

Snow Water Lake and Warm Creek Allotments Grazing Permit Renewal

ENVIRONMENTAL ASSESSMENT



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BLM
NEVADA Elko District, Wells Field Office



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Cover photo: East Humboldt Range from the east side of Snow Water Lake by Jeff Moore, Rangeland Management Specialist

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Appendix 1- Proposed Project Procedures for Range Improvement Projects

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1 – INTRODUCTION

The Bureau of Land Management (BLM), Wells Field Office proposes to issue a grazing permit renewal decision to provide area-specific direction and management actions for the Snow Water Lake and Warm Creek Allotments in the northeastern portion of Elko County, Nevada. See Map 1 for the location of these allotments.

This Environmental Assessment (EA) has been prepared for compliance with the National Environmental Policy Act (NEPA). This EA tiers to the Environmental Impact Statement (EIS) for the 1985 Wells Resource Management Plan (RMP) and incorporates by reference relevant portions of the 2012 Standards and Guidelines Assessment for the Snow Water Lake and Warm Creek Allotments. These documents are available for review at the BLM Elko District Office, 3900 E. Idaho Street, Elko, NV 89801, telephone 775-753-0200.

1.1 Purpose and Need

The purpose of the action is to fully process the renewal of the term grazing permit for the Snow Water Lake and Warm Creek Allotments in accordance with all applicable laws, regulations, and policies. The grazing permit needs to be renewed with terms and conditions for grazing use that would meet, or make significant progress toward meeting, the Standards and Guidelines for Rangeland Health, Resource Management Plan goals and objectives, and other pertinent multiple use objectives for the allotment. Title 43 of the Code of Federal Regulations (CFR) Section 4130.2(a), effective March 24, 1995, states “Grazing permits or leases shall be issued to qualified applicants to authorize use on the public lands and other lands under the administration of the Bureau of Land Management that are designated as available for livestock grazing through land use plans.” The operator meets all of the qualifications to graze livestock on public lands administered by the BLM.

The decision to be made is to determine the conditions and limitations necessary to issue a grazing permit that will comply with the BLM’s statutory obligations as outlined in 43 CFR §4130.2 (a), implement the multiple use mandate specified in the Federal Land Policy and Management Act of 1976, and conform to the Fundamentals of Rangeland Health outlined in 43 CFR §4180.

1.2 Relationship to Laws, Policies and Land Use Plans

The Federal Land Policy and Management Act of 1976 (FLPMA) requires an action under consideration be in conformance with the applicable BLM land use plan and be consistent with other federal, state, local and tribal policies to the maximum extent possible.

1.2.1 BLM Land Use Plan Conformance

The proposed action and alternatives conform to the following decisions and objectives of the Wells Resource Management Plan (RMP), as approved 19 July 1985, and its amendment for elk management, approved 14 February 1996. They are further consistent with allotment specific

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objectives and directives from the Wells Rangeland Program Summary (RPS) dated 15 September 1986, which provided additional management guidance and objectives for each grazing allotment affected by the Wells RMP.

The following objectives, standard operating procedures, and/or management actions are outlined in the specific planning documents and apply specifically to the Snow Water Lake and Warm Creek Allotments:

Wells Resource Management Plan

1. Livestock Grazing (Wells RMP Record of Decision, page 17)
 - Provide for livestock grazing consistent with other resource uses.
 - Livestock grazing will continue in all allotments.
Monitor and adjust grazing management systems and livestock numbers as required.
2. Terrestrial Wildlife Habitat (Wells RMP Record of Decision, pages 19-22)
 - Conserve and/or enhance wildlife habitat to the maximum extent possible.
 - Eliminate all of the fencing hazards in crucial big game habitat, most of the fencing hazards in non-crucial big game habitat.
 - Eliminate all of the high and medium priority terrestrial riparian habitat conflicts in coordination with other resource uses.
3. Riparian/Stream Habitat
 - Improve high and medium priority riparian/stream habitat to at least good condition.
 - Prevent undue degradation of all riparian/stream habitat due to other uses.

Wells Rangeland Program Summary

Snow Water Lake Allotment

1. Livestock Grazing
 - Manage livestock to maintain present ecological status and trend.
 - Provide forage to sustain 1,160 AUMs for livestock grazing.
2. Wildlife Habitat
 - Manage rangeland habitat to provide forage for wildlife (Deer 150 AUMs and Antelope 60 AUMs).
 - Facilitate big game movement by fence modification (3.7 miles).
 - Improve 7 springs to good or better condition

Warm Creek Allotment

1. Livestock Grazing
 - Improve livestock distribution within the central and western portions of the allotment.
 - Improve ecological status allotment-wide.
 - Enhance spring forage production within the northern half of the allotment.
2. Wildlife Habitat
 - Facilitate big game movements by fence modification (0.3 miles).

1.2.2 Standards and Guidelines for Rangeland Health Conformance

The proposed action and alternatives would also continue to or provide for attainment or significant progress towards attaining the following applicable Standards for Rangeland Health for the Northeastern Great Basin Area of Nevada approved on February 12, 1997.

1. Upland Sites: Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate and land form.
2. Riparian and Wetland Sites: Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria.
3. Habitat: Habitats exhibit a healthy, productive, and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species.
4. Cultural Resources: Land use plans will recognize cultural resources within the context of multiple uses.

1.2.3 Consistency with Non-BLM Authorities

The proposed action is further consistent with other Federal, State and local land use policies and plans to the maximum extent possible.

1.2.3.1 Nevada Statewide Policy Plan for Public Lands, 1986

Agriculture. (p. 9) Goals for Agriculture. Recognize that agricultural production in Nevada will be necessary to help meet the requirements of future state populations and is especially important to the economies of rural counties of the state. Develop policies and regulations that provide for the long-term productivity and availability of public land resources for agricultural purposes.

1.2.3.2 Elko County Public Lands Policy Plan, 2008

“7. Agriculture and Livestock Production (p. 28)

Agricultural production is necessary to help maintain the historical, cultural and economic viability of Elko County. Elko County encourages the federal agency use of the 2006 Elko County Grazing Economic Impact study, or updated studies, in all environmental analysis on livestock grazing related decisions.

Policy 7-1: Preserve agricultural land and promote the continuation of agricultural pursuits, both traditional and non-traditional;

Policy 7-2: The pursuit and production of renewable agricultural resources are consistent with the long term heritage of Elko County. This private industry benefits the County economically and culturally;

Policy 7-3: Opportunities for agricultural development on public lands should continue at levels that are consistent with historical customs, environmental sustainability, culture and compatibility with other multiple uses;

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Policy 7-4: Grazing should utilize sound adaptive management practices. Elko County supports the periodic updating of the Nevada Rangeland Monitoring Handbook to help establish proper levels of grazing;

Policy 7-5: Allotment management strategies should be developed that provide incentives to optimize stewardship by the permittee. Flexibility should be given to the permittee to reach condition standards for the range. Monitoring should utilize the use of long-term trend studies as described above;

Policy 7-6: Encourage agencies managing public lands to coordinate with the N-1 Grazing Board on all manners affecting livestock grazing on public lands within the County;

Policy 7-7: Range water rights and improvements such as those associated with seeps, springs, streams, lakes and wells used by livestock should be protected in the long term for that use. Encourage cooperation between the federal land management agencies and the grazing operator in protecting the riparian values of these water sources;

Policy 7-8: The Congressional Delegation should be encouraged to develop regionally variable grazing fees that are based on the quality and quantity of forage, accessibility and infrastructure.

Policy 7-9: Elko County requests federal agency notification of all actions regarding permit renewals for potential request by Elko County for status as a cooperating agency in such action.”

1.2.3.3 Relationship to regulatory or statutory authorities

Table 1 identifies elements of the human environment that are regulated by a statutory or regulatory authority that would be affected and are analyzed in Chapter 3 of this EA, as well as those that BLM determined would not be affected.

Table 1: Review of Statutory Authorities		
Element/Resource	Present?	Affected?
Critical Elements		
Air Quality	No	No
Area of Critical Environmental Concern	No	No
Cultural Resources	Yes	Yes
Environmental Justice	No	No
Farm Land -Prime/Unique	No	No
Human Health & Safety	No	No
Migratory Birds	Yes	Yes
Native American Religious Concerns	Yes	Yes
Non-Native Invasive and Noxious Species	Yes	Yes
Threatened/Endangered/Sensitive Species	Yes	Yes
Visual Resource Management	Yes	No
Water Quality(Surface/Ground)	Yes	Yes
Wastes, Hazardous/Solid	No	No
Wetlands, Riparian Zones	Yes	Yes
Wild & Scenic Rivers	No	No
Wilderness	No	No
Other Resources		
Lands/Realty	Yes	No
Wild Horses & Burros	Yes*	Yes
Recreation	Yes	Yes

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Table 1: Review of Statutory Authorities		
Element/Resource	Present?	Affected?
Lands With Wilderness Characteristics	Yes	Yes
Wildlife	Yes	Yes
Soils	Yes	Yes
Fire Management	Yes	Yes
Forestry	Yes	No
Woodland Products	Yes	No
Livestock Grazing	Yes	Yes
Vegetation	Yes	Yes
*While the Snow Water Lake and Warm Creek Allotments do not lie within Herd Areas or Herd Management Areas, the proximity is close enough to warrant analyzing impacts to this resource.		

2 – ALTERNATIVES

2.1 Alternatives Analyzed in Detail

2.1.1 No Action Alternative

Under this alternative, the grazing permit would be issued for a 10-year period to the holder of the preference for grazing privileges on the Snow Water Lake and Warm Creek Allotments under the current terms and conditions of the permit. Livestock use on both allotments would continue under the “Agreement for Implementation of Changes in Livestock Grazing Use on the Snow Water Lake and Warm Creek Grazing Allotments.” Map 2 displays the existing range improvements in the Snow Water Lake and Warm Creek grazing allotments. The pastures within the Snow Water Lake are also displayed. Warm Creek Allotment is a single pasture.

The grazing permit would appear as follows:

Table 2: No Action Alternative Permit Schedule							
Allotment	Pasture	Number	Kind	Begin Date	End Date	% Public Land	AUMs
Snow Water Lake	-	174	Cattle	03/01	07/11	95	723
Snow Water Lake	--	200	Cattle	11/01	12/31	95	381
Warm Creek	--	40	Cattle	04/13	07/11	100	118

The following grazing schedule would remain in place on the allotment and would be a term and condition of the grazing permit:

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Table 3: No Action Alternative Grazing Schedule			
Allotment/Pasture	Year 1	Year 2	Year 3
Snow Water Lake Allotment			
B	3/1-4/12	3/1-4/12	3/1-4/12
A	5/1-6/14	4/13-5/27	5/28-7/11
C	6/15-7/11	5/28-6/23	4/13-5/9
Private Ground	7/12-10/31	7/12-10/31	7/12-10/31
Creek	11/1-11/30	11/1-11/30	12/1-12/31
Lake	12/1-12/31	12/1-12/31	11/1-11/30
Warm Creek Allotment			
--	4/13-4/30	6/24-7/11	5/10-5/27

Three days will be allowed before and after the specified move dates to complete livestock pasture movements.

Changes from the use described above may be allowed for reasons of drought, flooding, or any other reasons acceptable to the BLM Authorized Officer. However, these changes must be requested in writing at least 30 days before the requested changes are proposed to occur, and be approved by the BLM Authorized Officer in writing.

2.1.2a Permittee Proposed Action Alternative

On 29 July 2011, the current permittee submitted an application to change the kind of livestock and grazing system on the Snow Water Lake and Warm Creek Allotments. This application included the following items, as modified by the BLM:

- a. Issue the grazing permit for a 10-year period to the holder of the preference for grazing privileges on the Snow Water Lake and Warm Creek Allotments following completion of the applied for permit transfer.
- b. Propose converting existing cattle AUMs to horse AUMs at a 1:1.2 ratio.
- c. The grazing permit would appear as follows:

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Table 4: Permittee Proposed Action Alternative Permit Schedule							
Allotment	Pasture	Number	Kind	Begin Date	End Date	% Public Land	AUMs
Snow Water Lake	-	210*	Cattle**	04/01	07/19	95	721***
Snow Water Lake	--	235*	Cattle**	8/15	10/5	95	381***
Warm Creek	--	49	Cattle**	5/8	7/19	100	118***
<p>*Maximum number of horses that can actually be grazed would be 200. Maximum number of cows that can actually be grazed would be 235. The grazing permit shows a greater number of animals if horses are grazed due to the math necessary to be able to show the number of permitted AUMs.)</p> <p>**Type of use can be either cattle or horses</p> <p>*** Cattle AUMs are shown. If horses are grazed, maximum permitted AUMs would be 922 on Snow Water Lake Allotment and maximum permitted AUMs would be 99 on Warm Creek Allotment.</p>							

- d. Implement the following grazing system for either 200 horses or a maximum of 235 cows. Permitted use on the allotments would be as follows:
- Snow Water Lake Allotment- 922 AUMs if grazed by horses, 1,106 AUMs if grazed by cows.
 - Warm Creek Allotment: 99 AUMs if grazed by horses, 118 AUMs if grazed by cows.

Table 5: Grazing System Proposed by Permittee		
Pasture	Year 1	Year 2
Snow Water Lake Allotment		
C*	4/1-4/5	--
A	4/5-5/7	5/29-7/4
B	5/23-6/27	4/23-5/28
C	6/28-7/19	4/1-4/22
<i>Private Ground</i>	7/20-8/14	7/20-8/14
Creek	8/15-9/9	9/10-10/5
Lake	9/10-10/5	8/15-9/9
Warm Creek Allotment		
<i>Private Ground</i>	10/6-3/31	10/6-3/31
*Year 1 turnout would be into Pasture C; Permittee would be allowed 5 days to trail animals to Pasture A to start rotation.		

- e. All domestic animals authorized to graze on public lands managed by the BLM would be required to be branded or branded and marked with brands registered in the State of Nevada as required by Nevada Revised Statutes (NRS) §564.025.
- f. Construct the following range improvements. (Map 2 displays the existing and proposed range improvements in the Snow Water Lake and Warm Creek grazing allotments.):
1. Drill a new well underneath the powerline where it crosses the boundary fence between the Warm Creek Allotment and Pasture A of the Snow Water Lake Allotment. Water would be provided in both allotments.

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2. Drill a new well underneath the powerline in the southern end of Pasture C of the Snow Water Lake Allotment.
3. Investigate reconstructing existing non-functional wells in Creek and Lake Pastures of the Snow Water Lake Allotment, specifically BLM project #4570, a well in the Creek Pasture, and BLM project #4940, a well along the northern boundary of the Lake Pasture.

2.1.2b Permittee Proposed Action Alternative- Gelded Horses

This alternative would contain the same action items as Alternative 2.1.2a, except that the permittee would only be allowed to graze cattle or gelded horses on the allotments.

2.1.3a Greater Sage-Grouse Friendly Alternative

On 5 March 2010, the U.S. Fish & Wildlife Service (USFWS) designated the Greater Sage-Grouse as a species warranted for protection under the Endangered Species Act but precluded from listing due to higher priority species. USFWS identified lack of regulatory mechanisms to protect Greater Sage-Grouse as one of its primary rationales for reaching the listing decision, and in response to that BLM has begun the process of amending Land Use Plans to incorporate protective measures. On 22 December 2011, BLM issued Instructional Memorandum (IM) 2012-043 providing interim guidance for actions BLM authorizes within Greater Sage-Grouse habitat until such time as the Land Use Plan amendments are complete. The IM recognizes two categories of Greater Sage-Grouse habitat, termed Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH), with differing levels of protection and analysis prescribed for each.

Nevada Department of Wildlife developed the habitat ratings upon which PPH and PGH designations have been developed for public lands administered by the BLM. PPH designated within these two allotments amounts to approximately 38 acres in the Snow Water Lake Allotment (0.17% of the allotment) and approximately 15 acres in the Warm Creek Allotment (0.96% of the allotment). PGH designated within these two allotments amounts to over 99% of the Warm Creek Allotment and almost all of Pastures A, B, and C of the Snow Water Lake Allotment (representing 17% of the allotment). The remainder of the allotments is classified as not priority Sage-Grouse habitat. See Map 6 for Sage-Grouse habitat delineations.

IM 2012-043 contains the following instructions for analyzing impacts in PGH:

“The intent of these interim conservation policies and procedures in PGH is to reduce and mitigate adverse effects on Greater Sage-Grouse and its habitat to the extent practical. These policies and procedures differ from those applied to PPH.

- *When approving uses and authorizations, consider and analyze management measures that would reduce direct, indirect, and cumulative adverse effects on Greater Sage-Grouse and its habitat. For example, consider alternatives that would increase buffer distances around active leks and timing restrictions within existing LUPs as needed to further reduce adverse effects on Greater Sage-Grouse and its habitat.*

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- *Consider deferring authorizations in PGH where appropriate, depending on local characteristics, new science and/or data (e.g., migratory corridors or habitat between PPH), and relative habitat importance if authorizations could result in Greater Sage-Grouse population loss in PPH.*
- *Consider offsite mitigation measures in collaboration with state wildlife agencies and project proponents when authorizing activities.*
- *Evaluate and address anticipated fence collision risks within 1.25 miles¹ of leks and other seasonal habitats. Where NEPA analysis suggests that a deviation from this distance is warranted, modifications of this distance are acceptable.”*

Although not documented, it is likely that nesting occurs within areas containing sagebrush with a bunchgrass understory, particularly in the Warm Creek Allotment which is composed primarily of native vegetation communities. C. McAdoo (NDOW, personal communication, 8/2012) has observed juvenile grouse within the Warm Creek Allotment, indicating nesting within the allotment or nearby. Managing livestock grazing to maintain residual cover of herbaceous vegetation to reduce predation during nesting may be the most beneficial for Sage-Grouse populations (National Technical Team Report 2011). Alternatives 1 and 2 do not contain provisions for resting any of the pastures that are likely used for nesting by hens. Implementation of a rest-rotation system is more likely to ensure appropriate residual herbaceous cover for nesting as compared to Alternatives 1 and 2, and would also ensure that nesting hens are free from disturbance by livestock during years when a pasture is rested. In addition, deferring turnout until as late as possible during the nesting season (while still accommodating the livestock operation) ensures a minimal amount of disturbance to nesting hens when a pasture is actually grazed during the nesting season.

In consideration of this information and in conformance with the IM guidance above, BLM has developed the following alternative:

- a. Issue the grazing permit for a 10-year period to the holder of the preference for grazing privileges on the Snow Water Lake and Warm Creek Allotments following completion of the applied for permit transfer.
- b. Propose converting existing cattle AUMs to horse AUMs at a 1:1.2 ratio.
- c. The grazing permit would appear as follows:

¹Stevens, B.S. 2011. Impacts of Fences on Greater Sage-Grouse in Idaho: Collision, Mitigation, and Spatial Ecology (Master's Thesis). University of Idaho, Moscow, Idaho.

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Table 6: Greater Sage-Grouse Friendly Alternative Permit Schedule							
Allotment	Pasture	Number	Kind	Begin Date	End Date	% Public Land	AUMs
Snow Water Lake	-	263*	Cattle**	05/01	07/27	95	723***
Snow Water Lake	--	235*	Cattle**	8/15	10/5	95	381***
Warm Creek	--	49*	Cattle**	5/8	7/19	100	118***
<p>*Maximum number of horses that can actually be grazed would be 200. Maximum number of cows that can actually be grazed would be 235. The grazing permit shows a greater number of animals if horses are grazed due to the math necessary to be able to show the number of permitted AUMs.)</p> <p>**Type of use can be either cattle or horses</p> <p>*** Cattle AUMs are shown. If horses are grazed, maximum permitted AUMs would be 922 on Snow Water Lake Allotment and maximum permitted AUMs would be 99 on Warm Creek Allotment.</p>							

- d. Implement the following grazing system for either 200 horses or a maximum of 235 cows. Permitted use on the allotments would be as follows:
- Snow Water Lake Allotment- 922 AUMs if grazed by horses, 1,106 AUMs if grazed by cows.
 - Warm Creek Allotment: 99 AUMs if grazed by horses, 118 AUMs if grazed by cows.

Table 7: Greater Sage-Grouse Alternative Grazing Schedule						
Pasture	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Snow Water Lake Allotment						
A	6/6-7/12	6/7-7/13	Rest	5/1-6/6	5/23-6/28	Rest
B	5/1-6/5	Rest	5/1-6/5	6/22-7/27	Rest	5/1-6/5
C	Rest	5/1-5/22	6/6-6/27	Rest	5/1-5/22	6/21-7/12
Creek	8/15-9/9	9/10-10/5	8/15-9/9	9/10-10/5	8/15-9/9	9/10-10/5
Lake	9/10-10/5	8/15-9/9	9/10-10/5	8/15-9/9	9/10-10/5	8/15-9/9
Warm Creek Allotment						
--	Rest	5/23-6/6	Rest	6/7-6/21	Rest	6/6-6/20

- e. AUMs associated with rested pastures/allotments would be placed into non-use status for that year.
- f. All domestic animals authorized to graze on public lands managed by the BLM would be required to be branded or branded and marked with brands registered in the State of Nevada as required by Nevada Revised Statutes (NRS) §564.025.
- g. Construct the following range improvements. (Map 2 displays the existing and proposed range improvements in the Snow Water Lake and Warm Creek grazing allotments.):
1. Drill a new well underneath the powerline where it crosses the boundary fence between the Warm Creek Allotment and Pasture A of the Snow Water Lake Allotment. Water would be provided in both allotments.

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2. Drill a new well underneath the powerline in the southern end of Pasture C of the Snow Water Lake Allotment.
3. Investigate reconstructing existing non-functional wells in Creek and Lake Pastures of the Snow Water Lake Allotment, specifically BLM project #4570, a well in the Creek Pasture, and BLM project #4940, a well along the northern boundary of the Lake Pasture.

2.1.3b Greater Sage-Grouse Friendly Alternative- Gelded Horses

This alternative would contain the same action items as Alternative 2.1.2a, except that the permittee would only be allowed to graze cattle or gelded horses on the allotments.

2.2 Alternatives Eliminated from Further Analysis

2.2.1 No Grazing Alternative

Under this alternative, livestock grazing would be eliminated from the Snow Water Lake and Warm Creek Allotments. The Environmental Impact Statement for the Wells RMP analyzed the no grazing alternative. However, the Wells RMP establishes, among other things, that the Snow Water Lake and Warm Creek Allotments are to provide for livestock grazing use. The 1985 Wells RMP and Rangeland Program Summary (RPS) established objectives for livestock grazing and provide for the establishment of a rangeland monitoring program to determine if management objectives are being met and to adjust grazing management systems and livestock numbers as required. Elimination of livestock grazing is an action not in conformance with the RMP and RPS.

Monitoring data shows all applicable Standards and Guidelines for Rangeland Health are being met with livestock grazing present on the allotment. Since all management objectives are being met with grazing occurring on the allotments, elimination of grazing from these allotments is not considered by BLM to be a reasonable alternative for analysis in this EA. This alternative is dropped from further consideration.

3 AFFECTED ENVIRONMENT/EFFECTS OF ALTERNATIVES

This chapter characterizes the resources and uses that have the potential to be affected by the proposed action, followed by a comparative analysis of the direct, indirect and cumulative impacts of the alternatives. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

3.1 Scope of Analysis

The Snow Water Lake and Warm Creek Allotments are located approximately twenty-five miles south of Wells, Nevada. The Snow Water Lake Allotment contains approximately 18,049 acres of public land administered by the BLM and 4,317 acres of private land, while the Warm Creek Allotment contains 1,537 acres of public land administered by the BLM.

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The Warm Creek Allotment sits on the alluvial fan on the east side of the East Humboldt mountain range, while the Snow Water Lake Allotment spans the lower portions of the fan and a portion of the valley bottom. Snow Water Lake, an ephemeral water body that is the last remnant of Lake Clover, a Pleistocene-era lake, dominates much of the valley floor portion of the Snow Water Lake Allotment. The lake is currently fed by a number of sloughs originating at a major spring complex on private land within the allotment, supplemented by ephemeral drainages flowing off the East Humboldt Range. Elevations on the two allotments range from a little over 6,200 feet at the highest points of the Warm Creek Allotment to slightly less than 5,600 feet in the lakebed on Snow Water Lake Allotment.

The Snow Water Lake Allotment is currently divided into five pastures. Pastures A, B, and C are located on the west side of Highway 93, while the Creek and Lake pastures lie on the east side of the highway. No internal fencing exists within the Warm Creek Allotment. Map 2 displays the current land ownership, roads, pastures, existing range improvements, and water locations.

Pastures A, B, and C of the Snow Water Lake Allotment are seeded partially to entirely with crested wheatgrass, although sagebrush and some native forbs and grasses have recolonized those pastures. The Creek and Lake Pastures are native pastures supporting a mostly alkaline/sodic plant community of greasewood, rabbitbrush, Great Basin wildrye, alkali sacaton wildrye, alkali sacaton, and native wheatgrasses. The Warm Creek Allotment supports mostly native vegetation consisting of black sagebrush, big sagebrush, bluebunch wheatgrass, Indian ricegrass, needle and thread grass, and patches of antelope bitterbrush. Utah juniper is encroaching into the sagebrush habitat in the southern end of the Warm Creek Allotment and in Pastures B and C of the Snow Water Lake Allotment.

There are no lotic perennial riparian areas on either allotment. Several lentic springs and seeps exist on the Snow Water Lake allotment. No known threatened or endangered species or their habitat, exist on public land within either allotment. However, an endangered species of dace is found in the Warm Springs complex which is located entirely on private land. Wildlife values present on the two allotments consist of deer and antelope habitat, Greater Sage-Grouse habitat, and habitat for a variety of non-game species. One recent fire, the 2001 Snow Egbert fire, affected portions of both allotments.

3.2 Impacts Common to All Alternatives

This subsection discusses the impacts of climate change, wildfire, and threats of disease (i.e. West Nile Virus) in general. Specific effects/impacts are described within the analysis for each affected element.

Events that can impact rangeland health, such as wildfire and climate change, can be difficult to predict and may appear speculative. However, BLM acknowledges direction in Secretarial Order 3226 to consider activities that could have long-term impacts.

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For this EA, “long-term” projects are defined as those where impacts (positive² or negative³) are expected to last ten years or more. One decade has been selected for reasons that include, but are not limited to:

- Observations made by BLM resource specialists with regards to their professional experience and understanding of cause and effect relationships for their respective resources in the BLM Elko District.
- Native vegetation can, depending upon the species, take more than ten years to become firmly established in arid environments where water is a growth limiting factor.
- Soils exposed to both fire severity (duration) and intensity (temperature) (not uncommon where drought resistant vegetation exists) can remove viable seed sources, as well as result in the mortality of biological activity in the upper 3 inches of a soil horizon, resulting in delayed decomposition and nutrient cycling necessary for plant growth.
- Grazing permits are typically issued for a ten year period.
- BLM guiding documents (Resource Management Plans, Standards and Guidelines for Rangeland Health, etc.) are normally reviewed and revised every five to fifteen years.

Climate Change

Predictions⁴ associated with climate change, identified during a 2011 literature review for impacts that could occur within the BLM-Elko District include:



Temperature increase predicted of 1 to 2 degrees F (Karl et al. 2009) between now and 2020, leading to:

- earlier snow melt and onset of spring (Stewart et al. 2005; Mote 2005; ; Bernstein 2007; Feng 2007; Barnett 2008),
- longer growing season for forage production (Bernstein 2007), but potentially lower quality forage (Karl et al. 2009),
- an increase in evapotranspiration (Hamlet 2006),
- threat of an increase for diseases, insects, and non-native and noxious species (Chambers et al. 2009),
- reduction in soil moisture for plants (Izaurrealde et al. 2011),
- increase in drought frequency and severity (Bernstein 2007),
- likely increase to stream temperature in non-shaded riparian areas, and

² Positive impacts: Impacts expected to improve rangeland conditions beyond the existing status.

³ Negative impacts: Impacts expected to reduce rangeland conditions to or below the minimum standards and guidelines as stated in the Wells RMP (1985).

⁴ Predictions: In addition to compliance with Secretarial Order No. 3226 to consider impacts of climate change, CEQ advises agencies to recognize the *scientific limits of their ability to accurately predict climate change effects*, especially of a short-term nature, and not devote effort to analyzing wholly speculative effects. BLM (2008) further states that disseminated information based on non-agency reports/studies (i.e. third party scientific reports in credible publications) should be up-to-date, have integrity (based on accurate science and technology), useful to management for planning, and objective (BLM 2008, OMB 2002, DOI 2002).

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- an increase in wildfires resulting from a combination of the above factors (Ehrenfeld 2003, Norton 2003).



Precipitation could vary from **no change** to as much as **15% less** than present (Timmerman et al. 1999; Meehl 2006; Karl et al. 2009) suggesting the:

- potential for species shifting geographically to adapt to changing conditions (Crozier 2003, 2004; Inouye et al. 2000),
- mortality of species unable to adapt to changing conditions (Beever et al. 2003; Galbreath et al. 2009),
- increase of storm intensity (Bernstein 2007),
- higher potential for floods and subsequent erosion on soils with high clay content (CCSP 2008; Furniss 2010), and
- higher demand for water in urban, rural, and agricultural areas, as well as from increasing demands for diverted flow to areas like Las Vegas, Nevada (Deacon et al. 2007).

Two of the predicted events expected to occur as a result of climate change, an increase of wildfire and shifts or increases for insects/disease, are events that directly affect (or have the potential to effect) resources within the Snow Water Lake and Warm Creek Allotments and that can be effectively managed and/or mitigated against through agency actions and are therefore considered further.

Anthropogenic Induced Fire(s) and Wildfire(s)

Fire impacts affect resource conditions and wildlife. Repopulation of native species can require as many as (or more than) ten years in areas where restoration is left to natural recovery and water is a limiting factor. As a result of 2001 Snow Egbert fire, substantial portions of the sagebrush plant communities have been converted to areas dominated by perennial grasses.

Fire is possible under all alternatives from a variety of ignition sources, including humans (manual or mechanical) or climatic events (i.e. lightning). Proactive measures by BLM-Elko to minimize impacts by fire include: annual enlistment and support for Hot Shot Crews⁵ throughout predicted fire season months, monitoring of weather conditions by BLM fire crews, and communicating with other agencies when fires occur in surrounding areas. BLM also assigns roles/responsibilities to qualified emergency assessment team members (advisors within fire impacted resources such as soils, range, wildlife, and botanists). Once a fire is considered both contained and controlled by a Fire Incident Commander, the advisors are among the first to examine and determine fire severity to provide stabilization and rehabilitation recommendations.

⁵ Hot Shot Crews: an interagency national resource, usually comprised of 20 (+/-) members prepared (i.e. on call) to respond to any fire emergency. Required of a hot shot member is: a high level of physical fitness, special training in wildland fire suppression tactics, a commitment to accept assignments lasting several weeks at a time, working an average of 16 hrs a day during fire conditions, and be able to endure primitive (i.e. wilderness) and extreme conditions (i.e. fire/heat/weather, smoke, poison oak). Teams include medics, helicopter members, fallers, saw teams, firefighters, spotters, and various chains of command.

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Spread of Insects and Disease

Insect populations (some of which can carry infectious disease) expected to increase because of geographic shifting and adaptation to increasing temperatures could impact the BLM-Elko District. Through previous scoping (for another project) a concern was identified about possible sage-grouse mortality because of West Nile Virus from infected mosquitoes breeding in manmade water sources.

West Nile Virus (WNV) is a mosquito-borne flavivirus⁶ that can cause debilitating or fatal neuroinvasive⁷ disease in humans and animals. The virus attacks the brain causing inflammation and swelling. The virus persists largely within a mosquito-bird-mosquito infection cycle. Mosquitos get the virus by feeding on infected birds and can then pass it on to other birds, and occasionally to other animals and people. The virus is not spread from person-to-person (Walker 2009). Mosquito season in northeastern Nevada is typically May to October.

Today, WNV has been reported in every county in Nevada. The number of WNV cases reported in humans in Nevada between 2005 and 2010 totaled 196 cases with 26 of those cases reported for Elko County. (Nevada Dept. of Health and Human Services 2011). Less than 1% of humans infected with WNV develop a serious neurological infection (MayoClinic.com). Vaccines for humans are in clinical trials but not yet available. (Nevada Dept. of Agriculture 2009).

Horses also appear sensitive to the virus; however, there is no evidence that WNV causes disease in cattle. Some bird species have experienced population declines attributed to WNV including the American crow, Western scrub-jay, blue jay, yellow-billed magpie, Steller's jay, American robin, tufted titmouse, house wren, and Greater Sage-Grouse.

The dominant vector of WNV in sagebrush habitats is the mosquito (*Culex tarsalis*). This species prefers sites with submerged vegetation on which to oviposit⁸, and warm standing water that promotes rapid larval development, including ephemeral⁹ puddles, vegetated pond edges, and surface water held in slow draining formations such as in hummocky areas (hoof prints), and road-side trenches. The larvae mature from 7 days to 4 weeks to become full-fledged mosquitos, depending on temperature and food availability. *Culex tarsalis* mosquitos are most active the first few hours after sunset (Walker 2009).

Collaborative efforts continue between Federal, state, and other organizations (i.e. academia, Institute of Medicine, the Centers for Disease Control and Prevention and the National Institutes of Health) to meet and examine issues of shared concern regarding research, prevention, detection, and management of emerging or reemerging infectious diseases. Within the Great Basin, efforts for research also include NV Dept. of Wildlife; NV Dept. of Agriculture; NV State

⁶ Flavivirus: a virus that is capable of reproducing within its arthropod (jointed leg) vector and that can cause a number of serious human diseases.

⁷ Neuroinvasive: a disease agent capable of entering or infecting the central nervous system.

⁸ Oviposit: to deposit or lay eggs.

⁹ Ephemeral: drainage area receiving only seasonal precipitation or during high rainfall events (then subject to gullying and erosion) that are able to support a variety of wildlife and plant species that often cannot not grow on other sites.

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Health Dept.; USGS; Animal and Plant Health Inspection Service and US Fish and Wildlife Service.

Methods suggested from the above agencies and supported by BLM, for recommendations regarding past and emerging threats of disease include using pesticides, posting public statements and using media/internet to inform the public about areas where reports have identified possible outbreaks, and stating what the public can do to both protect themselves and how to minimize infestations.

3.3 Effects of the Alternatives

The degree to which resources/uses may be affected by the proposed activities are discussed in the following subsections. Each subsection includes discussion of the:

- (1) Affected Environment (current condition) of the resource or use
- (2) Effects (direct and indirect) of each alternative
- (3) Cumulative Impacts, if identified

3.3.1 Cultural Resources

Affected Environment

Grazing on public lands requires issuance of a permit by the BLM and is therefore considered an undertaking under the National Historic Preservation Act (NHPA). Compliance with Section 106 of the NHPA, as implemented using the Protocol between the BLM and State Historic Preservation Office (SHPO) in Nevada, requires a “good faith effort” to identify, evaluate and mitigate adverse effects to historic properties prior to the approval of a proposed undertaking - in this case completing a grazing permit renewal.

Livestock grazing, and any associated range development projects have the potential to adversely affect historic properties on both the Snow Water Lake and Warm Creek allotments. In order to comply with the Nevada State Protocol Agreement, which outlines NHPA compliance, a Class II sample archaeological inventory was conducted on both allotments.

Gathering data from prior archaeological investigations is essential to the development of a strong sample survey and was completed for both allotments. BLM records show that 24 project inventories had been completed with the project area since 1975. This resulted in 88 previously recorded sites, 15 of which were considered eligible for the National Register (NR). Both prehistoric and historic sites were found, with some areas containing higher site densities than others. Based upon this information, a sample survey pattern was formed, taking into account variance in environment, known site densities and established surveys.

Lithic scatter sites are the most common resource found within both allotments, with diagnostic artifacts suggesting that human occupation spans to at least 10-12 thousand years ago. Historic resources in the area include the Warm Creek Ranch, one of the oldest in Nevada, portions of the Hastings Cut-off National Historic Trail and the Warm Creek Civilian Conservation Corps

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(CCC) base camp. CCC era range improvements have also been documented and are believed to be associated with the Warm Creek Camp.

Prior Inventory of 3,325 acres (14%), and an additional 1,750 acres (7%) of new inventory in response to this project proposal resulted in an analysis of 5,075 acres (21%). This was considered sufficient to identify a significant sample size of potentially eligible sites within the project area through the completion of a Cultural Resource Inventory Needs Assessment (CRINA) completed in consultation between the BLM and the Nevada State Historic Preservation Office (SHPO) as outlined in the Nevada State Protocol Agreement.

Inventories performed from May 7, 2012 to May 16, 2012 recorded 22 new sites and updated 4 previously recorded sites. Three of the newly recorded sites are recommended eligible for the National Register (NR), all under criterion D, 16 are recommended as not eligible, and the remaining 3 are recommended as unevaluated. The previously recorded sites were re-evaluated to include one eligible site, two as not eligible, and one site remained unevaluated. All NR recommendations are awaiting concurrence from the Nevada SHPO, upon submission of a Section 106 project report.

As part of the recent inventory, an evaluation of cattle grazing and range improvements impacts to historic properties was conducted. Evidence of grazing and impacts arising from cattle trampling were observed at all of the documented sites. These impacts were relatively minor and likely no more a contributing factor to the degradation of historic properties than natural forces. Unfortunately, previous documentation of the 88 known sites does not mention the degree to which cattle impacted the site at the time of recording, leaving no baseline data to compare present site condition with past. Based on artifact descriptions, it appears that sites in the Snow Water Lake and Warm Creek allotments have only been minimally adversely impacted due to livestock trampling since they were originally recorded. The rerecording of the sites yielded similar and in some cases greater number of artifacts then when first inventoried in the 1980s and 1970s. In the cases of range improvements within this allotment, all have been inventoried and evaluated in terms of their effects upon cultural resources and found to have no impact.

In addition to the considerations required for renewing a grazing permit, the proposed action also includes a conversion from cattle to domestic horses. The grazing behavior of cattle over more than 150 years of known use has led to a rather homogenous impact of grazing, and therefore potential for trampling of artifacts across both allotments has likely been evenly distributed. The grazing behavior of domestic horses is unknown, with some suggesting the potential for heterogeneous grazing leading to areas of concentrated impact (Beever, 2003).

Direct and Indirect Effects Common to All Alternatives

Grazing has been documented as an impact agent on archaeological sites, specifically surface lithic scatters in Osburn and Hartley (1987), Attaman (1996) and others. While the effects of trampling can be extremely detrimental in some cases, in this situation the effects appear to be minimal to non-existent. The area is known to have been extensively utilized for 70 years prior to the Taylor Grazing Act, and has been in continuous use under Division of Grazing, and then BLM monitoring since the Taylor Grazing Bill was enacted in 1934. While no baseline

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monitoring data exists for any of the sites located within the two allotments, site condition for the vast majority is good to extremely good based upon the number of complete and nearly complete projectile points, limited trampling evidence on other tools and debitage and the presence of complete or nearly complete glass bottles in historic sites.

Alternative 1- No Action

Grazing would continue to impact undocumented cultural resources within the allotments. However, impacts would be expected to continue to be minimal.

Alternative 2a and 2b- Proposed Action

Converting the allotments from cattle to domestic horses may negatively impact cultural resources, but grazing stipulations and requirements could be used to decrease the impacts. A site monitoring plan is included as a condition of this EA to ensure that adverse effects to cultural resources are avoided.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Nearly identical to the Proposed Action in regards to cultural resource impacts, the potential for adverse impacts is slightly less due to the increased periods of rest for several of the pastures within the Snow Water and Warm Creek Allotments.

Cumulative Impacts

The CESA has been identified as the Snow Water Lake and Warm Creek Allotments with a ¼ mile buffer beyond the allotment boundaries (see Map 3). The boundary for the CESA is based upon the potential for impacts to cultural resources from domestic horses within the allotment boundaries and the possibility of wild horses or wildlife being drawn to and congregating near the periphery of the allotments due to the presence of large groups of domestic horses.

Overall, the Proposed Action (either 2a or 2b) would have positive effects on cultural resources, by establishing monitoring measures for previously undocumented sites. The No Action Alternative has slightly negative effects, resulting over the long-term in adverse impacts upon cultural resources. The Sage-Grouse friendly alternative (either 3a or 3b) provides for periods of rest for three of the five pastures of the Snow Water Lake Allotment and the Warm Creek Allotment, minimizing the potential for adverse impacts and ensures positive effects for cultural resources through monitoring.

3.3.2 Fire Management

Affected Environment

Fire history and fire effects in the Great Basin are a vital component of resource health. Historically, the Snow Water Lake and Warm Creek Allotments were fire adapted. Fire played a regular disturbance role in the ecosystem. Fire exclusion has occurred throughout the west since

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Europeans arrived, which is thought to have affected the natural role of fire. Vegetation volume has increased, and vegetative composition has changed as a result of this natural disturbance alteration resulting in mature sagebrush with increasing dead to live woody material and decreasing understory grasses and forbs. Fires prior to European settlement once carried through fine fuels and created structural and age class diversity in sagebrush sites. According to Miller and Tausch (2001), infrequent fires in the past 130 years have allowed pinyon and juniper to establish on sagebrush sites. This pinyon-juniper fuel type presents a unique fire hazard as the potential for crown fire is higher.

Single focus policies based solely on full fire suppression have had an impact on the landscape causing fuel loads and suppression costs to increase with no notable improvement in the attainment of resource objectives. In areas where fires have not occurred for many years, fuel loading can increase the intensity of fire causing atypical burn results. Timing, intensity, and frequency can critically influence vegetation recovery, leading to potentially long-term changes in vegetation and flammability.

The 2004 Northeast Nevada Fire Management Plan (NEN FMP) identified eleven Fire Management Units (FMUs) within the Elko District BLM. The Snow Water Lake and Warm Creek Allotments are located within the Spruce Fire Management Unit (FMU). The Spruce FMU is located in the southeastern portion of the NEN Fire Planning Unit (FPU). This FMU lies generally within the Long/Ruby Valley and Spruce/Steptoe Valley subbasins and is comprised of 1,423,419 acres. Fire history and statistics were developed from the 2004 NEN FMP and updated with more recent fire history data collected through BLM Geographic Information System (GIS). See Map 4. Table 8. shows the number of fires, total acres burned and average fire size for the last 30 years within the Spruce Fire Management Unit.

Table 8: Spruce Fire Management Unit Fires			
	30 Years (1980 – 2010)	Ignition Cause (1980 – 2010)	
Number of Fires	328	Lightning	281
Largest Fire (Acres)	5,337		
Total Acres Burned	28,167	Human/Other	47
Average Fire Size (Acres)	86		

According to BLM fire records for 1980 through present, only one large fire has impacted the Snow Water Lake and Warm Creek Allotments. The 2001 Snow Egbert Fire impacted the Snow Water Lake and Warm Creek Allotments. Table 9. shows the number of acres burned in each allotment. See Maps 4 and 6 for the area burned by this fire.

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Table 9: 2001 Snow Egbert Fire	
Allotments	Acres Burned
Snow Water Lake	625
Warm Creek	450

Direct and Indirect Effects of Alternatives

Alternative 1- No Action

Under this alternative the livestock grazing permit would remain the same. Cattle would still be the authorized grazing animal. Cheatgrass has been identified within the Snow Water and Warm Creek Allotments as a minor component in the unburned areas and as a plant of concern in the burned areas. Without any expected soil disturbances associated with new range improvements, cheatgrass would not be expected to become established throughout the native pastures. Crested wheatgrass pastures are believed to not be at risk of cheatgrass invasion. There are no direct or indirect impacts to fire management from this alternative.

Alternative 2a and 2b- Proposed Action

Under this alternative, either cattle or domestic horses could be authorized, though numbers of horses would be grazed at a 1:1.2 ratio as compared to cows. The grazing system proposed for this alternative would continue periodic deferment of grazing throughout the Snow Water Lake and Warm Creek Allotments through a 2 year rotation. Pastures that are grazed during the critical growing season would be deferred the next grazing year. Grazing deferment on a 2 year rotation would allow for perennial vegetation to recover from grazing impacts and allow for seed maturation. Soil disturbances associated with range improvements would occur and cheatgrass could be expected to increase throughout Snow Water Lake and Warm Creek Allotments. On years when grazing would be deferred to later in the grazing season, fine fuels (grasses) may increase throughout the deferred pastures and could pose an increased threat of wildfire throughout the allotments. The construction of proposed water developments may provide increased disturbance around construction sites and trough locations. Such disturbance from well construction and increased grazing activity around troughs may provide vectors for cheatgrass. However, higher grazing activity near trough locations would annually reduce the amount of standing fine fuels and reduce the threat of wildfire throughout the pasture.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Under this alternative, either cattle or domestic horses could be authorized, though numbers of horses would be grazed at a 1:1.2 ratio as compared to cows. The grazing system proposed for this alternative would allow for deferment of grazing throughout the Snow Water Lake and Warm Creek Allotments. Grazing would occur on the allotments after May 1st. Similar to the proposed action where grazing would be deferred to later in the grazing season, fine fuels (grasses) may increase throughout the deferred and rested pastures and may pose an increased threat of wildfire throughout the allotments. Pastures that have been rested would contain larger concentrations of fine fuels and this could increase the threat of a wildfire. The construction of proposed water developments may provide increased disturbance around construction sites and

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trough locations. Such disturbance from well construction and increased grazing activity around troughs may provide vectors for cheatgrass. However, higher grazing activity near trough locations would annually reduce the amount of standing fine fuels and reduce the threat of wildfire throughout the pasture.

Cumulative Impacts

The CESA for Fire Management is the Spruce Fire Management Unit. The Spruce FMU is described in the Northeastern Nevada Fire Management Plan and is 1 of 28 FMUs within the Northeastern Nevada FPU. This FMU lies generally within the Long/Ruby Valley and Spruce/Steptoe Valley sub-basins and ranges from 5,000 and 10,000 feet mean sea level (msl). Land ownership for this FMU is displayed in Table 10. Map 4 shows the location of the FMU, together with all fires that have occurred since 1980 within this FMU.

Public Acres	Private Acres	Bureau of Indian Affairs	Total Acres
1,249,341	173,936	142	1,423,419
88%	12%	<1%	

The Spruce FMU is the fire planning unit for the Spruce Mountain area and sets forth objectives and strategies for fire management within the Spruce FMU.

Past, present, and reasonably foreseeable future actions (PPRFFAs)

PPRFFAs within this CESA include livestock grazing, proposed vegetation treatments, proposed wild horse eco-sanctuary, mining, fuel woodcutting, commercial wood products, and commercial and dispersed recreation. No direct or indirect impacts from the Proposed Action or alternatives would occur to fire management outside of this CESA boundary. The potential exists for future wildfire events in the area, as does the potential for additional fuels management activities and possible wildland fire management for resource benefit. Some indirect effects from the Proposed Action and the Sage-Grouse Friendly Alternative include the possibility of increased fine fuels (perennial or annual grasses) due to deferred grazing, rest, or construction of water developments. However, the amount of fine fuels that may occur onsite site due to deferred grazing, rest, or disturbances associated with the construction of water developments would be relatively small scale; therefore, there are no cumulative impacts of concern related to Fire Management.

3.3.3 Invasive, Nonnative Species

Affected Environment

A “noxious weed” is defined as any species of plant that is, or is likely to be, detrimental or destructive and difficult to control or eradicate (Nevada Revised Statute [NRS] 555.010-555.220). Noxious weeds have become a growing concern in Nevada based on their ability to increase in cover relative to surrounding vegetation and exclude native plants from an area. The

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spread of noxious weeds has resulted in substantial economic impacts on some sectors of the State of Nevada (State). As a result, the State has enacted laws requiring the control of noxious weed species (NRS 555.005, NAC 555.010). In addition, the federal Noxious Weed Act of 1974, as amended (7 United States Code [USC] 2801 et. seq.) requires cooperation with State, local, and other federal agencies in the application and enforcement of all laws and regulations relating to the management and control of noxious weeds. Recognizing these regulations, the Bureau of Land Management (BLM) requires that National Environmental Policy Act documents consider and analyze the potential for the spread of noxious weed species and provide preventative rehabilitation measures for each management action involving surface disturbance.

The BLM considers plants “invasive” if they have been introduced into an environment where they did not evolve (i.e., non-native). As a result, invasive species usually have no natural enemies to limit their reproduction and spreading (Westbrooks 1998). Some invasive plant species can produce substantial changes to vegetation composition, structure, or ecosystem function (Cronk and Fuller 1995).

Noxious weeds and invasive species have the ability to readily establish and spread rapidly, particularly in disturbed areas, and may cause damage to agriculture, rangeland resources, and forestry, as well as increase fire susceptibility. Noxious weeds and invasive species are spread by a variety of means including vehicles, construction equipment, construction and reclamation materials, livestock, wildlife and wind. Vehicle traffic is a major contributor to weeds invading a new area because seeds and plant parts can become embedded in tire treads and any mud carried on a vehicle from an infested area. Weeds could then establish themselves most easily along roadways.

Cheatgrass is a concern within the understory of the sagebrush scrub community as cheatgrass provides very little habitat for threatened and sensitive species such as the Greater Sage-Grouse and the pygmy rabbit that rely upon sagebrush vegetation for food and shelter. Cheatgrass also is able to alter the natural fire regimes of the sagebrush community which often leads to an increase in noxious weed or invasive species infestations. The dry, dead cheatgrass stems produce a continuous layer of fuel to carry large and rapidly growing sagebrush fires.

Under NRS 555.010-555.220, noxious weeds are classified into three categories: A, B, and C. Each category has specific control requirements, with the most stringent requirements for those species found in Category A.

Category A includes noxious weeds, which are:

- Not found or limited in distribution throughout the state;
- Actively excluded from the state and actively eradicated wherever found; and
- Controlled by the state for all infestations.

Category B includes noxious weed species, which are:

- Established in scattered populations in some counties of the state;
- Actively excluded where possible; and
- Controlled by the state in areas where populations are not well established or previously unknown to occur.

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Category C includes noxious weeds, which are:

- Currently established and generally widespread in many counties of the state; and
- Controlled and abated at the discretion of the state quarantine officer (Nevada Department of Agriculture 2006).

Baseline vegetation studies, which included field assessments and subsequent documentation of invasive non-native plant species occurrences, are ongoing throughout the Elko District BLM. Invasive non-native species found within or adjacent to these allotments include: whitetop (*Cardaria draba*), Canada thistle (*Cirsium arvense*), Scotch thistle (*Onopordum acanthium*) and Russian knapweed (*Acroptilon repens*). Cheatgrass (*Bromes tectorum*) is a non-native invasive grass species that is prevalent in burned and disturbed areas throughout these allotments. It is also a minor component of the undisturbed plant communities throughout these allotments.

Direct and Indirect Effects of Alternatives

Alternative 1- No Action

The No Action Alternative would have minimal effects on current noxious and invasive species populations as long as current grazing management practices are continued. However, the No Action alternative does not provide additional safeguards to improve livestock distribution by adding new wells and fixing existing wells. Without these water improvements it could lead to an increase in risk in the spread and establishment of invasive and noxious weed populations.

There would be little indirect effect on invasive or noxious species populations under the No Action alternative if current management strategies are maintained. However, if grazing intensifies on the allotment, effects on soil and vegetation could have negative impacts on invasive and noxious species management. Since previous permittees have taken varying levels of non-use, it is reasonable to expect that livestock management is likely to intensify and therefore negative effects on soil and vegetation from invasive and noxious weed populations could increase.

Alternative 2a and 2b- Proposed Action/ Alternative 3 – Greater Sage-Grouse Friendly Alternative

Grazing impacts to vegetation would continue under this alternative and have the potential to insignificantly increase noxious weed prevalence and distribution based on differences in how horses graze, water, and digest food compared to cows. As noted elsewhere in this EA, there are several important differences between how horses and cows graze across the landscape. Cows have only lower incisors and typically consume forage by grasping plants with their tongues, drawing it into their mouths, and then biting with the lower incisors and upper dental plate. Cows tend to travel short distances while eating and will lie down for periods of time to allow rumination of consumed food to occur. In comparison, horses have both upper and lower incisors and lack the need to ruminate, and as such are capable of biting grass and other forage species much closer to the ground level. Horses also tend to take several steps between bites and will thus cover a much larger area than cows while grazing. On the other hand, horses typically

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cannot consume as much water in a single drinking period as cows due to the differences in their digestive systems. This may force them to visit water sources more times per day than cows. This ability to take in lower amounts of water could increase the amount of trails to and from water sources and increase localized grazing around water sources as compared to similar cattle grazing.

The differences outlined above would mean that consumed plants would be more completely utilized by horses than they would be by cows. This would reduce the amount of remaining leaf area and overall weaken the plant's ability to recover from a grazing episode. In addition, a horse of the same mass as a cow would need to consume more pounds of forage to meet its nutritional needs due to its less efficient digestive system (cecal versus ruminant). However, the way in which horses use the landscape would tend to leave more plants ungrazed between bites-while use on individual plants would be higher, overall utilization patterns could be much lighter across the landscape *assuming* that horses remove an equivalent number of AUMs as the currently authorized cattle grazing. The periods of deferment built into the grazing system, however, would allow the grazed plants opportunities to regrow and maintain vigor between periods of grazing.

The potential for increased trailing could add additional points of entry for weeds such as cheatgrass, whitetop, Russian knapweed, etc. The tendency for seeds to pass through a horse's digestive tract unaffected by digestive processes (cecum vs. ruminant) could enhance distribution of weed species, should horses consume them at the seed dissemination stage. Continued weed treatments and surveys within these allotments will eliminate these increased risks. Improved water distribution within these allotments will also help disperse these animals across the landscape reducing the grazing impacts on native/desirable vegetation thereby reducing the risk of noxious weed infestation. Regardless of the species chosen to graze these allotments, as long as the grazing is kept in balance with the natural environment the difference between kinds of livestock will only have minor differences on the landscape.

Cumulative Impacts

The CESA for noxious weeds and invasive species is the Snow Water Lake and Warm Springs Allotments. The past, present, and reasonably foreseeable future actions associated with these allotments include anything that could transport seeds and ground disturbing activities. Examples within this CESA include: potential mine exploration/development, past and future wildland fires (2001 Snow Egbert fire), Highway 93 (associated construction/maintenance and travel), powerlines, and recreational uses.

Invasive and noxious weed populations already exist within the CESA in un-reclaimed previously disturbed areas and along existing roads. The common elements associated with most weed infestations are anything that causes ground disturbance such as: wildfire, grazing, or use of motorized vehicles (transportation and disturbance), mining and exploration activities. Surface disturbances associated with mining typically create areas that are devoid of vegetation or are sparsely vegetated until desirable vegetation can become established after reclamation. Intensive long-term grazing in localized areas and burned areas as a result of wildfires can reduce the vegetative cover provided by native vegetation. Recent wildfires have converted what was once

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primarily sagebrush habitat to expanses of cheatgrass in some areas. Surface disturbances from off road recreational vehicle use and road maintenance vehicles can result in the loss of vegetative cover that will increase the risk of noxious and invasive weed cover and dominance.

Noxious weeds and invasive species readily become established in areas that have been subjected to surface disturbances that have removed or reduced vegetative cover. After weeds are introduced into an area, they generally continue to spread into adjacent areas. The spread of weeds results in the displacement of native vegetation important to wildlife.

Although all of these activities within the CESA increase the cumulative risk of noxious weed and invasive plant invasions, the risks posed by the Proposed actions when added to the PPRFFAs are minor.

3.3.4 Lands With Wilderness Characteristics

Affected Environment

Managing the wilderness resource is part of the BLM's multiple use mission. Lands with wilderness characteristics provide a range of uses and benefits in addition to their value as settings for solitude or primitive and unconfined recreation. Guidance and general procedures for conducting wilderness characteristics inventories is found under Section 201 of the Federal Land Policy and Management Act of 1976 (FLPMA) and supersedes all previous guidance on inventorying lands with wilderness characteristics.

Section 201 of FLPMA requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values, which includes wilderness characteristics. FLPMA also provides that the preparation and maintenance of the inventory shall not, of itself, change or prevent change of the management or use of public lands. Regardless of past inventories, the BLM must maintain and update as necessary, its inventory of wilderness resources on public lands. In some circumstances conditions relating to wilderness characteristics may have changed over time, and an area that was once determined to lack wilderness characteristics may now possess them. The proposed action may impact wilderness characteristics; therefore a wilderness characteristics inventory of the project area is required per BLM Manual 6310 Conducting Wilderness Characteristics Inventory on BLM Lands.

The 1980 Intensive Inventory was conducted on unit NV-010-015, Clover Valley, which was a 62,720 acre unit that was found to lack wilderness characteristics. On June 19, 2012, a Land with Wilderness Characteristics (LWC) inventory was conducted on NV-EK-03-443, Snow Water Lake Allotment a 15,243 acre area that was contained within the Clover Valley 1980 Intensive Inventory.

Direct and Indirect Effects of Alternatives

The LWC inventory of Snow Water Lake concluded that the area lacks wilderness characteristics; therefore there will be no direct or indirect effect on LWC because of this project.

3.3.5 Livestock Grazing

Affected Environment

Livestock grazing is one of the most important economic activities in Elko County. A 2003 study identified 142 economic sectors within the Elko County economy. Cattle ranching recorded \$53.8 million in output value, which ranked this industry 8th out of the 142 sectors; the sector employed 482 people, representing 2.53% of the total workforce, which ranked this sector 9th out of the 142 sectors; the industry realized \$43.5 million in export sales, representing 5.77% of Elko County's total exports, which ranked this sector 4th out of the 142 sectors. Total economic impact of the industry to Elko County amounted to \$96.6 million dollars, with a total direct and indirect payroll of 905 jobs representing \$14.4 million in income (Alevy, Jonathan, et. al., 2007; Fadali, Elizabeth, et. al., 2009; Fadali, Elizabeth, and Thomas R. Harris., 2006; Harris, Thomas R., et. al., 2007).

Elko County has a land base of just under eleven million acres, of which 71.5% is in Federal ownership. Private farm and rangelands occupy another 26% of the county's land base, with the remaining 2.5% of the land base occupied by other uses. Hay is the principle crop raised on the private farmlands. The 1997 Census of Agriculture counted 402 farms and ranches in the county, with an aggregate cow herd ranking Elko County fourth in the nation in terms of animal numbers. Approximately 68% of all Elko County beef cow operations held federal grazing permits. The average Elko county ranch derives 49% of its annual forage requirements from public lands. Each Animal Unit Month (AUM) utilized on public lands in Elko County is estimated to have a total annual production value of \$38 and a total annual economic impact of \$68 when considered independently of private land resources; when combined with private lands involved in livestock operations, these figures increase to an annual production value of \$84 per AUM and a total economic impact of \$148 per AUM. In 2006, an estimated 152,000 cows grazed within the county.

The current grazing permit for the Snow Water Lake Allotment allows cattle grazing from 1 March to 11 July and 1 November to 31 December annually with a total permitted use of 1,106 AUMs. The current grazing permit for the Warm Creek Allotment allows cattle grazing from 13 April to 11 July annually with a total permitted use of 118 AUMs. A management plan further specifies where livestock can be in each allotment within the date ranges on the permit. The combined 1,224 AUMs represent a total potential annual economic impact of \$83,232 to the Elko County economy for the public AUMs alone. (The private and public lands combined represent a potential annual economic value of \$181,152.)

Under the current management plan based on a cow-calf operation, livestock normally turn out onto public lands on the west side of Highway 93 in March and are rotated through Pastures A, B, and C of the Snow Water Lake Allotment and the Warm Creek Allotment through July 11th each year. Livestock are then normally held on residual farming stubble and other forage on private lands until the first of November, when they are turned out onto the Creek and Lake Pastures of the Snow Water Lake Allotment for the remainder of the year. Livestock are then normally fed hay and held on private land through the winter. The sale of calves and culled cows provides the majority of the ranch income.

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Direct and Indirect Effects of Alternatives

Alternative 1- No Action

Under the No Action Alternative, a 10-year grazing permit with the existing terms and conditions would be issued. The current management plan would remain in effect. Overall economic impact to Elko County would be unchanged from the current situation described in the affected environment.

Alternative 2a and 2b- Proposed Action

Under this alternative, the current grazing permit would authorize either cows or domestic horses. Grazing cows would have no impacts as compared to the No Action Alternative, as the level of authorized grazing use would remain the same. Grazing horses would essentially remove this operation from the agricultural sector of the Elko County economy, as it would no longer utilize resources derived from public and private lands to produce agricultural commodities.

The private base properties associated with the grazing privileges on the Snow Water Lake and Warm Creek Allotments are the planned future site of the headquarters for Saving America's Mustangs proposed wild horse eco-sanctuary. Proposals for the eco-sanctuary do not include any of the public lands lying within either of these allotments. The proposed domestic horse grazing on the Snow Water Lake and Warm Creek Allotments would be regulated as if it were a production livestock operation and would be expected to operate within the constraints of the regulations governing grazing on public lands managed by the BLM. The domestic horses grazed on the Snow Water Lake and Warm Creek Allotments are not and would not be wild horses. Operation income would shift from sale of agricultural products to other sources, likely tourist dollars and private donations.

The proposed range improvements would serve to better distribute livestock across Pastures A, C, Creek, and Lake Pastures of the Snow Water Lake Allotment and the Warm Creek Allotment. Presently, only one dependable water source exists in each of the Warm Creek Allotment and Pasture A of the Snow Water Lake Allotment, which tends to concentrate animals around those areas and causes the animals to expend energy trailing between water and grazing areas. Only one functional well presently exists that serves the Lake and Creek Pastures, though surface water is generally available in the lake, in the sloughs, or in several small springs, especially in the spring months. Rebuilding the two existing wells in these pastures would lessen the reliance on undependable surface water and allow the animals to expend less energy trailing to and from the functional well. The permittee would be expected to bear most costs associated with drilling the two new wells and rehabilitating the two existing wells.

Horses do differ from cows in many important ways. Three of the most prominent, dietary overlap with other species, competition for water, and feed efficiency will be dealt with.

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Diet/Dietary Overlap with Other Species

Although horses and cattle are often compared as grazers, horses have been cited as more destructive to the range than cattle due to their digestive system and grazing habits. Horses are cecal digesters while most other ungulates including cattle, pronghorn, and others are ruminants (Hanley and Hanley 1982, Beever 2003). Cecal digesters do not ruminate, or have to regurgitate and repeat the cycle of chewing until edible particles of plant fiber are small enough for their digestive system. Ruminants, especially cattle, must graze selectively, searching out digestible tissue (Olsen and Hansen 1977). Horses, however, are one of the least selective grazers in the West because they can consume high fiber foods and digest larger food fragments (Hanley and Hanley 1982, Beever 2003).

Horses can exploit the high cellulose of graminoids, or grasses, which have been observed to make up over 88% of their diet (McInnis and Vavra 1987, Hanley 1982). However, this lower quality diet requires that horses consume 20-65% more forage than a cow of equal body mass (Hanley 1982, Menard et al. 2002). With more flexible lips and upper front incisors, both features that cattle do not have, horses trim vegetation more closely to the ground (Symanski 1994, Menard and others 2002, Beever 2003). As a result, areas grazed by horses may retain fewer plant species than areas grazed by other ungulates. A potential benefit of a horse's digestive system may come from seeds passing through system without being digested, but the benefit is likely minimal when compared to the overall impact [wild] horse grazing has on vegetation in general.

Horses also compete with wildlife species for various habitat components, especially when habitat resources become limited (i.e. reduced water flows, low forage production, dry conditions, etc.). Smith (1986) determined that elk and bighorn sheep were the most likely to negatively interact with wild horses. Hanley and Hanley (1982) compared the diets of feral horses, domestic cattle and sheep, pronghorn antelope, and mule deer and found that horse and cattle diets consisted mostly of grasses, pronghorn and mule deer diets consisted mostly of shrubs (>90%) and sheep diets were intermediate. Due to different food preferences, diet overlap between wild horses, deer, and pronghorn rarely reaches above 20% (Hubbard and Hansen 1976, R. Hansen, R. Clark, and W. Lawhorn 1977, Meeker 1979, Hanley and Hanley 1982).

Water

For wildlife and domestic species living in arid environments, the availability and location of water is critical not only for survival but for habitat utilization. Feral horses have been observed to travel great distances to and from water daily, and during dry summer months when less water is available from seasonal sources, horses remain slightly closer to perennial water sources than in the winter and spring (Ganskopp and Vavra 1986, R. Hansen, R. Clark, and W. Lawhorn 1977).

Horses have been found to have some effect on the frequency of use of a water source by other wildlife in arid environments. (Ostermann-Kelm et al. 2008). The presence of wild horses at water sources is believed to deter the use of that water by pronghorn antelope until the horses leave the area.

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Feed Efficiency

A review of some selected literature yields the following equivalent rates for converting animal units or numbers from cattle to horses:

-Sedivec, Kevin. Determining Pasture Rental Rates. North Dakota State University publication R-1092, May 1996. "Mature Horse" rated at 1.5 Animal Units (where a 1,000 lb. cow/calf pair rates 1.0 Animal Units).

-Ruyle, George, and Phil Ogden. What is an A.U.M.? Arizona Ranchers' Management Guide, Arizona Cooperative Extension- University of Arizona, 1993. 1 cow AUM represents 0.9 horse AUMs, which represents a 1:1.11 conversion factor from cow to horse.

-Pratt, Mindy and G. Allen Rasmussen. Determining Your Stocking Rate. Utah State University Cooperative Extension publication NR/RM/04, May 2001. One Mature Horse represents 1.25 Animal Unit Equivalents (citing to USDA NRCS National Range and Pasture Handbook).

-University of Nebraska- Nebraska College of Technical Agriculture. Horse Pasture Grazing and Stock Rates. May 2010. "*Horses, in particular, are patch grazers, causing under-utilization of some areas and overgrazing of others. This is where use of some type of rotational grazing system can be beneficial. However, the most important factor affecting the health and persistence of a pasture is stocking rate... Stocking rate includes the number of animals (or animal units), pasture area, and length of time that the pasture will be grazed each year. ..For non-ruminants like horses, the specific assignment of an AU value is less clear, but the principle that a larger animal eats more than a smaller one holds true. There are some sources that value yearlings at 0.75 AU, two-year old horses at 1.0 AU, and mature light horses at 1.25 AU.*"

-Manitoba Agriculture, Food and Rural Initiatives. Animal Unit Months, Stocking Rate and Carrying Capacity. No Date. Horse listed as 1.20 Animal Unit Equivalents.

-Government of Alberta, Agriculture and Rural Development. Stocking Rates and AUM- Frequently Asked Questions. June 2003. Yearling horses = 0.75 Animal Unit Equivalents; 2-year old horses = 1.00 Animal Unit Equivalents; 3-year old horses = 1.50 Animal Unit Equivalents.

-Redfearn, Daren D. and Terrence G. Bidwell. Stocking Rate: The Key to Successful Livestock Production. Oklahoma State University Cooperative Extension Fact Sheet PSS-2871. Horses given Animal Unit Equivalent rate of 1.25.

-Holechek, Jerry L., et. al. Range Management, Principles and Practices. Prentice-Hall, Third Edition, 1998. 1,200 pound horse rated at 1.80 Animal Unit Equivalents; however, this is based on one AUM equaling 600 pounds of forage. If calculations are made using the more commonly accepted 780 lbs. of dry forage, the AUM equivalency drops to 1.38.

The permittee has proposed converting the existing AUMs on these allotments from cows to horses at a 1:1.2 ratio, which is towards the lower end of the range reported in the above

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citations. Under the proposed grazing system if horses are grazed, the permittee would continue grazing 200 horses in lieu of the presently authorized 200 cows; while authorized AUMs would be reduced to 922 AUMs on the Snow Water Lake Allotment and 99 AUMs on the Warm Creek Allotment. The total amount of forage removed would be the same if 200 cows or 200 horses were grazed under the grazing system outlined because the number of AUMs are fewer if the permittee chooses to graze horses. (i.e., The permittee would need to shorten the grazing season to not exceed the total number of permitted AUMs if they choose to graze the full 200 head of horses.) . The proposed conversion rate(1:1.2) should be sufficient assuming that the smaller sized horses currently grazing on the base property are used; however, the ratio may need to be adjusted upwards if larger sized horses are brought in and/or monitoring data shows excessive forage utilization.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Under this alternative, permitted use would remain the same on both allotments; however, the amount of authorized livestock use annually would decrease due to rested pastures. The AUMs associated with the rested pastures would be placed into non-use status for that year. The amount of non-use would vary from year to year depending on which pasture or pastures are rested. Turnout date would be deferred until May 1st each year to reduce any potential impacts with the Sage-Grouse nesting season. The Warm Creek Allotment would alternate between rest and use in alternate years. Pastures A, B, and C of the Snow Water Lake Allotment would be rested two years out of six. Total use in the Snow Water Lake Allotment would vary between 824 and 936 cattle AUMs (686 and 780 horse AUMs) annually, depending on which combination of pastures would be rested.

Overall impacts would be similar to those described in Alternative 2 with a few key exceptions. The reduced AUMs and seasons of use available on the public lands would force the domestic horse operation to derive more of its forage requirements from private lands, either through increased hay production, utilizing more of the native and/or seeded rangeland on the private lands, or purchasing additional hay from outside sources. All of these options would lead to increased operational costs for the permittee and/or increased impacts from livestock grazing on the private land. These additional restrictions and the loss of forage from public lands could threaten the financial viability of the operation if it has to rely on traditional sources of ranch income. However, the economic models and goals of the kind of operations proposed by the permittee should horses be run would negate some of these impacts for as long as the ranch operates as part of the proposed headquarters for the Northeast Nevada Wild Horse Eco-Sanctuary.

Cumulative Impacts

The CESA for Livestock Grazing is the Snow Water Lake and Warm Creek Allotments.

Livestock grazing would continue under any of the three proposed alternatives. Alternative 1 (No Action Alternative) would continue the existing livestock operation in place on the allotments and would continue the positive economic impacts to the agricultural sector of the Elko County economy. Alternatives 2a and b and 3a and b would authorize varying levels of

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either domestic horse or cattle grazing; however, the economic activities associated with that use should horses be run would be attributed to sectors of the economy other than production agriculture (i.e., primarily tourism). Alternative 3 would authorize either horse or cattle grazing, but at reduced levels as compared to the other two alternatives.

Despite the economic importance of the farming and ranching industry to the local economies, the business of livestock grazing remains challenging. Rates of economic return on investment are low, usually averaging about two percent. Volatile cattle and energy input prices and ever increasing equipment capital costs hamper the viability of livestock operations. Increased mining activity driven by high mineral prices and expanding use of public and private lands for recreation also causes conflicts with the livestock industry. Trends in livestock operation demographics in Elko County show a general increase in the number of individual ranch operations, a decrease in the physical size of individual operations, and a gradual aging of the ranching population. These trends reflect the on-going break up of large commercial cattle operations into smaller hobby and/or lifestyle ranches and the lack of recruitment into the industry as children of operators leave the ranch for better opportunities elsewhere.

The role of western rangelands in the livestock industry has been declining in recent decades, largely through the abundant availability of cheap grains fueled by cheap oil. However, the increased demand for grains (principally corn) for competing uses, especially energy production, has reversed these trends in the past several years. Range grazing of livestock is “proven to be the most environmentally benign and energy efficient of all land-based food production systems” and involves 30-80% less energy input than present production systems (Holecheck, 2007). Predictions are that future energy shortages may re-emphasize and promote the role of western rangelands, both private and public, to meet American food needs.

3.3.6 Native American Concerns

Affected Environment

In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P.L. 94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601) and Executive Order 13007, the BLM must provide the affected Tribes and Bands the opportunity to comment and consult on proposed BLM land management actions. The BLM must also make efforts to identify locations having traditional, cultural, or religious values to Native Americans and insure that land management actions do not unduly or unnecessarily burden the pursuit of traditional religion or life ways by inadvertently damaging important locations or hinder access to them.

Located within the traditional territory of the Western Shoshone and the Goshute, the Elko District, Wells Field Office, contains spiritual/traditional/cultural resources, sites, and social practices that aid in maintaining and strengthening social, cultural, and spiritual integrity. Recognized tribal entities with known interests in the general area of the Snow Water Lake and Warm Creek Allotments are the Te-Moak Tribe of Western Shoshone (Wells and South Fork Bands) and the Confederated Tribes of the Goshute Indian Reservation. The most local tribal

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communities and/or reservation lands are located at the town of Wells (North of Warm Creek Ranch – 22 mi.) and at Odgers Ranch (South of Warm Creek Ranch in Butte Valley – 43 mi.).

Contributing elements that assist in maintaining social and spiritual integrity include, but are not limited to: antelope traps; certain mountain tops used for prayer; medicinal and edible plant gathering locations; prehistoric and historic village sites and gravesites; sites associated with creation stories; hot and cold springs; material used for basketry and cradle board making; locations of stone tools such as points and grinding stones (mono and matate); chert and obsidian quarries; locations supporting spiritual ceremony, pine nut harvesting, traditional gatherings, and camping; unique geologic features such as rocks or boulders used for offerings and medicine gathering; tribally identified Traditional Cultural Properties (TCP's); TCP's found eligible to the National Register of Historic Places; rock shelters; "rock art" locations; lands that are near, within, or bordering current reservation boundaries; lands that conflict with tribal land acquisition efforts that involve the Nevada Congressional Delegation; and all water sources.

Specifically, within the general area adjacent to these two allotments, known locations of significant tribal concern (as provided by tribal participants during past consultations) are:

- Clover Valley geological formation associated with a creation story – located on private land.
- Pine nut producing pine trees located West of Warm Creek Ranch/US93 (located on Forest Service administered) and at Spruce Mountain.
- Antelope traps in the Spruce Mountain vicinity.

Given the description of the proposed action itself (grazing permit renewals) and the fact that only two minor site-specific and new ground disturbing projects are proposed through this action (2 proposed new well locations), it is believed that no adverse impacts to traditional/cultural/spiritual sites, resources, or associated activities would occur. Within Section 3.3.1 Cultural Resources, Affected Environment, of this document it states: "These impacts [from grazing] were relatively minor and likely no more a contributing factor to the degradation of historic properties than natural forces..." and "...site condition in the vast majority is good to extremely good based upon the number of complete and nearly complete projectile points, limited trampling evidence on other tools and debitage and the presence of complete or nearly complete glass bottles in historic sites."

Limited information exists as to livestock impacts to those rare edible/medicinal plant species identified by tribal participants in the past and throughout the Elko District. Within the two analyzed allotments, no edible/medicinal plant harvesting (other than pine nuts) is known to exist.

However, because the location of the action described in the Environmental Assessment lies, generally, between Wells and Ely, Nevada, and due to verbal requests by tribal leadership to do so, a preliminary EA will be provide to the following Tribal entities: Wells Band Council, South Fork Band Council, Te-Moak Tribe of Western Shoshone, and the Confederated Tribes of the Goshute Indian Reservation. Consultation is ongoing and new information may be provided by participating tribal representatives that could alter BLM project design and location, proposed implementations, and/or decision making.

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Alternative 1- No Action

Grazing would continue within the two allotments, with the low likelihood of any effect to spiritual, religious, or traditional use resources. For further discussion of cultural resources (archaeological sites) see section 3.3.1 of this document.

Alternative 2a and 2b- Proposed Action

Grazing would continue within the two allotments, with the low likelihood of any effect to spiritual, religious, or traditional use resources. For further discussion of cultural resources (archaeological sites) see section 3.3.1 of this document.

Alternative 3a and 3b – Greater Sage-Grouse Friendly Alternative

Grazing would continue within the two allotments, with the low likelihood of any effect to spiritual, religious, or traditional use resources. For further discussion of cultural resources (archaeological sites) see section 3.3.1 of this document.

Cumulative Impacts

It is believed that cultural resources, including tribal resources and sites of cultural, traditional, spiritual use and associated activities are increasingly in danger of losing their physical and spiritual integrity. As populations grow, public interest in utilizing lands administered by the BLM increases and thus the potential for the decline of culturally sensitive areas also increases. Different world views and social and spiritual practices and beliefs often conflict with each other. Because the traditional territory of the Western Shoshone, Goshute, and Paiute encompass the majority of the State of Nevada, including the Elko District, Wells Field Office, it is imperative that BLM and affected Tribes remain flexible and open to productive and proactive communication in order to assist each other in making decisions that will significantly reduce or eliminate any adverse affects to all parties involved.

A Native American Religious Concerns Cumulative Effects Study Area (CESA) boundary has been recommended to include the watershed of Clover Valley. This watershed incorporates the ridge top of the Wood Hills to the northeast, running south across the valley floor to the tip of Spruce Ridge, follows to Spruce Mountain and then cuts west to the southern boundary of the East Humboldt Mountains. From there, it continues north to an approximate location near Angel Lake where the boundary rejoins with the Wood Hills (see map 5). Traditional Native American use of the area has been suggested to be largely dependent upon the availability of water (Stewart, 1936). No areas of religious, spiritual or traditional concern have been identified through consultation; therefore no cumulative impacts have been identified.

3.3.7 Recreation

Affected Environment

The Snow Water Lake and Warm Creek Allotments are used for dispersed recreational activities. No developed recreational facilities exist within either allotment. Most recreational activities occurring on these allotments are camping and off-road vehicle use associated with the late summer and fall big game hunting seasons. Portions of the Hastings Cutoff of the Emigrant Trail pass through the Snow Water Lake Allotment, and trail enthusiast groups have placed several signs and monuments on or around the allotment marking the route of the trail. Other dispersed recreation activities include camping, photography, wildlife viewing, sightseeing/exploring, and upland game hunting.

Direct and Indirect Effects of Alternatives

Alternative 1- No Action

Under this alternative dispersed recreation use would continue in the same way as is occurring now. Recreationists see the grazing operation while recreating; they go through gates at fences, and know of or use existing springs and other water sources. Livestock are seen throughout the area but to the casual user, this presence is random and the norm. There are livestock trails present through the vegetation, and recreationists use them rather than walking cross-country.

Alternative 2a and 2b- Proposed Action

Under this alternative, grazing could occur with either cattle or horses. Grazing horses would likely substantially increase recreational uses of the public lands on these allotments, especially if the proposed Northeast Nevada Wild Horse Eco-Sanctuary comes to fruition. The horses would be expected to draw sightseers, some who would come specifically to view the horses. There would be no difference in impacts if horses are a mixed herd or a gelded herd as specified in Alternative 2b. Should cattle grazing continue, the proposed grazing system would not result in any net increase in livestock use, though cattle would be present on the public lands for shorter periods of time than as under the existing grazing system. The proposed range improvements would not likely have any additional impacts to recreational uses.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Impacts of this alternative would be similar to those under Alternative 2. If horses are grazed, they would be expected to draw increasing numbers of viewers, but the rested pastures would lower the chances of casual recreationists coming into contact with domestic grazing animals. There would be no difference in impacts if horses are a mixed herd or a gelded herd as specified in Alternative 3b.

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Cumulative Impacts

The CESA for recreation is the Snow Water Lake and Warm Creek allotment boundaries. Saving America's Mustangs has proposed the Warm Creek Ranch within the Snow Water Lake Allotment as the future location of the headquarters of the Northeast Nevada Wild Horse Eco-Sanctuary. The eco-sanctuary will not include any public lands within either allotment. However, according to Saving America's Mustangs website (https://www.savingamericasmustangs.org/index.php/info/mustang_monument/, accessed 12 June 2012), the eco-sanctuary will feature extensive recreational activities, as follows:

“There will be endless activities on the grounds; complete with electronic classrooms equipped with educators and seminars about the wild horses and Native American history. Guided hikes through the desert, camping in teepees, special campfires with musical storytelling and Native American legends, arts and crafts, creative writing, photography, internships, and learning the science of the land and caring for the horses will be just a few of the things guests can participate in. There will also be plenty of eco-friendly tents and teepees for lodging.”

While most of these activities are restricted to private land, a few of the activities could occur on public land- likely at least partially including those in the Snow Water Lake and Warm Creek Allotments- and would need to be authorized through Special Recreation Permits and would be analyzed through an environmental analysis process. There are no cumulative impacts of concern.

3.2.8 Soil Resources

Affected Environment

Soils in the project area are Aridisols that vary in depth, texture, erosion potential, and other characteristics based upon several soil forming factors. These soils have a mesic temperature regime and aridic soil moisture regime. Isolated patches of hydric soils are present near water resources. Topography within the project area consists of a Pleistocene lake bed, dunes, and dissected alluvial fans. Soils on these features are generally deep and formed from parent materials that were deposited by water or wind. The surface textures of the soils ranges from fine sandy loam in the lake bed to very gravelly loam on the western edge of the the project area. Hazard of erosion by wind is high for 8%, moderate for 67% and low for 25% of soils in the project area. Hazard of erosion by wind is highest with fine soils in the eastern portion of the project area and decreases as soils become coarser to the west. Hazard of erosion by water when soils are disturbed is slight throughout the area. More information regarding soil characteristics can be found in the Standards and Guidelines assessment (BLM 2012) or the NRCS soil survey (USDA, 2002).

A small portion of the project area has soils that are capable of producing a biological soil crust cover. The remaining area has soils which either have too coarse a soil texture, or are flooded too frequently to develop soil crusts. Observations indicate that moss crusts are present in areas capable of producing crusts on public land. Cyanobacterial crusts have not been observed anywhere in the project area. Areas of livestock concentration and other disturbance such as near

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springs, watering wells, fencelines and roads also do not contain biological soil crusts. Biological soil crusts are important for reducing wind erosion, inhibiting weed growth, improving infiltration and preventing soil splash erosion (BLM 2001).

Soils within the project area are currently impacted by a wide variety of natural and anthropogenic influences. Actions which affect soil quality include but are not limited to recreation, wildfire, climatic variability, grazing, and hoof action. These activities can result in a variety of impacts which vary in spatial and temporal scale and severity. Most existing impacts to soils are dispersed; however, there are some impacts from fencing, road construction, and livestock improvements, which result in small scale, potentially severe impacts to soils. These activities result in removal of vegetation, soil compaction, and other impacts to soil quality factors. Short term impacts such as dispersed recreational use have not been observed to impact soil quality in the long term. Continued use of long term facilities such as water developments and roads will continue to result in small scale impacts to soils which are not likely to recover without targeted restoration. The project area also receives long term low intensity impacts from livestock grazing, dispersed recreation, and climatic variability. The area has been grazed historically by cattle likely resulting in some impacts to soil quality. Recent drought and climatic variability in general has likely affected soil quality by reducing vegetative productivity, infiltration, aggregate stability, and other soil quality factors. These impacts are likely exacerbated by the effects of global climate change (Karl et. Al 2009).

Qualitative and quantitative assessment of soils within the subject area indicates that while there are some negative impacts to soils, these soils exhibit characteristics that are appropriate to soil type, climate, and landform. Monitoring found that sufficient vegetative cover exists on these allotments to stabilize soils and ensure proper infiltration. In addition, rangeland health assessments completed at key areas within the project area show none to slight departures from expected for all indicators at the three key areas except for the Warm Creek Allotment, where two of the indicators received slight to moderate departures because of the lack of bunchgrasses. More details regarding this monitoring can be found in the Standards and Guidelines assessment (BLM 2012).

In general, grazing impacts soil quality directly through alteration of physical soil properties and indirectly through removal of vegetation.

Direct and Indirect Effects Common to All Alternatives

Grazing and related activities can potentially impact soil resources within the project area by affecting the soil's physical properties and through removal of vegetation. Direct impacts include compaction, hoof shear and other physical impacts which reduce aggregate stability increasing the likelihood of erosion by wind and water (USDA 2001). These direct impacts also occur to biological soil crusts where present. The effects of these impacts are similar to those described above with the addition that affected biological soil crusts would take longer to recover. Similar impacts occur indirectly as a result of vegetation removal. Through a decrease in vegetative cover, grazing can increase exposure of soils to erosion from rainfall impact. A decrease in vegetative vigor due to grazing stress and increased susceptibility to weed establishment can also increase the hazard of erosion.

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Impacts to soil resources could be greater in the future under all of the alternatives than in recent years, because previous operators did not graze as many animals as were permitted, or did not use all of the pastures that they were permitted to use. If the current or future operators graze more than past operators did there may be unforeseen impacts to soils.

Alternative 1- No Action

Under the No Action Alternative, the current impacts to soils would be expected to continue, but may also increase or decrease depending on decisions made by the operator regarding the number of animals and length of time grazing occurs on the allotments. It is possible that increased impacts could lead to some negative effect to soils, but this would not lead to any major shift in soil quality that would result in rangeland health standards not being met in the short term. Any negative impacts would likely be gradual and could be addressed and corrected during the next permit renewal with few long term effects.

Alternative 2a and 2b- Proposed Action

The proposed action would implement a new grazing system, change the kind of animals grazing, and install/reconstruct rangeland water improvements, all of which would result in some positive and some negative impacts to soil resources. Proposed rotation and rest of pastures should reduce the potential for adverse impacts, but the uncertainty regarding the level of impacts under the Proposed Action is still greater when compared to the No Action Alternative because the change of use from cattle to horses within these two allotments is unprecedented at this scale. Even if negative effects occur as a result of the proposed changes in grazing use, it is not likely that this would lead to any major shift in soil quality that would result in rangeland health standards not being met in the short term. Any negative impacts would likely be gradual, and could be addressed and corrected during the next permit renewal with few long term effects.

Installation of livestock watering wells and distribution systems would likely decrease adverse impacts to some soils but increase adverse impacts to others. Impacts would be similar to those observed at other livestock watering wells within the project area. Heavy impacts would occur to about two acres in the immediate vicinity of all well sites. Additional impacts would also occur to the portion of the allotment served by the watering wells but this would not likely lead to any recognizable departure from the current condition. Biological soil crusts would disappear in the areas surrounding the proposed new water projects and would decrease in nearby areas that would see increased livestock use. However, soil crusts would likely improve in areas with less livestock use. Recovery of biological soil crusts can take between 5 and 250 years based on soil characteristics and climate variables (Musha, 2006).

Alternative 3 – Greater Sage-Grouse Friendly Alternative

The effects of Alternative 3 would be similar to those described for the proposed action. The periods of rest would be longer than under Alternative 2 and this may benefit soil quality.

Cumulative Impacts

The Cumulative effects study area (CESA) is the Clover Valley Watershed Basin (see Map 5). The CESA is defined as this area because water consumption and use within this watershed may indirectly affect or be affected by soil resources within the project area, and grazing use also impacts soils within the project area as described above. Impacts to basin wide water supply are described in the water resources section of this document. Water supply within the basin has likely affected soils by decreasing the amount of available water and changing the soil structure in much of the project area. Other cumulative effects to soils such as impacts from roads, invasive species, and recreation are described above for the affected environment. These cumulative impacts have already resulted in substantive cumulative effects within the basin which would continue to occur and may slightly increase or decrease under all of the alternatives. The incremental change in impacts that could occur under the alternatives is very small when compared to the cumulative impacts that occur within the basin as a whole.

3.3.9 Special Status Species, Migratory Birds, and Other Wildlife including Fisheries and other Aquatic Species

Affected Environment

WARM CREEK ALLOTMENT

The affected environment for wildlife in the Warm Creek and Snow Water Lake Allotments are discussed separately, since the allotments differ somewhat in habitat types present and in wildlife species that may occur. The Warm Creek Allotment provides habitat for a diversity of wildlife species, including: mule deer, elk, pronghorn, upland game birds, meso-carnivores, small mammals, passerine birds, waterfowl, raptors, amphibians, reptiles, and invertebrates. Habitat within the allotment is dominated by black sagebrush vegetation, with an herbaceous understory of needle and thread, Indian ricegrass, cheatgrass, and a variety of forbs. Additional habitat types found in smaller proportion include encroaching juniper woodland and 372 acres of perennial grasslands containing a minor shrub component on the north end of the allotment. These grasslands are a result of BLM rehabilitation efforts following the Egbert wildfire in 2001. The 2012 Standards and Guides Assessment documented that current livestock grazing was in conformance with guidelines for Standard 3: Habitat. Priority wildlife species were derived through consultation with NDOW and using the Nevada Comprehensive Bird Conservation Plan (BCP; GBBO 2010). The primary habitat type within the allotment is sagebrush; therefore, priority bird species were identified using the BCP habitat account for sagebrush (Standards and Guidelines Assessment; Table 3). In addition, NDOW suggested Loggerhead Shrike (*Lanius ludovicianus*), Bald Eagle (winter; *Haliaeetus leucocephalus*), Rough-legged Hawk (winter; *Buteo lagopus*) and Common Nighthawk (*Chordeiles minor*) as additional priority bird species for the area (Standards and Guidelines Assessment; Table 3). While the list is not comprehensive of all bird species that may use the allotment, by managing for conservation of a suite of priority species it ensures that habitat needs are met for the remainder of sagebrush-associated species. Non-avian priority species were determined in consultation with NDOW.

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Special Status Species BLM's policy for management of special status species is found in BLM Manual Section 6840. Special status species include the following:

- Federally Threatened or Endangered Species: Any species that the United States Fish and Wildlife Service (USFWS) has listed as an endangered or threatened species under the ESA throughout all or a significant portion of its range.
- Proposed Threatened or Endangered Species: Any species that the USFWS has proposed for listing as a federally endangered or threatened species under the ESA.
- Candidate Species: Plant and animal taxa that are under consideration for possible listing as threatened or endangered under the ESA.
- BLM Sensitive Species: 1) Species that are currently under status review by the USFWS; 2) Species whose numbers are declining so rapidly that federal listing may become necessary; 3) Species with typically small and widely dispersed populations; or 4) Species that inhabit ecological refugia or other specialized or unique habitats.
- State of Nevada Listed Species: State-protected animals that have been determined to meet BLM's Manual 6840 policy definition.

Nevada BLM policy is to provide State of Nevada listed species and Nevada BLM sensitive species with the same level of protection provided to candidate species in BLM Manual 6840.06C. Nevada protected animals that meet BLM's 6840 policy definition are those species of animals occurring on BLM-managed lands in Nevada that are: 1) 'protected' under authority of the Nevada Administrative Code; 2) have been determined to meet BLM's policy definition of "listing by a state in a category implying potential endangerment or extinction;" and 3) are not already included as federally listed, proposed, or candidate species (BLM Information Bulletin NV-2003-097).

Greater Sage-Grouse

Instruction Memorandum 2012-043 delineated two categories of Greater Sage-Grouse habitat for management purposes: Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH). PPH comprises areas that have been identified as having the highest conservation value to maintaining sustainable Greater Sage-Grouse populations. These areas include breeding, late brood-rearing, and winter concentration areas and have been identified by the BLM in coordination with NDOW. PGH comprises areas of occupied seasonal or year-round habitat outside of priority habitat, and these areas have also been identified.

Over 99% of the Warm Creek Allotment is categorized as Preliminary General Habitat (Map 6). Only about 15 acres, in the extreme northwestern corner of the allotment in a patch of unburned sagebrush, is categorized as PPH. In contrast to a number of recommended conservation measures for PPH, management direction for PGH in IM 2012-043 is limited to the following:

The intent of these interim conservation policies and procedures in PGH is to reduce and mitigate adverse effects on Greater Sage-Grouse and its habitat to the extent practical. These policies and procedures differ from those applied to PPH.

- When approving uses and authorizations, consider and analyze management measures that would reduce direct, indirect, and cumulative adverse effects on Greater Sage-Grouse and its habitat. For example, consider alternatives that

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would increase buffer distances around active leks and timing restrictions within existing LUPs as needed to further reduce adverse effects on Greater Sage-Grouse and its habitat.

- Consider deferring authorizations in PGH where appropriate, depending on local characteristics, new science and/or data (e.g., migratory corridors or habitat between PPH), and relative habitat importance if authorizations could result in Greater Sage-Grouse population loss in PPH.
- Consider offsite mitigation measures in collaboration with state wildlife agencies and project proponents when authorizing activities.
- Evaluate and address anticipated fence collision risks within 1.25 miles of leks and other seasonal habitats. Where NEPA analysis suggests that a deviation from this distance is warranted, modifications of this distance are acceptable.

The nearest lek is located 1.4 miles southeast of the allotment, on privately owned land (S&G Assessment, Figure 5). Nine additional leks are located within 5.3 (8.5 km) miles of the allotment (S&G Assessment Table 4, Figure 5), which is the size of nesting areas around leks in lower density and fragmented habitats described by Doherty et al. (2010a, 2010b) and Holloran and Anderson (2005). The status of each lek is displayed in Table 4 of the Standards and Guidelines Assessment.

No habitat use studies (e.g., radiotelemetry) have been conducted within or near the allotment. It is not known to what degree Sage-Grouse hens nest or rear broods within or near the allotment, but it is likely that nesting occurs within the sagebrush stands. C. McAdoo (NDOW, per com, 8/2012) has observed juvenile grouse within the allotment in mid-summer, indicating that nesting occurs there or very nearby. No specific monitoring for Sage-Grouse habitat characteristics was conducted, but as stated in the S&G Assessment, there were no obvious deficiencies in the herbaceous understory cover or sagebrush canopy cover. Cheatgrass at Key Area DW-T-07-01 comprised ~30% of the total vegetative cover at the site. However, this key area was located on a bitterbrush site, and therefore is less likely to be used by nesting Sage-Grouse, which prefer sagebrush communities. Cheatgrass composition at Key Area KA-01, representative of sagebrush habitat throughout the allotment, was less than 1%.

Eagles

The Golden Eagle is a year-round resident in the vicinity of the Warm Creek Allotment. The Bald Eagle is a spring/fall migrant and winter resident. Suitable Bald Eagle winter habitat is widely dispersed on uplands, irrigated lands and riparian areas throughout the Elko District. Recent data suggest declines in Golden Eagle populations both regionally and in Nevada (Kochert et al. 2002 and Sauer et al. 2008 *in* GBBO 2010), while Bald Eagle populations are increasing (Beuhler 2000 and Sauer et al. 2008 *in* GBBO 2010).

Other Raptors

The Warm Creek Allotment provides potential nesting, wintering, and/or foraging habitat for other special status raptors, including but not limited to Ferruginous Hawk, Swainson's Hawk,

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Rough-legged Hawk, Prairie Falcon, Burrowing Owl, and Short-eared Owl. Rabbits, small mammals, reptiles, and invertebrates provide primary prey for raptors. The Nevada Department of Wildlife maintains a database of raptor nests. No nests have been documented within the allotment, but any of the *Buteo* or owl species in Appendix 8 of the Standards and Guidelines Assessment could nest or forage within the allotment.

Loggerhead Shrike

A BLM Sensitive Species, Loggerhead Shrike inhabits desert scrub, sagebrush rangelands, grasslands and meadows (NDOW 2006). Shrikes often perch on poles, wires, or fenceposts; suitable hunting perches are an important part of habitat. Arthropods, amphibians, small to medium-sized reptiles, small mammals and birds are primary prey (Reuven 1996). The allotment serves as year-round habitat for the species and may host resident breeding pairs as well as wintering migratory individuals that breed further north.

Pygmy Rabbit

The pygmy rabbit is a BLM Sensitive Species that was petitioned for listing as threatened or endangered under the Endangered Species Act. On May 20, 2005, the U.S. Fish and Wildlife Service announced a 90-Day finding in the Federal Register indicating that, "... the petition does not provide substantial information indicating that listing the pygmy rabbit may be warranted." The finding does not downplay the need to conserve, enhance or protect pygmy rabbit habitat. There is a single historical (pre-1946) record of pygmy rabbit at Jerry Crab Spring, about a half mile west of the allotment boundary.

The sagebrush-bunchgrass habitat type is important for pygmy rabbits. Typical pygmy rabbit habitat consists of dense stands of big sagebrush growing in deep loose soils that are deeper than 20 inches, have at least 13 to 30 percent clay content, and are light colored and friable. Habitat is generally on flatter ground or moderate slopes in Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) uplands, Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) drainages, and in ephemeral drainages in between ridges of low sagebrush (*Artemisia arbuscula*); however they have been found in greasewood (*Sarcobatus* sp.) and rabbitbrush (*Chrysothamnus* sp.) (Ulmschneider 2008). The black sagebrush that comprises the majority of shrub-steppe vegetation on the allotment is not ideal habitat for pygmy rabbits, but is likely suitable to some degree.

Unlike other rabbits, the pygmy rabbit digs its own burrows, which are three inches in diameter and may have three or more entrances that range in size from five to seven inches in diameter (Ulmschneider 2008). Burrows are relatively simple and shallow, often no more than seven feet in length and less than four feet deep with no distinct chambers. The winter diet of pygmy rabbits is composed of up to 99 percent sagebrush. During spring and summer, diet may consist of roughly 51 percent sagebrush, 39 percent grasses, and ten percent forbs. During winter, pygmy rabbits use extensive snow burrows to access sagebrush forage, as travel corridors among their underground burrows, and possibly as thermal cover (USFWS 2003).

Preble's Shrew

Likely habitat associations for Preble's shrews (*Sorex preblei*) collected in northeastern Nevada were described as "ephemeral and perennial streams dominated by shrubs, primarily below 2,500

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m in elevation” (Ports and George 1990). At Sheep Creek, ~55km north of Elko, Ports and George (1990) collected 12 specimens “in a seasonally wet, sagebrush-dominated community.” Little else is known about the ecology and distribution of Preble’s shrew in Nevada or its specific habitat needs. Given the brief description of habitat associations of Preble’s shrews in northeastern Nevada, it is reasonable to expect that the species could occur within the allotment.

Dark Kangaroo Mouse

The dark kangaroo mouse (*Microdipodops megacephalus*) is adapted to arid rangelands and can be found in areas of loose sands and gravel, but may occur in sand dunes near the margins of its range. Arthropods represent an important dietary component. Suitable habitat is present throughout the allotment, but no data exists to corroborate their occurrence within or near the project area.

Bats

Although no surveys for bats have been conducted in the allotment, it is likely important foraging habitat for many bat species, all of which are BLM Sensitive Species. Wetlands and surface water associated with springs, drainages, ephemeral wetlands, and sagebrush rangelands provide habitat for many bat species. Water sources are especially critical to bats because they drink from open water and because these areas provide an insect forage base. Healthy sagebrush and salt desert scrub habitats, as well as irrigated agricultural fields also provide a variety of insect forage for many bat species. Bats that are known or likely to occur within the allotment can be found in Appendix 8 of the Standards and Guidelines Assessment.

The nearest bat surveys were conducted on Spruce Mountain from 2004 through 2009 by BLM and NDOW specialists. The following bat species were detected: little brown myotis (*Myotis lucifugus*); silver-haired bat (*Lasionycteris noctivagans*); long-eared myotis (*Myotis evotis*); Brazilian free-tailed bat (*Tadarida brasiliensis*); Townsend’s big-eared bat (*Corynorhinus townsendii*); big brown bat (*Eptesicus fuscus*); small-footed myotis (*Myotis ciliolabrum*); California myotis (*Myotis californicus*); long-legged myotis (*Myotis volans*); pallid bat (*Antrozous pallidus*) and the Yuma myotis (*Myotis yumanensis*). A complete list of bat species that could occur within Hunt Units 101 and 105 was provided by NDOW (Standards and Guidelines Assessment; Appendix 8). Hunt Units are logical or intuitive population management units for big game, and are often intrinsically useful units for management of other wildlife or plant populations. Hunt Units 101 and 105 contain the Warm Creek and Snow Water Lake Allotments, and are pictured on Map 7.

- Little Brown Myotis: The little brown bat is probably a year-round resident primarily found at higher elevations. This species often is associated with coniferous forests. Foraging occurs in open areas among vegetation, along water margins, and above open water. Roost sites include hollow trees, rocky outcrops, buildings, mines and caves (Bradley et al. 2006). Limited foraging habitat occurs within the allotment. The potential for this species to occur within the allotment is considered low.
- Silver-haired Bat: The silver-haired bat is a transient spring and fall migrant that occupies low to middle elevations (1,500 to 8,200 feet) (Bradley et al. 2006). This species inhabits coniferous and mixed deciduous/coniferous forests of pinyon-juniper, subalpine fir, white

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fir, limber pine, aspen, cottonwood, and willow (Bradley et al. 2006), gleaning insects and moths in or near wooded areas and along edges of roads, streams, or water bodies. This species roosts both singly and in small groups in hollow trees, rock crevices, mines, caves, and houses. The potential for this species to occur within the allotment is considered low.

○ Long-eared Myotis: The Long-eared myotis is found throughout Nevada from approximately 2,260 to 6,790 feet in elevation but primarily is found at the higher elevations (Bradley et al. 2006). It is primarily associated with coniferous forests, including pinyon-juniper woodlands; however, the species also utilizes sagebrush and desert scrub habitats. Day roosts include hollow trees; under loose tree bark; crevices in rock cliffs and fissures in the ground. Night roosts primarily occur in caves, mines, and abandoned buildings (AGFD 1993; Bradley et al. 2006; Harvey et al. 1999). This species is known to roost singly or in small groups. This species gleans insects (primarily small moths) over vegetation and open water (Bradley et al. 2006). Suitable foraging habitat occurs within the allotment. The potential for this species to occur within the allotment is considered moderate.

○ Brazilian Free-tailed Bat: The Brazilian free-tailed bat is found throughout Nevada in a wide variety of habitats ranging from desert scrub to high elevation mountain habitats (680 to 8,200 feet) (Bradley et al. 2006). This species roosts in a variety of structures including cliff faces, caves, mines, buildings, bridges, and hollow trees. Some caves are used as long-term transient stopover roosts during migration (Bradley et al. 2006). The Brazilian free-tailed bat is known to travel long distances to foraging areas and often forages at high altitudes. This species is common in northeastern Nevada, but the potential for this species to occur within the allotment is considered low.

○ Townsend's Big-eared Bat: The Townsend's big-eared bat is a year-round resident found throughout Nevada from low desert to high mountain habitats (690 to 11,400 feet in elevation) (Bradley et al. 2006). The Townsend's big-eared bat primarily occurs in pinyon-juniper, mountain mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural lands, and urban habitats (Bradley et al. 2006). It prefers caves, mines, and buildings that maintain stable temperatures and airflow for nursery colonies, bachelor roosts, and hibernacula (Harvey et al. 1999). It does not make major migrations and appears to be relatively sedentary, not traveling far from summer foraging grounds to winter hibernation sites (Harvey et al. 1999). Its distribution seems to be determined by suitable roost and hibernation sites, primarily caves and mines. This bat is believed to feed entirely on moths (Harvey et al. 1999) and gleans insects from foliage and other surfaces (Bradley et al. 2006). The potential for this species to occur within the allotment is considered moderate.

○ Big Brown Bat: The big brown bat is a year-round resident in Nevada, found from low to high elevations (980 to 9,800 feet) and in a variety of habitats, including pinyon-juniper, blackbrush, creosote, sagebrush, and salt desert scrub (Bradley et al. 2006). This species gleans insects over water and open landscapes, as well as in both forested and edge settings (Bradley et al. 2006). The big brown bat is a colonial species, roosting in groups of up to several hundred. Roost sites include caves, mines, buildings, bridges, and trees. This species is known to be more tolerant of

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human habitation than other bat species. There is a moderate potential for this species to occur within the allotment.

- Western small-footed Myotis: The Western small-footed myotis is found throughout Nevada from approximately 3,500 to 5,900 feet in elevation (Bradley et al. 2006). This species inhabits a variety of habitats including desert scrub, grassland, sagebrush steppe, blackbrush, greasewood, pinyon-juniper woodlands, pine-fir forests, agricultural lands, and urban areas (Bradley et al. 2006). Day and maternity roosts of western small footed myotis have been found in crevices in cliffs, boulders, and on talus slopes. Summer roosts are highly variable and include buildings, mines, under the bark on trees, and crevices in cliffs and boulders (AGFD 1993; Harvey et al. 1999). This species prefers small protected dry crevices. Night and hibernation roosts are located in small caves and abandoned mine adits. Buildings also are used as temporary night roosts between flights. Western small-footed myotis forage for insects over the edge of rocky bluffs, in clearings, near rocks, and over forests (AGFD 1993; Bradley et al. 2006; Harvey et al. 1999). The potential for this species to occur within the allotment is considered moderate.
- California Myotis: The California myotis is a year-round resident found throughout Nevada at low and middle elevations (689 to 8,957 feet; Bradley et al. 2006). This species occurs in a variety of habitats from Lower Sonoran desert scrub to forests. The California myotis gleans insects above open habitat. This species typically roosts singly or in small groups, although some mines are known to shelter colonies of over 100 individuals. Roost sites include mines, caves, buildings, rock crevices, hollow trees, and under exfoliating bark (Bradley et al. 2006). This species is known to forage throughout the winter. The potential for this species to occur within the allotment is considered high.
- Long-legged Myotis: The long-legged myotis occupies pinyon-juniper and montane coniferous forest habitats from approximately 3,050 to 11,220 feet in elevation in Nevada (Bradley et al. 2006). Individuals typically day roost singly or in small groups in buildings, rock crevices, caves, abandoned mines, or in hollow trees, particularly large diameter snags or live trees with lightning scars (AGFD 1993; Bradley et al. 2006; Harvey et al. 1999). Night roosts and hibernacula are often in caves and mines. Foraging typically occurs in open areas, often at canopy height (Bradley et al. 2006). The potential for this species to occur within the allotment is considered moderate.
- Pallid Bat: The pallid bat is a year-round resident in Nevada. Found primarily at low and middle elevations (1,300 to 8,400 feet), this species occupies a variety of habitats such as pinyon-juniper, blackbrush, creosote, sagebrush, and salt desert scrub (Bradley et al. 2006). This species feeds primarily on large ground-dwelling arthropods (e.g., scorpions, centipedes, grasshoppers), but also feeds on large moths (Bradley et al. 2006). The pallid bat is a colonial species, roosting in groups of up to 100 individuals (AGFD 1993). Roost sites consist of rock outcrops, mines, caves, hollow trees, buildings, and bridges (AGFD 1993; Bradley et al. 2006). The pallid bat is intolerant of roost sites in excess of 40°C (Bradley et al. 2006). Based on its known range and suitable habitat within the study area, the potential for this species to occur within the allotment is considered moderate.

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○ Yuma Myotis: The Yuma myotis is a year round resident found primarily in the southern and western half of Nevada at low to middle elevations (1,476 to 7,677 feet). This species occurs in a wide variety of habitats, including sagebrush, salt desert scrub, agriculture, playa, and riparian habitats. This species gleans aquatic insects over open water and above vegetation. Roost sites include buildings, trees, mines, caves, bridges, and rock crevices. Night roosts are usually associated with buildings, bridges, or other man-made structures (Bradley et al. 2006). The potential for this species to occur within the allotment is considered low.

Plants

There are no known Special Status plant species within the allotment (Nevada Natural Heritage Program 2011).

Invertebrates

There are no known Special Status invertebrates within the allotment (Nevada Natural Heritage Program 2011).

Non-special status species

Migratory birds

The project area contains habitat for a number of migratory bird species. The Nevada Department of Wildlife provided a list of wildlife species that occur in Hunt Units 101 and 105 (Appendix 8; Standards and Guidelines Assessment). Many of these are migratory bird species that do or could occur in the project area.

Big game

Twenty-two percent of the allotment is classified by NDOW as crucial winter habitat for mule deer (*Odocoileus hemionus*). One wildlife key area (#DW-7-T-01), located on the western border of the allotment (Standards and Guidelines Assessment; Figure 4), was established in 1985 to monitor utilization of bitterbrush and habitat conditions within crucial deer winter habitat (Standards and Guidelines Assessment; Appendix 9). The site was monitored during June, 2011, and the habitat was rated as good (Standards and Guidelines Assessment; Appendix 9). Prior year habitat ratings could not be determined because of lack of data. One deficiency noted during the 2011 monitoring was that the age class rating for bitterbrush was unsatisfactory because it lacked the seedling and young age classes (Standards and Guidelines Assessment; Appendix 9). Twelve percent and sixty-six percent of the allotment is classified as crucial summer and intermediate mule deer habitat, respectively.

Eighty-seven percent (1,339 ac) of the allotment is classified as yearlong pronghorn habitat (Standards and Guidelines Assessment; Figure 3). No key areas have been established specifically to monitor pronghorn habitat condition, but one key area (#4349-01; Standards and Guidelines Assessment; Figure 4) within pronghorn yearlong habitat was established to monitor impacts of livestock grazing management. Using data collected at this site in June 2011, the habitat rating for pronghorn was good (Standards and Guidelines Assessment; Appendix 9). However, one deficiency not noted on monitoring forms was the presence of fences that are not built to BLM wildlife-friendly specifications. The unfavorable fence condition was included in the habitat rating for pronghorn.

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Rocky Mountain elk (*Cervus elaphus*) make use of the allotment throughout the year (C. McAdoo, NDOW Game Biologist, per com, 5/2012). Bighorn sheep (*Ovis canadensis*) do not use the allotment, nor does it contain habitat that they would be expected to begin using. It is unknown how much use, if any, of the allotment is made by mountain lions (*Puma concolor*).

Amphibians and reptiles

No information exists regarding the status or trends of amphibians and reptiles within the allotment, reflecting the fact that no systematic survey or monitoring effort exists for the area. It is reasonable to conclude that the expected assortment of amphibians and reptiles common to sagebrush and juniper habitats within the Great Basin exists within the allotment. A list of all possible wildlife species within Hunt Units 101 and 105 (which includes the allotment), including reptiles and amphibians, can be found in the Standards and Guidelines Assessment, Appendix 8.

SNOW WATER LAKE ALLOTMENT

Wildlife habitat types within the allotment are variable, ranging from playa, sand dunes, and salt desert scrub, to sagebrush and alkali meadows, to ephemeral and emergent wetland (Standards and Guidelines Assessment; Figure 2). The western quarter of the allotment is dominated by sagebrush, which transitions to greasewood/salt desert scrub, then into the Snow Water lake area which contains ephemeral water, playas, sand dunes, and may be surrounded by sloughs and emergent wetlands, especially in wetter years.

Special Status Species

Greater Sage-Grouse

Although only a portion of the allotment contains sagebrush, Sage-Grouse may utilize this area, and may also utilize agricultural fields on private land within the allotment, depending upon the particular crop grown. Only 38 acres (0.2%) of PPH occur on public land within the allotment, along the southern boundary. Nearly all of the allotment west of Hwy 93 is categorized as PGH (Map 6), totaling 3,658 ac, or 20.3% of the total area of public land within the allotment. The remainder of public land within the allotment is categorized by NDOW as low value habitat (13.6%), non-habitat (65.5%), or unsuitable habitat (<1%). There is a single lek (Warm Creek 1) within the allotment, located on private land (Standards and Guidelines Assessment; Figure 5). The status of this lek is 'unknown', as it was surveyed in 2008 and again in 2012 (although not to NDOW protocol) and no grouse were observed. Seventeen additional leks occur within 5.3 miles of the allotment, as detailed in the Standards and Guidelines Assessment, Table 6 and Figure 5.

No habitat use studies (e.g., radiotelemetry) have been conducted within or near the allotment. It is not known to what degree Sage-Grouse hens nest or rear broods within or near the allotment, but it is probable that some level of nesting takes place within the sagebrush stands. No key areas have been established specifically to measure Sage-Grouse habitat characteristics. Range/Livestock Key Areas 1 and 2 were located in saline meadow and greasewood ecological site types, respectively (Standards and Guidelines Assessment; Figure 1). Because these sites

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were not located within Sage-Grouse habitat, data collected there was not evaluated for Sage-Grouse habitat values.

Key Area 3 was located on a black sagebrush\Indian ricegrass ecological site type, which was seeded with crested wheatgrass in about the 1960's (Standards and Guidelines Assessment; Figure 1). At this site, crested wheatgrass decreased from 75.3% composition to 19.6% (as measured by dry weight) from 1986 to 2011. In contrast, sagebrush increased from 14.7% composition to 46.3% (dry weight) during the same time period, while total vegetative dry weight production increased from 758 to 2,256 lbs/ac. These observations indicate substantial improvement toward desired conditions for Sage-Grouse during the time period.

Key Area 4 was located on a black sage\Indian ricegrass ecological site type, which was also seeded with crested wheatgrass in about the 1960's (Standards and Guidelines Assessment; Figure 1). Crested wheatgrass decreased from 70.6% composition to 53.8% from 1992-2011. In addition, sagebrush increased from 6.1 to 22.2% composition during the same time period. Likewise, total vegetative dry weight production increased from 288 to 1,342 lbs/ac. These observations indicate substantial improvement toward desired conditions for Sage-Grouse during the time period. Production data is summarized in the Standards and Guidelines Assessment, Appendix 4.

Pygmy rabbit

Four pygmy rabbits were observed in the allotment incidental to a NDOW waterbird survey in 2006. Pygmy rabbits could be present wherever favorable combination of loose, friable soils and taller, dense sagebrush occurs. They may also make limited use of other habitats including rabbitbrush and greasewood (Ulmschneider 2008), and could be present throughout much of the allotment.

Snowy Plover

Snowy Plovers (*Charadrius alexandrinus*) nest on the ground on broad open beaches, salt or dry mud flats, and barren shorelines of alkaline playa lakes where vegetation is sparse or absent (NDOW 2006, GBBO 2010). Non-vegetated or sparsely vegetated habitat within the allotment includes playas with ephemeral water in Snow Water Lake. Although not documented during waterbird surveys, this area may host nesting Snowy Plovers.

Other Raptors

The Nevada Department of Wildlife raptor database shows four Ferruginous Hawk nests, all located and last checked in May, 1994. Additional nests of other raptor species likely occur within or near the allotment and surrounding area, but no systematic inventory and monitoring effort exists to locate or track such nests.

Plants

There are no known Special Status plant species within the allotment (Nevada Natural Heritage Program 2011).

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Invertebrates

There are no known Special Status invertebrates within the allotment (Nevada Natural Heritage Program 2011).

Amphibians and reptiles

No information exists regarding the status or trends of amphibians and reptiles within the allotment. No systematic survey or monitoring effort exists for the area. It is reasonable to conclude that the expected assortment of amphibians and reptiles common to sagebrush and juniper habitats within the Great Basin exists within the allotment. A list of all possible wildlife species, including reptiles and amphibians, can be found in the Standards and Guidelines Assessment, Appendix 8.

Non-special status species

Mammals – Big Game

About one percent of the allotment is classified as crucial summer deer habitat, all of which burned in the 2001 Egbert Fire. The remainder of the allotment is classified as intermediate deer habitat (Standards and Guidelines Assessment; Figure 3). No key areas have been established to monitor either habitat type. Although four range key areas were established for monitoring livestock impacts, habitat ratings for deer were not calculated at these sites because browse vigor and vertical cover ratings (necessary components of a habitat rating) are not a component of data collected at range key areas. Deer use of the allotment is none to light, which is concentrated in the south end of Pasture C (C. McAdoo, NDOW, personal communication, 5/2012).

All of the allotment is classified as yearlong pronghorn habitat. No key areas have been established specifically to monitor pronghorn habitat condition, but data collected at key areas for livestock monitoring were used to evaluate pronghorn habitat quality. Data collected at four sites indicated that pronghorn habitat quality ranged from Fair to Good (Standards and Guidelines Assessment; Table 7). One deficiency present within the allotment that was not noted on monitoring forms was the presence of fences that did not meet BLM wildlife-friendly specifications. Knowledge of the presence of these fences and their impact on pronghorn habitat was incorporated into the habitat condition ratings.

Elk travel back and forth through Pasture C to the pivot irrigation fields on private land, often via Outhouse Draw (Map 2). This occurs when there is alfalfa or alfalfa stubble in the fields for forage. Elk also use the water source in the north end of Pasture C, and Government Spring on the southern boundary of the pasture (C. McAdoo, per com, 5/2012; Map 2).

The affected environment for the remainder of wildlife species is similar to that described for the Warm Creek Allotment.

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Direct and Indirect Effects of Alternatives

Alternative 1- No Action

Effects common to all species

Expected effects to vegetation are described in Section 3.3.10, and include effects to habitat such as continued progression of crested wheatgrass seedings toward a greater native vegetation composition, as well as maintenance of good plant vigor in native portions of both allotments. Over the coming decades, the relatively small extent of existing juniper is expected to encroach further into intact sagebrush habitat, thus benefitting species that use juniper during some portion of their life cycle and becoming a detriment to shrub and/or grass-associated species. The majority of pastures are not expected to be affected by juniper encroachment, and within these areas maintenance of good plant vigor will not impact wildlife species. In addition, standard terms and conditions present within the grazing permit would limit cattle utilization of vegetation to a level BLM has shown to be commensurate with use by wildlife.

Special Status Species

Greater Sage-Grouse

Under this alternative, it is likely that recent trends in vegetation community composition and/or structure would continue or stabilize. For example, the observed trends toward higher native vegetation composition in the pastures seeded with crested wheatgrass would likely continue, and would be a benefit to Sage-Grouse. New water wells would not be drilled and livestock use patterns would remain concentrated around existing water sources. Livestock kind would remain the same, thus livestock grazing preferences would be unchanged. All range improvements, including pipelines, troughs, fences, and gates would remain in place and may pose a risk (fence collision, slight risk of West Nile Virus associated with anthropogenic water sources), be beneficial (a water source at a trough), or have a neutral effect on Sage-Grouse (underground pipeline). Sage-Grouse would continue to face potential disturbance during the breeding season from livestock beginning March 1 rather than April 1 or May 1 under Alternatives 2 and 3, respectively.

Eagles and other raptors

As top predators in an ecosystem, raptors are dependent upon an adequate prey base for survival, including small mammals, birds, and reptiles. In turn, the prey base is dependent upon healthy vegetative communities. This alternative would benefit raptor prey populations as crested wheatgrass seedings continue to progress toward a higher percent composition of native plant species. Native pastures have been shown to support a higher diversity, and often higher relative density, of small mammals, birds, and reptiles (Reynolds and Trost 1980).

Snowy Plover

Because snowy plovers nest in sparsely or non-vegetated areas, no effects to any nesting individuals within the project area are anticipated.

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Loggerhead shrike

The species has undergone continent-wide decline, due especially to changes in human land use practices, the spraying of biocides, and competition with other species that are more tolerant to human-induced habitat changes (Reuven 1996). Similar to raptors, shrikes are a predator species and are thus dependent upon an adequate prey base, including arthropods, amphibians, small to medium-sized reptiles, small mammals and birds (Reuven 1996). This alternative would benefit the species as seeded pastures continue to progress toward a higher percent composition of native plant species which contain a greater abundance of potential shrike prey species (Reynolds and Trost 1980).

Pygmy rabbit

As a strong sagebrush-associate, pygmy rabbits require habitat characteristics similar to Sage-Grouse, particularly areas of taller and denser sagebrush canopy (Weiss and Verts 1984, Keinath and McGee 2004). The No Action Alternative would have similar effects on pygmy rabbits as it would for Sage-Grouse. For example, expected continuation of increased sagebrush cover in crested wheatgrass seedings would benefit the species. Risk of burrow collapse due to livestock trampling would remain.

Preble's shrew/Dark kangaroo mouse

Little is known about the ecology or habitat needs of Preble's shrew and Dark kangaroo mouse in Nevada or elsewhere. However, it is reasonable to surmise that the noted trend toward greater native plant composition in seeded pastures would benefit these species, as native pastures have been shown to contain greater density of small mammals (Reynolds and Trost 1980).

Bats

Bats rely on insect populations for food. Diversity and abundance of insects has been shown to be greater in native sagebrush habitats compared to crested wheatgrass seedings (Wenninger and Inouye 2008). Bats would benefit from increased invertebrate populations associated with the noted trend toward increased native vegetation in seeded pastures.

Amphibians and reptiles

Similar to other species/groups above, reptiles would likely benefit due to the expected increased native vegetation composition in seeded pastures. Relative density of native short-horned (*Phrynosoma douglasii*) and sagebrush lizards (*Sceloporus graciosus*) was shown to be greater in native versus crested wheatgrass pastures (Reynolds and Trost 1980). Native amphibians likely exhibit a similar trend.

Non Special Status Species

Migratory birds

There would be no additional impacts to migratory birds other than what already occurs under the current permit. As noted for other species/groups above, migratory birds would likely benefit due to the expected increased native vegetation composition in pastures seeded with crested wheatgrass. Relative density and diversity of nesting birds was found to be lower in seeded compared to native sagebrush pastures (Reynolds and Trost 1980).

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Big game

Resource competition between big game and cattle would continue at current levels. However, the standard terms and conditions in the current grazing permit (e.g., maximum utilization levels, AUM limits imposed based on carrying capacity estimations, and grazing system) are designed to minimize competition and provide for vegetative and other natural resources that are satisfactory for all rangeland users.

Range improvements would remain in place, and may provide benefits (water sources at troughs), pose a risk (fence entanglement or barriers to movement), or have no effect on big game (underground pipeline). Because livestock kind would be unchanged, there would be no change in social interaction/dominance between livestock and native wildlife.

Alternative 2a and 2b- Permittee-Proposed Action

This alternative would include either cattle or domestic horses. Option A includes any domestic horse (studs, geldings, and mares), while Option B would permit geldings only. Horses have been shown to use the landscape in a more heterogeneous manner than cattle, often using fewer trails than cattle, which graze a landscape more homogeneously (Beever 2003). The tendency for horses to use the landscape in a more heterogeneous manner than cows could result in patches that are more heavily utilized and others that are used lightly or not at all. Compared to cows, horses are able to trim vegetation closer to the ground, potentially leaving lower stubble height than cows even though AUMs may be identical, and potentially delaying plant recovery (Menard et al. 2002) within a pasture or allotment. Because horses are less efficient cecal digesters compared to ruminants (e.g., cows), they must also consume 20-65% more than a cow of equivalent body mass (Hanley 1982, Wagner 1983, Menard et al. 2002 in Beever 2003). A conversion factor of 1.2 cows per horse was chosen to ensure a similar total amount of forage use after livestock kind conversion.

Horse and cattle dietary overlap averaged 72% and 84% during summer and winter, respectively, on sagebrush-grass range in Wyoming (Krysl et al. 1984). Grasses were the primary species eaten, and both animals selected grass species in a similar order, but shrubs and forbs were also important dietary components. Annual monitoring at key areas would be used to assess the changes in impacts to vegetation, if any, due to livestock conversion.

Feral horses can be socially dominant over native Great Basin ungulates, producing different effects on wildlife compared to cattle, such as prohibiting access to scarce water sources for some species of wildlife (Meeker 1979 and Berger 1985 in Beever 2003, Ostermann-Kelm 2008). However, domestic horses often do not exhibit such behavior, or exhibit it to a much lesser degree (B. Thompson, Elko BLM Wild Horse and Burro Specialist, per com, 6/2012). This alternative would defer livestock turnout until at least April 1, one month later than the No Action Alternative, and includes installation of up to three additional water sources to improve the distribution of livestock within each pasture, thus moderating effects of grazing within any individual area in a pasture. These additional water sources would also be accessible to most local wildlife species during times of the year that the wells are operated, provided social interaction between domestic horses and native wildlife does not preclude use by wildlife. Direct ground disturbance due to well construction would be minimal. Potential effects to

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vegetation within the immediate area of the wells and associated troughs include direct habitat loss, fragmentation, degradation, introduction or spread of non-native invasive species, and trampling. Ground and vegetation disturbance would be approximately two acres per new well.

An additional impact with this alternative as compared to Alternative 1 is that it could result in increased recreational viewing of horses, both on public and private land within the project area. This could result in increased disturbance to wildlife through increased traffic on roads, noise, and human presence in sensitive areas.

Effects common to all species

Expected effects to vegetation are described in Section 3.3.10, and include effects to habitat such as continued progression of crested wheatgrass seedings toward a greater native vegetation composition, as well as maintenance of good plant vigor in native portions of both allotments. Compared to the No Action Alternative, livestock would be turned out one month later in the spring (April 1 versus March 1), resulting in less disturbance from livestock during the early breeding season for many wildlife species, including migratory birds, raptors, and Greater Sage-Grouse. Over the coming decade, the relatively small extent of existing juniper is expected to encroach further into intact sagebrush habitat, thus benefitting species that use juniper during some portion of their life cycle and becoming a detriment to shrub and/or grass-associated species. The majority of pastures are not expected to be affected by increased juniper encroachment, and within these areas maintenance of good plant vigor under this Alternative will benefit wildlife species. In addition, standard terms and conditions present within the grazing permit would limit livestock utilization of vegetation to a level BLM has shown to be commensurate with use by wildlife.

Special Status Species

Greater Sage-Grouse

Installation of up to three additional water sources in different pastures would distribute livestock use more evenly throughout each pasture where installed. The addition of three anthropogenic water sources into an otherwise arid landscape could increase the risk of West Nile Virus exposure for Sage-Grouse (and other wildlife). However, water would be contained in a trough and a float installed to eliminate the potential for overflow and pooling of water on the ground, which can serve as mosquito breeding habitat (Zou et al. 2006, Doherty 2007). Relative to the other sources of standing water within the project area (such as ponds and springs on private land, and flooded portions of Snow Water Lake), the risk posed by three floated troughs would be negligible.

New water wells would distribute livestock use away from the single existing water sources in pastures A and C of the Snow Water Lake Allotment, and in the Warm Creek Allotment, and would also more evenly distribute use in the Lake pasture if an existing well structure is made operational. Distributing use more uniformly throughout a pasture can avoid creating areas of heavy or severe use and leave greater residual vegetation heights which are valuable to Sage-Grouse and other wildlife. In addition, new water wells would provide additional sources of drinking water for wildlife.

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Nesting Sage-Grouse could be directly disturbed by livestock through nest trampling, or may abandon nests if approached too closely or frequently, or otherwise disturbed by livestock (Coates et al. 2008). However, because horses often use the landscape more heterogeneously than cows, the chance that any individual nest would be disturbed through close or direct contact could be lessened if only horses are grazed. As noted above, additional disturbance could occur due to the potential for increased recreational viewing of horses within the project area, but the level of this use, if any, is speculative.

Eagles/Other raptors

The addition of three water sources onto the landscape would concentrate livestock in areas where not previously concentrated. This could result in disturbance to Golden Eagles and other raptors that may nest in these areas, and construction and/or maintenance activities could also result in disturbance to nesting raptors near the sites. If the water wells are constructed, Best Management Practices would be followed, including stipulations requiring surveys for active raptor nests, and if found, avoiding impacts through cessation or deferment of construction until nests are completed.

Loggerhead shrike

The species has undergone continent-wide decline, due especially to changes in human land use practices, the spraying of biocides, and competition with other species that are more tolerant to human-induced habitat changes (Reuven 1996). Similar to raptors, shrikes are a predator species dependent upon an adequate prey base, including arthropods, amphibians, small to medium-sized reptiles, small mammals and birds (Reuven 1996). This alternative would benefit the species as seeded pastures continue to progress toward a higher percent composition of native plant species.

The addition of three water sources onto the landscape would concentrate livestock in areas where they were not previously concentrated. This could result in additional disturbance to nesting shrikes in the vicinity of the new water wells. If the water wells are constructed, Best Management Practices would be followed, including stipulations requiring surveys for active shrike nests, and if found, avoiding impacts through cessation or deferment of construction until nests are completed.

Pygmy rabbit

Pygmy rabbits require habitat characteristics similar to Sage-Grouse, particularly areas of taller and denser sagebrush canopy (Weiss and Verts 1984, Keinath and McGee 2004). Both options under Alternative 2 would have similar effects on pygmy rabbits as for Sage-Grouse. For example, expected continuation of increased sagebrush cover in crested wheatgrass seedings would benefit the species. Risk of burrow collapse due to livestock trampling would remain, but could be lessened due to the more heterogeneous use of the landscape by horses compared to cows.

New water wells would distribute livestock use away from the single existing water sources in pastures A and C of the Snow Water Lake Allotment, and in the Warm Creek Allotment, and would also more evenly distribute use in the Lake pasture if an existing well structure is made operational. Distributing use more uniformly throughout a pasture can avoid creating areas of

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heavy or severe use and leave greater residual vegetation heights which are valuable to pygmy rabbits and other wildlife.

Preble's shrew/Dark kangaroo mouse

Little is known about the ecology or habitat needs of Preble's shrew and Dark kangaroo mouse in Nevada or elsewhere. However, it is reasonable to surmise that the noted trend toward greater native plant composition in seeded pastures would benefit these two species, as native pastures have been shown to contain greater density of small mammals (Reynolds and Trost 1980).

Bats

Bats rely on insect populations for food. Diversity and abundance of insects has been shown to be greater in native sagebrush habitats compared to crested wheatgrass seedings (Wenninger and Inouye 2008). Bats would benefit from increased invertebrate populations associated with the noted trend toward increased native vegetation in seeded pastures. In addition, the construction of up to three new water wells would provide additional sources of available drinking water, and would likely concentrate insects, thereby providing additional foraging opportunities.

Amphibians/reptiles

Similar to other species/groups above, reptiles would likely benefit due to the expected increased native vegetation composition in seeded pastures. Relative density of native short-horned (*Phrynosoma douglasii*) and sagebrush lizards (*Sceloporus graciosus*) was shown to be greater in native versus crested wheatgrass dominated pastures (Reynolds and Trost 1980). Native amphibians likely exhibit a similar trend.

Non-special status species

Migratory birds

Additional impacts to migratory birds could include areas that are grazed more heavily in patches than under the current cattle permit, resulting in reduction in quality and/or quantity of herbaceous cover in these patches for some species of migratory birds. However, this would likely be offset by the heterogeneous nature of horse grazing, in which other patches are likely to be grazed less intensively or not at all, resulting in no net effect to migratory birds due to site-specific grazing.

In general, as noted for other species/groups above, migratory birds would likely benefit due to the expected increased native vegetation composition in pastures seeded with crested wheatgrass. Relative density and diversity of nesting birds was found to be less in seeded compared to native sagebrush pastures (Reynolds and Trost 1980). Impacts to migratory birds throughout the remainder of the project area would be comparable to those under the other Alternatives. In addition, construction of up to three new water wells would provide additional sources of drinking water for migratory birds.

Big game

Resource competition between big game and livestock would be present, and may differ from that present under the No Action Alternative because horses could be grazed. However, the standard terms and conditions in the proposed grazing permit (e.g., maximum utilization levels,

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AUM limits imposed based on carrying capacity estimations, and grazing system) are designed to minimize competition and provide for vegetative and other natural resources that are satisfactory for all rangeland users, regardless of livestock kind.

Existing range improvements would remain in place, and may provide benefits (water sources at troughs), pose a risk (fence entanglement or barriers to movement), or have no effect on big game (underground pipeline). Additional water sources would provide increased sources of drinking water when in operation, thus benefitting big game. However, with a change in livestock kind, there is the potential for negative social interaction between horses and native ungulates.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

The effects of construction of three new water wells on wildlife under this alternative would be the same as discussed under Alternative 2. Therefore, these are not discussed further.

Effects common to all species

Expected effects to vegetation are described in Section 3.3.10, and include effects to habitat such as continued progression of crested wheatgrass seedings toward a greater native vegetation composition, as well as maintenance of good plant vigor in native portions of both allotments. Compared to the No Action and Proposed Action Alternatives, livestock turnout would occur later in the spring (May 1 compared to March 1 and April 1, respectively), resulting in less disturbance during the breeding season for many species such as migratory birds, raptors, and Greater Sage-Grouse. In addition, this alternative would implement a rest-rotation system where Warm Creek Allotment would receive complete rest every other year, and pastures A, B, and C in the Snow Water Lake Allotment would receive complete rest every three years. This would benefit wildlife by eliminating disturbance from livestock during rested years, and by allowing plants to complete a growth cycle free from livestock utilization during rested years. Over the coming decade, the relatively small extent of existing juniper is expected to encroach further into intact sagebrush habitat, thus benefitting species that use juniper during some portion of their life cycle and becoming a detriment to shrub and/or grass-associated species. The majority of pastures are not expected to be affected by increased juniper encroachment, and within these areas maintenance of good plant vigor under this Alternative will benefit wildlife species. In addition, standard terms and conditions present within the grazing permit would limit livestock utilization of vegetation to a level BLM has shown to be commensurate with use by wildlife.

Special Status Species

Greater Sage-Grouse

Although empirical data, such as radiotelemetry monitoring, regarding local Sage-Grouse ecology are lacking, it is reasonable to conclude that of the four pastures west of Hwy 93, Warm Creek Allotment is the most valuable to Sage-Grouse for nesting/brood-rearing/wintering (C. McAdoo, NDOW, per com 5/2012). Warm Creek was never seeded with crested wheatgrass, contains a significant sagebrush/native grass and forb understory, and is adjacent to

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mesic/riparian areas to the west which are categorized as PPH. These areas could be valuable as nesting and brood-rearing habitat, and juvenile Sage-Grouse have been observed within the allotment (C. McAdoo, NDOW, per com, 8/2012). For these reasons, a rest-rotation system was developed in which Warm Creek Allotment would receive complete rest every two years, and Snow Water Lake pastures A, B, and C every third year. A similar grazing system, incorporating complete rest or deferred grazing during the breeding season, was recently implemented in the Hubbard Vineyard Allotment in northern Elko County where Sage-Grouse were known to prefer specific native pastures for nesting over adjacent crested wheatgrass seedings. Similar variants of this system had been in place there informally for nearly 10 years, and had resulted in substantial improvements to riparian and upland wildlife habitat.

This alternative could institute a change in kind of livestock from cattle to domestic horses, and a grazing system in PGH that would reduce or eliminate direct disturbance by livestock during the breeding and much of the nesting season. This alternative would delay turnout until at least May 1, depending on the specific pasture, which is 1-2 months later than the Alternatives 1 and 2. This alternative would also institute mandatory rest, either every other year in Warm Creek Allotment, or every third year in pastures A, B, and C of the Snow Water Lake Allotment. These factors would result in less direct disturbance to any nesting hens within the four primary pastures containing PGH. It would also reduce or eliminate indirect disturbance by allowing for greater residual herbaceous vegetation height for nesting hens and perennial forb occurrence for broods.

Given the potential for domestic horses to graze differently than cattle, this alternative would provide complete pasture rest at regular intervals for pastures containing PGH, and would be a more conservative approach in accounting for any potential harmful effects of a change in kind of livestock to horses when compared to a system that implements grazing every year in each pasture.

Pygmy rabbit

This alternative is designed to benefit Sage-Grouse through timing of grazing and institution of a rest-rotation grazing system in pastures that contain PGH. As a strong sagebrush-associate, pygmy rabbits require habitat characteristics similar to Sage-Grouse, particularly areas of taller and denser sagebrush canopy (Weiss and Verts 1984, Keinath and McGee 2004). Improvement or maintenance of sagebrush habitats with native grass/forb understories would benefit pygmy rabbits. The expected continuation of a trend toward increased sagebrush cover in crested wheatgrass seedings would also benefit the species. Risk of burrow collapse due to livestock trampling would remain, but would be less than under Alternatives 1 and 2 due to the years where no grazing takes place in the four western pastures.

Potential effects to remainder of wildlife species would be similar to those described under Alternative 2. However, any adverse effects could be less intense because of the regularly scheduled rest from grazing in the four western pastures and later allotment turnout compared to Alternatives 1 and 2.

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Cumulative Effects Study Area

Game species are managed by NDOW at a population level. A population is typically defined as a group of organisms of the same species occupying a particular space at a particular time, with the potential to interbreed (Krebs 1972). The project area (which is defined as the Warm Creek and Snow Water Lake Allotments combined) lies within NDOW Management Area 10, which encompasses populations of deer, pronghorn, and elk. Because it encompasses interbreeding groups of big game animals, any action that affects habitat or big game directly in any part of Management Area 10 could affect animals in the remainder of the area. Therefore, the Cumulative Effects Study Area (CESA) for big game, determined through consultation with NDOW, is Management Area 10 (Table 11, Map 7). Hunt Unit 078 was also included in the CESA; it is a small unit that is surrounded on three sides by Area 10 and logically fits with the management regime for Area 10.

The project area lies within the Ruby Valley Population Management Unit (PMU) for Greater Sage-Grouse. Using the same reasoning as above for big game, the CESA for Greater Sage-Grouse is the Ruby Valley PMU (Table 11, Map 7). Within the CESA there are 409,168 acres of PPH and 329,177 acres of PGH.

Many wildlife populations are migratory and leave the project area (Warm Creek and Snow Water Lake Allotments) entirely during a portion of the year (migratory birds). Other species may use the project area at any time during the year (Golden Eagle). This presents a challenge when trying to describe the CESA for each species, as there could be different descriptions depending on the species. Therefore, it is often useful to discuss a CESA in terms of watershed boundaries, which tend to encompass local populations of many different wildlife species, whether they are wholly or partially migratory, or resident. Watershed boundaries often follow the tops of mountain ranges when present, which often act as natural barriers to movement for many wildlife species.

Hydrologic units can be defined along a gradient of scales, ranging from entire river basins within a region, such as the entire Great Basin (Level 1), down to the smallest scale such as a 10-40,000 acre subwatershed (Level 12). The scale used to describe the CESA for wildlife was the Hydrologic Unit Code (HUC) 10 watershed scale. This is a smaller-scale hydrologic unit size, and was used to describe the CESA for all wildlife except the game species. The Lone Butte and The Slough HUC 10 watersheds encompassed the entire project area and much of Clover and Independence Valleys and formed the CESA for the remainder of wildlife species (Table 11, Map 7).

Table 11. Cumulative Effects Study Areas (CESA) for wildlife in the Snow Water Lake/Warm Creek project area.		
Resource	CESA	Acres
Big game	NDOW Management Area 10 plus Hunt Unit 078.	4,431,873
Greater Sage-Grouse	Ruby Valley PMU	1,386,791
All other wildlife	Lone Butte and The Slough HUC 10 Watersheds	296,248

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Past, present, and reasonably foreseeable future actions within the wildlife CESAs include:

- Livestock grazing
- Wild horse use and creation of a wild horse eco-sanctuary
- Wildfire
- Lands and realty Rights Of Way
- Mineral exploration
- Recreation activities including off-road travel, Special Recreation Use Permits for eco-tourism related to the wild horse eco-sanctuary
- Utility and other rights of way
- Hunting
- Fuels/vegetation treatment projects

Cumulative Impacts

NEPA Handbook H-1790-1 states “if the proposed action and alternatives would have no direct or indirect effects on a resource, you do not need a cumulative effects analysis on that resource.” The wildlife resources for which there could be cumulative effects are discussed below.

Big Game

Livestock grazing - All or portions of 111 BLM grazing allotments occur within the CESA. Livestock grazing is expected to continue on federally administered grazing allotments within the CESA, at approximately the same intensity as over the past 20 years. Cumulative impacts from grazing within the CESA would be in addition to resource competition that would be present under all three alternatives. However, Standard Terms and Conditions present within BLM and USFS grazing permits are designed to limit livestock use of resources to a level commensurate with use by wildlife. Given these constraints, possible impacts from all three alternatives would not present a negative cumulative effect to big game over what already occurs.

Wild horse use and creation of a wild horse eco-sanctuary - Portions of six (Goshute, Spruce-Pequop, Antelope Valley, Triple B, Maverick-Medicine, Diamond Hills South) Herd Management Areas (HMA) lie within the big game CESA (Map 7). The estimated wild horse populations exceed the upper limit of Appropriate Management Level (AML) in 5 of 6 HMAs (Table 12). Appropriate Management Levels were established to maintain proper level of resource use by wild horses, in concert with other resource users such as livestock and wildlife. When AML is exceeded, impacts to vegetation can be severe, particularly around limited water sources and within preferred foraging areas. Wild horse populations in excess of AML can restrict use of the same resources by wildlife, including big game, through decreased habitat quantity or quality or social interaction where wild horses exclude native ungulates.

Because the population of wild horses within the big game CESA is above AML, elk, deer, and pronghorn face elevated competition for resources, including food, water and space. Under Alternative 2a, permitted domestic studs may exhibit similar behavior to wild horses, particularly social dominance over native Great Basin ungulates at limited water sources (B. Thompson, per

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com, 6/2012). Standard terms and conditions common to BLM grazing permits would be in place under all alternatives to ensure proper utilization levels on vegetation within the project area. However, possible impacts from social dominance of domestic studs over native ungulates under Alternative 2a, added to impacts from the current overpopulation of wild horses in 5 of 6 HMAs overlapped by the big game CESA, could have significant negative cumulative impacts on big game. Similar impacts could occur if the proposed wild horse eco-sanctuary is authorized within the CESA boundary.

HMA	AML	Estimated Population
Antelope Valley	155-259	671
Goshute	74-123	358
Spruce-Pequop	49-82	336
Maverick-Medicine	166-276	587
Triple B	250-518	498
Diamond Hills South	10-22	295
Total	704-1,280	2,745

The Wells Field Office is currently evaluating a proposal to create a public/private wild horse eco-sanctuary on 14,000 acres of private land and about 530,000 acres of public land, immediately adjacent to the project area. This proposal would involve a change in livestock from cows to several hundred wild horses, and could include the installation of new fences, a rise in recreation as visitation to see wild horses increases, installation of new water sources, and the presence of wild horses in areas where they are not currently authorized under the Wild and Free Roaming Horses and Burros Act. Specifically, wild horses could be permitted in the Spruce Allotment directly adjacent to the southern boundary of the project area. If any or all of these are actions listed above are implemented, additional resource competition with wildlife for both food and water could occur. Alternative 2a would permit studs and mares within the project area, a possible source of additional competition for big game (especially for limited water sources) above and beyond what currently occurs (B. Thompson, per com, 6/2012). There would be no additional cumulative impacts with wild horse use from the other alternatives.

Wildfire - In 2001, the Snow Egbert fire burned approximately 1,056 acres of public land administered by the Bureau of Land Management-Elko District Office, 503 acres of public land administered by the United State Forest Service, and 395 acres of private land, for a total of 1,954 acres. About 3.9% of the project area burned, including 249 acres of crucial summer deer habitat, 472 acres of elk year-round habitat, and 749 acres of pronghorn habitat.

Within the big game CESA, 95 wildfires have burned a total of 100,637 acres (2.4% of 4,213,340 acres) during the past 20 years. Wildfires in Nevada have increased in size during this timeframe, and may continue to increase in the next 20 years due to climate change, increased fuel loading related to historic and current wildfire suppression, increased recreational demands on public lands, and other factors. However, 2.4% of the landscape affected by wildfire over 20 years is a relatively small amount, allowing the vast majority of big game habitat to remain

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intact. The impact of all alternatives, when added to those from wildfire, would not present additional cumulative impacts to big game.

Lands and Realty Rights Of Way - There are currently 618,294 acres (15% of the big game CESA) authorized for Lands and Realty actions such as roads, transmission lines, leases, and other actions within the big game CESA. An additional 52,289 acres are pending authorization. These totals also include actions such as land exchanges that would not result in direct ground disturbance, but could result in changes in management that could indirectly affect big game. Given the small (≤ 6 ac) ground disturbance expected with the construction of new water wells under Alternatives 2 and 3, the cumulative effect would be negligible when added to current and future ROWs. In addition, standard Terms and Conditions contained within all Alternatives would ensure effects to vegetation would be consistent with use by Sage-Grouse. Alternative 3 would be more beneficial than Alternative 1 or 2, but cumulative effects from any of the alternatives added to ROWs would be negligible.

Mineral exploration/extraction - Mineral activities are expected to continue in response to robust commodity prices and based on current supply of and demand for minerals and commodities. West Pequop Project LLC has submitted a Plan of Operation Amendment to the BLM for the West Pequop Project which would create an additional 300 acres of surface disturbance associated with mineral exploration activities. This would bring the total surface disturbance within the operations area to 400 acres. Exploration activities proposed on the West Pequop Project would include drilling, constructing drill access roads, trenching, and bulk sampling. All of the West Pequop Project is located within the big game CESA.

Past, present, and future mining notices (<5 acres) and plans (>5 acres) within each CESA are summarized in Table 11. Within the big game CESA, 15,590 acres of disturbance have occurred or are currently authorized, while 10,811 acres have been submitted to BLM for consideration. If all future pending acres are disturbed, total disturbance would amount to 0.6% of the CESA. This would be actual ground disturbance, and does not take into account ancillary activities such as noise, human presence, increased vehicle travel to and from disturbance areas, etc. Therefore, actual disturbance would be greater than ground disturbance, but is not easily quantified because it would depend on the number of parcels, their locations, timing of disturbance, etc. Nevertheless, minor ground disturbance associated with new water wells in Alternatives 2 and 3, when added to ground disturbance associated with mining activity in the big game CESA, would not result in significant cumulative effects.

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Table 13. Past, present, and pending ground disturbance acreages associated with mining activities within wildlife Cumulative Effects Study Areas (CESAs).

CESA	Past notices/plans (ac)	Present notices/plans (ac)	Pending notices/plans (ac)	Total (ac)	% of CESA (Past, present, pending)
Big game	3,510	12,080	10,811	26,401	0.6
Sage-Grouse	1,265	10,309	3,647	15,221	1.1
Other wildlife	21	5	1	27	0.01

Recreation activities including off-road travel - Off Highway Vehicle use, driving for pleasure, hunting, antler collecting, hiking, and wildlife viewing are primary recreational uses in the area. Elko County grew by 7.8% between 2000-2010

(<http://quickfacts.census.gov/qfd/states/32/32007.html>). If the trend continues, recreational activities are likely to increase concomitantly over the term of the permit (10 years), potentially disturbing big game species by causing them to avoid areas around roads (Rost and Bailey 1979, deVos and Miller 2005, Sawyer et al. 2007). If established, the wild horse eco-sanctuary proposed within the big game CESA (see above) would add to current levels of recreational activity. If Alternatives 2 or 3 are implemented, this could also result in a new opportunity for people to view horses recreationally on both public and private land within the project area, potentially disturbing big game through increased vehicle traffic and noise.

BLM is in a planning process for amending the Wells Resource Management Plan (RMP) for Recreation use management at Spruce Mountain. Public scoping occurred in fall 2011 and the BLM is working on a final project proposal and alternatives. BLM's objectives are to amend the existing OHV Area designation in the Wells RMP from "Open" (unrestricted cross-country travel), to "Limited" OHV travel. Limitations could include type or mode of travel; time or season of use; vehicle type; administrative use only; or limited to only those routes that are designated through this planning process. The plan would also designate the area an Extensive Recreation Management Area, where recreation is planned and actively managed on an interdisciplinary basis, in concert with other resources. The project also includes a defined travel network in the area. A decision record for the Spruce Mountain Recreation Amendment to the Wells RMP is expected in winter 2012-2013. OHV use throughout most of the rest of the big game CESA is not currently limited to existing roads and trails.

When added to the impacts of current and expected increases in recreational activity within the big game CESA, possible additional recreational activities associated with Alternatives 2 and 3 could result in moderate to low additional cumulative impacts.

Hunting - Elk, deer, and pronghorn hunting occurs throughout the CESA. Within the CESA there are an estimated 24,500 mule deer (excluding Hunt Unit 078 as it is grouped with other units and the population is not estimated separately; NDOW 2011a). Approximately 4,684 deer tags were sold within the CESA in 2010 (again, excluding Hunt Unit 078; NDOW 2011a).

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Regarding deer in Area 10, NDOW's Big Game Status report (2011a) states:

The Area 10 population continues to account for approximately 20% of the statewide mule deer population and acts as a stronghold for Nevada's deer population. Generally speaking, the Area 10 deer herd has been stable with the exception of an unprecedented growth period in the late 1980's and a winter-related die-off during the 1992-1993 winter. Recovering from the mortality loss during the 1992-1993 winter, Area 10 was in an upward growth trend from 1997 through 2007. In 2008, the herd began to stabilize near the current population level...Barring extreme weather conditions or catastrophic wildfires, we should continue to be optimistic about future trends of the Area 10 Deer Herd.

Regarding elk in Units 078, a portion of 104, and 105-107, NDOW's Big Game Status report (2011a) states:

In the winter of 1997, 146 elk were released in Unit 105 on Spruce Mountain. It has been 14 years since the release and elk have established themselves throughout the entire unit group. Although the long-term average calf ratio remains relatively low, positive population growth is occurring and mature bulls have been observed and harvested. Elk have established in Unit 078 and more frequent observations of elk in Unit 106 indicate the herd is still expanding its distribution and range. Movement between adjacent units such as 077 and especially Unit 121 is also occurring and evidenced by elk numbers observed in Unit 105 during late winter surveys in 2011. The total number of elk classified during winter helicopter surveys exceeded the modeled estimate for the unit group. Despite good recruitment observed this year, poor recruitment in recent years would likely not have allowed for population growth. It is expected that some of the elk observed during this year's survey emigrated from adjacent areas, especially Unit 121. Until follow-up radio-collaring work can be accomplished to determine summer and winter use patterns of the elk in question, the current elk population estimate for this unit group will not be drastically altered. Plans for a telemetry study are underway and should help to depict seasonal movements of this elk herd. The increase in observed calf ratios and subsequently, the modeled population estimate, are likely reflective of favorable forage conditions which occurred during the last growing season, in conjunction with a relatively mild winter. Up to this point, harvest management has been designed to promote overall herd growth towards the population objective of 340 elk. With the success of this management strategy, the Department will work to maintain the population objective. Although the population is currently showing strong growth, a continued focus will remain on identifying the causal factors for low observed calf ratios and working towards developing solutions where possible and practicable. Several habitat projects in the area, including chainings, seedings, and water developments, should continue to bolster this population and allow for additional hunting opportunity.

Estimates for elk and pronghorn populations within the CESA were not possible due to grouping of Hunt Units (part of which were outside the CESA) for reporting purposes. Within Hunt Units

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101-103, elk populations remain at low levels due to aggressive elk tag quotas (NDOW 2011a). Pronghorn populations within the CESA are either in a long-term upward trend (Units 078, 105-107) or stable after a three year downward trend (Units 101–104, 108; NDOW 2011a). Hunting for big game species within the CESA will continue to be a major recreational use of the landscape and the big game resource, and the major tool used to manage big game populations. The impact of all three alternatives on big game species would be negligible relative to impacts from hunting harvest and ancillary disturbance. There would be no additional cumulative effect from any of the three alternatives.

Fuels/vegetation treatment projects - The Wells Field Office has issued an Environmental Analysis which evaluates the effects of a multi-year vegetation treatment project on Spruce Mountain. This Spruce Vegetation Restoration project was developed to:

- Reduce the expansion of pinyon-juniper woodlands and promote healthy forests by removing stressed and diseased trees
- Reduce hazardous fuels to reduce the threat of a large-scale wildland fire
- Restore and maintain healthy rangelands and wildlife habitat
- Protect historic pinyon-juniper woodlands
- Reduce invasive weeds
- Restore areas previously damaged by wildfire with desired vegetation
- Protect treatment areas from livestock grazing to allow for establishment and for treatment success on a case by case basis
- Protect cultural resources within the project area

The project area lies in crucial mule deer winter habitat and, when implemented, would improve the quality of this habitat on up to 10,000 acres within the big game CESA.

Fifty-three additional vegetation treatment projects totaling 31,331 acres have been completed within the CESA in the past 20 years. Nearly all of these were seedings or a combination of vegetation treatments (brushbeating, roller chopping, thinning, etc.) and seeding. The Overland/Big Wash pinyon-juniper thinning project (US Forest Service) was recently initiated in the vicinity of Overland Pass (south end of Ruby Mountains) to improve mule deer winter and transitional range by setting back the successional stage of the area to a more browse dominated site. This vegetation project will also increase wildlife diversity and reduce the potential of catastrophic wildfires by reducing the fuel load. The Overland Pass area is, and has been, an extremely important winter and transitional range for thousands of mule deer that reside in Management Area 10. Initial efforts are aimed at conducting pinyon and juniper thinning on approximately 3,500 acres (NDOW 2011a).

Other than the Spruce Mountain vegetation treatment project described above, no other proposed projects were found in the BLM GIS database. When added to impacts of vegetation treatments within the big game CESA, the impacts to vegetation under all three alternatives would be negligible to big game populations.

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Greater Sage-Grouse

Livestock grazing - All or portions of 35 BLM grazing allotments occur within the Sage-Grouse CESA. Livestock grazing is expected to continue on federal grazing allotments within the CESA, at approximately the same intensity as over the past 20 years. Cumulative impacts from grazing within the CESA would be in addition to resource competition that would be present under all three alternatives. However, Standard Terms and Conditions present within BLM and USFS grazing permits are designed to limit livestock use of resources to a level compatible with use by wildlife. Given these constraints, possible impacts from all three alternatives would present a negligible cumulative effect to Greater Sage-Grouse over what currently occurs.

Wild horse use and creation of a wild horse eco-sanctuary - The Sage-Grouse CESA overlaps with part of the Spruce-Pequop, Triple B, and Maverick-Medicine HMAs. The estimated wild horse population in these HMAs currently exceeds AML in the Spruce-Pequop and Maverick-Medicine HMAs (Table 12). It is unlikely that wild or domestic horses physically preclude Sage-Grouse from using scarce resources such as water. However, given the current overpopulation of wild horses within the HMAs overlapped by the Sage-Grouse CESA, there are likely effects to sagebrush and riparian vegetation that decrease its quality for Sage-Grouse. Standard terms and conditions present in all three alternatives would be in place to limit over-use of vegetation within the project area by cattle or domestic horses. Therefore, there would be no cumulative effect to Sage-Grouse from any alternative when added to existing wild horse use within HMAs in the CESA. Creation of a wild horse eco-sanctuary within the CESA could result in additional impacts to Sage-Grouse from increased recreational viewing of wild horses; however, it is not anticipated that impacts from any of the alternatives would result in cumulative impacts to Sage-Grouse.

Wildfire - Within the CESA there are 409,168 acres of PPH and 329,177 acres of PGH. Over the past 20 years, 36 wildfires have burned 24,290 acres (1.8% of CESA) within the CESA, 24,009 acres of which were PPH or PGH. This amounts to 3.3% of PPH and PGH impacted by wildfire within the CESA. Espinosa and Phenix (2008) reported that 11.6% of Sage-Grouse habitat had burned within Nevada during 1999-2007, indicating that this CESA contained much less fire activity than throughout the remainder of Sage-Grouse habitat in Nevada. Given the fire history within the CESA over the past 20 years relative to the rest of Nevada's Sage-Grouse habitat, it is likely that fire activity will remain low, resulting in minor impacts to Sage-Grouse habitat within the CESA. Impacts from all three alternatives, when added to those from past, present and expected future wildfires, are expected to present a negligible cumulative impact to Greater Sage-Grouse.

Lands and realty Rights Of Way - There are currently 326,673 acres authorized and 6,417 acres pending authorization within the CESA (totaling 24% of the Sage-Grouse CESA). Acreage totals include actions such as land exchanges that would not result in direct ground disturbance, but could result in changes in management that could affect Sage-Grouse. Given the small (≤ 6 ac) ground disturbance expected with the construction of new water wells under Alternatives 2 and 3, in addition to the potential benefit of additional water sources, there would be no cumulative effect when added to current and pending ROWs.

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Mineral exploration/extraction - Mineral activity has been relatively low within the Sage-Grouse CESA. Ground disturbance resulting from mineral activities totaling 11,574 acres on BLM land has occurred or is presently authorized (LR 2000 database queried 6/2012), with 3,647 additional acres pending. If all pending acres were authorized, a total of 15,221 acres (1.1%) could be disturbed (Table 13). Similar to big game, these acres refer only to actual ground disturbance and do not take into account ancillary effects such as noise, human presence, and increased traffic. Given the small (≤ 6 acres) ground disturbance associated with the construction of and use of new water wells under Alternatives 2 and 3, in addition to the potential benefit of additional water sources for Sage-Grouse, there would be no cumulative effect when added to current and pending mineral activities within the CESA.

Recreation activities - Implementation of Alternatives 2 or 3 could result in new opportunities for people to view horses recreationally on both public and private land within the project area, potentially disturbing Sage-Grouse through increased vehicle traffic and noise. When added to the current and expected increase in recreational activity within the Sage-Grouse CESA, Alternatives 2 and 3 could produce a moderate cumulative impact to grouse populations, particularly at the lek located on private land within the project area, and at any newly discovered leks or in nesting areas in the remainder of the project area.

Hunting - Estimates from post-season questionnaires indicated that 2,088 Sage-Grouse were harvested in Elko County in 2010, up 51% from the 10-year average (NDOW 2011b). No studies have demonstrated that hunting is a primary cause of reduced numbers of Sage-Grouse; however, recent literature suggests that the effects of hunting on Sage-Grouse populations is equivocal, and may be additive, rather than compensatory, to natural over-winter mortality (Connelly et al. 2000, Connelly et al. 2003, Reese and Connelly 2011). None of the alternatives are expected to reduce Sage-Grouse populations within the project area or Sage-Grouse CESA. Therefore, when added to potential effects of Sage-Grouse hunting within the CESA, there would be no cumulative effect from any alternative.

Fuels/vegetation treatment projects - Twenty-two vegetation treatment projects totaling 10,256 acres have occurred within the CESA during the past 20 years. Most of these were seedings or a combination of vegetation treatments (brushbeating, roller chopping, chaining, thinning, etc.) and seeding. Other than the Spruce Mountain Restoration vegetation treatment project described above, no other proposed projects within the grouse CESA were found in the BLM GIS database (accessed 6/2012).

Other wildlife

Livestock grazing - All or portions of 12 BLM grazing allotments occur within the CESA. These allotments include range improvements such as fences, corrals, wells and watering troughs. Standard Terms and Conditions present within BLM and USFS grazing permits are designed to limit livestock use of resources to a level compatible with use by wildlife. Given these limits to use by livestock, possible impacts from all three alternatives would not present a negligible cumulative effect to wildlife species over what currently occurs.

Wild horse use and creation of a wild horse eco-sanctuary – A portion of the Spruce-Pequop HMA overlaps the Other wildlife CESA (Map 7). The estimated wild horse population currently

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exceeds the upper AML limit by 300% (Table 12). Appropriate Management Levels were established to maintain proper level of resource use by wild horses, in concert with other resource users such as livestock and wildlife. When AML is exceeded, impacts to vegetation can be severe, particularly around limited water sources and within preferred foraging areas for wild horses. This can restrict or preclude use of the same resources by wildlife through decreased habitat quantity and quality.

Because the population of wild horses within the HMA in the CESA is above AML, many wildlife species face elevated competition for resources, including food and water. Standard terms and conditions common to BLM livestock grazing permits would be in place under all alternatives to ensure proper utilization levels on vegetation within the project area. However, when added to impacts from the current overpopulation of wild horses within the CESA, wildlife are subject to negative cumulative impacts.

Wildfire - Within the Lone Creek and The Slough watersheds, 7 wildfires have burned 5,026 acres (1.7% of the CESA) over the previous 20 years. Similar to past wildfire activity in the other two CESAs, fire activity within this area was very low relative to other areas within the Elko District and throughout Nevada. If the current trend continues, it is expected that wildlife habitat loss/alteration due to wildfire will be minimal, and that the cumulative effects of all alternatives with wildfire would be low.

Mineral exploration/extraction - Within the wildlife CESA, 26 acres of ground disturbance due to historical mineral activity has occurred and 1 acre is pending authorization (Table 13). Given the small expected disturbance due to construction and use of three new wells under Alternatives 2 and 3, in addition to the benefit provided by additional water sources on the landscape, no cumulative effects are anticipated. No new ground disturbance would occur under Alternative 1, therefore no cumulative impact with mining would occur.

Recreation activities - As described for big game, implementation of Alternatives 2 or 3 could result in new opportunities for people to view horses recreationally on both public and private lands within the project area. This could result in additional disturbance to many wildlife species due to increased vehicle traffic and noise. Within the project area, Ferruginous Hawks are perhaps the most sensitive to disturbance, particularly during the breeding season at nest sites. Reproduction may be negatively affected by human disturbance, causing nest desertion or premature fledging of chicks (Collins and Reynolds 2005). The BLM routinely establishes no-activity buffers from 0.5 to 1 mile around active Ferruginous Hawk nests during permitted activities such as off road races, mining, and other ground disturbing activities to avoid impacts to breeding hawks. Implementation of such a buffer as outlined in Appendix 1 "Proposed Project Procedures Common to All Range Improvement Projects" would minimize adverse impacts to nesting raptors.

Other species of wildlife could also be affected by increased human presence associated with the addition of recreational horse viewing in the project area. When added to the expected general increase in recreational activity in Elko County, implementation of Alternatives 2 and 3 could have minor cumulative impacts to a number of wildlife species in addition to big game and Greater Sage-Grouse.

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Hunting - As detailed in the big game section, hunting is a primary use of the landscape in the area. Big game and upland game hunting occurs throughout the Other wildlife CESA during fall and early winter. Many of the migratory species are gone from the area by this time or have finished breeding. Resident species are undoubtedly disturbed to some degree by increased vehicle traffic and human presence associated with hunting in the CESA. However, cumulative impacts of these disturbances are likely negligible to wildlife populations, due to both their timing (outside of the breeding season) and dispersed nature. When added to these effects, the impacts of all alternatives would not result in cumulative impacts with hunting.

Fuels/vegetation projects - Fourteen projects totaling 6,705 acres have occurred within the CESA within the past 20 years (BLM GIS database accessed 6/2012). Most of these were seedings or a combination of vegetation treatments (brushbeating, roller chopping, chaining, thinning, etc.) with seeding. Other than the Spruce Mountain Restoration vegetation treatment project described above, no other proposed projects were found in the BLM GIS database. Many of these projects were implemented to set back the successional stage of vegetation communities, resulting in additional vegetation diversity on the landscape. In general, these vegetation treatments are a benefit to wildlife populations, although some species might be negatively impacted at a local level depending on the treatment type. However, when added to the effects of vegetation projects within the CESA, no cumulative effects would be expected from any of the alternatives.

3.3.10 Vegetation

Affected Environment

Vegetation present in any area is a function of climate, soils, available plant species, and disturbance regimes. The limitations posed by and interrelations between these four factors dictate the plant communities present on any given site at any given time. Traditional thoughts of plant ecology held that each combination of these factors supports one “climax” plant community. However, current range science holds that a site may support multiple stable states, with disturbances and other factors controlling which state a site is in and how and when the community transitions from one state to another. Movement between these various states is not necessarily linear and may require high energy inputs, such as fire or mechanical treatments, for a site to move from one stable state to another. In other words, movement may not always be accomplished through passive changes in management.

The plant communities occupying the Great Basin ecosystem started to form roughly twenty-six million years ago, when the uplifting of the Sierra Nevada mountain range blocked most moisture rolling eastward off the Pacific Ocean. The plant communities that developed as the region dried, lay in the transition zone between hot desert plant communities to the south and coniferous forests to the north. The spatial distribution and relative abundance of these communities has been in constant flux in direct response to climatic change associated with the glacial periods, with movement both north and south across the landscape and up and down in elevation on mountain ranges.

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The climate in the late Pleistocene geologic period- extending from roughly 25,000 to 11,500 years before present- was substantially cooler and wetter than the climate existing today. The higher precipitation and lower evaporation allowed large lakes to form in most of the valley bottoms throughout the Great Basin. Many of these basins had previously held lakes during wet periods earlier in the Pleistocene. Most of the native plant species making up the modern plant communities were already present, though in substantially different quantities and distributions than currently found, and the present plant communities existed at elevations up to 1,000 feet lower than where they exist today.

The Great Basin climate entered a generally warming and drying trend approximately 11,500 years ago, which dried up most of the Pleistocene lakes. Plant communities generally shifted northward and upwards in elevation in response to the changing conditions. Specific recent climatic periods in the Great Basin and their associated impacts on vegetation development in the last 11,500 years are summarized from Tausch (1999) and presented below:

11,500-8,000 Years Before Present (YBP)- Early Holocene. A wildly fluctuating climate marked this period, with gradually warming temperatures the only real constant trend. Pinyon-juniper woodlands started invading the Great Basin, primarily from the south, with far more juniper than Pinyon.

8,500-5,500 YBP- Middle Holocene. Warmest period of the Holocene. This period principally saw an expansion of woodland range and an increase in abundance of desert shrub species.

5,500-4,500 YBP- Late Holocene. A gradual increase of precipitation occurred during this period. Pinyon and junipers continued their expansion into the northern Great Basin area.

4,500-2,500 YBP- Neoglacial. Precipitation continued to increase, and temperatures decreased substantially from mid-Holocene highs. Pinyon and juniper woodlands reached their approximate current extents during this period. Desert shrub occurrence declined, but grass species substantially increased.

2,500-1,300 YBP- Post-neoglacial drought. Precipitation fell off dramatically, though temperatures remained cool. Woodlands shrunk in both density and extent, and desert shrubs of the goosefoot family- especially black greasewood- expanded. Most of the floodplains and alluvial fans currently present in the northern Great Basin were constructed during this time period.

1,300-800 YBP- Medieval Warm Period. Both temperatures and precipitation increased, with precipitation timing shifting from winter to late spring/early summer. Grass species increased in abundance during this period.

800-550 YBP- Unnamed Dry Period. Cooling temperatures and drying conditions caused a decline in woodlands and an increase in desert shrubs.

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550-150 YBP- Little Ice Age. Temperatures cooled and precipitation increased substantially during this period. Woodlands began to expand in both range and density, though high fire frequency limited these trends in some locations.

Vegetation present in the Great Basin at the time of European contact was a direct product of the above events. Uplands were primarily vegetated by bunchgrasses and sagebrush, along with a smaller but vitally important forb component. The relative quantities of each plant class vary greatly both across the landscape and across time. Fire return intervals averaged between twenty and one-hundred years; more frequent fires would maintain more of a grassland and forb ecosystem. In the long-term absence of fire, shrub species - especially sagebrush- would start to increase in density. Grasses and forbs would start decreasing in abundance when sagebrush canopy cover reached +15%, and shrub canopy covers of 30-40% excluded almost all herbaceous vegetation from the plant communities. Valley bottoms- especially basins that held Pleistocene lakes- have soils containing high salt content, which limited vegetation occurring there to salt tolerant species. Pinyon/juniper woodlands occupied most of the higher elevations.

A number of factors have combined over the past 150 years to create the current vegetation communities, chiefly fire exclusion, domestic livestock grazing, introduction of invasive non-native species, and continued climate change. Widespread arrival of Europeans brought hundreds of thousands of cattle and millions of sheep into the Great Basin. Grazing on the public range remained completely unregulated until the early 1900's, and the cattle and sheep decimated the preferable bunchgrass and forb communities and more palatable shrubs. The removal of the competition from grasses, plus a coinciding relatively wet period, active fire suppression, increasing temperatures, and increasing levels of carbon dioxide in the atmosphere allowed the woody species- both shrubs and Pinyon/juniper woodlands- to dramatically increase their abundance and geographic distribution across the region. New weed species accidentally introduced by the Europeans, principally halogeton, cheatgrass, Russian thistle, and various knapweeds, quickly exploited and occupied niches inherent in the sagebrush-grasslands. The passage of the Taylor Grazing Act in 1934 ended the unregulated use of the public rangelands, and implementation of grazing systems coupled with active restoration and rehabilitation projects- including seeding both native and non-native grass species into areas depleted by the historical grazing- have led to vastly improved ecological conditions across much of the landscape.

Figure 2 of the Standards and Guidelines Assessment shows the distribution of potential natural vegetation types within both allotments.

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Figure 1: Key area in Warm Creek Allotment in 1985.



Figure 2: Repeat view in 2011. Note increases in Pinyon/Juniper woodland cover and encroachment into sagebrush habitat.



Livestock in Elko County traditionally graze on grass and forb species during the spring months of the year. In the late summer, after the forbs complete their life cycle and desiccate and grass species enter dormancy and lose much of their nutritional values, livestock tend to shift to eating

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more woody plants- principally antelope bitterbrush- to meet their nutritional needs. Livestock are primarily fed hay through the winter months which is raised on private land.

Plants have both community and individual responses to defoliation by grazing animals. Plant growth is largely fed by carbohydrate reserves stored within the plant materials, which is resupplied by photosynthesis conducted by new growth areas. Defoliation of the plant by any means, including fire or grazing by wildlife or livestock, forces the plant to use more of its reserves to re-grow to replace the removed portions. Plants in the Great Basin ecosystem generally did not evolve, at least in recent eras, under heavy grazing pressures. Part of this evolution had to do with the general absence of large ungulate herbivores, which was in turn influenced by climate and possibly native hunting pressures. As a result of lack of adaption to heavy grazing pressure, the growing points (the parts of the plant that produce new plant growth) in the native grasses are elevated in the plant structure; if a growing point is removed, the grass must regenerate the growing point, which is extremely costly in terms of energy output and use of carbohydrate reserves. This makes the principle grass species in the Great Basin especially susceptible to repeated grazing damage occurring during the growing season, especially when the plants have to compete with other plants for resources while trying to grow or re-grow. Plants that did evolve under grazing pressure- including crested wheatgrass- have their growing points at or below ground level, which allows them to tolerate grazing pressures during the growing season.

Repeated defoliations during the critical growing seasons can seriously weaken the native grass plants as they devote higher percentages of their stored energies to regrowth. Repeated grazing during the critical growing season over years can lead to plant mortality. A niche opened by a grazed or recovering plant can provide openings for other species in the community to occupy, either through a decrease in shade or a sudden increase in the availability of moisture and nutrients in the soil. Native grasses tend to produce low numbers of seeds, and the seeds produced have low viability and generally do not survive more than a season. The lack of a seed bank in the soil can mean the eventual disappearance of species from a plant community, creating openings for other species, particularly shrubs or invasive species in the Great Basin.

Most grasses and forbs start growth in early to mid-Spring (April) and complete flowering by late spring or early summer. Annual plants complete their life cycle by mid- to late summer, while perennial plants enter a period of dormancy that lasts through the summer. Some regrowth in perennial grasses may occur in the fall if sufficient moisture is present. The dominant shrub species persist throughout the year, with flowering occurring in the spring for bitterbrush and the late fall for the other species present.

Pastures A, B, and C of the Snow Water Lake Allotment are seeded partially to entirely with crested wheatgrass, though sagebrush and some native forbs and grasses have recolonized those pastures. The Creek and Lake Pastures are native pastures on the valley bottom supporting a mostly alkaline/sodic plant community of greasewood, rabbitbrush, Great Basin wildrye, alkali sacaton wildrye, alkali sacaton, and native wheatgrasses. The Warm Creek Allotment supports mostly native vegetation consisting of black sagebrush, big sagebrush, bluebunch wheatgrass, Indian ricegrass, needle and thread grass, and patches of antelope bitterbrush. Utah juniper is encroaching into the sagebrush habitat in the southern end of the Warm Creek Allotment and in

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Pastures B and C of the Snow Water Lake Allotment. Cheatgrass is present across portions of both allotments, although monitoring data shows significant declines in the abundance of this plant since 1983.

One recent fire, the 2001 Snow Egbert fire, affected approximately 450 acres of the Warm Creek Allotment and approximately 625 acres of the Pasture A of the Snow Water Lake Allotment. Completed rehabilitation treatments in the Warm Creek Allotment included 230 acres drill seeded with a mixture of bluebunch wheatgrass, thickspike wheatgrass, and Indian ricegrass. BLM determined the burned area in Pasture A did not need rehabilitation treatments. Map 4 depicts the area burned by this fire.

Direct and Indirect Effects of Alternatives

Alternative 1- No Action

Existing livestock management including cattle grazing would continue on both allotments under this alternative. Grazing during the growing season would continue to occur primarily within the pastures of the Snow Water Lake Allotment seeded to crested wheatgrass. Crested wheatgrass's ability to tolerate grazing during the growing season (as outlined above) would allow the plant to continue persisting; however, native grasses, forbs, and especially sagebrush would be expected to continue to colonize into the crested wheatgrass seedings in Pastures A, B, and C of the Snow Water Lake Allotment, and further increases in sagebrush canopy cover would be expected to start replacing and eventually suppressing both native grasses and crested wheatgrass from these pastures. Native forage species present in the Warm Creek Allotment and Pasture C of the Snow Water Lake Allotment would continue receiving periodic deferment until the end of the growing season, which would allow the plants opportunity to complete growth and reproduction cycles and maintain plant vigor. However, the dense sagebrush canopy cover present in the southern end of both allotments- especially the Warm Creek allotment- would effectively prevent any substantial recruitment of new individual grass plants into the plant community. In turn, the Pinyon/juniper woodland would be expected to further increase its density and extent and encroach more into the sagebrush habitats, especially in the Warm Creek Allotment and Pasture C of the Snow Water Lake Allotment.

Alternative 2a and 2b- Proposed Action

Under this alternative, grazing would continue using either horses or cows. If cows are grazed, the number of animals could increase from 200 to a maximum of 235, though the length of time the animals would spend in each pasture would be reduced so that the amount of forage removed from the allotment would not change. The grazing system implemented would be similar enough in nature to the No Action that there would be no substantially different impacts to vegetation resources as compared to the No Action Alternative.

As noted elsewhere in this EA, there are several important differences between how horses and cows graze across the landscape. Cows have only lower incisors and typically consume forage by grasping plants with their tongues, drawing it into their mouths, and then biting with the lower incisors and upper dental plate. Cows tend to travel short distances while eating and will lie

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down for periods of time to allow rumination of consumed food to occur. In comparison, horses have both upper and lower incisors and lack the need to ruminate, and as such are capable of biting grass and other forage species much closer to the ground level. Horses also tend to take several steps between bites and will thus cover a much larger area than cows while grazing. On the other hand, horses typically cannot consume as much water in a single drinking period than cows due to the differences in their digestive systems, which may force horses to visit water sources more times per day than cows. This need for more frequent watering by horses could increase the amount of trails through upland plant communities to and from water sources as compared to cattle grazing with a similar stocking rate.

The differences between how cattle and horses graze outlined above would mean that individual consumed plants would be more completely utilized by horses than they would be by cows, which would reduce the amount of remaining leaf area and overall weaken the plant's ability to recover from a grazing episode. However, the way in which horses use the landscape would tend to leave a greater number of plants ungrazed between bites. The periods of deferment built into the grazing system would allow the grazed plants opportunities to regrow and maintain vigor between periods of grazing. The potential for increased trailing could add additional points of entry for weeds such as cheatgrass, and the tendency for seeds to pass through a horse's digestive tract could enhance distribution of weed species. There would be no expected substantial differences in the crested wheatgrass seedings, as the use would continue to occur principally during the growing season. Grazing in the Creek and Lake Pastures of the Snow Water Lake Allotment would continue to be deferred until after the end of the growing season on an annual basis, which would allow consumed plants in those pastures to maintain production and vigor.

Construction of the proposed wells would serve to create new zones of potentially intense disturbance in the immediate vicinity of the water troughs associated with the wells. However, this intense zone of grazing impacts around water sources would be relatively small (approximately 2 acres around each well). Overall impacts to vegetation would be highly beneficial, as horses would not be forced to continuously trail back and forth to only one spot for water. The entire number of animals would be able to spread themselves across a much larger area, thus resulting in a substantially more even utilization distribution pattern than what is currently occurring.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Impacts of grazing and the proposed improvements would overall be the same under this alternative as the impacts described in Alternative 2. However, the increased deferment until May 1 and the rest periods built into this grazing system would reduce the overall effects of grazing on the consumed plants and would give these plants far more recovery time including complete years where livestock grazing would not interfere with growth and reproduction cycles. This additional deferment and years of rest are expected to lead to increased plant vigor. However, this would not likely lead to any substantial additional recruitment of new individuals into the plant community because of the dense sagebrush canopy cover present in the native portions of the two allotments. Sagebrush and other native plants would be expected to continue expanding into the crested wheatgrass seedings regardless of grazing impacts.

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Cumulative Impacts

The CESA for Vegetation is the Snow Water Lake and Warm Creek Allotments.

Vegetation present on the allotments has been affected by many actions. Abusive grazing prior to the early 1900's severely depleted the bunchgrass component in many parts of the allotments, especially in the alluvial fans on the west side of Warm Creek Ranch. Introduction of exotic annual weeds associated with the highway, Civilian Conservation Corps camp, and other vectors exploited openings in the plant community. The BLM seeded many of these depleted areas with crested wheatgrass in the 1960's.

Other actions that have impacted vegetation resources are power and telephone transmission lines, the various disturbances associated with roads, and the CCC Camp. While not an action planned or undertaken by the BLM, wildfires are an occurrence that can have an impact on the vegetation communities. During the last 30 years there has been only one wildfire of any size within the allotments, the 2001 Snow Egbert fire. However, the potential exists for additional large fires to burn in the allotments, especially as Pinyon/juniper woodlands and sagebrush continue to expand and increase in density. The Bureau and cooperating agencies have and would be expected to continue to aggressively suppress wildfire on the lands in and around the allotments and conduct subsequent post-fire rehabilitation actions to appropriately stabilize the vegetative communities and to restore plant communities, such as reseeding sagebrush, as appropriate. Based on a combination of active suppression and stabilization and restoration, the long-term impacts from wildfire on the Snow Water Lake and Warm Creek Allotments have been minor. There are no cumulative impacts of concern relating to vegetative resources on the two allotments.

3.3.11 Water Resources

Affected Environment

Water resources in the allotments include springs/seeps (springs), groundwater wells, a pipeline conveyance, and several intermittent streams and ponds. The project area falls within the Nevada Division of Water Resources (NDWR) designated Clover Basin. Water that enters this watershed does not flow above ground to any other basin. Instead, water that enters this watershed collects in the waterbody known as Snow Water Lake and either evaporates or infiltrates into groundwater. The allotments contain only intermittent streams which contain many low gradient channels that direct water toward Snow Water Lake primarily during springtime. Water resource inventory data collected from 1979 to 2012 along with Proper Functioning Condition Assessments provide much of the following information regarding flow, condition, and other characteristics of these water resources. These data are only available for sources on BLM administered lands.

The project area contains 13 springs on public land and about 8 springs on private land. Discharge from springs on public land ranges from no overland flow to about 0.5 gallons per minute (gpm). These discharge measurements of are not a quantification of total water produced

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by the spring since a portion or all water coming from a spring is evaporated, utilized by nearby vegetation, or seeps into groundwater near the spring source. Most springs are sources that express indications of a spring source as evidenced by riparian vegetation and/or surface ponding, but do not have any measurable overland flow. The lack of overland flow from springs in the project area is a result of their small discharge as well as their existence on flat topography (see figure 3).

Figure 3. unnamed spring in the Snow Water Lake Allotment which expresses no overland flow.



About three of the springs on public land within the project area have been developed to increase availability of water at the surface. Spring development was usually accomplished by piping a portion of spring water a short distance from the source into troughs or by constructing an earthen pit or dam for water collection. The fraction of total spring water made available by the diversion depends upon the type and extent of the development as well as the individual spring source topography and substrate.

Ponded water is by far the most extensive water resource in the project area. During the wettest years water fills Snow Water Lake and results in coverage of around 30% of the project area following springtime snowmelt runoff. Most years this runoff either never reaches Snow Water Lake or results in only a few weeks of shallow ponding in Snow Water Lake.

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There are two operating water wells on public land, and others on private land within the allotments that make groundwater available at the surface. These wells are operated at the discretion and expense of livestock operator.

There are no known surface water quality conditions within the project area that have resulted in any inability to use water resources for their current beneficial uses. Some water quality data have been collected, but these data are insufficient to determine trends at local springs and do not include any nutrient or bacteria data. For purposes of evaluation, riparian condition assessments can be used to determine whether and to what extent water quality is under anthropogenic influence; for example, a spring is more likely to have issues with water quality if its riparian area has been rated as non-functional than if it is at proper functioning condition. A summary of riparian condition assessments is presented in the Riparian/Wetlands section of this document. Other anecdotal data such as presence of moss, or lack of vegetation at a spring source could indicate problems with water quality. While there have been some recorded observations of natural accumulation of dissolved solids and physical impacts to springs in the project area, these have not resulted in conditions which preclude use by livestock and wildlife. The Nevada Division of Environmental Protection has not listed any of the water bodies within the project area on the State of Nevada List of Impaired Water Bodies (Section 303(d) of the Clean Water Act).

The project area contains several riparian areas which are associated with springs/seeps (springs) and ponded areas. These areas provide water, forage and habitat diversity for wildlife and livestock. These systems occupy a small portion of the watershed as a whole, but are disproportionately important for biodiversity and users of the landscape including humans (USDI 2001).

Riparian condition assessments were conducted in 2002 and 2008 to evaluate condition of selected areas. Riparian condition assessments are qualitative assessment of riparian areas based on quantitative science. The methodology evaluates the functionality of riparian areas based on hydrological, vegetation, and soils/erosional factors, within the context of the geologic setting and the potential of the area. The results of these assessments can be found in the standards and guidelines assessment. In summary, the standards and guidelines assessment (S&G) explains that most riparian areas were rated in properly functioning condition. A few areas were rated as functional at risk; however, livestock grazing was not a causal factor. The S&G concluded that the standard for riparian and wetland sites was being met (BLM 2012).

Additional riparian areas not included in the PFC assessment exist around Snow Water Lake and the intermittent streams surrounding it. Aerial photo reconnaissance indicates that these streams do support some vegetative riparian value. Much of the Snow Water Lake area is frequently inundated by floodwater and supports some riparian value; however, riparian vegetation does not exist. The lack of vegetation is at least partially due to the natural accumulation of salts and other factors contributing to poor soils. Most of the riparian areas surrounding these streams and ponded areas are on lands not administered by BLM. Aerial photos indicate that greater portions of BLM administered land have been inundated in the past, but these areas appear to be receiving less moisture in recent years. This could be due to a variety of factors including climate change,

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groundwater diversion in the watershed, and surface water diversion on private lands of the intermittent streams that feed Snow Water Lake.

Direct and Indirect Effects Common to All Alternatives

Water consumed by livestock would be very small when measured against all available water in the project area, but consumption from individual springs may represent a large portion of available water at these sources. Most livestock watering comes from groundwater wells and seasonally ponded areas, and this use would have no impact on water availability for other uses. There would, however, be some short term heavy use of water from springs which may limit their ability to provide water for wildlife and riparian uses.

Livestock can also affect riparian areas associated with water sources and by physically altering riparian soils, and by impacting vigor of riparian vegetation. Physical disturbance caused by hoof action can compact and disturb riparian soils making them less productive and less stable. Subsequent erosion of riparian soils can change water flow patterns resulting in shrinkage of the riparian area and decreased riparian value. Overuse of riparian vegetation decreases its ability to reproduce and survive disturbance. These impacts increase when more animals are present on riparian areas and when riparian areas occur on steep slopes (USDI 2001).

Heavy livestock impacts to water sources and associated riparian areas are generally considered to be negative; however some impacts have positive consequences. Physical impacts from livestock use within a riparian area can create flow paths and ponding areas for surface water which can be utilized by stock and wildlife. This water might not be available on the surface in the absence of disturbance. Occasional grazing of riparian vegetation increases vegetative vigor and productivity.

Use of surface water by livestock can impact water quality directly through physical disturbance, and bacterial, nutrient, and sediment loading. These impacts are most likely to occur on undeveloped and unprotected springs that have available surface water. Physical impacts to spring sources from hoof action can alter flow patterns in the source area and result in less water being available at the surface for beneficial users. Less water at the source would concentrate and exacerbate any poor water quality conditions that may exist (BLM 1999).

Impacts to water resources could be greater under any of the alternatives than in recent years because previous operators did not graze as many animals as are permitted, or did not use all of the pastures that they are permitted to use. If the current or future operators graze more than past operators have, there may be additional impacts to riparian areas. However, the relatively low gradient topography of water resources in the project area makes it possible for these riparian areas to absorb a high level of impacts before permanent damage to hydrology occurs.

Alternative 1- No Action

Under the No Action Alternative the current types of impacts to water resources are expected to continue and may increase in intensity if the permittee decides to run the full numbers of livestock and grazing season allowed under the permit. Even considering the potential increase in

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impacts allowed under the existing permit as compared to past use (i.e., less than fully permitted use), it is expected that the riparian and water quality standards would continue to be met. These standards have been met under the current level of impacts, and the increase in impacts possible under the No Action Alternative would not likely be sufficient to result in standards not being met in the short term. Due to the occurrence of riparian areas on low slopes within the project area, any negative impacts would likely be gradual, and could be addressed and corrected during the next permit renewal with few long term effects.

Alternative 2a and 2b- Proposed Action

Under the Proposed Action, domestic horses may be impacting water resources instead of cattle and this may result in different kinds of impacts than those described under the No Action Alternative. Most of the Wells Field office experience with horse impacts to water resources has been in wild horse herd management areas (HMAs) rather than with large scale domestic horse permits. Horses in areas near the project area have been observed to impact water sources with greater severity than cattle because they spend more time near water and more aggressively attempt to get water from the source. In addition, horses have been observed to be more territorial with water sources than cattle. Impacts from the Proposed Action would be different from those that occur in HMAs because all horses in the project area would be rotated from pasture to pasture in much the same way that cattle have been rotated in the past on these allotments. The domestic horse grazing would likely have fewer of the adverse impacts expected from wild horse grazing on water resources because of the rotational grazing.

Under the Proposed Action the impacts to water resources could change if there is a change in kind of animals and season of use. There would be a shorter season of use permitted, but this does not necessarily mean that the impacts to riparian areas would decrease. In fact, the impacts to the riparian areas would increase on those years the pastures are grazed. The most vulnerable water sources are located within the Lake and Creek pastures which would experience a change in season of use from winter months to fall months. In addition, the season of use in Pasture B which contains a small unprotected spring where grazing use would be changed from early spring to late spring/summer use. It would be expected that the livestock would spend more time in and near water sources during these warmer months, potentially causing greater impacts than those described under the No Action Alternative. The uncertainty regarding the level of impacts under the Proposed Action is greater when compared to the No Action Alternative because there are no known and documented examples of changing type use from cattle to horses at this scale. Regardless of this uncertainty it is not likely that hydrology and water quality would be affected in any way that would result in exceedence of water quality standards. It is possible that increased impacts could lead to some negative impacts to riparian functionality, but this would not lead to any major short term shift in impacts to riparian areas which would result in major changes to riparian area functionality.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Impacts to water resources under Alternative 3 would be the same as the Proposed Action in all areas except Pasture B. Impacts to the spring in Pasture B would be less with Alternative 3 than the Proposed action since the pasture would be rested one out of three years. There would be

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little difference in impacts to other unprotected springs because they occur in the Lake pasture where year-long rest is not proposed under Alternative 3.

Cumulative Impacts

The Cumulative effects study area (CESA) is the Clover Valley Basin (see map 5). The CESA is defined as this area because water consumption and use within this watershed may indirectly affect water resources within the project area. Cumulative effects to water resources occur as a result of a combination of occurrences on both public and private land within the watershed including climate, water diversion, and livestock grazing. Consumptive water uses within the basin likely decrease the amount of available water in springs, streams and ponds in the project area. The Nevada State Engineer's Office reports that of the 19,000 acre feet of water that can be withdrawn from this basin, 18,505 acre feet are appropriated for use by water right holders. The primary use of this water is for irrigation. In the absence of these diversions more water would likely be present in the springs, streams and ponds in the project area. Impacts to water supply also occur as a result of climate change and climate variability which can affect the amount of water available in the area in the short and long term.

All of the alternatives could potentially result in an incremental increase in cumulative effects to water resources. These impacts are not expected to result in a major change over current conditions because the incremental change in impacts is very small when compared to the cumulative impacts that occur within the basin as a whole.

3.3.12 Wild Horses

Affected Environment

The Spruce-Pequop Herd Management Area (HMA) is immediately adjacent to the Snow Water Lake Allotment (see map 8 for location). The Appropriate Management Level (AML) for the Spruce-Pequop HMA is 48-82.

A wild horse gather in January-February 2011 removed 157 wild horses from the Spruce-Pequop HMA. An aerial population inventory flight in March 2012 observed 336 wild horses (this includes the 2012 foal crop) in the Spruce-Pequop HMA. The estimated population within the Spruce-Pequop HMA is 288 wild horses above the AML low range.

Direct and Indirect Effects of Alternatives

Alternative 1- No Action

There would be no impact to wild horses in the adjacent Spruce-Pequop HMA.

Alternative 2a and 2b- Proposed Action

In the western portion of the Spruce-Pequop HMA adjacent to the Snow Water Lake Allotment, studs have been observed in small groups. Grazing mares on the Snow Water Lake Allotment

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could increase the chance of roaming studs (wild horses) breaking down the fences to mate with the mares and run them back into the Spruce-Pequop HMA. If the permittee were to graze mares in the Lake Pasture of the Snow Water Lake Allotment, wild horses could break down fences to mate with the mares.

If Alternative 2b is adopted only gelded horses could be grazed on the allotments. Under this Alternative, the chances of studs breaking down boundary fences to get at mares would be avoided, which would reduce potential impacts to the Spruce-Pequop HMA.

Alternative 3 – Greater Sage-Grouse Friendly Alternative

Impacts would be the same as outlined above for Alternative 2b. If the permittee were to run geldings in the Lake pasture the impacts would be lessened.

Cumulative Impacts

The Cumulative effects study area (CESA) is the adjacent Spruce-Pequop Herd Management Area (see Map 8). The CESA is defined as this area because of its proximity to the Snow Water Lake Allotment. Increased movement of horses from the Spruce-Pequop Herd Management Area to adjacent areas could be expected as the ever greater numbers of wild horses search for sufficient resources and habitat for survival. The cumulative impacts of Alternative 2a and 3a (grazing mares in the Lake Pasture) could be negative and would be increasingly negative as wild horses in the adjacent HMA break down fences to mate with mares and run the mares back into the HMA, where their numbers would further increase each year.

Adopting Alternative 2b or Alternative 3b with geldings only would reduce the chances of this occurring. There are no additional cumulative impacts with Alternative 2b or Alternative 3b with geldings only.

3.4 Mitigation and Monitoring

Monitoring measures are outlined in the alternatives analyzed. The proposed action includes measures to reduce or minimize impacts. Cultural resource monitoring is a requirement under the terms of the EA in order to ensure no adverse effect to historic properties within the permitted area. Mitigation measures may be required for cultural resources based upon gathered monitoring data.

Cultural resource monitoring would require a qualified BLM Archeologist, or District Archaeological Technician (DAT), to re-visit known historic properties within both Snow Water Lake and Warm Creek allotments to monitor for grazing impacts. Monitoring would occur based upon the need and frequency determined by the BLM, and in the event of excessive grazing pressure/impacts identified through trampling, erosion or other impact resulting in an adverse effect, the BLM will develop avoidance or mitigation measures in consultation with the Nevada SHPO. This may include, but is not limited to, the development of enclosure fences or the mitigation of affected historic properties through archaeological excavations. This would be considered under a separate NEPA action and is not part of the current document's analysis.

4 CONSULTATION AND COORDINATION

4.1 Persons, Groups or Agencies Consulted

On 8 March 2012, BLM mailed a notice of availability of the Standards and Guidelines for Rangeland Health Assessment for these two allotments to the permittee, state and local governments, and members of the public interested in livestock grazing management on these two allotments. The S&G document remained available for public review on the Elko District's website, and BLM accepted public comments on the assessment, along with scoping comments for the development of this EA, through 9 April 2012. The BLM received a total of four timely comment letters from the following individuals or entities: Elko County Board of Commissioners, dated 14 March 2012; Nevada Cattleman's Association, dated 9 April 2012; Nevada Farm Bureau Federation, dated 9 April 2012; and Nevada State Clearinghouse, dated 9 April 2012. These comment letters are all available for review at the Elko District Office.

Comments submitted to the BLM during the scoping process included potential relationship of this action to the proposed wild horse eco-sanctuary; the S&G Assessment drew positive conclusions about livestock grazing on these two allotments, but did not properly address what impacts could occur with horse grazing instead of cattle; the need for the horse operation to comply with all Nevada state agriculture laws, including brand laws; how the proposed action could affect, or be affected by, on-going Greater Sage-Grouse protection efforts; that the 1:1.2 conversion ratio might be too low; adequacy of data and analysis presented in the S&G assessment, especially in light of proposed conversion to domestic horse grazing; potential impacts of domestic horse grazing to adjacent Herd Management Areas; and the need to insure adequate NEPA analysis is completed prior to approving any conversion to domestic horses.

BLM has taken measures to address all of these comments within the body of this EA.

4.2 Preparers

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4.3 Distribution

This EA is being posted for public review at the Elko District website at the following link:

http://www.blm.gov/nv/st/en/fo/elko_field_office/blm_information/nepa/nepa_archives/NEPA_Front.html

The EA will remain available for review through Friday, 5 October 2012.

5 REFERENCES

Acker, Duane and Merle Cunningham. 1998. Animal Science & Industry, Fifth Edition. Prentice-Hall, Inc./Simon & Schuster, Upper Saddle River, New Jersey. 704pp.

Arizona Game and Fish Department (AGFD). 1993. Bats of Arizona, a special Heritage Edition of the Arizona Wildlife Views (August 1993). Arizona Game and Fish Department, Phoenix, Arizona.

Ataman, Kathryn. 1996. A Short Position Paper supporting incorporation of effects of grazing practices on cultural resources located on public lands into BLM Grazing Standards and Guidelines. NE Nevada RAC meeting notes, 3/22/96.

BLM. 1999. Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Area. Technical Reference 1737-16. U.S. Department of the Interior, Bureau of Land Management, National Applied Resource Sciences Center.

BLM. 2001. "Biological Soil Crusts: Ecology and Management" Technical Reference 1730-2.

BLM. 2012. "Snow Water Lake and Warm Creek Allotments Grazing Permit Renewal- Standards and Guidelines for Rangeland Health Assessment".

Barnett, T. P., D. W. Pierce, H. G. Hidalgo, C. Bonfils, B. D. Santer, T. Das, G. Bala, A. W. Wood, T. Nozawa, A. A. Mirin, D. R. Cayan, M. D. Dettinger. 2008. Human-Induced Changes in the Hydrology of the Western United States. *Science*. 19: 1080-1083.

Beever, E. 2003. Management Implications of the Ecology of Free-Roaming Horses in Semi-Arid Ecosystems of the Western United States. *Wildlife Society Bulletin* 31 (3):887-895.

_____, P. F. Brussard, J. Berger. 2003. Patterns of apparent extirpation among isolated populations of pikas (*Ochotona princeps*) in the Great Basin. *Journal of Mammalogy*. 84: 37-54.

_____, R.J. Tausch, and P.F. Brussard. 2003. Characterizing Grazing Disturbance in Semiarid Ecosystems Across Broad Scales, Using Diverse Indices. *Ecological Applications* 13 (1):119-136.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

_____, and P.F. Brussard. 2004. Community- and Landscape-level Responses of Reptiles and Small Mammals to Feral-Horse Grazing in the Great Basin. *Journal of Arid Environments* 59:271-297.

_____, and J.E. Herrick. 2006. Effects of Feral Horses in Great Basin Landscapes on Soils and Ants: Direct and Indirect Mechanisms. *Journal of Arid Environments* 66:96-112.

Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of Livestock Influences on Stream and Riparian Ecosystems of the Western United States. *Journal of Soil and Water Conservation* 54:419-431.

Berger, J. 1985. Interspecific interactions and dominance among wild Great Basin ungulates. *Journal of Mammalogy* 66:571-573.

Bernstein, L., P. Bosch, O. Canziani, Z. Chen, R. Christ, O. Davidson, W. Hare, S. Huq, D. Karoly, V. Kattsov, Z. Kundzewicz, J. Liu, U. Lohmann, M. Manning, T. Matsuno, B. Menne, B. Metz, M. Mirza, N. Nicholls, L. Nurse, R. Pachauri, J. Palutikof, M. Parry, D. Qin, N. Ravindranath, A. Reisinger, J. Ren, K. Riahi, C. Rosenzweig, M. Rusticucci, S. Schneider, Y. Sokona, S. Solomon, P. Stott, R. Stouffer, T. Sugiyama, R. Swart, D. Tirpak, C. Vogel, G. Yohe. 2007. *Climate Change Synthesis Report: An Assessment of the Intergovernmental Panel on Climate Change*. IPCC Plenary XXVII (Valencia, Spain, 12-17 November 2007).

Blake, Phill. 2010. *Horse Pasture Management- Basic Land Stewardship Concepts*. USDA-NRCS.

Bradley, P. V., M. J. O'Farrell, J. A. Williams, and J. E. Newmark. 2006. *The Revised Nevada Bat Conservation Plan*. Nevada Bat Working Group. Reno, Nevada. 216 pp.

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*). *In The Birds of North America*, No. 506 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia.

CCSP 2008: The effects of climate change on agriculture, land resources, water resources, and biodiversity. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. P. Backlund, A. Janetos, D. Schimel, J. Hatfield, K. Boote, P. Fay, L. Hahn, C. Izaurrealde, B.A. Kimball, T. Mader, J. Morgan, D. Ort, W. Polley, A. Thomson, D. Wolfe, M. Ryan, S. Archer, R. Birdsey, C. Dahm, L. Heath, J. Hicke, D. Hollinger, T. Huxman, G. Okin, R. Oren, J. Randerson, W. Schlesinger, D. Lettenmaier, D. Major, L. Poff, S. Running, L. Hansen, D. Inouye, B.P. Kelly, L. Meyerson, B. Peterson, R. Shaw. U.S. Environmental Protection Agency, Washington, DC., USA, 362 pp.

Chambers, J. C. and M. J. Wisdom. 2009. Priority Research and Management Issues for the Imperiled Great Basin of the Western United States. *Restoration Ecology* Vol. 17, 5: 707-714.

Coates, P.S., J.W. Connelly, and D.J. Delehanty. 2008. Predators of Greater Sage-Grouse nests identified by video monitoring. *Journal of Field Ornithology* 79:421-428.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

- Collins, C.P. and T.D. Reynolds. 2005. Ferruginous Hawk (*Buteo regalis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/ferruginoushawk.pdf> [6/2012].
- Connelly, J.W., A.D. Apa, R.B. Smith, and K.P. Reese. 2000. Effects of predation and hunting on adult sage grouse *Centrocercus urophasianus* in Idaho. *Wildlife Biology* 6:227-232.
- _____, K.P. Reese, E.O. Garton, and M.L. Commons-Kemner. 2003. Response of greater sage-grouse *Centrocercus urophasianus* populations to different levels of exploitation in Idaho, USA. *Wildlife Biology* 9:335-340.
- Crozier, L. 2003. Winter warming facilitates range expansion: cold tolerance of the butterfly *Atalopedes campestris*. *Oecologia*. 135: 648–656.
- Crozier, L. 2004. Warmer winters drive butterfly range expansion by increasing survivorship. *Ecology*. 85:231–241.
- Deacon J. E., A. E. Williams, C. Deacon-Williams, and J. E. Williams. 2007. Fueling Population Growth in Las Vegas: How Large-scale Groundwater Withdrawal Could Burn Regional Biodiversity. Source: *BioScience*, 57(8):688-698. American Institute of Biological Sciences. DOI: 10.1641/B570809.
- Doherty, M.K. 2007. Mosquito populations in the Powder River Basin, Wyoming: A comparison of natural, agricultural and effluent coal bed natural gas aquatic habitats. Thesis, Montana State University, Bozeman, MT. 95 pp.
- _____, J.D. Tack, J.S. Evans, and D.E. Naugle. 2010a. Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning. BLM Completion Report: Interagency Agreement # L10PG00911.
- _____, D.E. Naugle, H.E. Copeland, A. Pocewicz, and J.M. Kiesecker. 2010b. Energy conservation tradeoffs: systematic planning for Greater Sage-Grouse in their eastern range. Pp. 505-516 in S.T. Knick and J.W. Connelly (editors). *Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats*. *Studies in Avian Biology*, Vol 38, University of California Press, Berkeley, CA.
- deVos, Jr., J.C., and W.H. Miller. 2005. Habitat Use and Survival of Sonoran Pronghorn in Years with Above-Average Rainfall. *Wildlife Society Bulletin* 33:35-42.
- Ehrenfeld, J. G. 2003. Effects of Exotic Plant Invasions on Soil Nutrient Cycling Processes. *Ecosystems* 6: 503–523. DOI: 10.1007/s10021-002-0151-3.
- Espinosa, S. and R. Phenix. 2008. Effects of wildfire (1999-2007) on Greater Sage-Grouse (*Centrocercus urophasianus*) and key ecological systems that they depend on in Nevada. Nevada Department of Wildlife, Reno, NV.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

Feng, S. and Q. Hu, 2007: Changes in winter snowfall/precipitation ratio in the contiguous United States. *Journal of Geophysical Research*, 112, D15109, DOI:10.1029/2007JD008397.

Furniss, Michael J.; Staab, Brian P.; Hazelhurst, Sherry; Clifton, Cathrine F.; Roby, Kenneth B.; Ilhadrt, Bonnie L.; Larry, Elizabeth B.; Todd, Albert H.; Reid, Leslie M.; Hines, Sarah J.; Bennett, Karen A.; Luce, Charles H.; Edwards, Pamela J. 2010. Water, climate change, and forests: watershed stewardship for a changing climate. Gen. Tech. Rep. PNW-GTR-812. Portland, OR: U.S. Department of Agriculture, Forest Service. Service, Pacific Northwest Research Station. 75 p.

Galbreath, Kurt E., David J. Hafner, and Kelly R. Zamudio. 2009. WHEN COLD IS BETTER: CLIMATE-DRIVEN ELEVATION SHIFTS YIELD COMPLEX PATTERNS OF **Climate Change Relative to BLM Nevada - Elko District, Tuscarora and Wells Field Offices** Pg | 10
M a y 2 3 , 2 0 1 1 DIVERSIFICATION AND DEMOGRAPHY IN AN ALPINE SPECIALIST (AMERICAN PIKA, *OCHOTONA PRINCEPS*). *The Society for the Study of Evolution*. *Evolution* 63-11: 2848–2863.

Ganskopp, D.C. 1983. Habitat use and Spatial Interactions of Cattle, Wild Horses, Mule deer, and California Bighorn Sheep in the Owyhee Breaks of Southeast Oregon. PhD Dissertation, Oregon State University.

Ganskopp, D.C. and M. Vavra. 1986. Habitat Use by Feral Horses in the Northern Sagebrush Steppe. *Journal of Range Management* 39(3):207-211.

_____. 1987. Slope Use by cattle, feral horses, deer, and bighorn sheep. *Northwest Science*, 61(2):74-80.

GBBO (Great Basin Bird Observatory). 2010. Nevada Comprehensive Bird Conservation Plan, ver. 1.0. Great Basin Bird Observatory, Reno, NV. Available: www.gbbo.org/bird_conservation_plan.html

Hamlet, A. F. and D. P. Lettenmaier. 2007. Effects of 20th century warming and climate variability on flood risk in the western U.S. *Water Resources Research*, 43, W06427, DOI:10.1029/2006WR005099.

Hanley, T. A. 1982. The nutritional basis for food selection by ungulates. *Journal of Range Management* 35:146–151.

_____, and K.A. Hanley. 1982. Food Resource Partitioning by Sympatric Ungulates on Great Basin Rangeland. *Journal of Range Management* 35(2):152-158.

Hansen, R.M., R.C. Clark, and W. Lawhorn. 1977. Foods of Wild Horses, Deer, and Cattle in the Douglas Mountain Area, Colorado. *Journal of Range Management* 30(2):116-118.

Harvey, M. J., J. S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas game and Fish Commission. 62 pp.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

Heilmann, T.J., R.A. Garrott, L.L. Caldwell, and B.L. Tiller. 1998. Behavioral response of free-ranging elk treated with an immunocontraceptive vaccine. *Journal of Wildlife Management* 62:243-250.

Holloran, M. J., and S.H. Anderson. 2005. Spatial distribution of Greater Sage-Grouse nests in relatively contiguous sagebrush habitats. *Condor* 107:742-752.

Hubbard, R.E., and R. M. Hansen. 1976. Diets of Wild Horses, Cattle, and Mule Deer in the Piceance Basin, Colorado. *Journal of Range Management* 29(5):389-392.

Inouye, D. W., B. Barr, K. B. Armitage and B. D. Inouye. 2000. Climate change is affecting altitudinal migrants and hibernating species. *Proceedings of the National Academy of Sciences*. 97: 1630–1633.

Izaurrealde, R. C., A. M. Thomson, J. A. Morgan, P. A. Fay, H. W. Polley, and J. L. Hatfield. 2011. Climate Impacts on Agriculture: Implications for forage and Rangeland Production.

Karl, T. R., J. M. Melillo and T. C. Peterson. 2009. Global Climate Change Impacts in the United States. Cambridge University Press. (eds.).

Keinath, D.A., and M. McGee. 2004. Species assessment for pygmy rabbit (*Brachylagus idahoensis*) in Wyoming. USDI, BLM, Cheyenne, WY.

Kochert, M.N., K. Steenhof, C.L. McIntyre, and E.H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). In *The Birds of North America*, No. 684 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA.

Krebs, C.J. 1972. *Ecology*. Harper and Row, New York, NY.

Krysl, L.J., M.E. Hubbert, B.F. Sowell, G.E. Plumb, T.K. Jewett, M.A. Smith, and J.W. Waggoner. 1984. Horses and Cattle Grazing in the Wyoming Red Desert, I. Food Habits and Dietary Overlap. *Journal of Range Management* 37:72-76.

McCort, W.D. 1984. Behavior of Feral Horses and Ponies. *Journal of Animal Science* 58:493-499.

McInnis, M.A. 1984. Ecological Relationships among Feral Horses, Cattle, and Pronghorn in Southeastern Oregon. PhD Dissertation. Oregon State University.

_____ and M. Vavra. 1987. Dietary Relationships Among Feral Horses, Cattle, and Pronghorn in Southeastern Oregon. *Journal of Range Mgt* 40(1):60-66.

Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A. Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper, I.G. Watterson, A.J. Weaver and Z.-C. Zhao, 2007: Global Climate Projections. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Meeker, J.O. 1979. Interactions Between Pronghorn Antelope and Feral Horses in Northwestern Nevada. Master's Thesis. University of Nevada, Reno, Reno, Nevada.

Menard, C., P. Duncan, G. Fleurance, J. Georges, and M. Lila. 2002. Comparative Foraging and Nutrition of Horses and Cattle in European Wetlands. *Journal of Applied Ecology* 39(1):120-133.

Mote, P.W., A.F. Hamlet, M.P. Clark, and D.P. Lettenmaier. 2005. Declining mountain snowpack in western North America. *Bulletin of the American Meteorological Society*, 86(1):39-49.

Musha, J.M., Hild, A.L. 2006. Biological soil crusts in grazed and ungrazed Wyoming Sagebrush Steppe. *Journal of Arid Environments* 67:195-205.

NDOW. 2006. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno, NV.

_____. 2011a. 2010-2011 Big Game Status report. Nevada Department of Wildlife, Reno, NV.

_____. 2011b. Upland and Migratory Game Bird, Rabbit and Furbearing Mammals; Harvest Data and Population Status Reports. Nevada Department of Wildlife, Reno, NV.

Nevada Natural Heritage Program. 2011. Special Status Species GIS database. Carson City, NV.

Norton, J. B., T. A. Monaco, J. M. Norton, D. A. Johnson, T. A. Jones. 2003. Soil morphology and organic matter dynamics under cheatgrass and sagebrush-steppe plant communities. *Journal of Arid Environments* (2004). 54: 445–466.

Nowak, Cheryl L., Robert S. Nowak, Robin J. Tausch, and Peter E. Wigand. 1994. A 30,000 year record of vegetation dynamics at a semi-arid locale in the Great Basin. *Journal of Vegetation Science* 5:579-590.

Osburn, A. S. Vetter, R. Hartley, L. Walsh and J. Brown. 1987. Impacts of Domestic Livestock Grazing on Archaeological Resources of Capital Reef National Park, Utah. *Midwest Archaeological Center Occasional Studies in Anthropology*, No. 20.

Ostermann-Kelm, S. E.R. Atwill, E.S. Rubin, M.C. Jorgensen, and W.M. Boyce. 2008. Interactions between Feral Horses and Desert Bighorn Sheep at Water. *Journal of Mammology* 89:459-466.

_____, S.D., E.A. Atwill, E.S. Rubin, L.E. Hendrickson, and W.M. Boyce, 2009. Impacts of Feral Horses on a Desert Environment. *BMC Ecology* 9:22.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

- Ports, M.A., and S.B. George. 1990. *Sorex preblei* in the Northern Great Basin. Great Basin Naturalist 50:93-95.
- Reese, K.P., and J.W. Connelly. 2011. Harvest Management for Greater Sage-Grouse: a changing paradigm for game bird management. Pp. 101-111 in S.T. Knick and J.W. Connelly (editors). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology, Vol. 38, University of California Press, Berkeley, CA.
- Reuven, Y. 1996. Loggerhead Shrike (*Lanius ludovicianus*), The Birds of North America Online (A. Poole, editor.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/review/species/231>
- Reynolds, T.D., and C.H. Trost. 1980. The response of native vertebrate populations to crested wheatgrass planting and grazing by sheep. Journal of Range Management 33:122-125.
- Rost, G.R., and J.A. Bailey. 1979. Distribution of Mule Deer and Elk in Relation to Roads. The Journal of Wildlife Management 43:634-641.
- Salter, R.E., and R.J. Hudson. 1982. Social Organization of Feral Horses in Western Canada. Applied Animal Ethology 8:207-223.
- _____. 1986a. Impacts of Feral Horses Grazing on Rangelands: An Overview. Equine Veterinary Science, 6(5):236-238.
- _____. 1986b. Potential Competitive Interactions Between Feral Horses and Other Grazing Animals. Equine Veterinary Science, 6(5):238-239.
- Sawyer, H., R.M. Nielson, F.G. Lindzey, L. Keith, J.H. Powell, and A.A. Abraham. 2007. Habitat Selection of Rocky Mountain Elk in a Nonforested Environment. The Journal of Wildlife Management 71:868-874.
- Sauer, J.R., J.E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD; <http://www.mbr-pwrc.usgs.gov/bbs/bbs.html>; Accessed on 4/16/2010.
- Schultz, Brad, and Kent McAdoo. Sagebrush Regions in Nevada: Climate and Topography influences Species Composition. University of Nevada Reno-Cooperative Extension Fact Sheet 02-12.
- Smith, M.A. and J.W. Waggoner, Jr., et al. 1982. Vegetation Utilization, Diets, and Estimated Dietary Quality of Horses and Cattle Grazing in the Red Desert of Westcentral Wyoming. BLM Contract No. AA851-CTO-31.
- Stewart, I. T., D. R. Cayan and M. D. Dettinger. 2005. Changes toward earlier streamflow timing across western North America. Journal of Climate, 18(8):1136-1155.

Snow Water Lake and Warm Creek Grazing Permit Renewal EA

Society for Range Management, 1989. A Glossary of Terms Used in Range Management (Third ed.). Society for Range Management, Denver, Colo.

Steward, Julian H. 1936. Basin-Plateau Aboriginal Sociopolitical Groups. University of Utah, Salt Lake City.

Tausch, Robin J. 1999. Historic Pinyon and Juniper Woodland Development. USDA Forest Service Proceedings RMRS-P-9:12-19.

Tausch, Robin J., Peter E. Wigand, and J. Wayne Burkhardt. 1993. Viewpoint: Plant community thresholds, multiple steady states, and multiple successional pathways: legacy of the Quaternary? *Journal of Range Management* 46:439-447.

Timmerman, A., J. Oberhuber, A. Bacher, M. Esch, M. Latif, E. Roeckner. 1999. Increased El Niño frequency in a climate model forced by future greenhouse warming. *Nature*. 398: 694-697.

Ulmschneider, H. 2008. Surveying for pygmy rabbits (*Brachylagus idahoensis*). Interagency Pygmy Rabbit Working Group.

U.S. Department of the Interior. 2001. Riparian area management: A guide to managing, restoring, and conserving springs in the Western United States. Technical Reference 1737-17. Bureau of Land Management, Denver, Colorado. *BLM/ST/ST-01/OOI+1737*. 70 pp.

USDA Natural Resources Conservation Service May 2001. Soil Quality Information Sheet. Rangeland Sheets.

USDA Natural Resources Conservation Service 2002. Soil Survey of Elko County, Nevada, Southeast Part.

United States Fish and Wildlife Service (USFWS). 2003. Endangered and Threatened Wildlife and Plants; Final Rule to List the Columbia basin District Population Segment of the Pygmy Rabbit (*Brachylagus idahoensis*) as Endangered. Federal Register Vol. 68, No. 43. March 5, 2003. 10388-10409.

Weiss, N.T., and B.J. Verts. 1984. Habitat and distribution of pygmy rabbits (*Brachylagus idahoensis*) in Oregon. *Great Basin Naturalist* 44:563-571.

Wenninger, E.J., and R.S. Inouye. 2008. Insect community response to plant diversity and productivity in a sagebrush–steppe ecosystem. *Journal of Arid Environments* 72:24-33.

Zou, L., S.N. Miller, and E.T. Schidtmann. 2006. Mosquito Larval Habitat Mapping Using Remote Sensing and GIS: Implications of Coalbed Methane Development and West Nile Virus. *Journal of Medical Entomology* 43(5):1034-1041.

APPENDICES

APPENDIX 1- PROPOSED PROJECT PROCEDURES

MAPS

MAP 1- LOCATION

MAP 2- PASTURES AND RANGE IMPROVEMENTS

MAP 3- CULTURAL CUMULATIVE EFFECTS STUDY AREA

MAP 4- SPRUCE FIRE MANAGEMENT UNIT AND FIRE HISTORY 1980-2010

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MAP 6- GREATER SAGE-GROUSE HABITAT CLASSES

MAP 7- WILDLIFE CUMULATIVE EFFECTS STUDY AREAS

MAP 8- WILD HORSES CUMULATIVE EFFECTS STUDY AREA

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Appendix 1 Snow Water Lake and Warm Creek Permit Renewal EA Proposed Project Procedures Common to All Range Improvement Projects

The following Proposed Project Procedures would apply to all proposed range improvement projects:

General

1. As range improvement projects are planned, conservation measures from the 1999 *Nevada Bird Conservation Plan* and the 2005 *Nevada Comprehensive Wildlife Conservation Strategy* as recommended by Nevada Department of Wildlife (NDOW) will be incorporated, when appropriate.
2. All trash and excess debris will be removed from the public lands and disposed of at an approved solid waste disposal site within 10 days of construction completion.
3. Ensure that vehicles entering and exiting project site are clean of any noxious weed or invasive or non-native plant parts and that they stay on existing and established roads to the site.
4. Baseline surveys will be conducted for special status species (plant and animal) prior to project implementation. Projects will be designed to avoid special status species and monitoring will be conducted to determine if indirect activities associated with projects are causing impacts.
5. Habitats of less mobile species tied to specific geographic areas (a particular spring, a burrow complex, a unique and locally rare patch of habitat) will be avoided. Examples would include burrow complexes used by burrowing owls or pygmy rabbits, a riparian area important for Columbian spotted frogs, etc.
6. A raptor and migratory bird nesting survey (using current approved US Fish and Wildlife Service protocol) will be required for projects that are proposed to be constructed between March-July. Should nests be found, construction will be postponed until completion of nesting or until after a second survey is completed to ensure no later nesting attempts have been initiated and/or are ongoing.
7. All equipment oil and hydraulic leaks will be repaired before use. Any leaks developed during use will be repaired immediately. If leaks into the soil are possible, drip pans will be used to prevent soil contamination.
8. During fueling operations the operator will insure no fuel spillage occurs. Care should be taken to insure all fuel tank caps, hoses, and spillage is minimized to prevent soil contamination. Should a spill occur, it will be reported to the BLM Hazardous Materials Specialist immediately for proper action.

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9. All soil disturbances will be monitored for the establishment of noxious or non-native invasive weeds. Treat invasive and noxious weeds in a manner that is most appropriate to the weed species and degree of infestation. Treatment will be in accordance with the procedures outlined by the *Programmatic Environmental Assessment of Integrated Weed Management on Bureau of Land Management Lands* (BLM 1999; BLM/EK/PL-98/008).
10. Disturbed areas will be treated (i.e., seeded, etc.), where such action is necessary and practical, to replace ground cover and prevent erosion.
11. BLM will obtain all necessary permits prior to construction to comply with state and federal laws.
12. Avoid surface disturbing activities when soils are wet on soils that are most susceptible to compaction (sandy loam, loam, and sandy clay loam textures).
13. Construction of all projects will be in accordance with the appropriate BLM handbooks or technical references to the maximum extent possible.

Cultural Resources

1. A Nevada BLM Cultural Resources Inventory Needs Assessment form will be completed for any grazing-related proposed action or ground-disturbing project maintenance within the allotment(s) that might affect cultural resources.
2. If an inventory is found to be necessary, the BLM will conduct inventories (or see that inventories are conducted), evaluate National Register of Historic Places (NRHP) eligibility of any recorded cultural resources, evaluate effects, and devise and complete appropriate mitigation measures prior to initiating earth disturbing activities for any of the proposed range improvement projects. These mitigating measures will be in accordance with the National Historic Preservation Act as guided by the 36 CFR §800 regulations, the BLM 8100 Manual, the State Protocol Agreement between the Nevada BLM and the Nevada State Historic Preservation Office and the Nevada BLM's Cultural Resources Inventory General Guidelines, 4th edition.
3. Native American consultation will be undertaken by the BLM for individual range improvement projects should information pertinent to the allotment(s) be recorded during ethnographic studies currently in process for nearby projects, or otherwise become available.
4. Project redesign to avoid adverse effects to cultural resources eligible for listing on the National Register of Historic Places (hereafter "historic properties") will be the preferred option. Should redesign be infeasible or if adverse impacts cannot be effectively avoided, other options such as data recovery at historic properties eligible under Criterion D of the National Register of Historic Places will be considered. If none of the mitigation options prove satisfactory, the range improvement in question will not be constructed.

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5. Both direct effects of project installation and indirect effects of livestock grazing (e.g. increased trampling on historic properties in previously “under utilized” areas) will be considered during Section 106 compliance for range improvements that might modify livestock use patterns.
6. If historic properties are found to be impacted by livestock or as a result of grazing or grazing management, the BLM and livestock grazing permittee will work together to devise measures to eliminate the impact or lessen it to the point where it no longer affects the qualities that make the property eligible for the National Register.
7. Maintenance or modifications to existing range improvement projects on public lands are allowed subject to the following criteria:
 - a. No new ground disturbance occurs, or;
 - b. A cultural resource inventory was previously completed and no cultural resources were found to be present, or;
 - c. A BLM archaeologist has determined that an inventory was completed and that no protective mitigation measures were part of the original project approval, and;
 - d. The improvement itself (historic road, railroad grade, bridge, trough, windmill, storage tank, etc.) is not a cultural resource.
8. If salt, mineral, or supplement placements are found to be impacting historic properties on public land, then salting locations must be moved ¼ mile away or to such a location that the site would no longer be affected by livestock attracted to the salt, mineral or supplement.
9. All persons participating in the construction, operation, or maintenance of range improvement projects will not disturb, alter, injure or destroy any scientifically important paleontological remains; or any historical or archaeological site, structure, building, object or artifact on public lands. The livestock grazing permittee is responsible for ensuring that its employees, contractors, guests, or any others associated with the ranch do not collect artifacts, or damage or vandalize archaeological or historical sites or the artifacts within them. Individuals involved in illegal activities will be subject to penalties under the Archaeological Resources Protection Act (16 U.S.C 470ii), the Federal Land Management Policy Act (43 U.S.C 1701), the Native American Graves and Repatriation Act (16 U.S.C. 1170) and other applicable statutes.
10. If human remains/burials or any previously unidentified cultural (archaeological or historical) resources or vertebrate paleontological resources are discovered during BLM authorized, permitted or funded project construction, the livestock grazing permittee or contractor will immediately cease all activities within 300 feet of the discovery, insure that the discovery is appropriately protected and immediately notify the BLM by telephone, followed with written confirmation. Work will not resume and the discovery will be protected until the BLM Authorized Officer issues a notice to proceed. Discoveries of human remains not associated with authorized activities will also be reported to the BLM Authorized Officer.

Special Project Requirements for Water Developments

1. Stockwater troughs will be located to take advantage of topography and vegetation to screen sites from view. Stockwater troughs will be placed so that the height of the top rim will not

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exceed 20 inches above ground level and maintained at this level or lower level. The overflow outlets will be located downhill from the trough a minimum of 40 feet.

2. A bird and small mammal access ramp/escape ladder (furnished by the BLM or the permittee or designed as part of the stockwater trough itself) will be maintained in each stockwater trough by the permittee.
3. Stockwater troughs and the storage tank will be painted an earthtone color (approved by the BLM) which blends with the surrounding environment.
4. No roads will be constructed, but vehicular use along the pipeline route associated with routine maintenance could occur.
5. If concentrated runoff occurs along vehicle tracks which begin to cause rilling or gullying, water breaks may be installed every 200 feet where slopes are less than ten percent, and every 150 feet on 11-25 percent slopes.
6. Surface disturbance associated with the project construction will not exceed a width of a 16-foot corridor along the route of the pipeline and a 30-foot diameter circle around each trough. All ground disturbance associated with pipeline construction resulting in bare ground may be seeded with a seed mixture approved by BLM to help prevent soil erosion and noxious weed/annual exotic weed/non-native invasive weed establishment.
7. Pipe will be buried at least 18 inches below the ground surface unless otherwise required for engineering or mitigation of cultural resource values.
8. No blading, grading, or scalping of the pipeline route will be allowed. Brush removal, if necessary, will be done by hand or with "brush beater" type equipment which does not uproot brush or otherwise break the ground surface.

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