding was seeded to crested wheatgrass in the 1960s. This seeding is transitioning toward increased big sagebrush cover and decreased crested wheatgrass cover. The Ruby Pipeline passed through this pasture; the disturbed area was then reseeded with native grasses, forbs and sagebrush. It is expected that the reseeding process will provide additional production once plants become established.

Sand Spring Pasture

The Sand Spring Pasture is dominated by big sagebrush communities. Approximately 50 percent of the pasture was treated with herbicides in the 1960s to increase native perennial grass production and remove big sagebrush cover. Historic grazing practices have led to decreased production of native grasses such as needle-and-thread, Indian ricegrass, basin wildrye and Thurber's needlegrass.

BLM Sensitive Species:

There is one BLM-listed sensitive plant species that is known to be present near the Massacre Lakes Allotment: *Polyctenium williamsiae*, commonly called Williams Combsleaf, was detected in 1946 in Long Valley in northern Washoe County. Holland and Morefield (2003) identified one potential site for the species within the Juniper Pasture. This site was one of several hundred potential sites in the region based upon mapping of lakebeds. Based upon elevation, topography and other factors the highest priority sites were surveyed. The Juniper Pasture site was one of 163 non-surveyed "… remaining potential sites … considered to have low probabilities of supporting *Polyctenium williamsiae* (especially the large majority in northwestern Nevada, where *P. fremontii* is the most likely occupant)".

Environmental Consequences

Assumptions

- Vegetation has been historically impacted by livestock grazing (sheep, cattle and domestic horses) for over 150 years; grazing levels and practices during the late 19th Century and much of the 20th Century decreased palatable native perennial grasses, shrubs and forbs and increased unpalatable brush species.
- Grazing management practices that reduce or eliminate grazing during the critical growth period for perennial grasses or decrease compaction and hoof action on wet soils would increase densities of deep rooted species and allow progress toward meeting the biodiversity standard. Some of the desirable grazing management practices include:
    - Turning out livestock after soils have dried; generally after May 1st.
    - Reducing or eliminating grazing during the critical growth period for perennial grasses
    - Grazing at levels that leave residual herbaceous vegetation at the end of the grazing period.

Impacts of Proposed Action

Implementation of the Proposed Action would result in livestock turnout on or after May 15th with 150 cattle, and then increased to 450 head on June 1. The Lake, East Seeding and West Seeding would be grazed 46 days or 548 AUMs of cattle use every other year during the 107 day critical growth period for perennial grasses. There would be no grazing use every other year during the spring during periods when soils are likely to be wet on the Sand Spring, Lake Field and East Seeding. Along with the 40% utilization limit for livestock would promote residual herbaceous vegetation remaining to become soil litter, soil structure is expected to improve. It is likely that a high percentage of perennial grasses would be able to complete their annual growth cycle, setting seed and storing nutrients in their root systems. There would be increased opportunity for establishment of deep rooted perennial grasses. Under these grazing management practices, adverse impacts to perennial grasses would be reduced and productivity would be expected to improve on the East and West Seedings, Sand Spring Pasture and Lake Field. Vegetation in the four pastures would either meet or make substantial progress toward meeting the Biodiversity Standard within several years of implementing the alternative. During years of favorable production of annual forbs on the lakebeds, decreased livestock utilization would be expected in the uplands of the Lake Field.

In the Juniper Pasture, there would be no livestock grazing during the normal period for wet soils and there would be no use during the critical growth period for perennial grasses. However, up to 45 head of wild horses would be in the pasture yearlong when soils are wet and during the entire 107 day critical growth period every year. Vegetation in portions of the pasture favored by wild horses would not meet the Biodiversity Standard.

Additional, periodic heavy grazing use would continue; trampling and soil compaction could continue adjacent to stockponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Biodiversity Standard.

Impacts of Alternative 2 – No Action

Implementation of the No Action Alternative would result in livestock turnout as early as April 16th with a maximum of 582 cattle. This could result in up to 30 days of use during periods of wet soils in the spring and a maximum of 582 AUMs of cattle use on alternating years in all pastures except Sand Spring. The Lake Field, East and West seedings would be grazed 60 days every year during the 107 day critical growth period for perennial grasses. A 60% utilization limit for livestock would result in decreased residual herbaceous vegetation remaining to become soil litter when compared to the Proposed Action. It is likely that a low percentage of perennial grasses would be able to complete their annual growth cycle, setting seed and storing nutrients in their root systems. Under these grazing management practices, adverse impacts to perennial grasses would continue and productivity would be expected to remain depressed on the East and West seedings, Sand Spring Pasture and Lake Field. Vegetation within these four pastures would make little or no progress toward meeting the Biodiversity Standard.

In the Juniper Pasture, there would be 60 days of livestock grazing during the 107 day critical growth period for perennial grasses. However, wild horses would be in the pasture when soils are saturated and during the entire 107 day critical growth period every year. Vegetation in most of the pasture would not meet the Biodiversity Standard.

Additionally, periodic heavy grazing use would continue; trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout

the allotment. These areas, which represent less than one percent of the allotment, would not meet the Biodiversity Standard.

Impacts of Alternative 3 – TRT Recommendations

Implementation of the TRT Recommendations Alternative would result in livestock turnout after May 15th with a maximum of 582 cattle. Grazing use would not be allowed during periods of wet soils in the spring and a maximum of 465 AUMs of cattle use in any pasture. Additionally, a 40% utilization limit for livestock would promote residual herbaceous vegetation remaining to become soil litter. There would be approximately 12 days of use by cattle during the critical growth period for perennial grasses in the Juniper Pasture, 19 days in the Sand Spring Pasture, and 13 days in the West Seeding every year. It is likely that a high percentage of perennial grasses would be able to complete their annual growth cycle, setting seed and storing nutrients in their root systems. Under these grazing management practices, adverse impacts to perennial grasses would be reduced and productivity would be expected to improve on the East and West seedings, Sand Spring Pasture and Lake Field. Lack of grazing during the wet period and a 40% utilization limit would lead to increased perennial grass productivity, density and vigor. There would be increased opportunity for establishment of deep rooted perennial grasses. Grazing every year during the critical growth period in three pastures limits the rate at which deep rooted perennial grasses would increase in vigor and density resulting in a slower rate of improvement to vegetation. Vegetation conditions would be expected to improve at a rate similar to the Proposed Action on the East Seeding and Lake Fields. Vegetation within these pastures would either meet or make substantial progress toward meeting the Biodiversity Standard within several years of implementing the alternative. In the Sand Spring Pasture and West Seeding, vegetation would make progress toward meeting the standard but at a slower rate to that expected for the Proposed Action.

In the Juniper Pasture, livestock grazing would not be allowed during periods of wet soils in the spring, or during the critical growth period for perennial grasses. However, wild horses would be in the pasture when soils are saturated and during the entire 107 day critical growth period every year. Vegetation in portions of the pasture favored by wild horses would continue to not meet the Biodiversity Standard.

Additionally, periodic heavy grazing use would continue; trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Biodiversity Standard.

Impacts of Alternative 4 – Allocation by Pasture

Impacts would be similar to those described for the Proposed Action for the Sand Spring Pasture, East and West seedings and Lake Field due to the post May 15th livestock turnout of up to 450 cattle, the 40% utilization limit and alternate years rest in the Sand Spring Pasture, Lake Field and East seeding. Vegetation within these pastures would either meet or make substantial progress toward meeting the Biodiversity Standard within several years of implementing the alternative.

In the Juniper Pasture, there would be no livestock grazing during the normal period for wet soils and there would be no grazing use during the critical growth period for perennial grasses. However, up to 121 head of wild horses would be in the pasture when soils are wet and during the entire 107 day critical growth period every year. Vegetation in portions of the pasture favored by wild horses would continue to not meet the Biodiversity Standard. It is anticipated that this area affected by wild horses would cover a substantial portion of the pasture.

Additionally, there would continue to be periodic heavy grazing use, trampling and soil compaction could continue adjacent to stock ponds, windmills, and developed springs that are scattered throughout the allotment. These areas, which represent less than one percent of the allotment, would not meet the Biodiversity Standard.

Impacts of Alternative 5 – No Grazing

Upland vegetation conditions are expected to improve in the short and long term under the No Grazing Alternative. In the long term, establishment of new palatable species would be expected and plant vigor and litter would increase as grazing pressure from wild horses and livestock are eliminated. The Biodiversity Standard would be met.

3.2.5. Wild Horses and Burros

Affected Environment

Massacre Lakes Herd Management Area (HMA) lies entirely within the boundaries of the Massacre Lakes Allotment north of County Road 8A (Map on page 125). Excess wild horses were last gathered from the HMA in 1988, which brought numbers into Appropriate Management Level (AML).

Based on the June 2012 population inventory and projected recruitment rate of 20% per year, the current wild horse population on the Massacre Lakes HMA is estimated to be 186 wild horses, well above the AML range of 25 - 35 wild horses. Though the population has varied from 149 to 160 head based on aerial inventories since 2009. The Massacre Lakes wild horse herd appeared to be healthy and reproducing based on periodically field observations. Genetic and horse health information has not been collected, as the herd was last gathered in 1988. The Nut Mountain HMA, contiguous to the Massacre Lakes HMA, has the lowest document coefficient of in-breeding of all BLM HMAs for which genetic testing has been completed. Additionally, the Carter Reservoir HMA, which has the same AML as Massacre Lakes, but is not contiguous to other HMAs, has been tested for genetic diversity and is well above minimum standards for diversity (Cothran cited in NAS, 2013). The livestock operator on the allotment opens all of the pasture gates at the end of the grazing season, and the wild horses in the HMA have no problems moving between seasonal ranges. Additionally, gates between allotments and HMAs are also opened at the end of the livestock grazing season to facilitate livestock movements back to home ranches.

Wild horse numbers have ranged from a low of ten animals after the 1984 gather to 160 animals in 2011. The numbers have been steadily increasing since the last Massacre Lakes gather in 1988. As the size of the herd increases, bands of wild horses often start using areas outside of the HMA in search of forage and water.

Environmental Consequences

Impacts of Proposed Action

The Proposed Action would have overall positive impacts to wild horses. Increasing the wild horse AML by 10 animals to 45 would allow for increased genetic diversity within the herd. The reduced numbers of livestock and the shorter season of livestock use in the HMA would result in less competition for forage and water between wildlife, livestock and wild horses.

Construction of a 17.2 acre exclosure at Sagehen Spring would decrease wild horse access to a favored water source and eliminate green forage on up to one acre at the site during the summer months. Gates to existing pastures would be closed and opened based on the period of use, which could affect wild horse movement at certain times of the year. The livestock operator would continue to open all of the gates so that wild horses can move freely between pastures when livestock are not authorized in the allotment.

Impacts of Alternative 2 – No Action

The No Action Alternative is expected to have negative and positive effects. Wild horses would be managed under the 2008 Resource Management Plan at an appropriate management level (AML) of 25 to 35 wild horses. There would be no additional impacts to the free-roaming behaviors of wild horses in the HMA. Subsequent wild horse removals would still be required to maintain animal populations in a thriving natural ecological balance and would contribute to maintaining ecological sites in good condition.

Impacts of Alternative 3 – TRT Recommendations

Impacts to wild horses would be similar to those described for the Proposed Action. There would be no additional impacts at Sagehen Spring as no new fencing would be implemented at Sagehen Spring.

Impacts of Alternative 4 – Allocation by Pasture

The alternative would have overall positive impacts to wild horses. Increasing the wild horse AML from 25- 35 to 100-121 would allow for increased genetic diversity within the herd. The elimination of livestock use in the HMA would result in less competition for forage and water between wildlife, livestock and wild horses.

Construction of a 17.2 acre exclosure at Sagehen Spring would decrease wild horse access to a favored water source and eliminate green forage on up to one acre at the site during the summer months. Gates to existing pastures would be closed and opened based on the period of use, which could affect wild horse movement at certain times of the year. The livestock operator will continue to open all of the gates so that wild horses can move freely between pastures when livestock are not authorized in the allotment.

Impacts of Alternative 5 – No Grazing

Implementation of the No Grazing Alternative would set the AML to zero horses, eliminating wild horse use on the Massacre Lakes Allotment. This would eliminate opportunities for a viable population of wild horses within the 39,888 acre HMA.

3.2.6. Wildlife Resources including Migratory Birds and Threatened and Endangered Species

Affected Environment

Threatened or Endangered Species

There are no federally listed or proposed for listing wildlife species which are known to occur within the Massacre Lakes Allotment.

Carson wandering skipper: The Carson wandering skipper (*Pseudocopaeodes eunus obscurus*), is a butterfly listed as endangered by the USFWS. The specie forages and reproduces in saltgrass sites adjacent to ephemeral lakebed where appropriate nectar producing plants including salt heliotrope are found. Approximately 2,700 acres of potential habitat for the species has been identified within the Massacre Lakes based upon the presence of salt heliotrope stands. The suitable habitat in the allotment was surveyed in 2008 and 2009 for the presence of Carson wandering skipper and none were detected. Additional potential Carson wandering skipper habitat sites within the Surprise Field Office have been visited but no Carson wandering skippers have been identified, therefore this specie will not be discussed further in the EA.

Candidate Species

In March 2010, the U.S. Fish and Wildlife Service (USFWS) announced that the Greater sage-grouse (*Centrocercus urophasianus*) was eligible for listing as a Threatened Species but would not be listed at that time. The USFWS announcement means there is sufficient information on biological vulnerability and threats to support the listing was precluded by higher priority listing actions. However, the announcement did change the status of the species to a Candidate for listing. Candidate Species do not receive statutory protection under the Endangered Species Act (ESA). Individual states continue to be responsible for managing the birds. Candidate species and their habitats are automatically managed as Bureau sensitive species, (BLM Manual 6840, December 2008). The Greater sage-grouse is discussed under Sensitive Species, below.

California bighorn sheep

California bighorn sheep (*Ovis canadensis californiana*) habitat requirements include large areas of steep, broken terrain that provide escape and lambing cover with generally low growing vegetation that allow sheep to see and escape predators. Foraging also occurs within a mile of escape terrain. The sheep are primarily grazers requiring quality habitat that contains good production of native bunchgrasses and forbs. Water sources immediately adjacent to escape terrain are also important. Bighorn require free water. Suitable habitat greater than two miles receives minimal use by sheep. Water sources greater than 0.5 miles from escape cover are generally not used by sheep (Van Dyke *et.al*., 1983).

Bighorn sheep, cattle and wild horses are grazers so direct competition between cattle, wild horses and bighorn sheep for forage can occur. This competition generally occurs on a small portion of its preferred habitat. In areas of steep rocky terrain where bighorn are generally found, competition is reduced since cattle and wild horses generally prefer gentle slopes. Competition can occur at watering sources, especially when water is limited. In the region, wild horses and livestock have been documented preventing bighorn sheep access to low flow spring sources (Van Dyke *et.al*., 1983).

Data and observations from the Nevada Department of Wildlife (NDOW), BLM observations and unpublished records indicate that a portion of the Juniper Pasture is currently used by California bighorn sheep. The Massacre Rim area in the western portion of the Juniper Pasture contains an established bighorn sheep population associated with high quality California bighorn sheep habitat, most importantly, steep rocky terrain for escape cover. Most of the highest quality habitat is outside the allotment. However, approximately 5,400 acres of quality habitat are located in the allotment. This includes the 1,000 acre Biebe Spring exclosure which is not being grazed by livestock or wild horses. There are two springs within this area. Biebe spring is within the exclosure and meets objectives.

Additional potential habitat occurs in the Sand Spring pasture is unoccupied. This habitat is considered low quality due to low amounts of escape terrain near water sources. Occupied and potential habitat constitutes 27.6% of the Massacre Lakes Allotment.

The Massacre Lakes Allotment lies within NDOW Hunt Units 011, 012, 013. NDOW radio telemetry data from collared sheep on the Massacre Rim indicate that bighorn sheep move north to south along the rim throughout the year with periodical dispersal to other suitable habitats including the Vya Rim. Upland habitat and springs within exclosures on the top of the rim provide excellent foraging habitat for bighorn sheep and data indicates regular use of these areas. Recent telemetry data indicate that bighorn sheep, cattle and wild horse use in the Massacre Lakes Allotment are largely separated spatially, with bighorn sheep staying in the rocky, steep portions of the allotment and cattle and wild horses preferring the flatter areas on the allotment east of the Massacre Rim. Telemetry data and field visits also confirmed that the majority of bighorn sheep on the Massacre Rim are wintering on the southern portion of the allotment on south facing slopes with little to no juniper cover.

Population dynamics and recruitment rates of the 012 unit bighorn sheep are available in the Nevada Department of Wildlife 2009-2010 Big Game Status Report at http://www.ndow.org/hunt/resources/population/index.shtm, and applicable portions of the report are included below:

"This year's average recruitment rate of 35 lambs per 100 ewes is the same as the 2007 ratio which was the lowest recruitment rate ever observed for this herd. The long-term average lamb ratio for the 012 population was 56 lambs per 100 ewes (1994-2007). The persistent drought conditions over the past several years have negatively impacted habitat conditions for bighorn in this hunt unit. The prolonged drought conditions and the intense competition between horses, cattle and bighorn have negatively impacted this herd in recent years. Lamb recruitment has averaged just 37 lambs per 100 ewes between 2007 and 2009. Competition has increased dramatically during the recent drought years and is especially intense near or close to the limited water sources."

"Most riparian areas within Unit 012 are in poor condition due to the drought and long-term overutilization by livestock and feral horses. With little to no ground cover, evaporation rates are very high and cause many of the water sources to dry up by late summer. "

Pygmy rabbit

Pygmy rabbits (*Bryachlagus idahoensis*) are dependent on sagebrush, primarily big sagebrush located in deeper soils. Pygmy rabbit burrows are typically under big sagebrush plants and only rarely in the open. The rabbits dig their own burrows in deep, friable soils without rock fragments. Soil types where burrows are found can be loamy to ashy and burrows are generally found greater than 72 cm (20 in) deep. Sites favored by pygmy rabbits are typically favorable microsites within larger expanses of less suitable habitats (Green and Flinders, 1980) In Oregon, overall shrub cover at pygmy rabbit sites averaged 28.8% and ranged from 21.0-36.2%. According to the species field report for the Ruby Pipeline, 60.0 percent of sites in Nevada exhibited 26–50% canopy cover (Ruby Pipeline Field Report).

Larrucea and Brussard (2008) surveyed the historic range of pygmy rabbits in Nevada and California, and found a greater probability of occupancy by pygmy rabbits at sites with low or no understory. On sites with substantial herbaceous understories, cottontail rabbits are more common than pygmy rabbits.

The 2006 Larrucea survey detected pygmy rabbit on the southern portion of the Massacre Lakes Allotment (Larrucea, 2006). Subsequent field visits by the BLM after the 2006 Larrucea survey detected pygmy rabbits and/or suitable habitat in many areas. The southern portion of the allotment in the Sand Springs, West, and East Seeding Pastures has many localized sites that contain the combination of soils and vegetation that are suitable for pygmy rabbits. The northern portion of the allotment in the Juniper Pasture and the northern portion of the Juniper pasture above the lakebeds contain small areas of deeper soils associated with mountain big sagebrush communities that may contain suitable habitat for pygmy rabbits.

Greater Sage-grouse

In 2011 the BLM initiated RMP Amendments for Greater sage-grouse across the range of sage-grouse habitat managed by the BLM (western states) to ensure the long term conservation of the species and to avoid the need of listing the species under the Endangered Species Act of 1973. The completion date for the RMP Amendments is in 2015. A number of different alternatives will be analyzed including alternatives from Non-Governmental Organizations and the State of Nevada. This date corresponds to the USFWS timeline to evaluate the need for listing the species in light of the new conservation direction brought forth for Greater sage-grouse under the BLM RMP Amendments. BLM policy and direction in the interim period are outlined in BLM Instruction Memorandum (IM) No. 2012-043. In addition to this policy, the BLM released the National Greater Sage-grouse Conservation Measures/Planning Strategy Technical Team Report on December 21, 2011. This report describes recommended conservation measures for greater sage-grouse for each BLM land use or resource program area. The conservation measures relating to the Range Management and Wild Horse Management are described on page 14–18.

BLM IM 2012-043 requires the BLM to designate Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH) boundaries. PPH comprises have the highest conservation value to maintain sustainable greater sage-grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas. PGH are areas occupied seasonally or year-round habitat but are located outside of priority habitat. PPH and PGH boundaries within the Surprise Field office have been delineated by the BLM in coordination with respective state wildlife agencies (CDFW and NDOW). The Massacre Lakes Allotment lies within the Vya and Massacre Population Management Units (PMU). See Map on page 135 for PPH, PGH, and non-habitat within the Massacre Lakes Allotment and PMU boundaries.

The Greater sage-grouse (*Centrocercus urophasianus*) is a large gallinaceous bird associated with sagebrush steppe habitats. Sage-grouse breed at communal strutting grounds ("leks") where males display for females. Leks are located in open, low sagebrush habitats or in other areas with sparse, low vegetation. Sage-grouse females nest most commonly within two miles of the lek but some females may nest much further away depending on surrounding habitat conditions (Knick and Connelly, 2011). Recent radio telemetry studies in the SFO indicate that even within areas of intact habitat, many female sage-grouse cover distances exceeding four miles away from the lek to nest and cross allotment boundaries on a regular basis.

Sage-grouse nest on the ground, most often under taller sagebrush cover (15-38% shrub canopy; 36 -79 cm shrub height) such as the "big" sagebrush types and Wyoming sagebrush (Connelly, 2000). Successful nesting habitat generally contains taller grass cover in association with this sagebrush (Connelly, 2000) although there is some variability across the range of sage-grouse. Although many nests found in lower quality habitats (i.e. rabbitbrush dominated habitats or habitats with lack of perennial grasses and nesting cover) are almost always unsuccessful due

to nest abandonment and predation. Sage-grouse utilize sagebrush as both winter and nesting habitat. Sage-grouse feed on sagebrush buds and forbs throughout much of the year, especially early spring through fall. Peak egg-laying and incubation varies from late March through mid-June, with re-nesting stretching into early July. Brood-rearing habitats are wet meadow and riparian areas where the young can find insects which are critical to supply protein during the first few weeks of life. Estimated summer home range is 2.5 – 7 km2 (618-1,730 ac) (Connelly, 2000). Forbs are important food sources for brood rearing and pre-nesting hens.

During field visits to the allotment, sage-grouse sign was found around many riparian areas and on upland sites, indicating use of these areas by sage-grouse. Within the allotment there are two active leks located in the Juniper Pasture. The Juniper Pasture, which consists of mostly low sagebrush habitat types, contains primarily breeding, spring, and summer habitats but does not possess large blocks of nesting habitat. Riparian habitats within the allotment exist primarily within the Juniper Pasture, with four of eleven spring sites that were rated by the BLM fenced to protect these areas from hot season grazing by cattle and wild horses. Brooding also has been documented at the Alkaline Meadow area in the Lake Field. These riparian areas are important for sage-grouse brood rearing and summer habitat. Sage-grouse populations also exist within surrounding allotments. See Figure 3.2 for the trends of the Post Canyon lek that lie within the allotment.

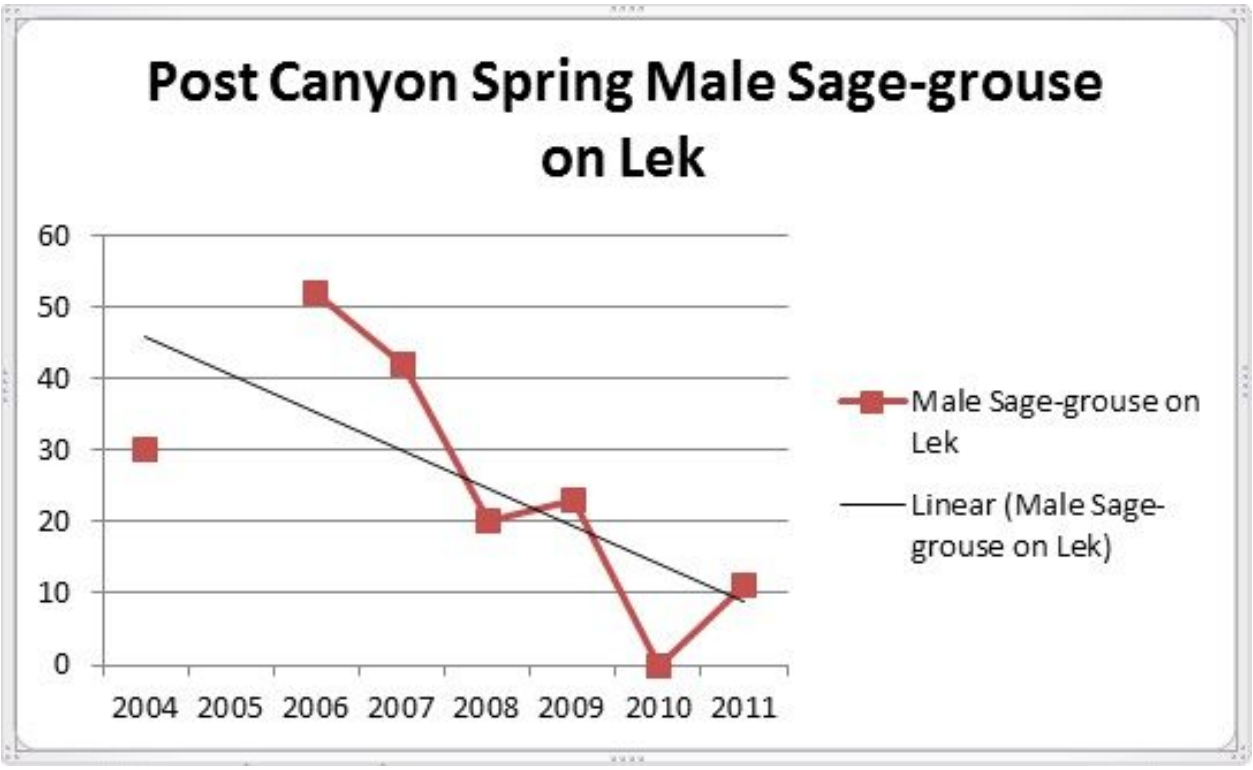

Figure 3.2. Lek Attendance- Post Canyon Spring, 2000 – 2011

High and low population trends show annual similarities to the adjacent Sheldon National Wildlife Refuge (NWR). Consistent counts of bird attendance at leks have only occurred since 2002 on the Surprise Field Office and since about 1990 for the Sheldon National Wildlife Refuge (NWR). Consistent counts of bird attendance at leks have only occurred since 2002 on the Surprise Field Office and since about 1990 for the Sheldon National Wildlife Refuge. Survey numbers show that sage-grouse populations peaked between 2004-2007 for both the Surprise Field Office and

the Sheldon NWR. Lek count numbers generally declined on both the Surprise Field Office and the Sheldon NWR in 2008, and then increased in 2009-2012 with near record high counts on some leks within the SFO in 2012. Recruitment of sage-grouse chicks into the breeding population in 2012 however was reduced as drought conditions began to impact sage-grouse broods. In 2013, sage-grouse lek attendance declined by as much as 50% on some leks. On one sage-grouse lek in the Vya PMU in the allotment adjacent to the Massacre Lake Allotment, 9 female sage-grouse were radio marked in 2013 with all 9 hens having failed or abandoned nest sites, indicating current drought conditions are negatively affecting sage-grouse fecundity. Data from the 2012 NDOW wing bee indicates that the Sheldon PMU has higher nest success than the Massacre PMU (66% compared to 53.7%) however Sheldon's chick/hen ratios was less than the Massacre PMU (.13 compared to 1.05). NDOW estimates a 1.5-2.0 chicks per hen ratio to maintain a stable to slightly increasing population. The sample size for the Vya PMU was too small to make accurate estimates.

In the Massacre Lakes Allotment, sagebrush communities generally provide cover and forage for sage-grouse at a level where sage grouse use is expected throughout the allotment. Habitat quality of sagebrush has been reduced in the West and East Seedings pastures due to brush-beating of sagebrush and seeding of non-native grasses (crested wheatgrass) in the past. Some of these areas have recovered with some sagebrush cover however many areas have not recovered to a level where habitat attributes related to sagebrush cover for sage-grouse have been met. The majority of riparian brood rearing habitats in the Massacre Lakes allotment have been fenced in the past due to high levels of use and poor riparian conditions. These sites provide higher quality brood rearing habitat compared to unfenced sites such as Sagehen Springs that are currently not providing high quality brood rearing habitat. Fenced riparian sites however do increase the probability of sage-grouse fence collisions (Stevens, 2012). At these fenced riparian sites, no mitigation for sage-grouse such as fence markers has occurred.

Low sagebrush sites, especially in the Juniper pasture are currently providing both perennial and annual forbs that are important for sage-grouse brood rearing. These sites are also used as breeding grounds for sage-grouse in the Juniper Pasture however breeding habitat is not considered a limiting factor. Low sagebrush sites in the Juniper Pasture currently lack deep rooted perennial grasses that increase screening and hiding cover compared to shallow rooted perennial grasses that currently dominate most sites.

Nesting habitat in the Massacre Lakes Allotment is currently lacking many of the attributes of high quality nesting habitat due to either lack of sagebrush cover in portions of the seeded pastures or lack of perennial grass cover due to livestock grazing. Perennial grasses in the majority of big sagebrush habitats in the allotment are nearly non-existent. In 2012, data collected in the West Seeding, East Seeding, and Lake Field (See Table 3.7 below) measured less than 1% perennial grasses in the interspaces, indicating an almost total loss of perennial grasses for hiding and screening cover in at least some areas of the allotment. Most research indicates that perennial grass cover is an important factor affecting nest success for sage-grouse (Connelly, 2000); however a recent study in Mono County, CA found that perennial grass cover to not be a significant factor affecting nest success but that shrub density was a significant factor of nest success (Kolada et al. 2009) however these studies were not completed in areas where perennial grasses composition is as low as the Massacre Lakes Allotment. In some areas in the allotment in big sagebrush habitats in the Sand Springs, East, and West seeding, cheatgrass has begun to increase in composition. This is especially evident is areas where perennial bunchgrasses are largely absent. In the long term, lack of perennial grass poses a serious risk to maintenance of sage-grouse habitat due to disturbance such as fire removing the shrub habitat component and

invasive cheatgrass establishing a monoculture in areas where perennial bunchgrasses are not present in sufficient quantities to resist exotic plant invasion.

Table 3.7. Line Point Intercept Data from East & West Seedings and Lake Field

Line-Point Intercept Data for plots in East & West Seedings & Lake Field						
PLOT	LINE	# grass plants in shrub interspaces	% sage cover	% canopy cover	% bare ground	% litter

Golden eagle

Golden eagles, a BLM sensitive species, (*Aquila chrysaetos*) are a common large raptor in northwestern Nevada. Eagles nest in the abundant rim rocks and forage in the surrounding areas. The most common prey item is the black-tailed jackrabbit although eagles within the region have been observed to utilize any mammals and birds they can capture during their foraging. During the winter eagles remain in the area (Ryser 1985). Golden Eagles are found in within the allotment and are commonly observed. There are 3 known golden eagle nesting territories within the allotment.

Ungulates

Pronghorn antelope

Pronghorn antelope (*Antilocapra americana*), are a common ungulate of open habitats in the northwestern Great Basin. Low sagebrush habitats are most commonly used throughout the year by pronghorn antelope. Predation risk is generally considered to be the reason why pronghorn are not typically found in heavier cover types. Areas with low shrubs typify summer habitat with a diversity of native grasses and forbs. Habitat characteristics in shrub-steppe communities include (O'Gara and Yoakum, 2004):

- Large expanses of low rolling terrain with slopes less than 30% and fences that pronghorn can crawl under
- Snow depths less than 40 cm
- Water available at less than 6.5 km intervals
- Vegetation consisting of 5% to 10% grasses, 10% to 70% forbs and 5% to 10% shrubs with heights 25 to 45 cm tall and a variety of communities and succulence.

Pronghorn are less dependent on open water if there is sufficient moisture in the vegetation (O'Gara and Yoakum 2004). Although forbs are an important component of pronghorn diet, browse is used on a yearlong basis (Pyshora 1977). As for all big game species, forbs are the preferred forage and contribute a high amount of protein and minerals to the diet of pronghorn antelope during the period of time in the spring and early summer when forbs are palatable. Meadows provide succulent, high quality forage and water during the hot summer months.

Pronghorn can be found throughout the Massacre Lakes Allotment yearlong, and are known to kid in the open expanses within the allotment (BLM Surprise Field Office). Most of the Massacre Lakes Allotment is occupied by pronghorn antelope seasonally, with the highest quality habitat existing in the Juniper and Lake Fields. Within the allotment, meadows and water sources are especially important summer habitats for pronghorn populations. The exclosures within the allotment are frequented by pronghorn antelope during the summer months. Pronghorn antelope

in the Massacre Lakes Allotment are currently affected by poor riparian conditions on unfenced sites, competition at unfenced riparian sites, reductions in forb quantity in severely degraded sites, and decreased grass cover that is used for hiding pronghorn young.

Mule deer

Mule deer (*Odocoileus hemionus*) are a common ungulate in areas of tall dense brush and tree cover. Mule deer habitat in the northwestern Great Basin is associated with interconnected expanses of tall shrub and tree communities including tall sagebrush, bitterbrush, mountain mahogany and juniper. The tall cover is used by deer for both hiding and thermal cover throughout the year Mule deer migrate seasonally seeking higher elevation areas in the summer months. To aid in thermoregulation, deer utilize various topographic aspects, south in the winter and north in the summer. Heavy shrub and tree cover also aids in thermoregulation. Mule deer generally forage on shrubs and forbs but will consume grasses early in the season when grasses are still green and contain higher levels of total digestible nutrients. Deer are generally browsers, with shrubs and forbs making up the bulk of their annual diet. The diet of mule deer is quite varied and the importance of various classes of forage plants varies by season; however sagebrush and bitterbrush are important components throughout the year (Wallmo et al. 1977).

Mule deer use occurs throughout the year in the Massacre Lakes Allotment. Majority of the use occurs in the Juniper Pasture. Areas where the vegetation consists primarily of short sagebrush species, seeded species and are other low vegetation communities are usually avoided because of the lack of hiding cover (e.g. big sagebrush spp.) and thermal cover.

The Massacre Lakes Allotment is located in the NDOW Hunt Units 011,012, 013 with the entire allotment situated in Nevada. NDOW collects data based on Hunt Units and not on allotment basis and reports pooled information for big game from several units together. Mule deer data (see link below) for Units 011-015 indicate that mule deer numbers vary from trending down to slightly increasing for the various mule deer populations in northwestern Nevada. The adjacent Unit 033, the Sheldon Refuge, is also experiencing continued low recruitment levels. Mule deer are known to seasonally migrate between BLM managed lands (within Hunt Units 011, 012, 013, and 014) and the Sheldon Refuge Important migratory corridors and transition habitats for mule deer also exists within the allotment. According to NDOW, big game animals are experiencing declines due to drought condition (7 of the last 10 years) effects on vegetation and competition with wild horses for limited forage and water resource

(Source: http://www.ndow.org/about/pubs/index.shtm#general).

Rocky Mountain Elk

Rocky Mountain Elk (*Cervus elaphus nelsoni*) are a large ungulate that appear to be increasing their range into the northwestern portion of the Great Basin. Elk are primarily grazers that forage in areas near tree cover (Kufeld,1973).

Established Rocky Mountain Elk populations are not known to exist within the allotment. Current elk populations west of the allotment and in the nearby Warner Mountains have likely not reached population levels where dispersal of elk herds is regularly occurring. Migratory patterns and behavioral habitats of current elk populations coupled with the overall lack of suitable habitat for elk within the allotment and no sighting of elk in the allotment make it unlikely elk migrate through the allotment for any meaningful period of time; therefore elk will not be discussed further in this EA.

Other Native Wildlife Species

The Massacre Lakes allotment contains habitat for a wide range of wildlife species typical of the northwestern Great Basin. Based upon the issues associated with livestock grazing and wild horse management the following additional species have been identified for discussion in this assessment:

- Cottontail rabbit
- Dark kangaroo mouse
- Sagebrush vole
- Coyote
- Bushy-tailed woodrat
- Long-eared myotis
- Common raven
- American avocet
- Snowy plover
- Sage sparrow
- Brewer's sparrow
- Green-tailed towhee
- Juniper titmouse
- Northern sagebrush lizard

These species were chosen because they are known or likely to occur in the allotment and are associated with the major habitat types within the allotment. Additionally, the bird species selected for discussion are migratory bird species.

The mountain cottontail (*Sylvilagus nutallii*) is a medium sized rabbit associated with sagebrush and juniper habitats in the Great Basin. The rabbit lives in burrows under sagebrush or between rocks. Its preferred food consists of grasses, but during the winter it utilizes sagebrush and juniper materials. In the northwestern Great Basin cottontails are positively associated with grass cover and are uncommon in areas without substantial grass cover. Cottontails and pygmy rabbits do not seem to occupy the same areas (Larrucea and Brussard 2008). It is unknown whether this is behavioral or a consequence of cottontails preferring greater grass cover than pygmy rabbits. Cottontail breeding season is April through June with 2-5 litters of 4-8 young (Chapman, 1975). Cottontail rabbits are known within the Massacre Lakes allotments primarily associated with mountain big sagebrush and juniper communities in the Juniper Pasture, as well as rock outcrops in the other pastures. It is estimated that potential cottontail rabbit habitat in the allotment includes approximately 20% of each pasture.

The dark kangaroo mouse (*Microdipodops megacephalus*) is a small, long-tailed rodent that lives in burrows excavated in sandy soils and dunes in sagebrush and desert scrub communities

commonly near ephemeral lake beds. The species is nocturnal and feed primarily on seeds, but is known to prey on insects during the summer months. Kangaroo mice are active during the spring and summer months and hibernate in their burrows during cold periods of the year. In the Massacre Lakes allotment, kangaroo mice are associated with sandy areas and dunes surrounding the ephemeral lake beds in the lower pastures. These areas represent approximately ~10% of the lower pastures.

Sagebrush voles (*Lemmiscus curtatus*) are small, short-tailed rodents that live in primarily in sagebrush communities. Voles do not hibernate and are active all year long. They are associated with a variety of sagebrush-perennial grass habitats and appear to favor sites with higher grass cover. Voles utilize are variety of shrubs and forbs in their diet but do not appear to utilize grass seeds. They are most active during the dusk and dawn periods. In the Massacre Lakes allotment voles would be primarily expected in mountain big sagebrush sites in the Juniper pasture (approximately 10% of the pasture) and basin big sagebrush sites with high grass cover in the lower pastures (approximately 40% of the pastures).

The coyote (*Canis latrans*) is a common predator of the Great Basin. Coyotes are opportunists in their foraging strategy which results in a diet of small mammals, insects, young of larger mammals, and juniper berries. Coyotes are an important predator of antelope kids and mule deer fawns during their first few weeks of life. They are also a predator of sage-grouse adults and young. Coyotes are capable of adjusting their litter size in response to changes in prey availability and hunting or control actions on adults. In the Massacre Lakes allotment the coyote is a common predator.

Bushy-tailed woodrats (*Neotoma cinerea*) are a common, large rodent that built large nests of sticks, grass, leaves and large animal droppings. They occupy a variety of plant communities, but in areas without trees they use rock outcrops for nesting sites. In plant communities with trees they commonly use rotten trees as nesting sites. Woodrats are nocturnal and most active just after and just before light. Diets are broad and consist of leaves, shrubs, juniper leaves and berries. In the Massacre Lakes allotment, woodrats are common in the juniper communities of the Juniper pasture (approximately 25% of the pasture) and in rock outcrops of the lower pastures (approximately 10% of the pasture).

The long-eared myotis (*Myotis evotis*) is a medium sized bat that primarily roosts under loose bark and inside of rotten trees including pine and juniper. They forage in a variety of sites in proximity to the roosting sites, but prefer foraging in riparian areas. There is suitable roosting habitat for this species in10% of the Juniper pasture and foraging habitat throughout the pasture.

The common raven (*Corvus corax*) is the most abundant large bird species in the northwestern Great Basin. Ravens are omnivores utilizing vertebrate or invertebrate foods they hunt, carrion, and supplemented by plant materials. They construct large stick nests in cliffs, trees, or man-made sites including power lines and windmills where they lay 3-7 eggs. Outside the breeding season ravens often move in large flocks. Ravens are positively associated with human actions in the Great Basin, construction of power lines and windmills increase nesting opportunities, fences provide hunting perches, and livestock and wild horses increase the amount of carrion. Ravens are a predator on many nesting birds and are an important predator of sage-grouse nests and fledglings (Ryser, 1985). The common raven is wide spread in the Massacre Lakes allotment.

The American avocet (Recurvirostra americana) is a colonial nesting shorebird associated with seasonal wetlands. Avocets nest on bare ground or in areas of low growing vegetation. They are particularly well adapted to feed in shallow waters and bare mud flats primarily on invertebrates.

Avocets lay 1-4 eggs, sometimes in the nests of other shorebirds, or in the nest of another avocet. Due to seasonal changes in water availability and associated changes in invertebrate production, avocets commonly migrate long distances to more productive wetlands after the breeding season (Dechant, et. al, 2002). The avocet is expected to reproduce on the shorelines of West and Middle Lakes in the allotment on years when there is water in the lakes. Avocets are also expected to utilize the lakes on years when there is water during the spring migration. Habitat for the avocet includes approximately 10% of the Lake Field.

The snowy plover (*Charadrium alexandrines)* is a small shorebird that utilizes barren playas adjacent to seasonally wet alkaline lake. Breeding occurs from April through July with one or two clutches if there is water in the lakebed to produce brine shrimp or other invertebrates. Two to six eggs are laid in an unlined nest on bare ground. Young leave the nest within hours of hatching and crouch to the ground at the signal of a parent if predators approach (Herman *et. al.* 1988). Snowy plovers are known to nest in the allotment in areas adjacent to Middle and West Lakes (Great Basin Bird Observatory undated).They are expected to forage on the lakebed during the spring migration when there is water in the lakes. Habitat for the plover includes approximately 10% of the Lake Field.

Sage sparrows (*Amphispiza belli*) are often associated with large patches of big sagebrush with shrub cover greater than 20% and substantial herbaceous and litter cover. Their nest is a cup of dry twigs and herbaceous stems usually located in a shrub usually 0.15 to 0.45 m (6-18 in) above ground, but up to 1 m (39 in). Their known breeding in Nevada is from early April to early August, with a few remaining to winter in the Great Basin each year. Sage sparrows tend to abandon sites that lose sagebrush cover or sites with a substantial cheatgrass component. This species feeds mostly on insects, spiders, and seeds while breeding, and mostly on seeds in winter; they also consume green foliage. Foraging occurs on the ground and in the shrub canopy. The sage sparrow is known to utilize sagebrush habitats throughout the allotment. These represent approximately 10% of the Juniper Pasture and a third of the other pastures.

Brewer's sparrows (*Spizella breweri*) are also a species associated with sagebrush communities in open rolling terrain. They nest and forage in shrub canopies preferring taller individual plants in sagebrush stands. They also are known to nest in other shrub communities including greasewood and bitterbrush communities. They glean insects from shrub canopies but also harvest seeds from the ground. They are associated with lower sagebrush canopy cover, less grass cover, less litter, and more bare ground than sage sparrows. The Brewer's sparrow is known to utilize sagebrush habitats throughout the allotment. These represent approximately 10% of the Juniper Pasture and a third of the other pastures.

The green-tailed towhee (*Pipilo chlorurus*) is a medium sized sparrow like bird associated with dense stands of tall shrubs commonly associated with mountain big sagebrush, canyons or woody riparian areas. They also utilize shrubby sites in or adjacent to areas with scattered juniper trees. They nest on or near the ground and do most of their foraging on the ground in shrub litter. Towhees prefer dense shrub sites or thickets over open sites with herbaceous vegetation for both nesting and foraging. Their diets include a diverse mix of seeds, berries and invertebrates. Suitable habitat for the towhee exists in the Juniper pasture associated with juniper edges, rocky draws and dense mountain big sagebrush communities that represent approximately 15% of the pasture.

The juniper titmouse (*Baeolophus ridgewayi*) is a small passerine bird associated with open juniper woodland and savannah sites. The species nests in cavities excavated by other species or naturally occurring in older juniper trees. It feeds on seeds, berries and invertebrates. It

does not appear to require free water. Suitable habitat for the titmouse in the Massacre Lakes allotment is associated with juniper stands in the Juniper pasture that represent approximately 15% of the pasture.

The northern sagebrush lizard (*Sceloporus graciosus graciosus*) is a common species of sagebrush and bitterbrush communities with sandy soils in the Great Basin. It prefers sites with open understories of low grass and forb cover which facilitates its "sit and wait" approach to foraging. Bare ground also increases the lizard's ability to see potential prey items at longer distances and facilitate quick movement to prey items. Its diet consists primarily of ants and beetles. The sagebrush lizard is known to occur in sandy areas representing approximately 15% of the lower elevation pastures within the Massacre Lakes allotment.

Migratory Birds

Migratory birds are protected and managed under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et. seq.*) and Executive Order 13186. Under the MBTA nests (nests with eggs or young) of migratory birds may not be harmed, nor may migratory birds be killed. Executive Order 13186 directs federal agencies to promote the conservation of migratory bird populations. With the exception of the Greater sage-grouse, the bird species described above are migratory bird species protected under the treaty.

Environmental Consequences

Assumptions

- Direct impacts to wildlife occur when livestock or wild horses physically harm individual animals or their nests or burrows.
- Indirect impacts occur when livestock grazing management practices or wild horse use result in changes to vegetation community structure, plant densities and production and species frequency that would result in changes to wildlife habitats.
- The livestock grazing practices being considered in this assessment which are likely to result in changes to wildlife habitats and their use include:
    - Amount of residual stubble and litter
    - Vigor and production of perennial bunch grasses, forbs or shrubs
    - Habitat use preferences from wildlife species
    - Competition between species.
- Wildlife populations would be expected to respond to changes in habitat conditions. The response to the habitat conditions for a particularly species will vary based upon the preferred habitats conditions of the individual species.
- There are other factors outside the scope of the actions being evaluated that may constrain population levels including but not limited to:
    - harvest
    - disease

- predation
- social interactions

- Actions that support land health, particularly the riparian and biodiversity standards, in the Massacre Rim ACEC, will be consistent with the special management requirements for wildlife.

Impacts of Proposed Action

Sensitive Species

California bighorn sheep

This alternative would affect bighorn on approximately 4,400 acres of high quality habitat within the Juniper Pasture outside the Biebe exclosure. A 60 day reduction in grazing by livestock during the critical growth period and a 40% utilization level would lead to increased availability and forage quality of native bunchgrasses. However, the hot season livestock use would increase by 8 days and grazing by up to 45 wild horses during both the 107 day critical growth period and the 92 day hot season would maintain heavy grazing pressure at one spring within high quality bighorn habitat decreasing forage availability for bighorn in the vicinity of the spring. Overall, the proposed action is expected to have slightly positive effects to bighorn sheep.

Pygmy rabbit

Pygmy rabbits occupy favorable microsites of tall clumps of basin big sagebrush and mountain big sagebrush with deep, loamy soils primarily in the lower pastures. These microsites occupy a small fraction of the sites dominated by tall sagebrush. Under the Proposed Action, a 40% utilization limit and delay of livestock grazing for one month would decrease livestock damage to rabbit burrows during the period of wet soils. These changes in livestock grazing would lead to an increase in native perennial grass production due to the 40% utilization limit on livestock and reductions in the number of days that livestock graze during the critical growth period for native bunchgrasses. This would increase forage for pygmy rabbits and herbaceous cover near burrows. There would be little overlap between pygmy rabbit habitats and wild horse use areas because pygmy rabbit habitats are primarily located outside the wild horse use areas.

Increased grass cover could increase use by cottontail rabbits, and displace use by pygmy rabbit due to competition between the two species (Larrucea & Brussard 2008). In the long term, habitat shifts between the two species, along with resource partitioning, would be likely to occur on an unknown fraction of pygmy rabbit habitats. Overall, the proposed action is expected to have positive benefits to pygmy rabbits.

Greater Sage-grouse

Implementation of the Proposed Action would potentially affect sage-grouse during breeding, nesting and brooding seasons. Delay of livestock grazing by one month would eliminate potential livestock use on the two leks in the Juniper Pastures and reduce potential livestock use on nesting habitat to two weeks within all pastures. The delayed turnout, implementation of livestock management practices that include periodic deferment and limiting utilization to 40% of current year's production on perennial grass plants would increase residual herbaceous cover in nesting areas, which could slightly improve nesting success.

Brood rearing habitats for sage-grouse are located within the Juniper Pasture. Unfenced spring meadows would be subject to an additional 8 days of hot season livestock grazing and 92 days of wild horse use. Fencing of Sagehen Spring would increase summer brooding habitat quality at this site. The remaining seven unfenced sites would continue to receive heavy hot season grazing by cattle and wild horses, however these sites have lower value to sage-grouse because they either dry up during summer months or are located in rocky draws in areas of juniper dominance which are avoided by sage-grouse.

Under the Proposed Action, Sagehen Spring would be fenced but the current amount of open water would remain unchanged. The impacts relating to conditions that support mosquitos and the West Nile Virus would remain relatively unchanged. The potential for West Nile virus would remain unchanged from present conditions. Overall, the proposed action is expected to have slightly positive benefits to sage-grouse.

Golden eagle

Under the Proposed Action, golden eagles would not be directly affected. Indirect impacts could occur in prey availability associated with vegetation changes. Increased perennial grass production would provide better hiding cover for prey leading to increased hunting effort for black-tailed jack rabbits (the primary prey of golden eagles in the northwestern Great Basin) but this would be offset as more residual grass and hiding cover would lead to increased prey densities of other prey species. Overall, the proposed action is expected to have slightly positive benefits to golden eagles.

Other Native Wildlife Species

Pronghorn antelope

Pronghorn antelope are seasonally wide spread in habitats with low vegetation within the Massacre Lakes Allotment. Antelope move seasonally up in elevation seeking the best quality forage areas. Under the Proposed Action, delaying livestock use by one month would eliminate potential direct impacts to kidding pronghorn antelope from livestock. Continued wild horse use in the Juniper Pasture during the early May kidding period would continue. Implementation of livestock grazing practices that provide for critical growth period rest or deferment, and limiting utilization of current year's growth would lead to increased production and densities of herbaceous species. On sites where the projected increases favor grasses more than forbs, forage values for antelope would remain the same or decline. On sites where forb production is increased, particularly short sagebrush sites in the Juniper Pasture, forage values for antelope would increase. This benefit is expected to be negligible due to cattle grazing every season in the Juniper pasture, where the highest pronghorn antelope use occurs. On lakebed sites where forb production is primarily associated with weather events, implementation of the Proposed Action would reduce hot season grazing from cattle and competition between livestock and antelope for forage and water in the Lake Field.

Under the No Action Alternative, the Juniper pasture was rested every other season, however under the Proposed Action, the Juniper pasture is grazed every season. Increasing livestock use by 8 days and use by wild horses of 92 days in the hot season would increase grazing pressure on the seven unfenced spring meadows within the Juniper Pasture. These sites are important to antelope during the summer months because they provide green succulent forage and water not available on the surrounding uplands. Fencing of Sagehen Spring would increase the availability of green forage for antelope during summer months. Construction of the new fencing to include

wire spacing, fence markers and a smooth bottom wire would facilitate antelope passage through the new fencing. Overall, the proposed action is expected to have negligible benefits to pronghorn antelope.

Mule deer

Mule deer in the Massacre Lakes Allotment generally occur in tall sagebrush and juniper communities. They usually only use short sagebrush habitats that are near edges or pockets of big sagebrush or juniper or to access water sources. The highest use areas for mule deer occur in the Juniper Pasture.

Implementation of the Proposed Action would have direct impacts to mule deer related to competition and habitat use preferences. Mule deer fawning occurs in June in plant communities that exist primarily in the Juniper Pasture. Livestock grazing would not occur during this period. There would be wild horses present during the fawning period, but horses prefer open terrain with short vegetation in contrast to the tall brush and tree communities preferred by mule deer at this time. Increased livestock grazing use in the Juniper pasture compared to current management would result in increased competition at water sites and mule shifting habitat use to avoid higher cattle use areas within the Juniper Pasture.

Indirectly implementation of this alternative would indirectly affect mule deer habitats through changes to the habitats utilized by deer. Implementation of livestock grazing practices that provide for critical growth period rest or deferment and limiting utilization of current year's growth would lead to increased production and densities of herbaceous species. On sites where the projected increases favor grasses over shrubs and forbs, forage values for mule would remain the same or decline. On sites where forb production is increased forage values for mule deer would increase.

Increasing livestock use by 8 days and use by wild horses of 92 days in the hot season would increase grazing pressure on the seven unfenced spring meadows within the Juniper Pasture. These sites are important to mule deer during the summer months because water is not available on the surrounding uplands. Fencing of Sagehen Spring would increase the availability of green forage for deer during summer months. However increasing cattle use during the hot season would result in more cattle use on bitterbrush and other palatable shrubs that are favored forage plants of mule deer. Horses do not utilize bitterbrush. Overall the proposed action is expected to have negligible benefits to mule deer.

Non-Game Wildlife Species

Cottontail rabbits would benefit from increased grass cover associated with decreasing cattle stocking by 132 head, delaying turnout one month, decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 60 days during the critical growth period. Increasing the wild horse AML by ten head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures. Implementation of riparian protective fences at Sagehen Spring would locally improve grass production and cover at these locations.

Dark kangaroo mice habitat quality would be improved due to increased dune stability associated with decreasing cattle stocking by 132 head, delaying turnout one month, decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 44 days during the critical growth period in the lower pastures and fencing the Alkaline Meadow. If these practices lead to substantial increases in grass cover, kangaroo mouse habitat value would start to decrease because kangaroo mice prefer foraging sites with open areas and substantial amounts of bare

ground. There would be no impacts from increasing the wild horse AML from 35 to 45 animals or implementing the Sagehen Spring protective fencing.

Sagebrush vole habitat quality would benefit from increased grass cover, forb cover and productivity, and improved soil conditions, associated with decreasing cattle stocking by 132 head, delaying turnout one month, decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 60 days during the critical growth period. Increasing the wild horse AML by 10 head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures. Implementation of riparian protective fences at Sagehen Spring would locally improve vegetative conditions at these locations and improve vole habitat.

Coyotes would be minimally affected by implementation of the Proposed Action. Coyotes are opportunist predators. Changes in grazing management practices and infrastructure would favor some prey and disfavor other prey species. Coyotes would shift habitat use and hunting patterns to adapt to prey changes. No measureable impacts are expected.

Bushy-tailed woodrat habitat would be locally improved due to changes in grazing management increase hiding cover and forage availability. Many sites occupied by woodrats are associated with rock outcrops and dense juniper stands. Livestock use of these sites is limited by topography, dense vegetation, rock features or woody debris, therefore the area of improved woodrat habitat would be very limited.

Long-eared myotis roosting sites in old junipers within the Juniper Pasture would not be affected by implementation of the Proposed Action. Bats would benefit from increased insects availability associated with increases in grass cover and improved soil conditions associated with decreasing cattle stocking by 132 head, delaying turnout one month, decreasing livestock utilization from 60 to 40%, reducing livestock grazing 60 days during the critical growth period and fencing at Sagehen Spring. Increased hot season grazing on seven unfenced riparian sites in Juniper Pasture would maintain or reduce low insect production at those sites. Increasing the wild horse AML from 35 to 45 animals would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures.

The common raven would be minimally affected by implementation of the Proposed Action. Ravens are opportunists. Changes in grazing management practices and infrastructure would favor some prey and disfavor other prey species. Ravens would shift habitat use and hunting patterns to adapt to prey changes. No measureable impacts are expected.

American avocets and snowy plovers utilize playa margins in the Lake Field for nesting and foraging. Implementation of the Proposed Action would reduce potential nest disturbance in the pasture by decreasing stocking by 132 head and delaying turnout by one month. There would be no impacts from increasing the wild horse AML, or fencing Sagehen Spring.

Sage sparrow and Brewer's sparrow habitat would benefit from increased grass cover, forb cover, productivity and improved soil conditions associated with decreasing cattle stocking by 132 head, delaying turnout one month, decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 60 days during the critical growth period. However improved grass cover would decrease bare ground. Depending upon amount of ground cover, habitat value for sparrows would be neutral to negative as they favor intershrub spaces with some bare ground. Increasing the wild horse AML by 10 head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures. Implementation of riparian protective fences at Sagehen Spring would have no impact.

Green-tailed towhee habitat would benefit from improved grass and forb productivity that lead to improved litter production under shrub associated with decreasing cattle stocking by 132 head, decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 60 days during the critical growth period. Increased use of bitterbrush and other mountain shrubs by livestock associated with an additional 8 days of livestock grazing in the Juniper Pasture would increase livestock use in towhee habitats. Increasing the wild horse AML by 10 head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures. Implementation of riparian protective fences at Sagehen Spring would have no impact on towhee habitat.

The Juniper titmouse would not be affected by implementation of the Proposed Action. The titmouse is a juniper obligate, nesting and foraging in juniper trees. Changes in livestock management practices and wild horse AMLs would not impact juniper communities. Implementation of riparian protective fences at Sagehen Spring would have no impact on titmouse habitat.

Northern sagebrush lizard habitat quality would be improved due to increased dune stability associated with decreasing cattle stocking by 132 head, delaying turnout one month, decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 44 days during the critical growth period in the lower pastures. If these practices lead to substantial increases in grass cover, sagebrush lizard habitat value would start to decrease because the lizards prefer foraging sites with open areas and substantial amounts of bare ground. There would be no impacts from increasing the wild horse AML from 35 to 45 animals or implementing the Sagehen Spring protective fencing.

Overall, the Proposed Action is expected to have neutral to slightly positive impacts to the majority of wildlife species within the Massacre Lakes allotment. The ACEC within the Massacre Lakes allotment was designated for wildlife and cultural resources. The Proposed Action would slightly benefit wildlife species within the ACEC however juniper encroachment into the ACEC is expected to continue to negatively affect two BLM sensitive species, bighorn sheep and sage-grouse. If left untreated, in the future much of the ACEC would not provide habitat for sage-steppe obligates. Wild horse grazing is expected to continue to negatively affect habitat conditions in some areas of the ACEC due to riparian degradation and reductions in screening and hiding cover. Existing riparian exclosure fences and new exclosure fences at Sagehen Springs are expected to improve habitat conditions within the ACEC but also increase wildlife fence strikes and entanglements to a small degree.

Impacts of Alternative 2 – No Action

California and BLM Sensitive Species

California bighorn sheep

This alternative would affect bighorn on approximately 4,400 acres of high quality habitat within the Juniper Pasture outside the Biebe exclosure. Grazing by livestock for up to 60 days during the critical growth period and a 60% utilization level would continue to adversely affect availability and forage quality of native bunchgrasses. Continued grazing by up to 35 wild horses during both the 107 day critical growth period and the 92 day hot season would maintain heavy grazing pressure at one spring within high quality bighorn habitat decreasing forage availability for bighorn in the vicinity of the spring and direct competition for water at the site.

Pygmy rabbit

Under the No Action Alternative, pygmy rabbit populations are expected to continue to be negatively impacted from little residual grass cover providing fewer foraging opportunities and increases in predation risk due to the majority of perennial grasses being consumed by cattle or wild horses. The majority of pygmy rabbit habitat occurs in the lower pastures that are generally only grazed by cattle. The No Action Alternative would continue stocking by up to 582 cattle, livestock turnouts in mid-April, and 60% maximum utilization for livestock. The potential for continued heavy utilization levels would remain unchanged. This would result in maintenance of grass cover within the allotment well below site potential. In the long term, continued declines in rangeland health and function across the landscape is expected to negatively impact pygmy rabbits, resulting in low quality seasonal habitats with little to no understory vegetation and decreased quality of habitat patches as grazing continued to impact these areas, resulting in pygmy rabbits dispersal to find more suitable habitat and locally decreased population levels at an allotment scale. There would be no change in habitat use between cottontail rabbits and pygmy rabbits.

Greater Sage-grouse

Sage-grouse and other ground nesting sagebrush obligate species such as sage sparrow and sage thrasher would be not be expected to benefit from the No Action Alternative and heavy grazing and negative impacts to sagebrush stands and native bunchgrasses would continue to occur. Currently, perennial grass composition in the allotment is below site potential and little residual grass is left for nesting birds at the end of the grazing season. Under the No Action Alternative, cattle AUMs would not be reduced and wild horse population levels would remain high, resulting in continued degradation of perennial grasses and sensitive riparian habitats. The No Action Alternative would not ensure utilization levels are not excessive (above 40%) or a performance based grazing strategy that would ensure that if overuse (greater than 60% utilization) occurs the impacts of overgrazing will be mitigated for by complete rest the following grazing use period. Heavy grazing and direct impacts would continue to occur in the Lake Field, East Seeding, West Seeding, and Sand Spring Pasture. These pastures contain the majority of the nesting habitat within the allotment. Utilization mapping and line point intercept data indicate heavy utilization and little perennial grass; under the No Action Alternative it is expected that this trend will continue unabated. Residual perennial grass cover would remain low in Lake Field, East Seeding, West Seeding, and Sand Spring Pasture due to no utilization limits that ensure overgrazing does not occur and poor vigor and growth of perennial bunchgrasses will continue due to no changes in stocking rates or seasons of use. This would also negatively impact other sage-steppe obligate species such as sage sparrow and sage thrasher that are influenced by residual perennial grasses.

Direct impacts to sage-grouse nesting would only occur in the East Seeding on odd years and in the West Seeding during even years. Impacts from cattle on the Juniper Pasture would take place every other year however wild horse numbers would remain unchanged and impacts across the Juniper Pasture would remain widespread, especially at riparian sites. Riparian habitat in the allotment would not improve due to no changes in wild horse population levels. Overall direct and indirect impacts to nesting birds, including sage-grouse would be higher than any of the alternatives.

As stated above, the recent Federal Register publication pertaining to sage-grouse states "…a complex set of environmental and biotic conditions that support the West Nile virus cycle must

coincide for an outbreak to occur. Currently the annual patchy distribution of the disease is keeping the impacts at a minimum" (Federal Register 2010, at page 13970). Under the No Action Alternative, no new range developments would occur and the risk of West Nile Virus in the allotment would remain unchanged.

Golden eagle

Under the No Action Alternative, golden eagles predatory success and search time for prey in the short term would remain unchanged due to no changes in cattle grazing or wild horse population levels. In the long term, however, the effects of the No Action Alternative on golden eagles are expected to be slightly negative due to decreased populations of prey species. No reductions in wild horse population numbers and cattle numbers would result in continually declining habitat conditions for many species, which would decrease foraging opportunities, and slow the population growth of prey species (kangaroo rats, jackrabbits, squirrels, fawns, etc.) that provide golden eagles with prey due to continuing declines in habitat quality for prey species.

Ungulates

Pronghorn antelope

Under the No Action Alternative, pronghorn antelope habitat would continue to remain below potential, especially in the Juniper Pasture and Lake Field where pronghorn most commonly are found. Low forb composition would be maintained due to stocking with up to 582 cattle, April cattle use, grazing up to 60 days during the critical growth period in the Juniper Pasture and utilization of up to 60%. Direct impacts to antelope on kidding grounds in the Juniper Pasture would not be reduced due to wild horse population numbers remaining unchanged. Unfenced riparian habitats in the Juniper Pasture, which are important for antelope during the summer months, would continue to degrade as wild horse population levels remain unchanged.

Mule deer

Under the No Action Alternative, mule deer habitat would continue to remain below potential, primarily in the Juniper Pasture where mule deer most commonly are found. Low forb composition would be maintained due to stocking with up to 582 cattle, April cattle use, grazing up to 60 days during the critical growth period and utilization of up to 60%. Cattle grazing of up to 46 days during the hot season would maintain levels of cattle browsing on bitterbrush and other palatable shrubs needed by deer for fall/winter protein source however cattle grazing in the Juniper Pasture would be less than the Proposed Action due to that pasture being rested every other year under current management. Unfenced riparian habitats in the Juniper Pasture, which are important for deer during the summer months, would continue to degrade as wild horse population levels remain unchanged.

Other Native Wildlife Species

Cottontail rabbit habitat values would continue to be less than potential due to decreased grass productivity that limits cover and forage for rabbits.

Dark kangaroo mouse habitat would be affected by continuation of livestock grazing practices including turnout in April, 60% utilization on grasses, and up to 582 head in the lower pastures that decrease dune stability. Grazing pressure in sandy areas would continue to maintain bare ground and open areas between shrubs favored by the mice.

Vole habitat would continue to be impacted by poor grass cover and degraded soil conditions associated with current cattle stocking, April turnout, 60% livestock utilization, and grazing during critical growth period grazing. Continued hot season grazing on unfenced meadows in Juniper pasture would maintain or reduce habitat value at those sites.

Coyotes are opportunists. Continuation of grazing management practices would favor some prey and disfavor other prey species. Coyotes would continue to modify habitat use and hunting patterns to adapt to prey changes. No measureable impacts are expected.

Bush-tailed woodrats habitat conditions would be maintained under the current grazing management practices that locally affect existing hiding cover and forage availability. Most sites occupied by woodrats are associated with rock outcrops and dense juniper stands. Livestock use of these sites is limited by topography, dense vegetation, rock features or woody debris, therefore area of woodrat habitat affected by grazing would be very limited.

Bats habitat in the Juniper Pasture would remain unchanged. Roosting habitat would not be affected by grazing. Limited grass cover and poor soil conditions associated with current livestock stocking, 60% livestock utilization, and grazing during the hot season would maintain existing insect production well below potential in the Juniper pasture.

American avocet and snowy plover nesting habitat in the Lake Field would continue to be subject to potential nest disturbance associated with livestock use during the spring and early summer.

Sage sparrow and Brewer's sparrow habitat would continue to be impacted by poor grass cover and degraded soil conditions associated with current cattle stocking, April turnout, higher utilization, and grazing during critical growth period grazing. Continued hot season grazing on unfenced meadows in the Juniper pasture would maintain or reduce habitat value at those sites. Heavy grazing does maintain open foraging areas in the inter-shrub spaces including areas of bare ground preferred by both species.

Green-tailed towhee habitat in the Juniper Pasture would continue to be affected by livestock and wild horses due to poor grass, forb and litter cover under tall shrubs. Additionally up to 46 days of hot season livestock use would result in browsing of bitterbrush and other mountain shrubs preferred by towhees for nesting and foraging. This would still be less than the Proposed Action, which has use in the Juniper pasture every season.

The Juniper titmouse would not be affected by continuing current livestock management and wild horse AMLs. The titmouse is a juniper obligate, nesting and foraging in juniper trees. Continuing livestock management practices and wild horse AMLs would not impact juniper communities.

Northern sagebrush lizard habitat would be affected by continuation of livestock grazing practices including turnout in April, 60% utilization on grasses, and up to 582 head in the lower pastures that decrease dune stability. Grazing pressure in sandy areas would continue to maintain bare ground and open areas between shrubs favored by the lizard.

Overall, the No Action Alternative is expected to have slightly negative impacts to the majority of wildlife species within the Massacre Lakes allotment. The ACEC within the Massacre Lakes allotment was designated for wildlife and cultural resources. The No Action would slightly negatively affect wildlife species within the ACEC however juniper encroachment into the ACEC is expected to continue to negatively affect two BLM sensitive species, bighorn sheep and sage-grouse. If left untreated, in the future much of the ACEC would not provide habitat

for sage-steppe obligates. Wild horse grazing is expected to continue to negatively affect habitat conditions in some areas of the ACEC due to riparian degradation and reductions in screening and hiding cover. Not protecting Sagehen Springs from wild horses impacts with an exclosure fence would allow this site to continue to degrade habitat conditions within the ACEC however, the fence built to wildlife specification would result the potential of bird strikes or wildlife entanglements. Grazing in the Juniper Pasture would occur less than the Proposed Action but utilization would be set at 60% rather than the 40% required with the Proposed Action.

Impacts of Alternative 3 –TRT Recommendation

The alternative does not prescribe a specific pasture rotation schedule. This analysis is based upon the "likely" grazing schedule described at the beginning of the Environmental Consequences section for this alternative on page 51 however there are 120 possible different grazing rotations mathematically possible under this alternative.

California and BLM Sensitive Species

California bighorn sheep

This alternative would affect bighorn on approximately 4,400 acres of high quality habitat within the Juniper Pasture outside the Biebe exclosure. A 48 day reduction in grazing by livestock during the critical growth period and a 40% utilization level would lead to increased availability and forage quality of native bunchgrasses. However, the hot season livestock use every year would increase by five days and grazing by up to 45 wild horses during both the 107 day critical growth period and the 92 day hot season would maintain heavy grazing pressure at one spring within high quality bighorn habitat. As a result forage availability would decrease for bighorn in the vicinity of the spring.

Pygmy rabbit

Under the TRT Alternative, a 40% utilization limit would decrease livestock damage to rabbit burrows during the period of wet soils however grazing use would still be more than the Proposed Action which implements a shortened season, reduction in cattle numbers and a 40% utilization limit. These changes in livestock grazing would lead to a slow increase in native perennial grass production due to the 40% utilization limit on livestock and up to 31 fewer days that livestock graze during the critical growth period for native bunchgrasses. The rate of change would be slow because there are no periods of rest or deferment anticipated in the West Seeding, Sand Springs, or Juniper Pasture which would be used by livestock during portions of the critical growth period. The slow increase would lead to more forage for pygmy rabbits and increased herbaceous cover near burrows. There would be little overlap between pygmy rabbit habitats and wild horse use areas because pygmy rabbit habitats are primarily located outside the wild horse use areas.

Increased grass cover could increase use by cottontail rabbits, and displace use by pygmy rabbit due to competition between the two species (Larrucea & Brussard, 2008). In the long term, habitat shifts between the two species, along with resource partitioning, would be likely to occur on an unknown fraction of pygmy rabbit habitats. Overall, the TRT alternative would have slightly positive benefits compared to the No Action Alternative but less positive benefits than the Proposed Action.

Greater Sage-grouse

Sage-grouse and other ground nesting sagebrush obligate species such as sage sparrow and sage thrasher would be expected to slightly benefit from residual and new grass cover and forbs as a result of pasture management which reduces the potential for heavy grazing and negative impacts to sagebrush stands and native bunchgrasses that are currently occurring by limiting utilization to 40%. Currently, perennial grass composition in the allotment is below site potential and little residual grass is left for nesting birds at the end of the grazing season. Under the TRT Recommendation, all pastures would be available for grazing, permitted AUMs would not be reduced and cattle use on the allotment could be increased above what has been occurring based on actual use reports due to the pastures not being rested from grazing. Therefore gains in native bunchgrasses that sage-grouse use for nesting and hiding cover would be slower than the Proposed Action Alterative.

All alternatives except for the No Action Alternative would benefit perennial grass composition in the long term due to reducing grazing impacts throughout the allotment by setting utilization at 40%; however, a performance based grazing strategy would not be in place with the TRT Alternative to ensure that if overuse (greater than 60% utilization) occurs, the impacts of overgrazing as it relates to loss of nesting cover would mitigate the next scheduled use period. The TRT Alternative does address overgrazing by reducing stocking levels using the desired stocking rate formula but overgrazed pastures would still be grazed the next season. Due to the poor vigor and small stature of perennial plants in the Lake Field, East Seeding, Sand Spring Pasture, and West Seeding (many plants are less than 4 inches tall), 40% utilization in a pasture every year would generally result in approximately 40% of individual plants being excessively utilized, therefore screening cover and nesting cover would not immediately improve to the levels needed for many species, including sage-grouse.

No rest under the TRT Recommendation would not allow for the reproduction and increase in vigor of perennial grasses in the East Seeding, Sand Spring Pasture, and West Seeding that the Proposed Action. The overall increase in vegetation volume increases would be reduced in the long term compared to the Proposed Action and Alternative 4 and 5. Residual grass cover would not increase as quickly under the TRT Alternative compared to the Proposed Action due to no rest in any of the pastures under this alternative. Additionally, direct impacts could occur to nesting sage grouse in any pasture in any given year depending on the grazing schedule for that season.

The TRT Recommendation could provide indirect benefits by increasing the amount of residual grass nesting cover available for sage-grouse in the long term because of the 40% utilization limit resulting in increased residual vegetation in pastures compared to current management. The Juniper Pasture would have a slight benefit from increased residual grass across the pasture from a 40% utilization limit that does not occur under current management but would occur under this alternative, the Proposed Action, and Alternative 4. A reduction in wild horse numbers would reduce the heavy grazing impacts to upland perennial bunchgrasses, especially in the Juniper Pasture, benefiting residual grass cover and habitat composition. A reduction in wild horse numbers would also reduce the impacts at sensitive riparian habitats within the Juniper Pasture; this would result in a decrease in potential direct impacts to sage-grouse at riparian areas from wild horses and an improvement in habitat composition and hiding cover at riparian sites as impacts at these areas are reduced.

This alternative would not provide for fencing of Sagehen Spring and impacts from wild horses at this important sage-grouse riparian habitat would continue unabated. It is not expected that Sagehen Spring will recover to an upward trend without removing impacts from the site. Overall, this alternative is expected to have positive effects to sage-grouse compared to current

conditions; however, it would provide less protection to sage-grouse and their habitat than the Proposed Action provides.

As stated above, the recent Federal Register publication pertaining to sage-grouse states "…a complex set of environmental and biotic conditions that support the West Nile virus cycle must coincide for an outbreak to occur. Currently the annual patchy distribution of the disease is keeping the impacts at a minimum" (Federal Register 2010, at page 13970). Under the TRT Recommendation Alternative, no new range developments would occur and the risk of West Nile Virus in the allotment would remain unchanged.

Golden eagle

Under the TRT Recommendation Alternative, impacts to golden eagles would be similar to those described for the Proposed Action but at a slower rate. The rate of change would be slower because there are no periods of rest or deferment anticipated in the West Seeding, Sand Springs, or Juniper Pasture which would be used by livestock during portions of the critical growth period. Limiting livestock utilization to 40% of current year's growth would allow improved vegetation cover and productivity.

Ungulates

Pronghorn antelope

Impacts to antelope would be similar, but slower, to those described for the Proposed Action due to decreased utilization limits. The rate of change would be slower because there are no periods of rest or deferment anticipated in the West Seeding, Sand Springs, or Juniper Pasture which would be used by livestock during portions of the critical growth period. Direct competition would be expected every season due to no pastures being rested.

Mule deer

Impacts to mule deer would be similar, but slower, to those described for the Proposed Action due to decreased utilization limits. The rate of change would be slower because there are no periods of rest or deferment anticipated in the West Seeding, Sand Springs, or Juniper Pasture which would be used by livestock during portions of the critical growth period. Direct competition would be expected every season due to no pastures being rested.

Other Native Wildlife Species

Cottontail rabbits would benefit from increased grass cover associated with decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 48 days during the critical growth period. Increasing the wild horse AML by ten head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures.

Dark kangaroo mice habitat quality would slowly improve due to increased dune stability associated with decreasing livestock utilization from 60 to 40%, reducing livestock grazing up to 29 days during the critical growth period in the lower pastures. The rate of change would be slow because there are no periods of rest or deferment anticipated in the West Seeding or Sand Springs Pasture which would be used by livestock during portions of the critical growth period. If these practices lead to increases in grass cover, kangaroo mouse habitat value would start to decrease because kangaroo mice prefer foraging sites with open areas and substantial amounts of bare ground. There would be no impacts from increasing the wild horse AML from 35 to 45.

Sagebrush vole habitat quality would benefit from slow increases in grass cover, forb cover, improved productivity and improved soil conditions associated with decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 48 days during the critical growth period. The rate of change would be slow because there are no periods of rest or deferment anticipated in the West Seeding, Sand Springs, or Juniper Pasture which would be used by livestock during portions of the critical growth period. Increasing the wild horse AML by ten head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures.

Impacts on coyotes would be similar to those described for the proposed action. Long-eared myotis roosting sites in old junipers within the Juniper Pasture would not be affected by implementation of the TRT Alternative. Impacts on bushy-tailed woodrats would be similar to those described for the proposed action.

Bats would benefit from increased insects availability associated with increases in grass cover and improved soil conditions associated with decreasing livestock utilization from 60 to 40%, reducing livestock grazing 48 days during the critical growth period and fencing at Sagehen Spring. Increased hot season grazing on seven riparian areas in the Juniper Pasture would maintain or reduce low insect production at those sites. Not including periods of livestock rest or deferment and increasing the wild horse AML from 35 to 45 animals would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures.

Impacts on ravens would be similar to those described for the proposed action.

American avocets and snowy plovers utilize playa margins in the Lake Field for nesting and foraging. Implementation of the Proposed Action would reduce potential nest disturbance in the pasture by decreasing grazing during the critical growth period by up to 29 days. There would be no impacts from increasing the wild horse AML.

Sage sparrow and Brewer's sparrow habitat would benefit somewhat from slow increases in grass and forb cover and productivity and improved soil conditions associated with decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 48 days during the critical growth period. The rate of change would be slow because there are no periods of rest or deferment anticipated in the West Seeding, Sand Springs, or Juniper Pasture which would be used by livestock during portions of the critical growth period. Improved grass cover would decrease bare ground. Depending upon amount of ground cover, habitat value for sparrows would be neutral to negative as they favor inter-shrub spaces with some bare ground. Increasing the wild horse AML by ten head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures.

Green-tailed towhee habitat in the Juniper Pasture would benefit from improved grass and forb productivity that lead to improved litter production under shrub associated with decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 48 days during the critical growth period. Increased use of bitterbrush and other mountain shrubs by livestock associated with an additional 5 days of livestock grazing in the Juniper Pasture and grazing the pasture every year would increase livestock use in towhee habitats. Increasing the wild horse AML by 10 head (from 35 to 45) would slow the rate of improvement in the Juniper Pasture and have no impact in the other pastures.

The Juniper titmouse would not be affected by implementation of the TRT Alternative. The titmouse is a juniper obligate, nesting and foraging in juniper trees. Changes in livestock management practices and wild horse AMLs would not impact juniper communities.

Northern sagebrush lizard habitat quality would be improved due to increased dune stability associated with decreasing livestock utilization from 60 to 40%, and reducing livestock grazing up to 31 days during the critical growth period in the lower. If these practices lead to substantial increases in grass cover, sagebrush lizard habitat value would start to decrease because the lizards prefer foraging sites with open areas and substantial amounts of bare ground. There would be no impacts from increasing the wild horse AML from 35 to 45.

Overall, the TRT Alternative is expected to have neutral to slightly positive impacts to the majority of wildlife species within the Massacre Lakes allotment. The ACEC within the Massacre Lakes allotment was designated for wildlife and cultural resources. The TRT Alternative would have both positive and negative impacts wildlife species within the ACEC however juniper encroachment into the ACEC is expected to continue to negatively affect two BLM sensitive species, bighorn sheep and sage-grouse. If left untreated, in the future much of the ACEC would not provide habitat for sage-steppe obligates. Wild horse grazing is expected to continue to negatively affect habitat conditions in some areas of the ACEC due to riparian degradation and reductions in screening and hiding cover. However a 40% utilization limit would reduce utilization levels within the Juniper Pasture. Sagehen Springs would continue to decline in condition as it would not be fenced however, no wildlife fence strikes or entanglements would occur.

Impacts of Alternative 4 – Allocation by Pasture

California and BLM Sensitive Species

California bighorn sheep

Impacts to bighorn sheep would be similar to those described for the No Action Alternative. Although livestock grazing in the 4,400 acres of high quality habitat within the Juniper Pasture outside the Biebe exclosure would be eliminated, increasing the wild horse AML by 86 animals to 121 would continue to adversely affect availability and forage quality of native bunchgrasses due to continued grazing during both the 107 day critical growth period. Wild horse use during the 92 day hot season would maintain heavy grazing pressure at one spring within high quality bighorn habitat decreasing forage availability for bighorn in the vicinity of the spring.

Pygmy rabbit

Impacts to pygmy rabbits would be similar to those described for the Proposed Action in the lower pastures because most pygmy rabbit habitat is in the lower pastures. Increased wild horse populations would affect a very small portion of the Juniper Pasture where impacts would be similar to those described under the Continue Present Management Alternative.

Greater Sage-grouse

Under Alternative 4, cattle AUMs would be reduced but wild horse population levels would remain at nearly the same levels, resulting in continued degradation of perennial grasses and sensitive riparian habitats in the Juniper Pasture. In the Lake Field, East Seeding, West Seeding, and Sand Spring Pasture, little to no wild horse use occurs and management of these pastures would be similar to the Proposed Action. Therefore, impacts and improvements in these grazing pastures of the allotment would be nearly identical to the Proposed Action. In the Juniper Pasture,

sage-grouse and other ground nesting sagebrush obligate species such as sage sparrow and sage thrasher would be not be expected to benefit from Alternative 4 due to heavy grazing and negative impacts to sagebrush stands and native bunchgrasses that would continue to occur. Currently, perennial grass composition in the allotment is below site potential and little residual grass is left for nesting birds at the end of the grazing season. Alternative 4 would not ensure utilization levels are not excessive (below 40%) and poor vigor and growth of perennial bunchgrasses would continue due to no changes in wild horse population levels. This would also negatively impact sage-grouse and other sage-steppe obligate species such as sage sparrow and sage thrasher that need residual perennial grasses for nesting cover and hiding cover. Direct impacts to sage-grouse could occur every year to breeding sage-grouse at the Post Canyon Lek in the Juniper Pasture due to the high wild horse population levels. This impact would be higher than any of the other Alternatives except for the No Action Alternative.

Under Alternative 4, wild horse numbers in the Juniper Pasture would remain essentially unchanged and impacts to sage-grouse brood rearing habitats across the Juniper Pasture would remain widespread. Unfenced riparian habitat in the allotment would not improve due to no changes in wild horse population levels. Impacts to sage-grouse at unfenced riparian sites include lack of cover and forb diversity, lack of water due to dewatering and loss of edge habitat as riparian areas decreased in extent due to degradation. Sagehen Spring would be fenced so benefits to sage-grouse would be recognized. Benefits would include more hiding and screening cover, increased forb diversity and increased edge as the riparian zone reached its full extent. Overall direct and indirect impacts to sage-grouse would be higher than Alternatives1, 3 and 5 in the Juniper Pasture however in the Lake Field, Sand Springs, East and West Seedings, impacts would be similar to the Proposed Action.

As stated above, the recent Federal Register publication pertaining to sage-grouse states "…a complex set of environmental and biotic conditions that support the West Nile virus cycle must coincide for an outbreak to occur. Currently the annual patchy distribution of the disease is keeping the impacts at a minimum" (Federal Register 2010, at page 13970). Under Alternative 4, Sagehen Spring would be fenced but no off-site water would be developed and therefore the risk of West Nile virus in the allotment would remain unchanged.

Golden eagle

Impacts to golden eagles would be similar to those described for the Proposed Action for the lower pastures due to decreased cattle stocking, delayed turnout, decreased utilization limits and reduced grazing during the critical growth period. In the Juniper pasture, impacts would be similar to those described under the Continue Present Management alternative.

Ungulates

Pronghorn antelope

Impacts to antelope would be similar to those described for the Proposed Action for the lower pastures due to decreased cattle stocking, delayed turnout, decreased utilization limits and reduced grazing during the critical growth period. In the Juniper pasture, impacts would be similar to those described under the Continue Present Management alternative.

Mule deer

Impacts mule deer would be similar to those described for the Proposed Action for the lower pastures due to decreased cattle stocking, delayed turnout, decreased utilization limits and reduced grazing during the critical growth period. In the Juniper pasture, impacts to forb production and riparian areas would be similar to those described under the Continue Present Management alternative. Because horses rarely browse bitterbrush or other shrubs, availability of bitterbrush and other palatable shrubs would increase even though horse populations would be greater than current allocations.

Other Native Wildlife Species

Impacts to cottontail rabbit habitat would be similar to those described for the No Action Alternative in the Juniper Pasture because seasonal grazing by up to 582 cattle would be replaced by yearlong grazing by up to 121 wild horses. Horses would be grazing during the wet season and during the entire critical growth period for native grasses and grasses would have little chance to set seed or build root crown reserves. In other pastures, impacts would be similar to those described for the Proposed Action due to lower livestock stocking rates, delayed turnout and a 40% utilization limit.

Sagebrush voles would be adversely impacted in the Juniper Pasture by decreased grass cover and degraded soil conditions associated with increased wild horse levels yearlong. Increased hot season grazing on unfenced meadows in the Juniper pasture would maintain or reduce habitat values at those sites. Fencing of Sagehen Spring would locally improve vole habitat. In other pastures, impacts would be similar to those described for the Proposed Action due to lower livestock stocking rates, delayed turnout and a 40% utilization limit.

Woodrats would adversely impacted in the Juniper Pasture by decreased grass cover and degraded soil conditions associated with increased wild horse levels yearlong. . In other pastures, impacts would be similar to those described for the Proposed Action due to lower livestock stocking rates, delayed turnout and a 40% utilization limit.

Long-eared myotis habitat in the Juniper Pasture would be adversely impacted by decreased grass cover and degraded soil conditions associated with increased wild horse levels yearlong. Increased hot season grazing on unfenced meadows in the Juniper pasture would maintain or reduce low insect production at those sites. Fencing of Sagehen Spring would locally improve bat habitat by increasing insect production. There would be no impacts to bats from implementation of grazing practices in the other pastures.

Impacts to the following wildlife species is expected to be similar to those described for the proposed action: common ravens, American avocet, snowy plovers, northern sagebrush lizard. Dark kangaroo mouse and coyotes

Sage sparrows and Brewer's sparrows would be adversely impacted in the Juniper Pasture by decreased grass cover and degraded soil conditions associated with increased wild horse levels yearlong. In other pastures, impacts would be similar to those described for the Proposed Action due to lower livestock stocking rates, delayed turnout and a 40% utilization limit.

Impacts to green-tailed towhee habitat would be similar to those described for the No Action Alternative in the Juniper Pasture because seasonal grazing by up to 582 cattle would be replaced by yearlong grazing by up to 121 wild horses. Horses would be grazing during the wet season and during the entire critical growth period for native grasses and grasses would have little chance to set seed or build root crown reserves. This would adversely affect litter production under

mountain shrubs favored by towhees as nesting and foraging sites. In other pastures, impacts would be similar to those described for the Proposed Action due to lower livestock stocking rates, delayed turnout and a 40% utilization limit.

Overall, Alternative 4 is expected to have slightly negative impacts to the majority of wildlife species within the Juniper Pasture and positive effects similar to the Proposed Action in the remaining pastures. The ACEC within the Massacre Lakes allotment was designated for wildlife and cultural resources. Alternative 4 would slightly negatively affect wildlife species within the ACEC however, juniper encroachment into the ACEC is expected to continue to negatively affect two BLM sensitive species, bighorn sheep and sage-grouse. If left untreated, much of the ACEC would not provide habitat for sage-steppe obligates. Wild horse grazing is expected to continue to negatively affect habitat conditions in some areas of the ACEC due to riparian degradation and reductions in screening and hiding cover, this is expected to be more pronounced than any other alternative. Upland sage-steppe habitats within the ACEC would likely have low residual grass cover, especially in proximity to water sources due to the high wild horse AML under this alternative and grazing by wild horses for 12 months in the Juniper Pasture. Existing riparian exclosure fences and new exclosure fences at Sagehen Springs are expected to improve habitat conditions within the ACEC but also increase wildlife fence strikes and entanglements to a small degree.

Impacts of Alternative 5 – No Grazing

California and BLM Sensitive Species

California bighorn sheep

The No Grazing Alternative would increase the amount of forage available for bighorn sheep due to no wild horses and cattle consuming forage within the allotment. The impact is expected to be beneficial to bighorn sheep because more forage would be available. The No Grazing Alternative would improve water quality at one site with no wild horses and cattle grazing. The No Grazing Alternative would eliminate competition at water sources and bighorn sheep would be able to expand into areas of otherwise suitable habitat that are currently not being used due to wild horses staying at springs and degrading riparian habitats needed by bighorn sheep.

Pygmy rabbit

Under the No Grazing Alternative, pygmy rabbit populations are expected to improve due to increases in residual grass cover, more foraging opportunities, and decreases in predation risk with perennial grasses not being consumed by wild horses and cattle. This will provide for initial increases in cover that would be expected to immediately benefit rodents and cottontail habitats. Increased grass cover within the allotment could increase use by cottontail, and displace known use areas by pygmy rabbit due to direct competition between the two species (Larrucea and Brussard 2008).

In the short term, habitat shifts between the two species, along with resource partitioning, would likely occur; however pygmy rabbits would still benefit from the No Grazing Alternative due to higher quality habitats compared to current habitat conditions. In the long term, increases in rangeland health and function across the landscape is expected to benefit pygmy rabbits, providing higher quality seasonal habitats and increased quality of habitat patches, aiding in home range expansion and population shifts in the future along with ensuring that occupied habitats are maintained through time.

Greater Sage-grouse

Sage-grouse and other ground nesting sagebrush obligate species such as sage sparrow and sage thrasher would be expected to benefit from residual and new grass cover and forbs as a result of the No grazing alternative which reduces all of the heavy grazing and negative impacts to sagebrush stands and native bunchgrasses that are currently occurring. Currently, perennial grass composition in the allotment is below site potential and little residual grass is left for nesting birds at the end of the grazing season. Under the No Grazing Alternative, the Massacre Lakes Allotment would be closed to grazing and cattle and wild horses will be removed from the allotment, benefiting ground nesting birds, including sage grouse that are influenced by residual grass cover for nest success. No direct impacts to nesting sage-grouse would occur to nesting birds since no grazing would be occurring during the nesting season. Residual perennial grass cover would increase in all of the pastures in the allotment due to no forage consumption by wild horses and/or cattle and improved vigor and growth of perennial bunchgrasses would occur in the long term. This would also benefit other sage-steppe obligate species such as sage sparrow and sage thrasher. Improvements in forb composition at low sagebrush sites would occur as a result of the No Grazing Alternative.

Riparian habitat in the allotment would improve rapidly with this alternative as vegetation volume and production increased in riparian habitats and provided more foraging and hiding cover for sage grouse and their broods. In the long term, improved riparian function would result in increases in riparian habitat availability, benefiting sage grouse in the allotment. Over time mat meadow conditions would develop at riparian sites. Suitability of these sites and vegetation production would be slightly decreased due to excessive amounts of decadent and dead herbaceous vegetation. Overall, this alternative is expected to have similar results as the Proposed Action however increases in vegetation volume and production is expected to occur at faster rate under this alternative and habitat value for sage-grouse would increase at faster rate than any of the other alternatives.

As stated above, the recent Federal Register publication pertaining to sage-grouse states "…a complex set of environmental and biotic conditions that support the West Nile virus cycle must coincide for an outbreak to occur. Currently the annual patchy distribution of the disease is keeping the impacts at a minimum" (Federal Register 2010, at page 13970). Under the No Grazing Alternative, no new range developments would occur and the risk of West Nile Virus in the allotment would remain unchanged.

Golden eagle

Under the No Grazing Alternative, golden eagles might experience slightly reduced predatory success and increased search time in the short term due to more residual grass and hiding cover becoming available for prey species (kangaroo rats, jackrabbits, squirrels, etc.). In the long term, however, the effects of the No Grazing Alternative on golden eagles are expected to be slightly positive due to increased populations of prey species. Removing wild horses and cattle would result in increased improved habitat, increased foraging opportunities, and population growth of prey species (kangaroo rats, jackrabbits, squirrels, fawns, etc.) that would provide golden eagles with more prey opportunities but could increase the energy budget required for eagles to hunt since prey species would have increased cover.

Ungulates

Pronghorn antelope

Under the No Grazing Alternative, pronghorn antelope would benefit from improvements in low sagebrush habitats, especially in the Juniper Pasture and Lake Field where pronghorn frequent, due to removal of all cattle and wild horse grazing and no competition between wild horses, cattle, and antelope. The No Grazing Alternative would increase forb composition for pronghorn antelope by removing cattle and wild horse grazing in the allotment. Direct impacts to antelope on kidding grounds in the Juniper Pasture would not occur under this alternative. Interspecific competition at water sources would not occur. Riparian habitats, which are important for antelope during the summer months, would improve as riparian habitats began to heal and function properly, resulting in increased vegetation production and water for antelope.

Mule deer

Under the No grazing Alternative, mule deer would benefit from improvements in riparian habitats, forb production, and improved browse plant composition. The No Grazing Alternative would increase forb and grass production by removing all wild horses and cattle from the allotment. Interspecific competition at water sources would not occur under this alternative. Riparian habitats, which are important for mule deer during the summer months, would improve as wild horses were removed and riparian habitats began to heal and function properly. This would increase vegetation production and water for mule deer. Elimination of cattle grazing would allow bitterbrush and other palatable shrubs to produce more browse needed by deer during fall and winter months.

Other Native Wildlife Species

Cottontail rabbits would benefit from increased grass cover associated with no grazing by cattle or wild horses.

Dark kangaroo mouse habitat quality would improve because of increased dune stability associated with no grazing. If lack of grazing leads to substantial increases in grass cover, kangaroo mouse habitat value would locally decrease as the species prefers areas of bare ground in the intershrub areas for foraging.

Sagebrush voles would benefit from increased grass cover and improved soil conditions associated with no grazing.

Coyotes are opportunists. Changes in grazing management practices and infrastructure would favor some prey and disfavor other prey species. Coyotes would shift habitat use and hunting patterns to adapt to prey changes. No measureable impacts would occur as result of cancelling grazing.

Bushy-tailed woodrat habitat would locally benefit from the elimination of grazing as would improve hiding cover and forage availability. Most sites occupied by woodrats are associated with rock outcrops and dense juniper stands and livestock use of these sites is limited by topography, dense vegetation, rock features or woody debris. Therefore, the area of improved woodrat habitat would be very limited.

The long-eared myotis would benefit from increased insect availability associated with no grazing.

The common raven is an opportunistic species. Changes in grazing management practices and infrastructure would favor some prey and disfavor other prey species. Ravens would shift habitat use and hunting patterns to adapt to prey changes. No measureable impacts would occur as result

of cancelling grazing. If fences were removed after grazing was canceled, increased search time and energy use for prey items would occur.

American avocets and snowy plovers would benefit from elimination of potential direct disturbance from livestock to nests in the Lake Field.

Sage and Brewer's sparrows would initially benefit from elimination of grazing because of decreased disturbance and increased seed and insect production in sagebrush stands. Over the long term improved grass cover would decrease bare ground. Depending upon amount of ground cover, habitat value for sparrows would be neutral to negative as both species favor sites with open areas and bare ground in the shrub interspaces.

Green-tailed towhees would benefit from elimination of any direct disturbance to shrubs following elimination of grazing. Improved grass cover would increase herbaceous forage and litter under shrubs and improve habitat values for towhees.

Northern sagebrush lizard habitat quality would improve because of increased dune stability associated with no grazing. If lack of grazing leads to substantial increases in grass cover, lizard habitat value would locally decrease as the species prefers areas of bare ground in the intershrub areas for hunting.

Overall, The No Grazing Alternative is expected to have positive impacts to the majority of wildlife species within the Massacre Lakes Allotment. The ACEC within the Massacre Lakes allotment was designated for wildlife and cultural resources. The No Grazing Alternative would benefit most wildlife species within the ACEC however juniper encroachment into the ACEC is expected to continue to negatively affect two BLM sensitive species, bighorn sheep and sage-grouse. If left untreated, in the future much of the ACEC would not provide habitat for sage-steppe obligates. Elimination of wild horse grazing would improve habitat conditions in the ACEC due to no riparian degradation and increases in screening and hiding cover; this is expected to be more pronounced than any other alternative. Riparian conditions would improve in the the ACEC and no new exclosures would be built under this alternative; in the future, existing exclosures would likely be removed, removing the potential for wildlife fence strikes and entanglements.

Chapter 4. CUMULATIVE IMPACTS

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The Council on Environmental Quality (CEQ) regulations that implement NEPA defines a cumulative impact as: "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR, §1508.7).

There are several different cumulative impacts assessment areas (CAA) for this project based upon the affected resources. The CAA for natural and cultural resources is the 131,692 acre area comprised of entire or partial 6th Order Watersheds: Evans Camp, Massacre Lake-Middle Lakes, Middle Lake east of County Road 34, Secret Creek-Fortynine Lake east of the powerline, Lone Spring Mountain east of the powerline, Long Valley east of the powerline and County Road 34, CC Spring east of the powerline The CAA for wild horses is the 174,821 acre area comprised of the Massacre Lakes, Nut Mountain, Bitner, and Wall Canyon HMAs. The CAA for Socio-Economic and recreation resources is the 413,272 acre area that includes the Massacre Lakes grazing allotment and six adjacent allotments. Both of these CAA's are shown on page 136.

No cumulative impacts are expected to Areas of Critical Environmental Concern, livestock management or Native American concerns; therefore, these resources will not be carried further in this analysis. Potential cumulative effects have been identified for cultural resources, climate change, soils and vegetation, social and economic conditions, wild horses, and wildlife.

4.1. Past, Present and Future Actions

4.1.1. Livestock Grazing

Domestic livestock grazing has occurred within the Project Area for at least 150 years. Initially, cattle were turned out in the area to take advantage of vast stands of native bunchgrasses. In 1881, Thompson and West described 11,000 cattle belonging to Todhunter in Long Valley as only the largest of several herds and 2,000 head of cattle in Massacre Valley (Thompson and West 1881). In addition to the cattle, there were large herds of horses. Cattle grazing initially was focused in areas within a few miles of existing water sources, primarily springs. Survey plats of the GLO from 1874 through 1881 show at least one "Cattle Camp" in every township within the CAA. Starting in 1900 Joel C. Allen acquired springs north of Massacre Lakes for a cattle and horse operation (Parman 1981). Starting in the late 19th century, sheep grazing began in addition to the ongoing cattle grazing, primarily by itinerant herders. Allen and a partner ran sheep in the Massacre Lakes area between 1912 and 1918 (Parman 1981). Sheep were herded to areas outside the areas heavily grazed by cattle, primarily during the spring months. At times dozens of sheep bands covered the landscape. Sheep grazing began to decrease during the droughts associated with the Dust Bowl Era and the advent of the Taylor Grazing Act, which favored cattle users with established ranches over sheep herders without ranch property.

Since the advent of the Taylor Grazing Act (TGA) in the mid-1930s, levels of grazing in the Project Area have decreased dramatically. Prior to the Act, livestock grazing was uncontrolled so exact levels of grazing are unknown. The limited existing records, along with the condition of vegetation and other resources during the 1930s and 1940s provide historic accounts that point to grazing levels many times greater than what are currently harvested by livestock and wild horses. During World War II ranchers were encouraged to produce as much meat and hides as possible from public land in support of the war effort.

Over the past forty years, the amount of livestock grazing in the allotments in the Project Area has been reduced. Additionally, domestic sheep grazing has been eliminated and the number of months grazed in most cattle allotments has been reduced. Livestock grazing management practices have been also been changed to reduce or eliminate adverse impacts associated with livestock grazing. Although it is difficult to quantity the amount of livestock use that occurred during this period, at least 13,000 cattle were grazing in the Long Valley-Massacre Lakes area in 1881 and 120,000 sheep were noted in Surprise Valley as late as the 1920s.

Livestock grazing was essentially unregulated prior to the Taylor Grazing Act of 1934. The unregulated and abusive grazing combined with the multi-year droughts associated with the dust bowl era damaged soils, causing substantial amounts of water and wind erosion leading to major declines in native bunchgrasses which were replaced by sagebrush and other shrubs not palatable to livestock.

Changes in livestock management practices were implemented after WWII that resulted in decreases in livestock numbers, allocation of specific areas (e.g. allotments) where a permittee's livestock were allowed to be grazed, and the length of grazing each year. These changes include an estimated 1,500 fewer cattle, delays in turnout livestock of approximately one month, and periods of deferment and rest from livestock grazing. Within the Massacre Lakes Allotment and six adjacent allotments there are currently 21,258 AUMs of forage authorized for use by cattle. The AUMs actually used vary each year, but are estimated to be 70 to 80% of the authorized use or approximately 15,000 to 17,000. Additionally there are 8,987 AUMs placed in suspended non-use and unavailable for use. Forage considered not available for regular use were placed into "Suspended non-use". Reductions in use were associated with periodic adjudications of forage available for use by livestock.

Grazing management practices that evolved starting in the 1960s included a variety of projects implemented through the years in order to support livestock use that would allow rangelands to be grazed in a sustainable manner. Within the natural resource assessment area, collectively, 133 miles of fencing, 32 reservoirs, 5 developed springs, and 18 wells have been constructed on public land by the BLM and private landowners to support grazing management objectives. Additionally, an approximately 29,075 acres of public and private land have been seeded to reduce sagebrush cover and reseeded with improved forage grasses. Most rangeland improvement projects were implemented from the 1950s to the late 1970s.

In the foreseeable future, it's likely that as additional monitoring of soil, vegetation, wildlife and cultural resources occurs, there will be adjustments in livestock stocking and other grazing management practices within the Natural Resources CAA to meet Land Health Standards. Historically trends have been decreases in stocking, decreased use periods, and increased management inputs by permittees associated with increased interest in public land resources. Livestock grazing management practices have been modified in recent years on the Nut Mountain, Long Valley, Little Basin and Board Corral allotments to allow achievement of Land Health Standards. In the future similar adjustments to grazing management practices are likely to occur in the Bitner, Horse Lake and Massacre Mountain allotments. These adjustments would be expected to include delayed livestock turnouts, decreased allowable utilization levels, implementation of meadow protection projects and increased deferment or rest during the critical growth period for perennial grasses.

4.1.2. Wild Horses

As described above, horse grazing in the wild horse CAA was an important component of historic livestock grazing use. Horse numbers are poorly documented but it appears that horse numbers fluctuated with national and even international demand. Griffiths (1903) describes large abandoned horse herds in the northwestern Great Basin following a decline in horse prices in 1894. Feral horses were apparently so abundant in Nevada that the legislature authorized destroying unbranded wild horses. However, domestic horses locally grazed to supply local, regional and national demand for working animals (Camacho and Kingston 1977, Hedel *et al.* 1981). Parman (1981) describes British agents purchasing horses for use in the Boer War in 1899.

The transition from horse based agriculture and cavalry to motorized vehicles started in the 1920s and was complete after WWII. The running of horses on public lands mirrored this trend. During the 1950s and 60s horses were only gathered when populations began to compete with cattle for forage and when prices for horse meat rose. The passage of the Wild Horse and Burro Act in 1971 ended the practice of private individuals gathering horses. Since wild horses acquired legal protection, horse populations again increased within the wild horse CAA, resulting in periodic gathers to remove excess wild horses. During the past seven years, 2 gathers have removed 622 horses from the CAA. The most recent gather, in 2011, brought wild horse populations within AML for three of four HMAs within the CAA. The current wild horse population for the three HMAs was estimated at 89 head in 2012, slightly under the AML of 100 head. The CAA was identified as a wild horse complex in the 2008 RMP which recognizes that wild horses within the four HMAs are one biological population. The complex includes 177,827 acres.

In recent years, adopting wild horses removed from public lands has been increasingly difficult. The result is that more horses being sent to long-term hold facilities which are currently at or near capacity. The net result in that horse gathers are being postponed or cancelled and only HMAs with emergency situations where starvation of horses is likely are being gathered. On other HMAs, including those in the CAA, gathers are likely to be delayed. It is anticipated that in the foreseeable future, horse populations will be greater than the high AML levels within the CAA.

4.1.3. Soils and Vegetation (Upland-Wetland)

The soils and vegetation conditions that existed in the CAA prior to livestock grazing can be reconstructed in a general sense based upon historic descriptions, relict areas and responses of individual species to grazing use. Lower elevation deep soil sites were dominated by basin wild rye and basin big sagebrush. Sandy sites associated with lakebed margins contained a mix of basin wild rye, Indian ricegrass and needle and thread intermixed with basin big sagebrush or greasewood depending upon alkalinity of the site. Lower terraces above the lake margins with dominated by Wyoming big sagebrush with the soil surface protected by biophysical crusts and sparse stands of bunchgrasses. Deep upland soils above 5,500 feet were for the most part Idaho fescue grasslands with mountain big sagebrush as the primary shrub. Shallow soils were short sagebrush/deep rooted bunch grass sites. Upland sites periodically burned with fire return intervals that varied widely based upon the amount of herbaceous materials to carry fire. Junipers were confined to rocky areas above rims and other rock features where they were generally safe from periodic fires. Meadows associated with springs contained dense mats of sedges and grasses that resulted in sub-irrigation of the meadows without obvious channels.

The soil and vegetation conditions began to change following the introduction of cattle and horses to the area starting in the 1860's. As described above, the abundant grass resulted in large herds of cattle and horses in the 1880's. The heavy grazing began to take a toll on grass species that had not evolved with heavy grazing. As the soil building and holding deep rooted grasses declined, soils were more susceptible to wind and water erosion, which decreased soil productivity and accelerated the decrease in grass productivity (Griffiths 1901). As palatable tall grasses decreased, shorter, less productive grasses and sagebrush increased; following a major die-off of cattle during the winter of 1889-1890, the formerly uncommon bitterbrush was able to establish itself as common shrub in deeper soils above 5,500 feet. At the end of the 19th century Griffiths (1901) reported that livestock forage had declined by two-thirds. During the first few decades of the 20th Century, sheep grazing became a major component of the grazing in the area until the end of WWI when surplus wool from the war effort was dumped into the market (Parman 1990). Sheep are primarily browsers, so they were able to utilize forages unavailable to cattle. Sheep are also capable of utilizing herbaceous and woody forages more completely than cattle or horses due to their smaller, pointed jaws. The result was large areas accessible to sheep grazing were denuded of all herbaceous and low growing woody vegetation (Griffiths 1901 and 1903). Cheat grass appeared in the area during the period of heavy sheep use. Sheep use declined with the advent of the Taylor Grazing Act, but WWII saw an increase in cattle use to supply the war effort with leather and meat.

Major meadow areas with perennial water were purchased by private landowners from the State of Nevada and fenced to allow production of native hay and forage for horses needed in livestock operations. Meadows associated with smaller springs were subject to very heavy grazing and in many cases meadow vegetation was completely eliminated.

Vegetation began to recover in the 1950's following decreases in livestock use. Sagebrush was able to dominate many upland areas because it was less palatable to cattle. Deep rooted bunchgrasses sensitive to critical growth period grazing including basin wild rye and bluebunch wheatgrass remained uncommon, but shallow rooted and grazing tolerant species including Sandberg's bluegrass, Thurber's needlegrass, squirrel-tail and Idaho fescue slowly increased on uplands. Large areas of Wyoming big sagebrush dominated stands existed with little grass understory. Unfenced meadow areas were dominated by bare ground and on-going soil erosion.

Starting in the 1960's and continuing to the present, upland soil conditions stabilized and grasses began to increase in density and productivity on most areas as allotments were fenced, waters increased, grazing systems implemented and reductions occurred. Where grazing systems were not effective, livestock management projects were not maintained, and wild horse populations increased above sustainable levels, improvements in upland vegetation slowed or reversed. As documented in this assessment, Massacre Lakes is one allotment where that has occurred.

Riparian sites associated with spring meadows are variable in size, ownership and management. Most large meadows with perennial waters are in private ownership and fenced to increase management options for the owner. These sites represent about 50% of the riparian acreage in the CAA. The usual practice is use the meadows as livestock gathering sites in the fall, holding the livestock on the meadow fields until the forage has been consumed. Several of the large fenced meadows and unfenced riparian areas have come into public ownership in the past several decades. These sites represent about 40% of the riparian acreage in the CAA. In the 1980's fencing of publically owned meadow sites became a common management practice to decrease livestock grazing pressure on important meadows and protect forage, water and cover primarily for wildlife. These sites represent six to eight % of the riparian acreage in the CAA. Unfenced

spring meadows and upland areas near water sources continued to remain in less than desirable conditions. These sites represent about two to four % of the riparian acreage in the CAA.

Cheat grass (*Bromus tectorum*) was introduced into the CAA early in the 20th century most likely by domestic sheep. This invasive annual is currently a common but low frequency grass species in many plant communities within the CAA. Models of vegetation trends for the northern Great Basin associated with global climate change indicate the species will increase its frequency and occurrence within the region. However the models indicate a low probability that cheat grass expansion will result in widespread stand conversion (Knick et al).

The Ruby Pipeline, a 42" natural gas buried line, was completed in 2012. 6.65 miles of the ROW for the pipeline crosses the CAA. The disturbance footprint of the pipeline was approximately 100 feet wide with a total disturbance area of 81 acres with the CAA. The pipeline operator is currently within the early stages of reclamation, but for the most part the surface of the ROW has not been successfully re-vegetated.

4.1.4. Wildlife

Wildlife populations and habitat conditions that existed in the CAA prior to livestock grazing are difficult to predict with any accuracy. Emigrant accounts have little information on wildlife other than to generally state game was in short supply. Based upon the generalized descriptions of vegetation changes described above the changes in habitats and relative populations of five wildlife species: pronghorn antelope, mule deer, greater sage-grouse and Brewer's sparrow will be used to assess cumulative impacts to wildlife and wildlife habitats. The three game species were chosen because their habitat requirements, their responses to the kinds of changes in vegetation conditions that occurred in the CAA, and past information on harvest trends is available. Brewer's sparrow is widespread sagebrush obligate well enough understood to allow accurate description of habitat trends.

Pronghorn antelope was the most common large mammal in the CAA prior to livestock grazing. Antelope seasonally followed forage primarily in an elevation gradient from low to high on the sites with short vegetation. Basin big sagebrush sites in Long Valley and the Massacre Lakes Basin were infrequently used generally because of the height of the preborn sagebrush and rye grass. Mountain big sage sites, not currently favored by antelope, were important summer use areas because they were dominated by mid-height bunch grasses and frequent burning maintained a good forb component. After the initiation of livestock grazing, antelope habitat would have improved because heavy grazing removed grasses and favored forb production. However, the continuation of grazing use by cattle and horses and then sheep, with similar dietary preference to antelope, stripped large areas of forage plants for antelope. This decreased suitable habitat over large portions of the CAA. Direct impacts from hunting also played a major role in the decline of the species (O'Gara and Yoakum, 2004). By 1909, pronghorn were so scarce in the Nevada that hunting of antelope was stopped. In 1920, a small population of antelope remained in northwestern Nevada and a predator control program was initiated that lasted until 1934 (Gabrielson, 1941). During this period pronghorn populations increased in the region by over ten times. Hunting was allowed again in Nevada starting in 1921.

Heavy grazing created opportunities for establishment of species that eventually led to the recovery of the species. Large areas of bare ground were led to establishment of stands of brush with forb understories. New brush stands were dominated by sagebrush, but the lack of competition from other species also favored establishment of bitterbrush and forbs. When well

established, the new mix of species was well suited to the needs of pronghorn. Many of these brush stands were at their most productive during the 1950's and 1960's. As the new brush fields matured, many mountain big sagebrush areas became less suitable habitat for antelope as brush heights exceeded 20 inches in height and the increasing levels of grass began to replace forbs.

New water developments, primarily small stock ponds, constructed during the 1950 through the 1980's expanded antelope summer ranges. Fencing projects implemented to facilitate livestock management initially restricted pronghorn movements. Fence design for barbed wire fencing was later modified to raise the bottom wire allowing pronghorn free passage through fences. Starting in the 1970's, fencing projects built to protect meadows from hot season livestock grazing provided pronghorn sources of succulent forage during the summer months. Predator control still occurs in the CAA but at low levels compared to practices decades ago. Harvest by hunters is closely regulated by NDOW with an estimated harvest of 70-85 males a year in the 011 Hunt Unit based on past harvest records.

In the future pronghorn habitat is expected to be influenced primarily by yearly precipitation patterns, periodic wildfires, wild horse populations and livestock grazing practices. Yearly precipitation seems to be the most important factor is productivity of pronghorn populations followed by availability of succulent forbs on wet meadows during the hot season.

Mule deer were an uncommon resident of the CAA prior to livestock grazing. Deer are primarily browsers of brush other than sagebrush and pre grazing conditions favored bunchgrasses and sagebrush not brush suitable for deer. Deer apparently were associated with localized areas of aspen, mountain mahogany and juniper that were in fire safe sites. They were also able to take advantage of localized areas of palatable brush establishment following fires.

Heavy grazing created opportunities for establishment of species that eventually led to a huge increase in deer populations. Large areas of bare ground were led to establishment of stands of brush with forb understories. New brush stands were dominated by sagebrush, but the lack of competition from other species also favored establishment of bitterbrush and forbs. When well established, the new mix of species was well suited to the needs of mule deer. Many of these brush stands were at their most productive during the 1950's and 1960's. As the new brush fields matured they provided excellent hiding and thermal cover the mule deer. Implementation of livestock grazing management practices after WWII set the stage for declines in mule deer habitat. Management of livestock including reductions in numbers, later turnouts, utilization limits and periods of rest or deferment favored production of grasses over brush and forbs. Habitat values for mule deer began to decline and populations decreased. However, deer habitat is still common and populations remain substantially greater than prior to livestock grazing. Harvest by hunters is closely regulated by NDOW with an estimated harvest of 120-160 bucks a year in the 011-013 Hunt Unit based on past harvest information.

In the future, mule deer habitat and populations are expected to be influenced most by yearly precipitation patterns, periodic wildfires, wild horse populations and livestock grazing practices. Yearly precipitation seems to be the most important factor is productivity of deer populations followed by hot summer foraging by livestock on bitterbrush and other shrubs palatable to deer.

Greater sage-grouse were a common large bird of sagebrush communities prior to settlement of the CAA. The large expanses of sagebrush with grass understories provided nesting cover and forage plants and insects. The advent of heavy grazing eliminated cover and food plants necessary for sage-grouse reproduction while unregulated hunting took a heavy toll on adult grouse. By 1916 sage-grouse were apparently threatened with extinction (Hornaday 1916). Predator control

to protect livestock and efforts described above to recover antelope populations, combined with areas of poorly watered sagebrush cover helped sage-grouse populations during periods of unregulated grazing. New sagebrush stands established in the areas of heaviest grazing pressure as shrub seeds found open areas. Following the Taylor Grazing Act of 1934 grazing pressure began to decrease and upland conditions began to improve for sage-grouse.

New water developments, primarily small stock ponds, constructed during the 1950's through the 1980s expanded livestock grazing into areas that were previously only occasionally grazed. Fencing projects implemented to facilitate livestock management created perches for ravens and posed hazards to flying grouse. Removal of sagebrush stands with little or no understory of grasses to plant crested wheatgrass eliminated sage-grouse habitat. Starting in the 1970's fencing projects to protect meadows from hot season livestock use improved sage-grouse brooding habitats. Predator control still occurs in the CAA but at low levels compared to practices decades ago. Harvest by hunters is closely regulated by NDOW with a 14 day season and limited bag limits each year (2 per day- 4 in possession).

Future actions for sage-grouse in the CAA are likely to include the continued implementation of grazing management practices that will reduce both critical growth period and hot season livestock grazing.

Brewer's sparrow populations were probably abundant prior to settlement and widespread grazing within the CAA. Abundant sagebrush communities would have contained large extents of nesting habitat. Because the sparrow likes to forage on the ground in the inter-shrub areas that include bare ground, many sagebrush stands with dense bunchgrasses were less than ideal for the species. However there were many areas of sagebrush that included opening associated with fire or other disturbances that allowed Brewer's sparrows to successfully occupy most sagebrush communities. After the initiation of livestock grazing, sparrow habitat would have improved because heavy grazing removed grasses and created more bare ground in the sagebrush interspaces. However the continuation of grazing use by cattle and horses and then sheep would have led to elimination of seed producing grasses and forbs between sagebrush plants required by foraging sparrows. This would have decreased suitable habitat over large portions of the CAA.

The excessive grazing did create opportunities for renewal of sagebrush stands as large areas of bare ground were available for sagebrush seeds reestablish sagebrush stands with sagebrush densities higher than pre-grazing conditions. Changes in grazing following the Taylor Grazing Act resulted in increased grass seed production in uplands that increased sparrow habitat quality and extent.

Future actions that will affect Brewer's sparrow habitat include continued implementation of grazing management practices that reduce critical growth period grazing which will increase seed availability but also decrease bare areas in the inter-shrub areas.

4.1.5. Cultural Resources

Over 12,000 years of human occupation combined with an abundance of raw materials for stone tool making resulted in a high density of archaeological sites in the Natural Resources CAA. The sites include a wide range of types associated with the activities of the indigenous peoples including villages, hunting blinds, food processing, tool making and rock art. Natural processes that result in soil deposition or loss continuously altered the cultural materials on or buried beneath the surface. Petroglyph panels faded due to natural processes that restored the etched

surface of the rocks. Artifacts made from organic materials typically decayed, except in special circumstances which allowed the delicate materials to be preserved.

Starting during the emigration period, occupation of the area by native peoples rapidly declined and processes that accelerated the degradation of sites and the loss of cultural materials increased. Accelerated erosion associated with introduction of domestic livestock led to disturbance of sites near livestock concentration areas. Hoof action displaced artifacts on the surface of the ground. Recreational collection of projectile points and ground stone implements from the surface and excavation of buried deposits decreased the number of artifacts that could be used as time markers for sites and destroyed the integrity of many sites.

In the past few decades, changes in livestock management practices designed primarily to improve soil and vegetation conditions in the Natural Resources CAA have decreased to rate of degradation to cultural resources. In addition construction of livestock exclosures for protection of natural resources and cultural resources has eliminated approximately 4,000 acres from livestock and wild horse grazing. Seventeen archaeological sites were completely or partially destroyed during construction of the Ruby Pipeline.

4.1.6. Global Climate Change

During the period of heavy livestock grazing within the CAA production of greenhouse gases (GHG) was much greater than occurs at present. Actual peak livestock use is unknown, but is likely to have been at least 10 times greater than current levels. Production of GHGs has continuously declined since the 1930's as grazing has been reduced. Within the CAA it is estimated that current production of GHGs from livestock is approximately 2,500 to 2,900 metric tons and an additional 100 tons from wild horses.

Future grazing by livestock and wild horse is expected to be similar or somewhat less than current production levels.

4.1.7. Social and Economic Conditions

Livestock grazing has been the dominant social and economic driver for the CAA. As described above livestock grazing in the area began in the 1860's, grew rapidly and then fluctuated as weather and economic conditions changed. As rangelands declined in productivity associated with overuse by livestock, grazing use also decreased. The passage of the Taylor Grazing Act in 1934, FLPMA in 1976 and other many other laws related directly and indirectly to the management of public lands resulted in consideration of other resources and uses besides livestock grazing. The net result has been that levels of livestock grazing have decreased from peak levels by an unknown but substantial percentage. Currently there are 21,258 AUMs authorized for use with the CAA of which approximately 16,000 to 18,000 are used each year. Based upon a value to the Modoc County economy of $95 per AUM (JW Associates 2007) the current annual value to the local economy associated with livestock grazing is $1.5 to $1.7 million dollars and 15 to 17 jobs.

The CAA is 93.2% in public ownership. The 28,275 acres (6.8 % of the CAA) that are privately owned are either associated with surface waters, mostly springs, that were purchased by private parties from the State of Nevada in the 19th century or as homesteads acquired from the federal government in the early 20th century. The trend during the past few decades has been decreasing private ownership as private landowners transfer lands back into the public sector. This transfer

has been either through exchange of lands or purchase agreements with willing private owners. The net result has been roughly 10,000 acres of private lands transferred back into public ownership. It is likely that an unknown amount of additional lands would be transferred to public ownership in the future.

Recreational use within the CAA was initially associated with hunting opportunities for mule deer, antelope and sage-grouse. Visitation associated with hunting peaked in the 1950's and 1960's prior to the implementation of conservative tag quotas by NDOW. Other recreational uses historically were associated with collection of Native American artifacts. During the past few decades recreational uses associated with following the Applegate Emigrant Trail, hiking, wild horse viewing have increased primarily in the NCA portion of the CAA. However visitation still remains relatively low with a few thousand visitor days each year. In the future recreational use is expected to increase slowly, but will continue to be limited by the remoteness of the area and lack of visitor services and paved roads.

4.2. Cumulative Impacts to Affected Resources

Cumulative impacts for the Proposed Action, TRT and Allocation by Pasture alternatives are based upon the assumption that future grazing management practices in the Horse Lake and Massacre Mountain allotments would be similar to those being proposed for Massacre Lakes and grazing management practices for the Board Corral, Little Basin, Long Valley, and Nut Mountain allotments would be the same as current permits. For the No Action alternative, cumulative impacts would be based upon current practices in all seven allotments. For the No Grazing alternative, cumulative impacts would be based upon no livestock grazing in any of the seven allotments.

4.2.1. Soils and Vegetation

Alternative 1 - Proposed Action

Implementation of the Proposed Action for the Massacre Lakes Allotment combined with other past, present and future actions within the Natural Resources CAA would result in improvements soil and vegetation conditions but would not restore conditions to pre-livestock grazing conditions within the CAA. Past uncontrolled livestock grazing practices decreased soil depths and productivity on large areas of upland soils leading to permanent changes in vegetation composition and productivity. Current and planned management would allow upland soil formation processes increase desirable soil properties including incorporation of organic materials, increased soil stability and productivity. Improved soil conditions would generally lead to increased upland plant vigor and productivity. Fifty-two percent of the Natural Resources CAA is allocated for use by wild horses in three HMAs. Wild horses are on rangelands 12 months of the year, including periods when soils are wet and subject to physical damage from hoof action and during the critical growth period for native perennial grass species. When wild horses are within the established AMLs for each HMA, approximately 15 to 25% of the uplands would not be expected to respond in the manner described above. If wild horse populations are above the upper AML then the portion of the uplands subject to wild horse use than limits improvement in soil and vegetation conditions would increase.

Impacts to riparian areas would be similar to those described for the No Action alternative below with the exception that estimated four to eight additional small meadows would be fenced to

protect the soil and vegetation resources from hot season livestock use or year round use by wild horses. The actual number of protected riparian acres would be very small. The additional protection would not result in a change in the percentage of the riparian acres subject to protective measures because of the small size of the meadows.

Because the weather conditions are highly variable with periods of drought as well as more favorable years, the expected improvements are not expected to be continuous. During drought or less favorable precipitation years, little or no improvements would be expected. During more favorable years, substantial progress would be expected to occur. Rare events associated with weather, wildland fire, insect outbreaks would occasionally result in major changes in vegetation composition.

Alternative 2 - No Action, Continue Present Management

Implementation of the No Action alternative for the Massacre Lakes Allotment combined with other past, present and future actions within the Natural Resources CAA would result improvements soil and vegetation conditions on approximately 70% of the CAA and maintenance of less than desirable conditions on approximately 30% of the CCA. Even in the portion of the CAA where improvement would be expected, pre-livestock grazing conditions would not be restored. Past uncontrolled livestock grazing practices decreased soil depths and productivity on large areas of upland soils leading to permanent changes in vegetation composition and productivity. Current and planned management would allow soil formation processes increase desirable soil properties including incorporation of organic materials, increased soil stability and productivity on less than half the CAA. Improved soil conditions would lead to increased plant vigor and productivity.

Large privately owned riparian areas would continue to be grazed in the fall each year. The few publicly owned large meadows are either excluded from livestock use or fenced to control livestock access. These meadows would continue to have healthy soil and vegetation conditions. Small fenced meadows including meadows newly fenced as part of grazing permit renewals and small unfenced meadows where livestock grazing during the hot season is restricted would also have healthy soil and vegetation conditions. Unfenced meadows associated with about 2 to 4 % of the riparian acreage in the CAA where livestock graze during the hot season or wild horses are present would continue to have less than desirable soil and vegetation condition due to harvest of vegetation and trampling action.

Fifty-two percent of the Natural Resources CAA is allocated for use by wild horses in three HMAs. Wild horses are on rangelands 12 months of the year, including periods when soils are wet and subject to physical damage from hoof action and during the critical growth period for native perennial grass species. When wild horses are within the established AMLs for each HMA, approximately 15 to 25% of the uplands would not be expected to respond in the manner described above. The majority of this use would occur in portions of the CAA not currently allocated for livestock use. If wild horse populations are above the upper AML then the portion of the uplands subject to wild horse use than limits improvement in soil and vegetation conditions would increase.

Because the weather conditions are highly variable with periods of drought as well as more favorable years, the expected improvements on less than half the CAA are not expected to be continuous. During drought or less favorable precipitation years, little or no improvements would be expected. During more favorable years, substantial progress would be expected to occur. On the portion of the CAA where little or no improvement would be expected, grazing by livestock

during the critical growth period and higher forage harvest would increase the likelihood that damage to soil and vegetation resources would occur during poor precipitation years and decrease the likelihood that soil and vegetation conditions would be improved during wet years. Rare events associated with weather, wildland fire, insect outbreaks would occasionally result in major changes in vegetation composition.

Alternative 3 – TRT Recommendations

Cumulative impact would be similar to those described for the Proposed Action. Although livestock turnout dates and stocking would be similar to current management practices, lowering livestock utilization limits by one third would increase opportunities for minimizing damage to soil and vegetation resources during dry years while improving soil and vegetation resources during wet years. Impacts to riparian areas would be the same as described for the No Action Alternative.

Alternative 4 – Allocation by Pasture

Cumulative impact would be similar to those described for the Proposed Action. Livestock turnout date, utilization and stocking would be similar to those in the Proposed Action and would increase opportunities for minimizing damage to soil and vegetation resources during dry years while improving soil and vegetation resources during wet years. Wild horse AMLs would be increased in only one HMA that represents less than ten % of the CAA. Impacts to riparian areas would be the same as described for the Proposed Action.

Alternative 5 - No Grazing

Elimination of livestock grazing on seven allotments and five HMAs would create the most favorable conditions for improvements in upland soil and vegetation conditions when compared to the other alternatives. However elimination of all grazing would not restore conditions to pre-livestock grazing conditions within the CAA. Past uncontrolled livestock grazing practices decreased soil depths and productivity on large areas of upland soils leading to permanent changes in vegetation composition and productivity. Current and planned management would allow upland soil formation processes increase desirable soil properties including incorporation of organic materials, increased soil stability and productivity. Improved soil conditions would lead to increased upland plant vigor and productivity.

Impacts to riparian conditions would vary based upon ownership. Elimination of grazing on public lands would result increased livestock grazing on private fenced meadows. It would be expected that private owners would utilize these meadows with fewer cattle over a longer period each year resulting in increased grazing during the hot season. These changes would lead to decreased soil and vegetation conditions on riparian areas that represent approximately 50% of the riparian acreage with the CAA. On the remaining half of riparian acreage that is publicly owned, elimination of livestock or wild horse use would allow these sites to maintain or improve desired soil and vegetation conditions.

4.2.2. Wild Horses and Burros

Alternative 1 - Proposed Action

At existing population levels (160 – 192) wild horse forage use would be approximately 3/5 of livestock use, and wild horse use is expected to increase prior to any future gathers. If the

population reaches approximately the same level as livestock use, the benefits of the Proposed Action to native bunchgrasses and riparian areas are expected to continue to degrade. Yearlong and seasonal wild horse trampling impacts to soils (when wet) would breakdown soil structure, which would favor swallow rooted grasses. The Proposed Action would set the wild horse AML at 25-45 head and would relieve pressure on existing developed and undeveloped water sources. The construction of the Sagehen Spring exclosure would have minor effects on wild horses as they would still have access to the natural water source. Soil and vegetation resources would benefit from the reduced season long wild horse use.

Alternative 2 - No Action, Continue Present Management

The cumulative effects under the No Action Alternative would be similar to the Proposed Action except the Sagehen Spring exclosure would not be built and setting the AML at 25 – 35 wild horses is less. There would be slightly improved vegetation and soils conditions at Sagehen Spring, which would cause an upward trend in towards meeting Proper Functioning Condition.

Alternative 3 – TRT Recommendations

The cumulative effects under the TRT Alternative would be similar to the Proposed Action as the AML at 25 – 45 wild horses is same. The Sagehen Spring exclosure would not be built. There would be slightly improved vegetation and soils conditions at Sagehen Spring, which would cause an upward trend towards meeting Proper Functioning Condition.

Alternative 4 – Allocation by Pasture

This alternative would set the wild horse AML at 100- 121 head and wild horses would be dominating grazer in the Juniper pasture. Wild horse use would be greater than cattle in the remaining pastures within the HMA. At existing population levels (160 – 192) wild horses would be reduced to 121 head with future gathers. Soil and vegetation resources would benefit from the reduced yearlong and seasonal wild horse trampling impacts, which include breakdown soil structure when wet, which would favor swallow rooted grasses. The construction of the Sagehen Spring exclosure is expected to have minor effects on wild horses as they would still have access to stock ponds and other natural water source in the Juniper pastures.

Alternative 5 - No Grazing

Under the No Grazing Alternative wild horse viewing opportunities would be eliminated and upland and riparian areas are expected to improve.

4.2.3. Wildlife Resources including Threatened and Endangered Species

Alternative 1 - Proposed Action

Wildlife populations would continue to be primarily regulated by yearly changes in habitat conditions associated with weather as described below. When compared to the No Action alternative, grazing management practices that decrease livestock use during critical growth period or hot season and leave more residual vegetation, as cover would generally improve wildlife habitats and productivity. For the Proposed Action Alternative delays in livestock turnouts, decreased grazing during the critical growth period and decreasing the allowable forage harvest by livestock would reduce livestock impacts in the CAA. These improvements would be

offset on about half the CAA by wild horse use during the critical growth period and hot season use of unfenced meadows. Pronghorn antelope would locally benefit from increased forb and brush production and spring cover for kids as well as increased vegetation on spring meadows during summer at about 10 small meadows. Mule deer would locally benefit from increased forb availability during the spring and increased brush availability during fall and winter. Sage-grouse would locally benefit from increased forb production and residual vegetation in shrub inter spaces as well as increased vegetation on spring meadows during summer at about ten small meadows. Brewer's sparrows would locally benefit from increased seed production from grasses and forbs in sagebrush communities.

Alternative 2 - No Action

Wildlife populations would continue to be primarily regulated to weather conditions. Drought years reduce vegetative productivity and cover. Conversely wet years have better vegetation productivity and cover. Wildlife populations directly or indirectly respond to the changes in vegetation. Grazing by livestock or wild horses also affects vegetation productivity and cover and factors into wildlife responses to habitat conditions. The degree and extent of the grazing pressure are highly variable associated with livestock grazing practices or wild horse populations. In many ways abusive grazing practices or high stocking rates mimic the impacts of drought on wildlife habitat. Grazing practices that reduce or eliminate hot season or critical growth period use and are designed to leave residual vegetation decrease these impacts.

On portions of the CAA where livestock grazing practices and wild horse grazing including grazing during the critical growth period, hot season use on meadows, or utilization levels that do not support adequate residual vegetation; forb productivity, hiding cover and availability of succulent meadow forage would locally decrease wildlife habitat quality. Pronghorn antelope in upland sites would have less than desirable forbs and palatable shrubs available and kids would be more visible to predators during the first few weeks of life. Unfenced spring meadows subject to hot season grazing or wild horse use would have less than desirable succulent species available during summer months. Mule deer would also have less cover in the uplands. Bitterbrush, a key brush species for deer, would be subject to browsing by cattle in areas subject to hot season use. Sage-grouse nesting habitats would also have less than desirable forb production and lack adequate residual cover in the shrub inter spaces. Unfenced spring meadows subject to hot season grazing or wild horse use would have less than desirable succulent species available during the summer brooding period for sage-grouse. Brewer's sparrow foraging habitat would have fewer forb and grass seeds.

Alternative 3 - TRT Recommendations

Wildlife populations would continue to be primarily regulated by yearly changes in habitat conditions associated with weather as described below. When compared to the No Action alternative, grazing management practices that decrease livestock use during critical growth period or hot season and leave more residual vegetation as cover would generally improve wildlife habitats and productivity. For the TRT Recommendation Alternative decreasing the allowable forage harvest by livestock would reduce livestock impacts in the CAA. These improvements would be offset on about half the CAA by wild horse use during the critical growth period and hot season use of unfenced meadows. Pronghorn antelope would locally benefit from increased forb and brush production and spring cover for kids as well as increased vegetation on spring meadows during summer at about ten small meadows. Mule deer would locally benefit from increased forb availability during the spring and increased brush availability during fall and winter. Sage-grouse

would locally benefit from increased forb production and residual vegetation in shrub interspaces. Brewer's sparrows would locally benefit from increased seed production from grasses and forbs in sagebrush communities. The TRT Alternative would lead to more direct disturbance impacts to wildlife than any of the other alternatives as a result of all pastures being used every year. This impact would vary by timing of grazing as it relates to the life cycle stage of species. It is difficult to predict the degree of impact as the TRT Alternative provides flexibility that allows the grazing schedule to be changed on a yearly basis. Typical direct impacts that would be expected from grazing includes disturbance of nesting birds, flushing of birds, trampling of nest and burrows of species, and disturbances on fawning and kidding grounds from grazing.

Alternative 4 – Allocation by Pasture

Cumulative impacts would be similar to those described for the Proposed Action. Except in the Juniper Pasture where cumulative impacts would be similar to the No Action Alternative.

Alternative 5 - No Grazing

Wildlife populations and habitats would continue to be primarily regulated by yearly changes in habitat conditions associated with weather as described below. Drought years would reduce vegetative productivity, especially for forbs preferred by antelope. Elimination of livestock and wild horse grazing within the CAA eliminate direct or indirect competition between antelope and other grazers for forage and cover that mimic or exacerbate drought conditions. No direct disturbance as a result of grazing would occur within the Massacre Lakes Allotment. Habitat conditions would generally improve rapidly throughout most of the CAA. In the absence of grazing, vegetation production would increase and fuel continuity across the landscape would increase. In areas where perennial grasses recovered and colonized bare spaces, the risk of fire and a subsequent conversion to annual exotic grasslands would be low however in areas where cheatgrass is a major component of the plant community, while the risk of fire and a subsequent conversion to annual exotic grasslands would be high. No grazing would increase the probability of fire spread as fine fuel continuity (grasses) was increased and a subsequent change to early seral vegetation in some areas would be expected as a result of fire. In some areas, a conversion to exotic annual grasslands would be expected to eventually occur. Habitat components and wildlife use would shift as some areas became dominated by cheatgrass and other areas became dominated by a mixture of unburned later seral habitat and early seral habitat. Early seral vegetation would favor some species such as pronghorn antelope but would not favor other species such as mule deer and sage-grouse.

4.2.4. Cultural Resources

Alternative 1 - Proposed Action

The cumulative effects of the Proposed Action on cultural resources should be an incremental reduction in the rate of disturbance to site integrity, spatial patterning, and site integrity. Impacts to datable organic features would also be reduced. This reduction in impacts would be a result of the expected improvement in ecological condition over an extended period of time as concentrated grazing in sensitive riparian zones is reduced.

Alternative 2 - No Action

The cumulative effects of this alternative on cultural resources would be a continued rate of disturbance to sites and organic features as a result of no change in management. A change

in vegetation type to more fire-friendly plants (such as cheat grass) could result in artifacts suffering more episodes of heat damage and the spalling of basalt rocks which could result in the destruction of rock art. Cultural resources around unmitigated springs (such as Sagehen Spring) would continue to be severely impacted by livestock and wild horses. Eventually, these water sources could become so eroded as to irreparably damaged. Not improving Sand Spring Well would continue to concentrate the use by livestock and wild horses around other water sources where NRHP eligible cultural resources exist.

Alternative 3 - TRT Recommendations

The cumulative effects of the Proposed Action on cultural resources should be an incremental reduction in the rate of disturbance to site integrity, spatial patterning, and site integrity. Impacts to datable organic features would also be reduced. This reduction in impacts would be a result of the expected improvement in ecological condition over an extended period of time as concentrated grazing in sensitive riparian zones is reduced. Cultural resources around unmitigated springs (such as Sagehen Spring and Alkali Meadows) would continue to be severely impacted by livestock and wild horses. Eventually, these water sources could become so eroded as to irreparably damaged. Not improving Sand Spring Well and Saddle Well would continue to concentrate the use by livestock and wild horses around other water sources where NRHP eligible cultural resources exist.

Alternative 4 – Allocation by Pasture

The continued overuse and proposed concentrated use by wild horses in the HMA would result in ever increasing impacts to cultural resources, especially in areas adjacent to water. Overgrazing of uplands and riparian/wetland sites would occur, and this combined with past actions of wildfire and historic heavy livestock grazing, would likely cause some plant communities to become degraded to the point of crossing an ecological threshold, with a limited amount of plant litter and cover, thereby affording little to no protection to cultural sites. Riparian sites or wetlands which are still recovering from the damage caused by past heavy livestock grazing use would likely become so damaged as to lose the entire structure, function, and integrity of the water source. Smaller sites would likely become nonfunctional and dry up, with a high amount of damage to cultural resources through breakage, displacement, and loss of site integrity. The proposed range improvements would protect some of the cultural resources, but ultimately others would continue to be severely impacted.

Alternative 5 – No Grazing

Cumulative impacts would be reduced the most by this alternative. Removing livestock and wild horses from the allotment would reduce trampling, wallowing, trailing, and digging by animals within archaeological sites. Native vegetation throughout the allotment would also be less impacted and consequently reducing the amount of erosion in the sites due to soil degradation. Living cultural resources, such as sage grouse, would also benefit from the less-impacted sage steppe habitat.

4.2.5. Social and Economic Values

Alternative 1 - Proposed Action

Cumulative impacts of implementing the Proposed Action Alternative would decrease economic activity associated with the seven livestock grazing allotments by an estimated ten % or $150,000

to $170,000 and result in the loss of one or two jobs. There would be no impact on recreational activity.

Alternative 2 - No Action

Continuation of Present Management would maintain $1.5 to $1.7 million dollars in annual economic activity within the local economy and support 15 to 17 jobs. Recreational use levels would continue to slowly increase but remain and very low levels.

Alternative 3 - TRT Recommendations

Cumulative impacts would be the same as described for Alternative 2.

Alternative 4 – Allocation by Pasture

Cumulative impacts would be the same as described for the Proposed Action Alternative.

Alternative 5 - No Grazing

Cumulative impacts of implementing the No Grazing Alternative would eliminate economic activity associated with the seven livestock grazing allotments. This would result in a loss to the local economy of $1.5 to $1.7 million each year and result in the loss of 15 to17 jobs. There would be no impact on recreational activity.

Chapter 5. CONSULTATION AND COORDINATION

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Persons, Groups, and Agencies Consulted

Modoc/Washoe Experimental Stewardship Program (ESP)

Natural Resources Conservation Service (NRCS)

Nevada Department of Wildlife (NDOW)

Friends of Nevada Wilderness

Western Watersheds Project

Massacre Lakes Allotment Permittee

Ft. Bidwell Tribal Council

Cedarville Rancheria

Summit Lake Tribal Council

BLM met with local tribal groups to discuss this grazing permit renewal and other projects being proposed. Formal consultation between the BLM and the Fort Bidwell Tribal Council occurred on January 21, 2012, November 14, 2012, and March 9, 2013. Formal consultation between the BLM and the Summit Lake Tribal Council occurred on February 12, 2012, October 20, 2012, and March 16, 2012. Formal consultation between the BLM and the Cedarville Rancheria occurred on January 7, 2012 and February 26, 2013. No comments or concerns regarding this grazing permit renewal and proposed projects were expressed by the tribes.

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Chapter 6. REFERENCES

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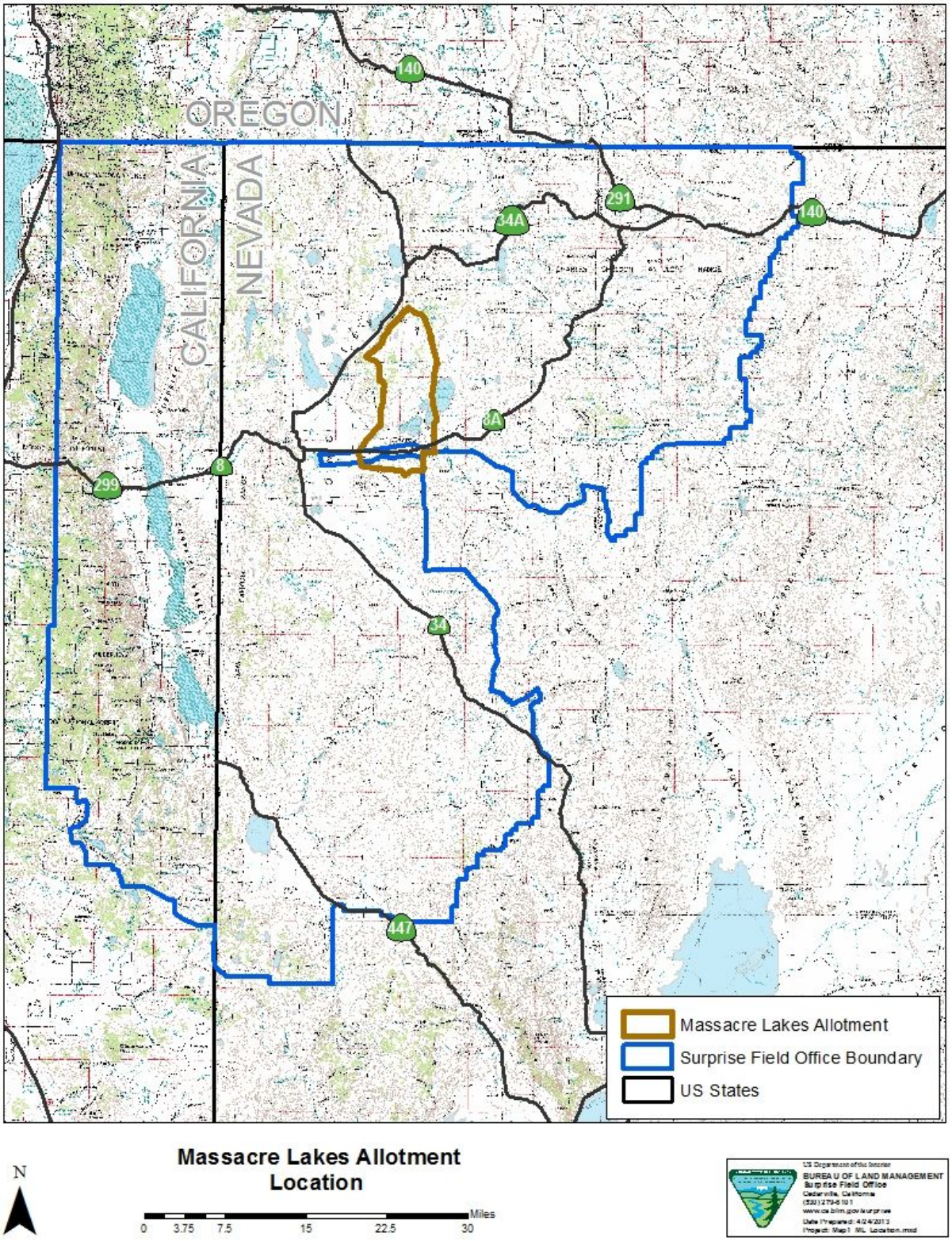
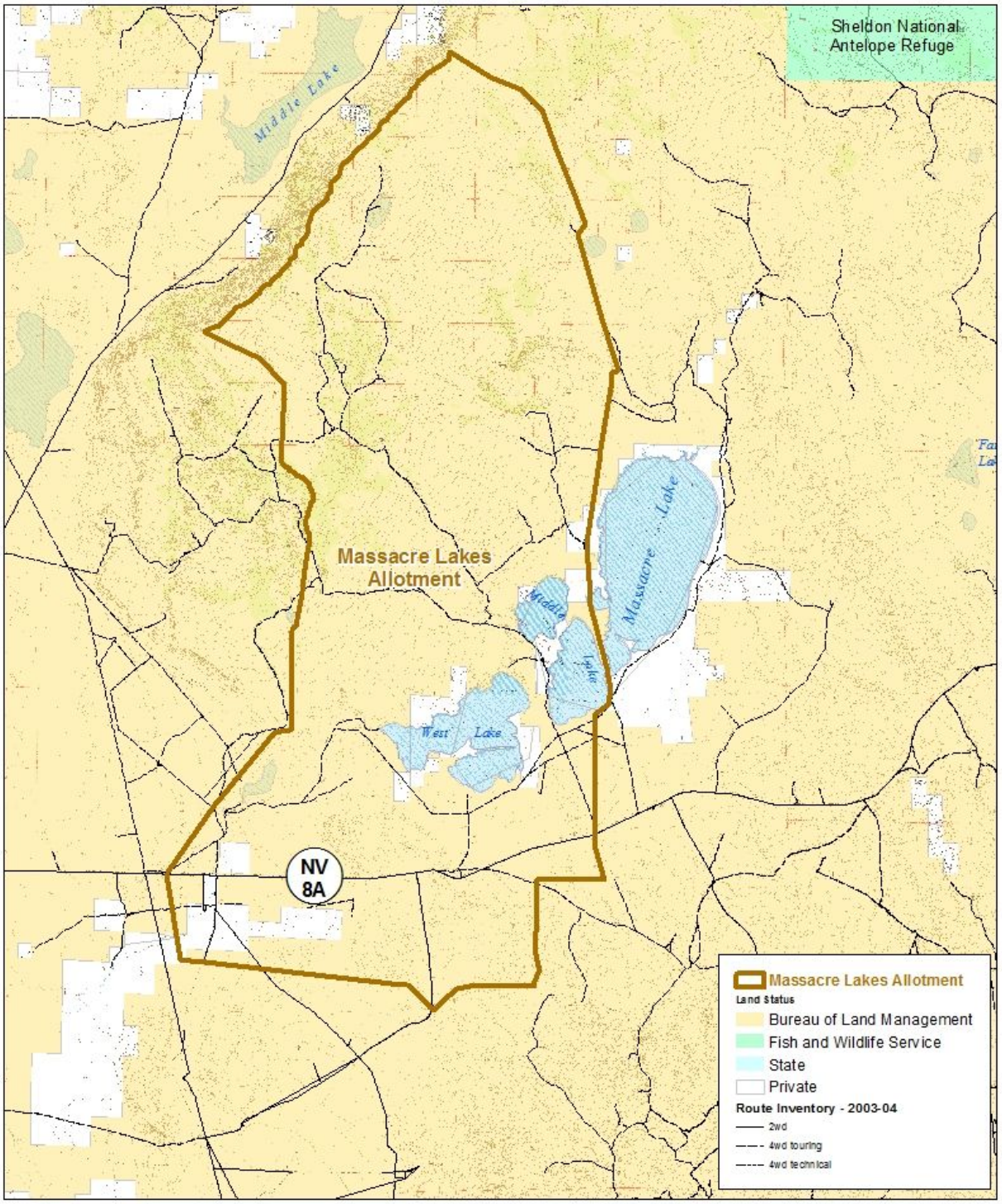
Appendix A. Maps





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Massacre Lakes Allotment
Land Status

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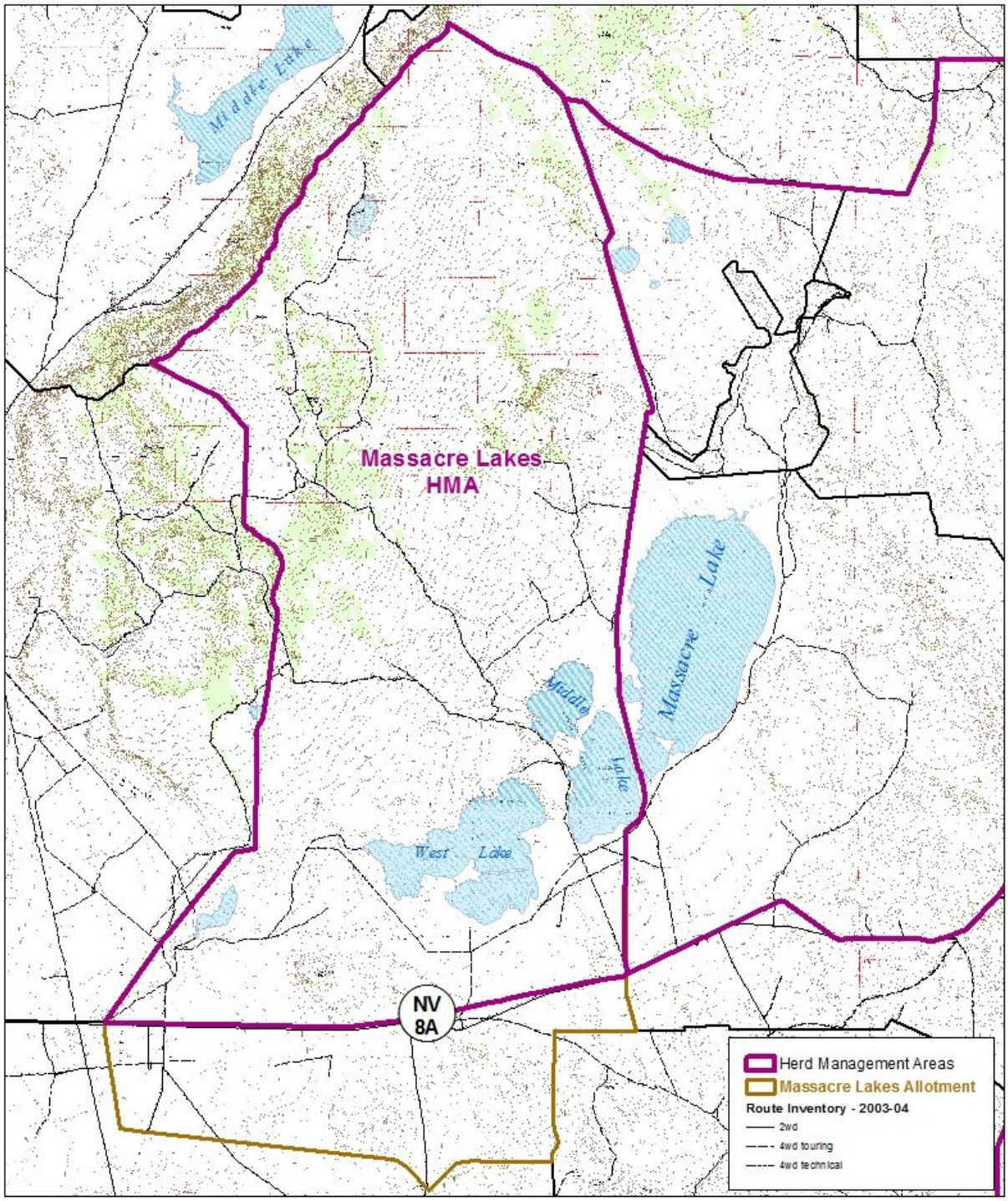

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Massacre Lakes Herd Management Area

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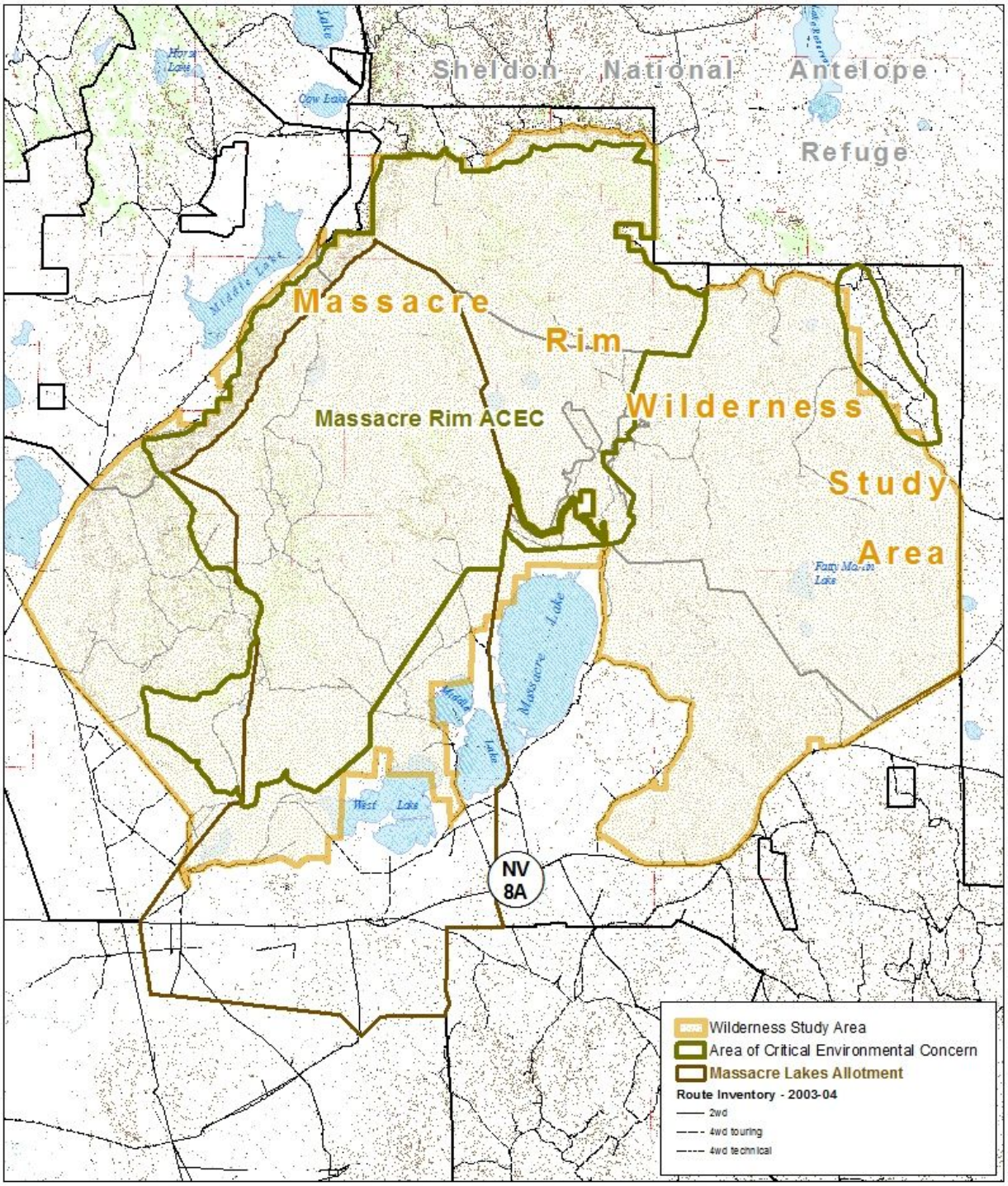

Massacre Lakes Wilderness and Area of Critical Environmental Concern

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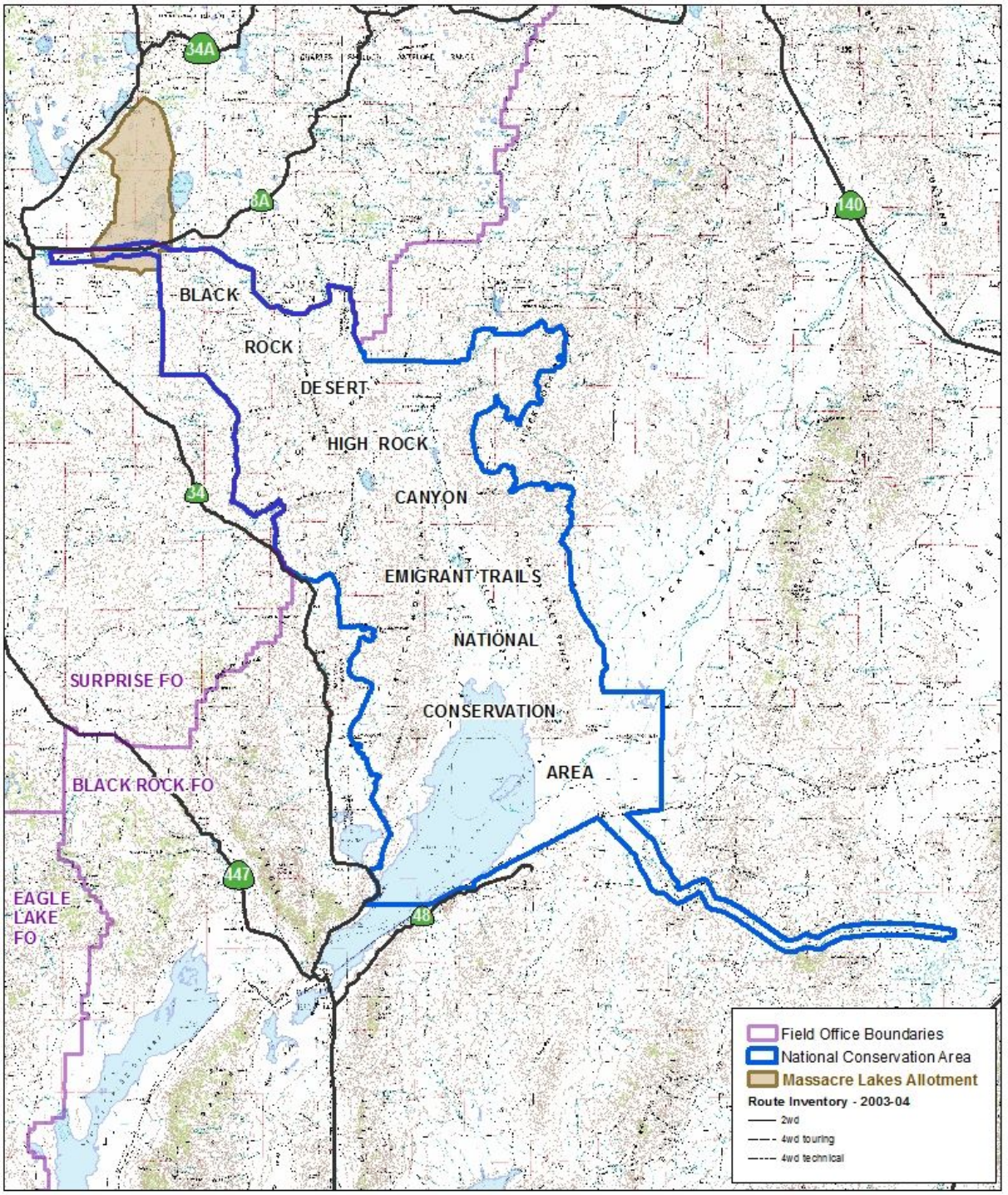

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Massacre Lakes and the National Conservation Area

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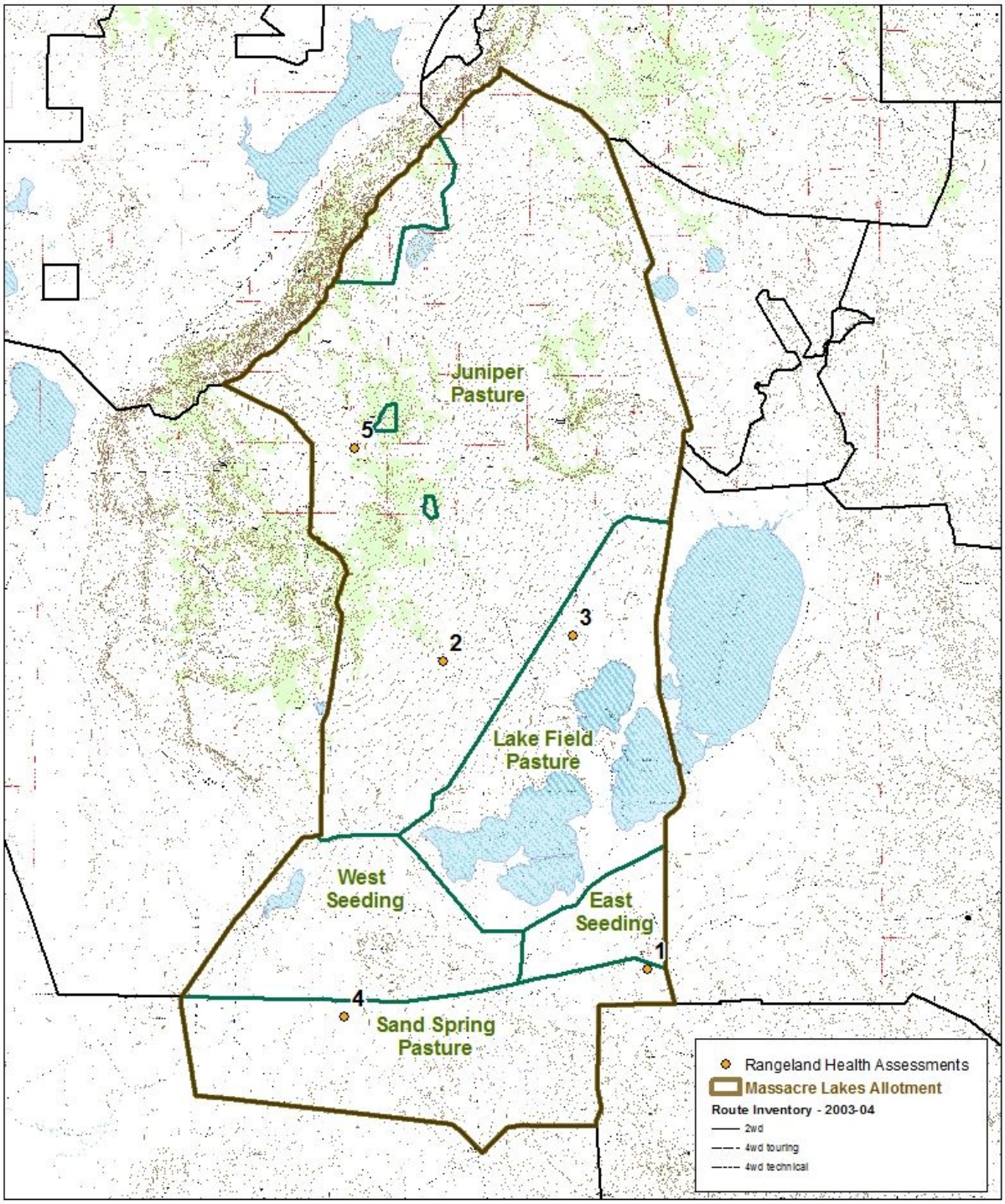

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Massacre Lakes Allotment
Rangeland Health Assessment

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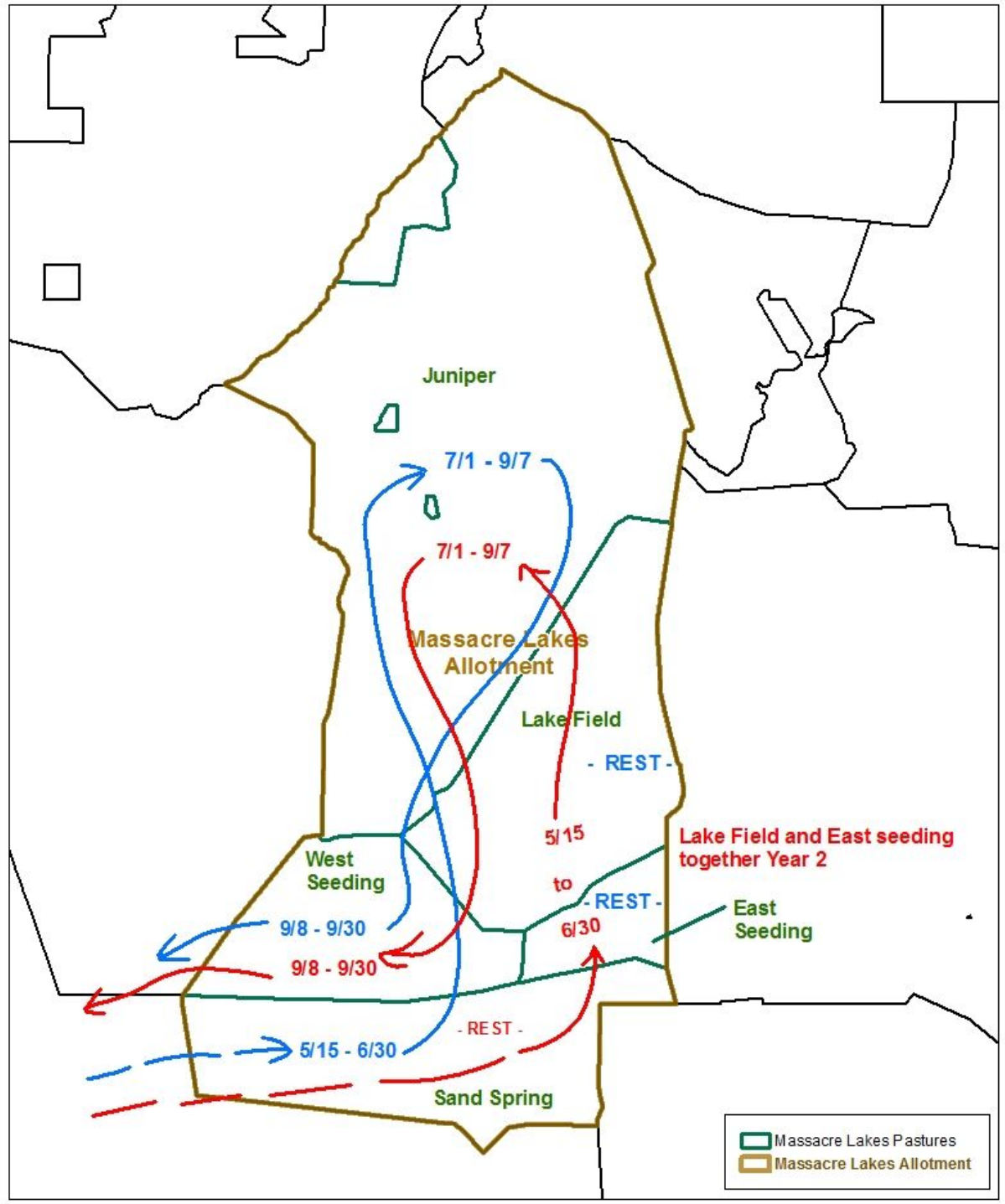

Massacre Lakes Allotment Livestock Grazing Scheme for Proposed Action Alternative

N

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Year 1

Year 2

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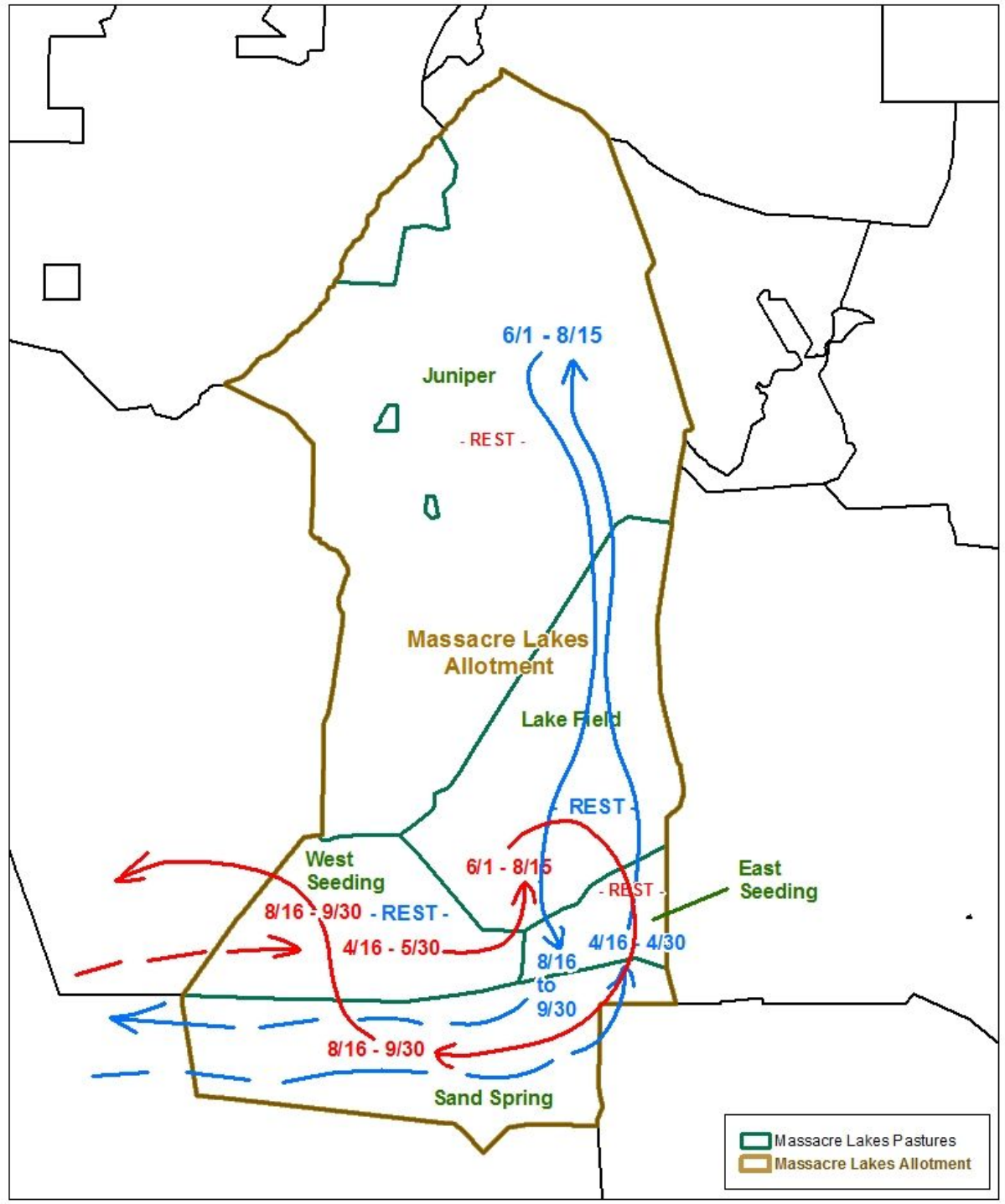

Massacre Lakes Allotment
Livestock Grazing Scheme for
No Action Alternative

N

0 0.5 1 2 3 4 Miles

Year 1

Year 2

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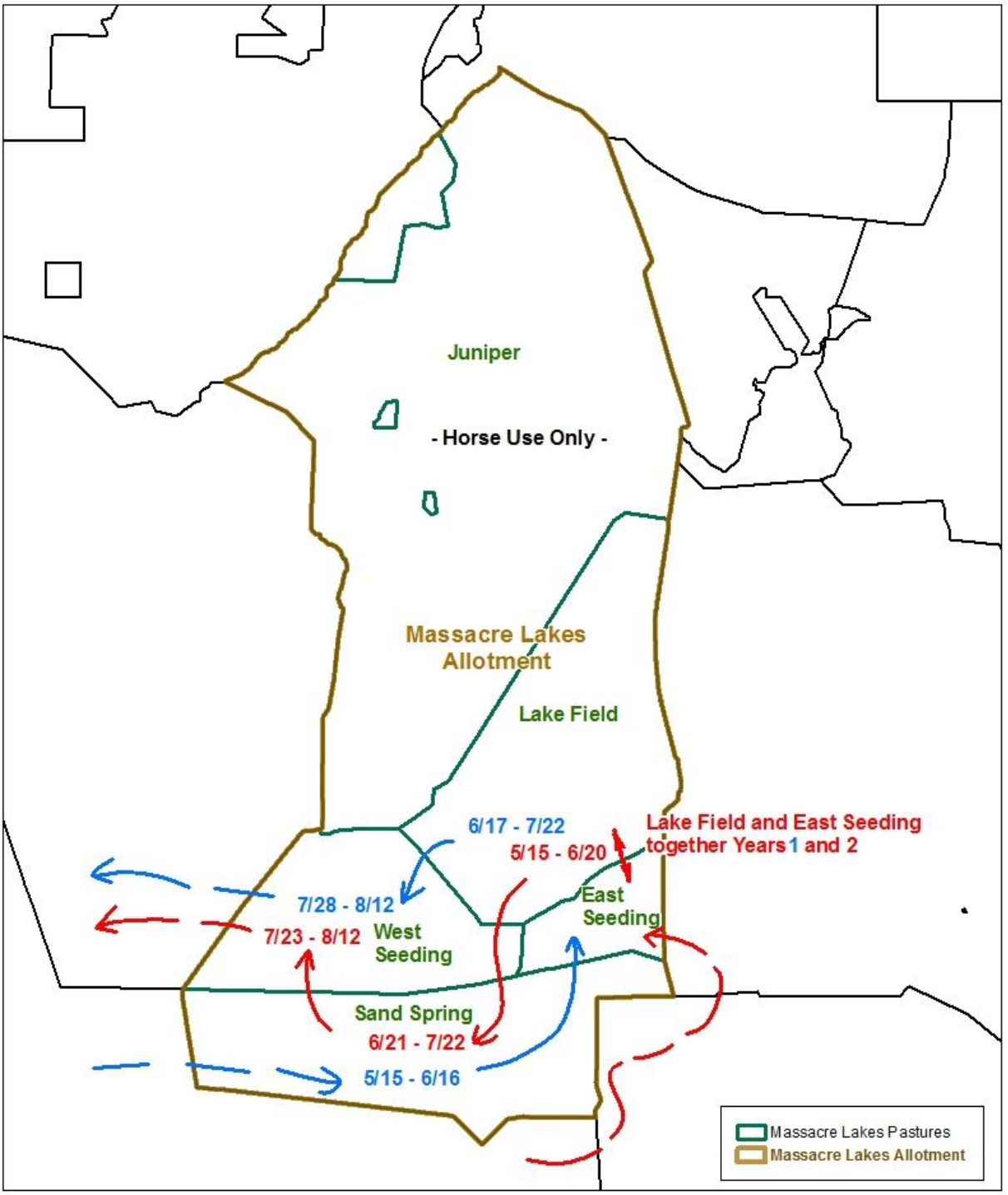

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Massacre Lakes Allotment Livestock Grazing Scheme for Allocation by Pasture Alternative

0 0.5 1 2 3 4 Miles

Year 1

Year 2

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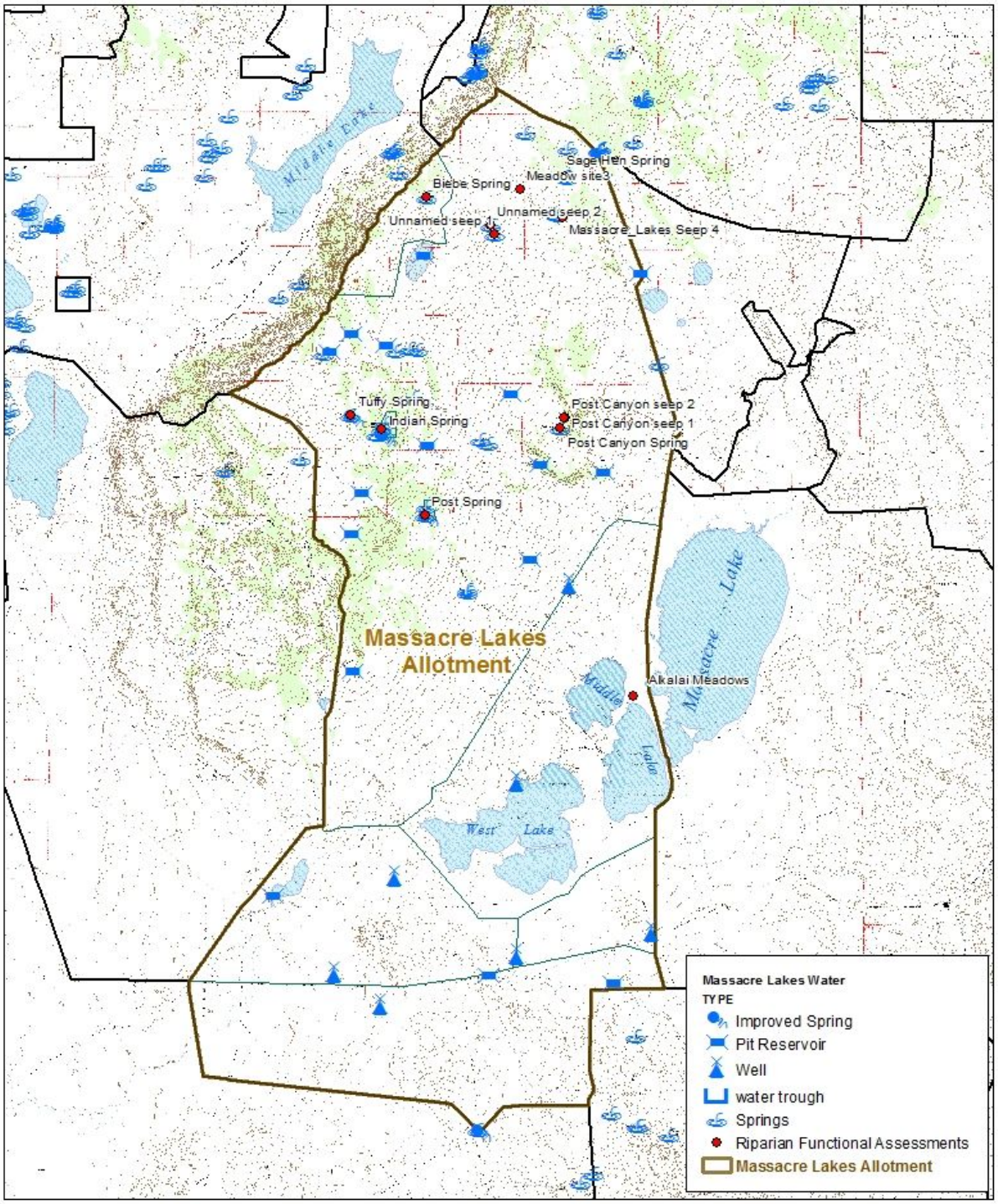

Massacre Lakes Allotment
Water Sources and
Riparian Functional Assessment

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0 0.5 1 2 3 4 Miles

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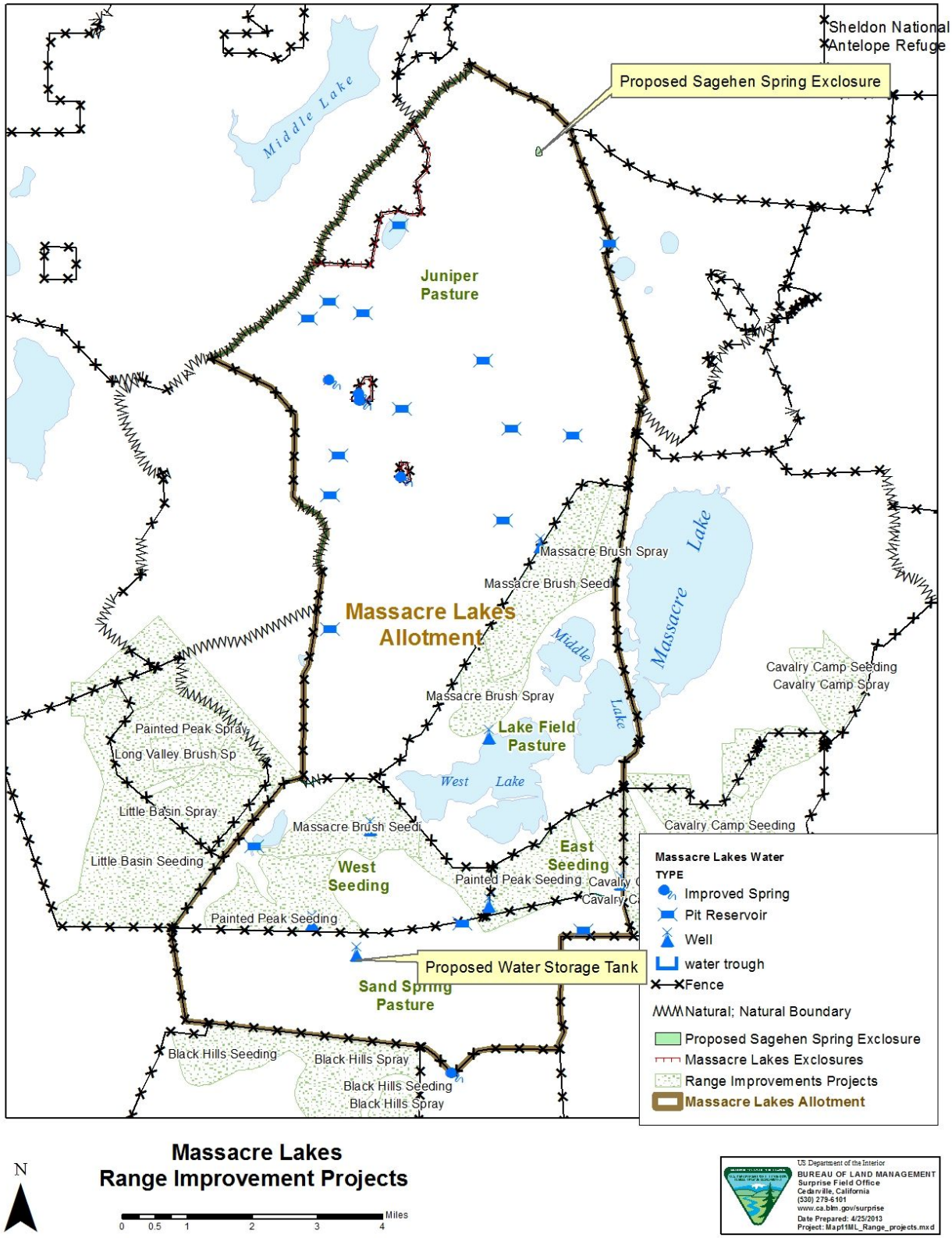
Sheldon National Antelope Refuge
Proposed Sagehen Spring Exclosure
Middle Lake
Juniper Pasture
Massacre Brush Spray
Massacre Brush Seed
Massacre Lakes Allotment
Massacre Lake
Middle Lake
Cavalry Camp Seeding
Cavalry Camp Spray
Massacre Brush Spray
Lake Field Pasture
Painted Peak Spray
Long Valley Brush Sp
West Lake
Little Basin Spray
Massacre Brush Seed
Cavalry Camp Seeding
East Seeding
Little Basin Seeding
West Seeding
Painted Peak Seeding
Cavalry C
Cavalry C
Painted Peak Seeding
Proposed Water Storage Tank
Sand Spring Pasture
Black Hills Seeding
Black Hills Spray
Black Hills Seeding
Black Hills Spray
Massacre Lakes Water
TYPE
Improved Spring
Pit Reservoir
Well
water trough
Fence
Natural; Natural Boundary
Proposed Sagehen Spring Exclosure
Massacre Lakes Exclosures
Range Improvements Projects
Massacre Lakes Allotment
N
Massacre Lakes
Range Improvement Projects
0 0.5 1 2 3 4 Miles
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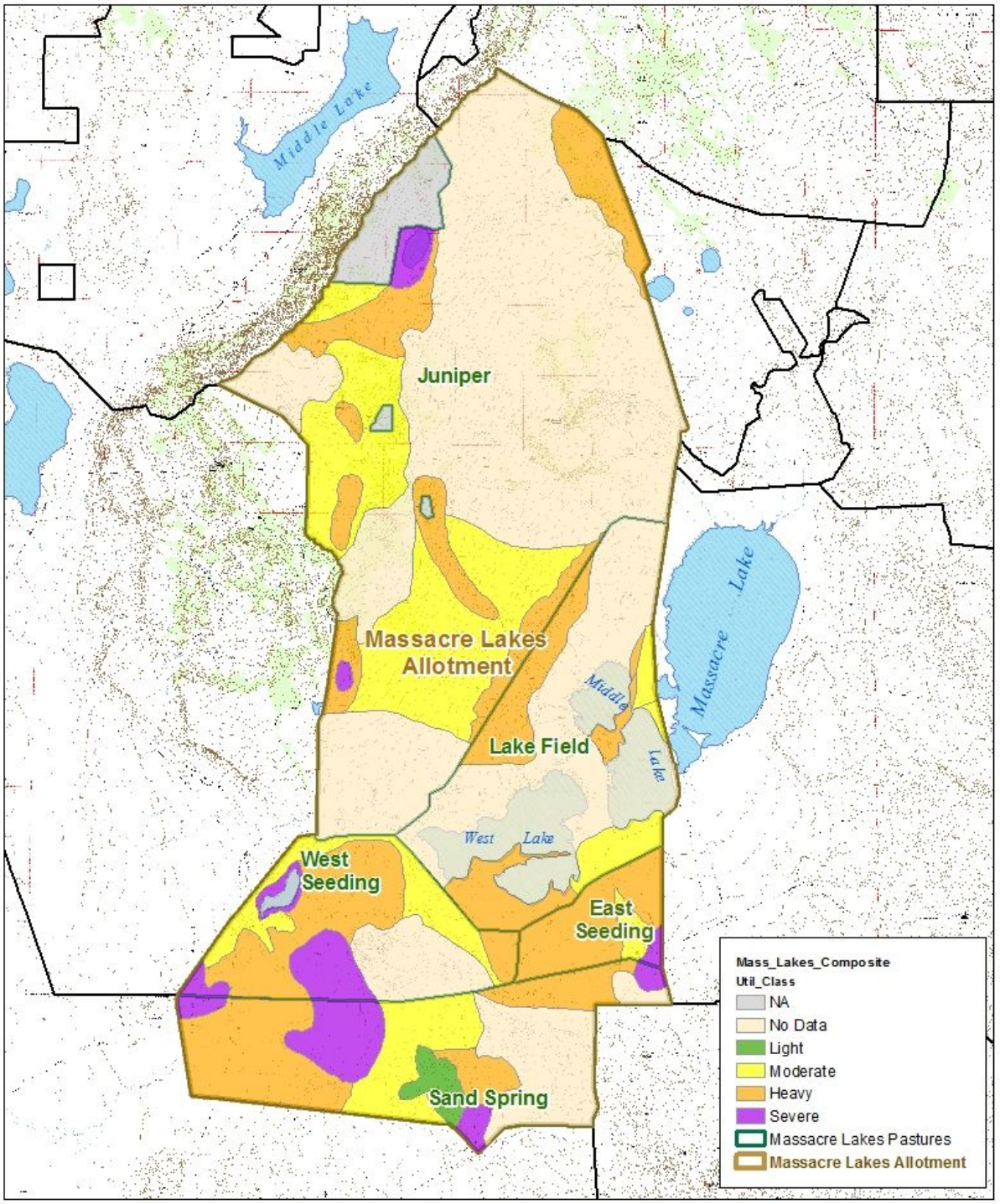

Massacre Lakes Allotment Composite Utilization

N

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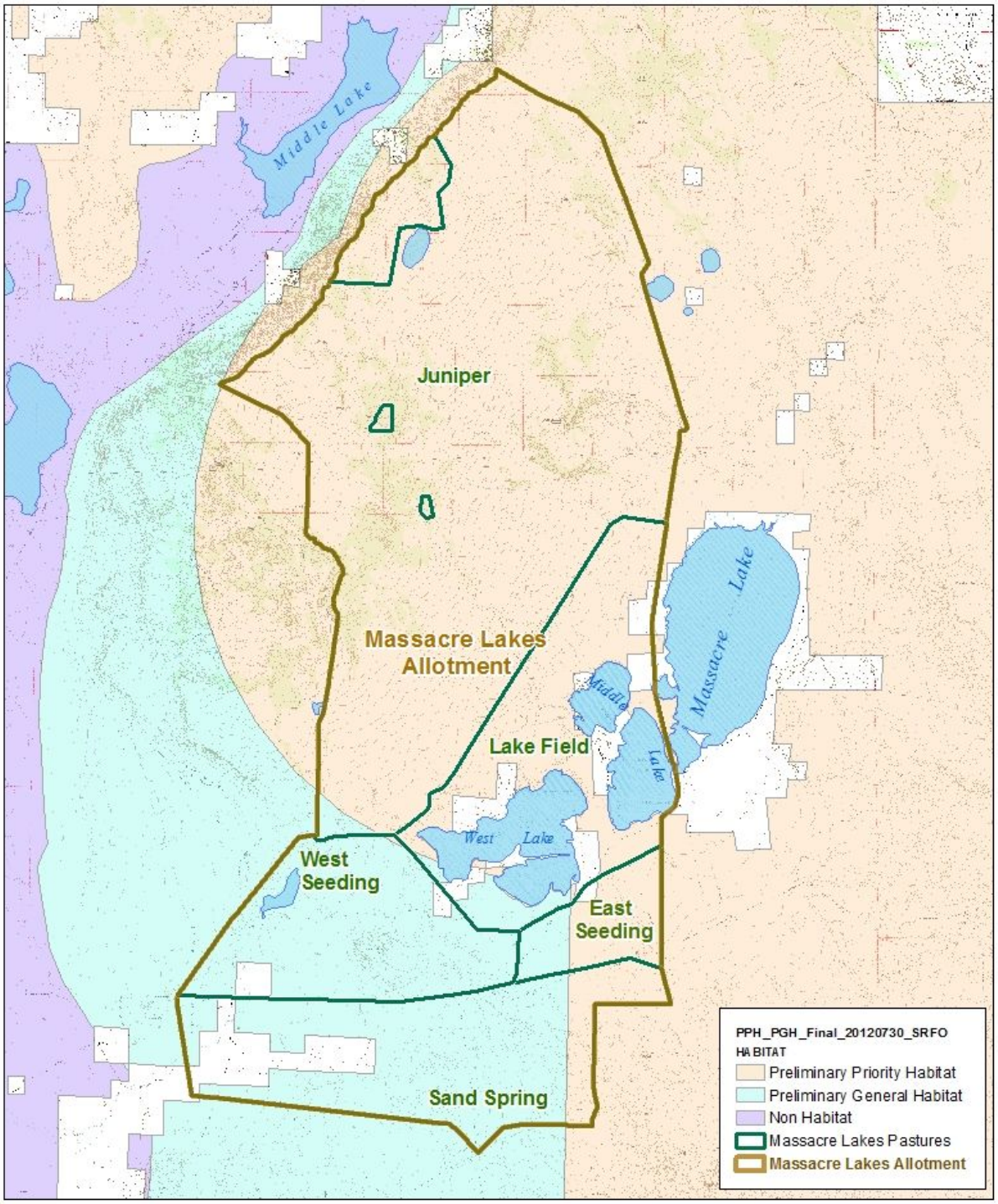

N

Massacre Lakes Allotment
Greater Sage-grouse Habitat

0 0.5 1 2 3 4 Miles

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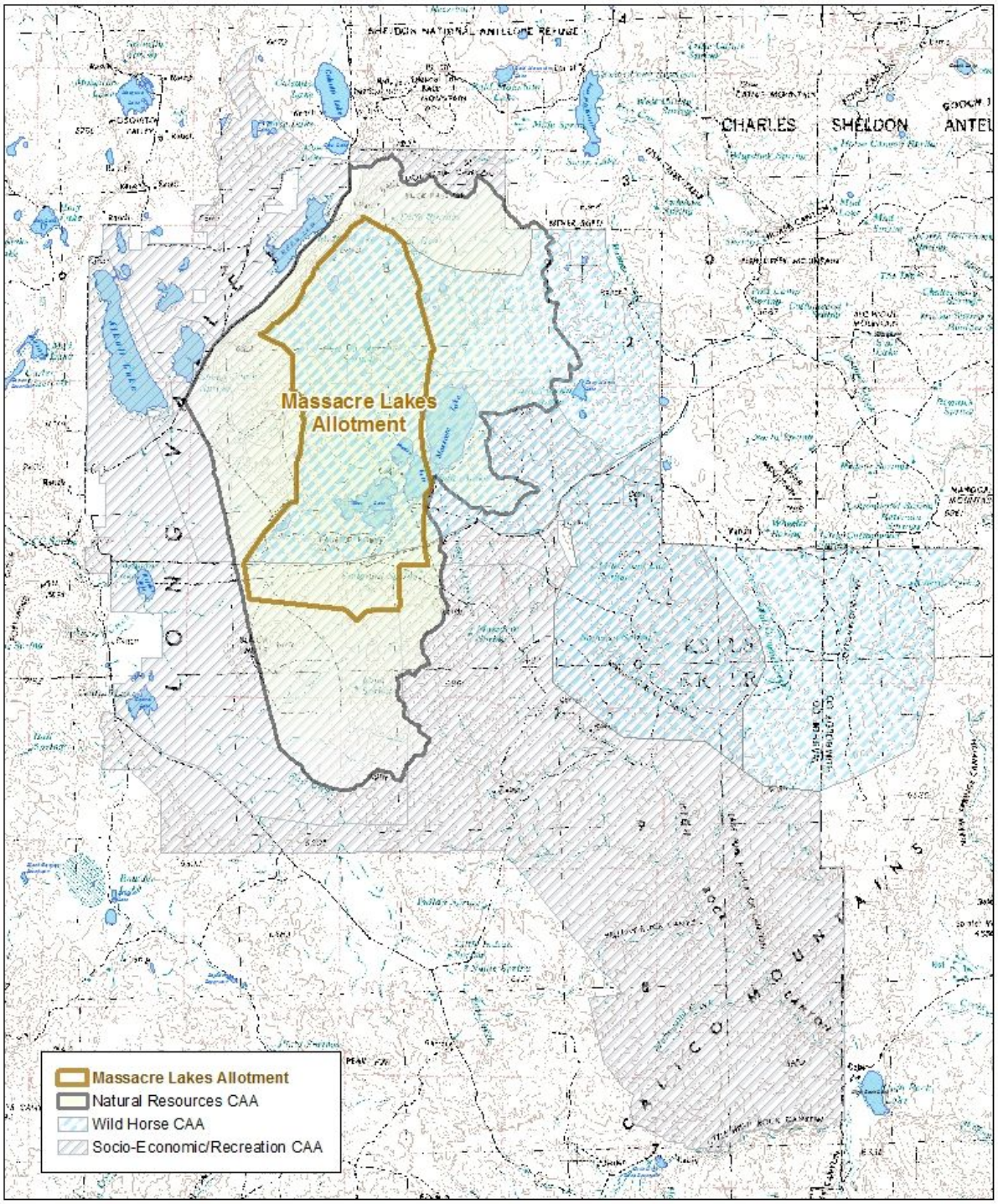

Massacre Lakes Allotment
Cumulative Assessment Areas