Environmental Assessment for
Sulphur Canyon Allotment Grazing Management Plan

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Bureau of Land Management
Spokane District
Wenatchee Resource Area

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Environmental Assessment
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Introduction

This environmental assessment addresses grazing use on Bureau of Land Management (BLM) lands within the Sulphur Canyon Allotment. This allotment is located in Douglas County Washington approximately 14 miles northwest of Coulee City. The allotment is part of the Moses Coulee Management Area (See attached location map). Legal Description of the lands is as follows:

T24N R25E Sec 1: Lots 2, 3, 4
Sec 2: Lots 1, 3, 4, SW¼NW¼

T25N R25E Sec 13: SE¼ (south of fence)
Sec 23: S½SE¼, NE¼SE¼
Sec 24: N½N½ (south of fence), SW¼NE¼, S½SE¼, SW¼
Sec 25: NW¼, NW¼NE¼, NE¼SW¼
Sec 26: NE¼NW¼, S½NW¼, NE¼, N½SE¼, SW¼SE¼, SW¼
Sec 27: NE¼SE¼, S½SE¼
Sec 34: NE¼, N½SE¼, SE¼SE¼
Sec 35: All
Sec 36: All

Purpose and Need

The purpose of this action is to address the request to renew the livestock grazing authorization and to incorporate recommendations for greater sage-grouse habitat management while providing for multiple uses of public lands and resources in accordance with federal laws, regulations, and the Spokane Resource Management Plan (RMP). The RMP identified wildlife habitat, recreation, soil & water management, and grazing as priority resources within the management area (USDI 1992).

The Federal Lands Policy and Management Act (FLPMA) of 1976 declares that it is the policy of the United States that "the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use."

The objectives of the Federal Rangeland Management Regulations (43 CFR Part 4100) are to: "promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; to promote the orderly use, improvement, and development of the public lands; to establish efficient and effective administration of grazing

of public rangelands; and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy rangelands." In 1997, the BLM developed the *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington* (Rangeland Health S&Gs) to help meet these objectives.

BLM Manual 6840 (Special Status Species Management) directs BLM to implement management plans that conserve candidate and Bureau-sensitive species and their habitats, and to ensure that actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed under the provisions of the Endangered Species Act.

For management of BLM-administered public lands in Eastern Washington, the Spokane RMP (1987) established the goal of providing "a variety of uses within the sustained yield capability of the resource." One of the general objectives identified in this plan was to allocate forage for livestock if it was not needed to sustain existing or target wildlife populations. The RMP further states that to implement grazing decisions, allotment management plans (AMPs)/coordinated resource management plans (CRMPs) and several other actions will be needed.

Background

Sulphur Canyon Allotment includes approximately 3,207 acres of public land intermingled with 2,484 acres of private for a total of 5,691 acres. The allotment is on the east side of Moses Coulee approximately 14 miles northwest of Coulee City, Washington. The east wall of Moses Coulee is a portion of the allotment boundary. The allotment is roughly 56% public land, and 44% private land owned by the lessee. The Bureau of Land Management acquired 640 acres in 2002 within the allotment from the Washington Department of Natural Resources. The allotment is divided into two pastures. The north pasture is approximately 2,801 acres and includes about 925 acres of BLM land (33%). The south pasture is approximately 2,889 acres and approximately 80% BLM lands (2,311 acres).

Currently, the lessee grazes cattle belonging to another rancher on the allotment. The cattle are grazed in a rotation system utilizing other grazing leases on Forest Service and private lands. The cattle winter in the Columbia Basin and are moved in the early spring to the Sulphur Canyon allotment before being moved north to the National Forest.

The current grazing preference for the allotment is 328 AUMs. The allotment is grazed on a grazing rotation system where the pasture that was grazed first is grazed last the next year. Most years, grazing occurs in March, April, May and June. The allotment has been grazed six of the last ten years. The allotment was not grazed in 2003, 2004 and 2005 because the lessee requested non-use.

Greater Sage-Grouse Habitat Management Recommendations

The allotment is near the southern edge of the Mansfield Plateau Greater Sage-Grouse Management Unit, which is considered occupied by resident, breeding sage-grouse (Stinson et al. 2004). Two active sage-grouse leks (Sulphur Canyon and Davis) are within 6.5 kilometers (4 miles) of the Sulphur Canyon area. Habitat evaluations performed in 2005 indicate the allotment

provides year-round habitat for sage-grouse (Musser et al. 2005).

In July 2000, BLM, along with the U.S. Forest Service (FS) and the U.S. Fish and Wildlife Service (FWS) entered into a Memorandum of Understanding with the Western Association of Fish and Wildlife Agencies (WAFWS) which established state wildlife agencies as the lead for state and local conservation of sage-grouse. The BLM National Sage-Grouse Conservation Strategy (BLM National Strategy) serves as guidance for managing, restoring and enhancing sagebrush habitat to support and promote the range-wide conservation of sagebrush habitats for sage-grouse and other sagebrush-obligate wildlife species on BLM lands (USDI 2004). The Washington Department of Fish and Wildlife (WDFW) published its Greater Sage-Grouse Recovery Plan (Stinson et al.) in 2004 and according to the BLM National Strategy, this plan should be used to guide management decisions related to sage-grouse conservation.

The State of Washington Greater Sage-Grouse Recovery Plan (Stinson et al. 2004) identifies 11 conservation strategies and tasks. Two of these strategies are applicable to this proposed action:

2.2—Protect nesting and brood-rearing areas from disturbance.

"Wherever possible, prevent disturbance in sage-grouse nesting and brood rearing habitat between 1 March and 15 June including development, blasting, military training, livestock trail use, falconry, off-road vehicle use, recreation, and training of hunting dogs."

4.4—Ensure compatibility of grazing management on public lands managed for sage-grouse.

4.4.1—Where protection and restoration of sage-grouse is a major objective for public lands, manage grazing so that the habitat characteristics needed for breeding and wintering can be consistently maintained.

"In general, management should be designed to increase herbaceous cover, improve the composition and diversity of native vegetation, and limit the spread of noxious weeds. This will probably require that grazing pressure be light (<35% usage), seasonally rotated, periodically deferred, and maintained at a low enough intensity to enable a rapid response to drought conditions or range fires. Galt et al. (2000) recommend setting stocking rates based on a 25% harvest coefficient. However, Crawford et al. (2004) caution against using utilization guidelines; they suggest there is no substitute for long-term vegetation monitoring."

The goal of WDFW's Recovery Plan "is to establish a viable population of sage-grouse in a substantial portion of the species' historic range in Washington." The recovery objective is "a breeding season population average of 3,200 birds for 10 years, with active lek complexes in 6 or more Management Units (Stinson et al. 2004)." In 2006, the Washington population was estimated at 778 birds at leks in 3 Management Units (Schroeder et al. 2007).

In addition to this guidance, the BLM National Strategy (USDI 2004) identifies 51 Suggested Management Practices (SMP's). Three of these SMP's are applicable to this proposed action:

36—Use grazing practices that promote the growth and persistence of native shrubs,

grasses and forbs needed by sage-grouse for seasonal food and concealment. Grazing practices include changing season of use, numbers of livestock, grazing intensity, distribution of livestock use, and type of livestock. Vegetation structure (height) should be managed so as to provide adequate cover for sage-grouse during the nesting period.

41—Maintain seeps, springs, wet meadows and riparian vegetation in a functional and diverse condition for young sage-grouse and other species that depend on forbs and insects associated with these areas. Consider fencing if vegetation associated with these wet areas cannot be maintained with current livestock use and the impacts of the fence are outweighed by the improved habitat quality.

44—Grazing use should be adjusted during extended drought periods. Consider transitioning back to pre-drought use when drought conditions have ended. Vegetation composition and vigor is slow to recover when drought and herbivore use are not in balance.

The goal of BLM's National Sage-grouse Conservation Strategy (USDI 2004) is: Sustain or reestablish the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of sage-grouse and other sagebrush-dependent wildlife species.

Land Use Plan Compliance:

All the alternatives presented below are in compliance with the Spokane Resource Management Plan Record of Decision/Rangeland Program Summary (ROD/RPS, May 1987). The ROD/RPS specifically allocates lands within this allotment for livestock grazing.

Description of Alternatives

Four alternatives are analyzed in this environmental assessment: Alternative 1: No Action/ Current Utilization with Spring–Summer Grazing, Alternative 2: Reduced Utilization with Early Spring Grazing, Alternative 3: Reduced Utilization with Late Summer-Early Fall Grazing , and Alternative 4- No Grazing.

Alternative 1 - No Action (No Action/Continue Under Current Management with Spring–Summer Grazing)

Under this alternative, the BLM would renew the current grazing lease with no changes. The lease would be renewed for a period of 10 years (3/01/2006-2/29/2016) as a custodial allotment authorizing cattle grazing during the period of 3/01 – 6/30 utilizing no more than 328 AUMs. Cattle would be rotated between the North and South pastures in the same grazing rotation system where the pasture that was grazed first one year is grazed last the next year, as described in the background section above.

Alternative 2 – Reduced Utilization with Early Spring Grazing.

Under this alternative the BLM would issue a grazing lease for a period of 10 years (3/01/2006-2/29/2016). The authorized season of use would be shortened to 03/01 - 04/30, and the AUMs would be reduced to 237 to help meet sage-grouse habitat recommendations. The reduction in AUMs and season on use is to achieve an overall authorized use reduction from 50% to 30%. This alterative also proposes using the same grazing rotation system where the pasture that was grazed first is grazed last the next year

For the purpose of this analysis, it is assumed that under this alternative, a water development would be placed on private lands within the grazing allotment by the lessee.

Proposed 2-year rotation Alt 2		
Pasture	Dates	AUMs
Year 1		
North	03/01 – 03/31	67
South	04/01 – 04/30	170
Year 2		
South	03/01 – 03/31	170
North	04/01 – 04/30	67

Alternative 3 – Reduced Utilization with Late Summer-Early Fall Grazing.

Under this alternative, the BLM would issue a grazing lease for period of 10 years (3/01/2006 – 2/29/2016). The authorized season of use would be changed to 09/01 – 10/30, and the AUMs would be reduced to 237 to help meet sage-grouse habitat recommendations. The reduction in AUMs and season of use is to achieve an overall authorized use reduction from 50% to 30%. This alternative also proposes using the same grazing rotation system where the pasture that was grazed first is grazed last the next year.

For the purpose of this analysis, it is assumed that under this alternative, livestock water would be provided in the north pasture at the expense of the lessee.

Proposed 2-year rotation Alt 3		
Pasture	Dates	AUMs
Year 1		
North	09/01-09/30	67
South	10/01-10/30	170
Year 2		
South	09/01-09/30	170
North	10/01-10/30	67

Management Actions/Project Design Features Common to Alternatives 1, 2 & 3

Monitoring

- BLM would continue to conduct utilization post grazing at three key areas within the allotment. Two key areas are in the south pasture and one is in the north pasture. Each key area has a photo-plot for trend monitoring.
- Actual use reports will be filed annually by the lessee.

- If monitoring shows a use of greater than that authorized, or failure to meet resource objectives, cattle numbers and/or duration of use may be adjusted or other changes made to achieve proper use.
- Additional monitoring will be initiated in to monitor sage-grouse habitat condition in accordance with current protocol.

Terms and Conditions

- If populations of sensitive, threatened or endangered species are located in the allotment in the future, changes may have to be made in grazing management or mitigating action may have to be taken to protect sensitive populations. Monitoring or a biological assessment of the species may be necessary to determine the impact of grazing on any new populations found in the future.

- No cattle attractants (e.g. salt licks or water troughs) will be placed on or near Lithosol soils (shallow rocky soils).

- The BLM will monitor the aspen groves on the allotment. If cattle are damaging the groves, the BLM will adjustment the grazing or enclose the groves to prevent damage to this community.

- If future rangeland improvements are planned for un-surveyed portions of the project area, Class III surveys and clearances will be necessary prior to their implementation. If additional cultural resources are identified on BLM lands in the allotment, a BLM archaeologist should be notified immediately so that the sites can be recorded and impacts to them can be assessed. All potentially eligible cultural properties on BLM parcels in the allotment should be monitored to assess impacts by cattle or other agents, regardless of the chosen Alternative. Site protection measures may be necessary and would be developed in consultation with DAHP and concerned THPOs.

Range Improvement Common to Alternatives 2 &3

A proposed pipe and trough system with a buck and rail exclosure at Sulphur Springs would be installed. The exclosure (approximately 220ft X 178 ft) would encompass the flat surrounding the spring and will attach to the pasture fence along the road. This exclosure is intended to reduce the impact of cattle in the spring itself while still allowing cattle to water near the spring.

Alternative 4 – No grazing

The grazing lease would not be renewed and livestock grazing would not be authorized. No range improvements would be constructed on BLM-administered lands. Fencing may need to be constructed along the boundaries of BLM administered lands if the grazing lessee wishes to graze the private and State lands within the allotment.

Comparison of Grazing plans				
Alternative	**Livestock**	**Season of use**	**Authorized Level of use on BLM Lands**	**AUMs**
1	200 Cattle	3/01 – 6/30	50%	328
2	200 Cattle	3/01 – 4/30	30%	237
3	200 Cattle	9/01 – 10/30	30%	237
4	None	None	0%	0

Affected Environment

The impacts of livestock grazing are described in Chapter 4 (Environmental Consequences) in the Spokane RMP/FEIS (pages 79-92), and details of grazing were addressed in Appendix J (Grazing Systems). The 'Affected Environment and Environmental Impacts' sections below focus on resources that could be affected by the implementation of the alternatives.

Rangeland Soils, Plant Communities and Botanical Values

Affected Environment

The soils in the Sulphur Canyon allotment consist primarily of Heytou very stony loam. This very deep, well drained soil is on basalt plateaus. It formed in glacial till mixed with loess in the surface layer. Also included are areas of Bakeoven soils and Rock outcrop that make up as much as 5 percent of the unit. Average annual precipitation ranges from 9 to 12 inches (USDA).

The allotment is within Daubenmire's (Daubenmire 1970) big sagebrush/bluebunch wheatgrass *(Artemisia tridentata/Agropyron spicatum)* zone. The vegetation in this zone is characterized as shrub steppe, a grassland with a shrub layer in a precipitation zone that is too dry for trees. The dominant plant community is big sagebrush/bluebunch wheatgrass *(Artemisia tridentata/Agropyron spicatum).* Other plant communities represented are stiff sagebrush/Sandberg's bluegrass (*Artemisia rigida/Poa secunda*) on very shallow, rocky soils, some small areas of three-tip sagebrush and Idaho fescue (*Artemisia tripartita/Festuca idahoensis*), and two aspen groves (*Populus tremuloides*) in Sulphur Canyon. The critical growth period for the key species in the shrub steppe habitat in this area is from 4/30 – 6/20 according to the Natural Resource Conservation Service Ecological Site Data for Douglas County, WA (NRCS, 2004).

Big sagebrush/blue-bunch wheatgrass is the dominant habitat type on the slopes throughout the allotment. This habitat supports over 60 species of perennial and annual forbs, including desert parsleys (*Lomatium* species), hawksbeard (*Crepis* species) long-leaf phlox (*Phlox longifolia*), everlastings (*Antennaria* species), mountain dandelion (*Agoseris* species), milk-vetch (*Astragalus* species), and buckwheats (*Eriogonum* species), which are known to compose up to 50% of the pre-laying diet of sage-grouse hens (Barnett and Crawford, 1994). In many places the big sagebrush/blue-bunch wheatgrass community also contains the shallow soil community components *Erigeron linearis* and *Eriogonum sphaerocephalum* indicating a mosaic of deep and shallow soils within the habitat. On some areas of the allotment, particularly some of the south

slopes, the big sagebrush/blue-bunch wheatgrass community shows evidence of past disturbance that has altered the forb diversity, shrub and perennial grass abundance (structure), and microbiotic crust cover when compared to reference areas, but overall the big sagebrush/blue-bunch wheatgrass community is in good condition. Although increaser species, such as woolly plantain (*Plantago patagonica*) and cheatgrass (*Bromus tectorum*) are found in the big sagebrush/blue-bunch wheatgrass habitat type in the allotment, they are not generally widespread. There are occasional patches of tumble mustard (*Sisymbrium altissimum),* especially in areas on some of the south slopes dominated by cheatgrass (*Bromus tectorum*). The greatest number of weedy species is found in the area of a water dugout in Section 35.

Sulphur Spring is the main livestock water source for the south pasture. The spring consists of a series of small pools; total of all pools is less than an acre of surface area. Some of the pools are in rocks. Historically, this area has been impacted by livestock grazing and other human activities. The impacted area is roughly two acres. The vegetation in this area consists primarily of weedy annual species, including bulbous bluegrass (*Poa bulbosa)* and cheatgrass (*Bromus tectorum*).

Lithosol soils (shallow rocky soils) are found on many ridge tops. Lithosol soil is underlain by basalt and support stiff sage/Sandberg's bluegrass and thyme buckwheat/ Sandberg's bluegrass (*Eriogonum thymoides/Poa secunda*) plant communities. This association is found throughout the allotment as patchy inclusions within deeper soiled communities, and large contiguous habitat on ridge tops. Common plants of the lithosols are: stiff sage, Sandberg's bluegrass, buckwheats (*Eriogonum spp.*), and Gairdner's penstemon (*Penstemon gairdneri*). Showy spring flower associates include cushion phlox (*Phlox hoodii*), bitterroot (*Lewisii rediviva*), flame flower (*Talinum spinescens*), and sagebrush violet (*Viola trinervata*). The lithosols, due to their sparse grass cover, receive little grazing pressure and are, for the most part, undisturbed.

Talus inclusions are common on shoulders of drainages and on breaks of ridges. These areas provide unique habitats within and along their margins for a variety of plants. *Hackelia hispida* var. *disjuncta*, a Washington Department of Natural Resources listed sensitive species, is found in the basalt rimrock above the coulee on the west side of the allotment. Some of the plants found along the margins and at the base of basalt talus and columns are Great Basin wild rye (*Elymus cinereus*), serviceberry (*Amelanchier alnifolia*), wax currant (*Ribes cereum*), western virgin's bower (*Clematis ligustisifolium*) and mock-orange (*Philadelphus lewisii*). Talus communities in this allotment do not appear to be disturbed by grazing because they are inaccessible and/or difficult for cattle to navigate.

Two aspen groves are located in the bottom of Sulphur Canyon in the middle and upper reaches of the canyon within the allotment. One of these areas is currently in an exclosure, the other is unfenced. These groves provide scarce shade in the south half of the allotment and, if accessible, will be attractive to cattle in the summer.

Hackelia hispida var. *disjuncta*, is the only Washington Department of Natural Resources listed sensitive species that was found in a survey of the allotment in 2005. Other sensitive species that are known to occur near the allotment but were not found in the allotment are: *Mimulus suksdorfii*, *Juncus tiehmii* and *Nicotiana attenuata*. *Mimulus suksdorfii* and *Juncus tiehmii* are found in moist areas such as seeps and springs, and *Nicotiana attenuata* is found in dry bottom lands, dry rocky washes and other dry open areas in places that are prone to periodic disturbance.

Specific information on the impact of grazing on these and other sensitive, threatened or endangered plants is not available. It is possible that unidentified populations of these species in previously undisturbed habitats could be impacted by disturbance.

Microbiotic soil crust is present, and found in greatest abundance on the steeper, moist north facing slopes in the northern end of the allotment. Microbiotic soil crusts (cryptogamic crusts), composed of lichens, bryophytes, algae, cyanobacteria, and fungi, play an important role in the soil stability, nutrient cycling, and hydrology of western rangelands (Belnap et. al. 2001). Cryptogamic crusts are characteristic of all but the saline-alkali soils in the steppe (Daubenmire 1970).

Rangeland health assessments provide information on the functioning of the ecological site. This assessment provides an indication of the status of the three attributes of rangeland health: soil/site stability, hydrologic function and biotic integrity. This qualitative assessment is then applied to the following '5 Standards of Rangeland Health'.

Standard 1 (Watershed Function - Uplands)
This standard focuses on the physical functions of upland soils and addresses the uplands role in the watershed's capacity to capture, store, and safely release moisture from normal precipitation events.

Standard 2 (Watershed Function - Riparian/Wetland Areas)
This Standard addresses the riparian and wetland condition and function within the allotment.

Standard 3 (Ecological Processes)
This standard addresses the ecological processes of energy flow and nutrient cycling as influenced by existing and desired plant communities.

Standard 4 (Water Quality)
This standard does not apply to the Sulphur Canyon allotment since there are no State or Federally regulated waters within the allotment.

Standard 5 (Habitat for Native, T&E, and Locally Important Species)
This standard focuses on retaining and restoring native plant and animal species, populations and communities.

After 3 years of rest from grazing, the Sulphur Canyon Allotment was sampled for Ecological Site Inventory (ESI) and rated for range health in the summer of 2005 (Peterson. 2006). Data taken consisted of sampling transects that ran through each pasture. Roughly, twelve miles of transects were established in the allotment. All major soil types were sampled. Data was collected on each ecological site encountered along these transects.

The three attributes of rangeland health: soil/site stability, hydrologic function and biotic integrity were rated according to the procedure described in the BLM Technical Reference 1734-6 (2000). The indicators include the following: rills, water flow patterns, pedestals and terracettes, bare ground, gullies, wind scours or depositions, litter movement, soil surface resistance to erosion, soil surface loss or degradation, plant community composition and distribution relative to infiltration and runoff, soil compaction layer, plant functional and structural groups, plant

mortality and decadence, litter amount, annual production, invasive plants, and reproductive capability of perennial plants.

Through this process, it was determined by the interdisciplinary team that all five standards of rangeland health were being met under the current grazing regime. (Peterson, 2006) Ninety percent of the allotment sampled was at "none to slight" departure from ecological site description.

Based upon these indicator ratings, there is a preponderance of evidence to conclude that for the allotment, soils are stable, water cycle (hydrologic function) is functioning well, and that there is integrity of the biotic communities.

Utilization is measured post grazing at three key areas within the allotment. Two key areas are in the south pasture (1-1 and 1-2) and one is in the north pasture (2-2). Each key area has a photo-plot for trend monitoring. Typically utilization is greater near water, shade, and salt and would gradually decrease at 1-2 miles from water and would become very light beyond two miles. Utilization would decrease by approximately 30% percent on slopes of 11-30%, percent, by 60% percent on slopes 31-60%, percent, and by 100% percent on slopes greater than 60% (Galt et al. 2000). The table below illustrates the utilization information, at these plots, over the past 10 years:

Utilization Data by Plot Over the Past 10 Years											
Plot	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Average
1-1	12%	49%	7%	NU**	NU**	NU**	33%	36%	35%	50%	32%
1-2	8%	ND*	8%	ND*	ND*	NU**	37%	33%	9%	10%	17%
2-2	ND*	14%	6%	ND*	NU**	New Plot in 2004					10%

**ND- No data for that year. That year was not used in calculating the average percentage*

***NU- No use that year. That year was not used in calculating the average percentage*

In addition to the Utilization Monitoring, use zone mapping is used to qualitatively assess utilization across the allotment. Use-Zone Mapping (UZM) is an ocular estimate of grazing use pasture wide. According to the monitoring files for this allotment, UZM was completed on September 24th 2008. At that time, 90% of the north pasture was at Slight use (6%-20%), and 10% at Light use (21%-40%). The south pasture was shown to be at 70% Slight use (6%-20%), 15% Light use (21%-40%), and 15% (portions near the exclosure in the south ½ of Sec 35) to be at Moderate use (41%-60%). Cattle were removed from the allotment at the end of June 2008, and grazed the north pasture first (03/01- 04/30) where re-growth had occurred, and the south pasture later in the season (05/01- 06/30) where higher use was concentrated in the shady areas and closer to Sulphur Springs.

Impacts on Rangeland Soils, Plant Communities and Botanical Values

Alternative 1 - No Action (No Action/Continue Under Current Management with Spring–Summer Grazing).

A utilization level of 50% is considered to be moderate (41%-60%) utilization. Moderate utilization during the period of critical growth may result in reduced vigor as shown by reduced

seed stalks, lower vegetative production and smaller crown size in key species of grasses. The authorized grazing period under this alternative includes the period of critical growth for key species. It can be expected that at the authorized utilization level of 50%, with grazing during the period of critical growth, key species in the big sagebrush/bluebunch wheatgrass would decrease in vigor under this alternative. Decreased vigor in the key native species could leave the community susceptible to an increase in invasive species. Cattle would likely be removed from the early-use pasture in time for some re-growth of grasses to occur in years of average or greater precipitation. Much less re-growth would occur in years of drought. This may not be true for some of the forbs grazed during the critical period. Most forbs do not have the kind of meristems that allow re-growth and will miss seed production if the flowering stems are grazed or trampled at this time, resulting in decreased reproductive potential for the year. Decreased reproductive potential over several years could reduce the density and diversity of native forbs in the plant community. Weedy species that are already present in the allotment would have the potential of spreading due to soil disturbance caused by grazing.

The plant communities associated with basalt talus and lithosols should not have any adverse impacts under this alternative. Aspen are known to be susceptible to damage by grazing and lounging cattle (DeByle 1985). These groves provide scarce shade in the south half of the allotment and, if accessible, will probably be attractive to cattle in the later part of the authorized grazing period under this alternative.

Crust will continue to be absent in areas of highest use, may be maintained as a simplified community in areas of less use and may remain intact in areas of very little use. Weedy species that are already present in the allotment would continue to have the potential of spreading due to soil disturbance caused by grazing.

Although the authorized use is a maximum of 50%, the actual use is less than 50% most years. Based on the utilization data above, the north pasture grazed March and April last year, had utilization rates of <20% or slight utilization on key species at the end of the growing season. Utilization zone mapping performed for the South pasture measured slight (6% - 20%) to moderate use (40%-60%) at the end of the growing season in 2008. (BLM 2008) Under this alternative, based on last year's use studies, the trend would continue to show re-growth in the early spring pasture and not during late spring use.

Alternative 2 – Reduced Utilization with Early Spring Grazing.
This alternative reduces authorized AUMs by 14 percent and reduces authorized period of use by 50 percent. Alternative 2 provides a shorter duration of grazing and consequently, less impact compared to Alternative 1. A grazing system with light utilization (30%) should not significantly reduce plant vigor in the big sagebrush/bluebunch wheatgrass communities. In both pastures, there will be time for the grasses to recover before the end of the critical growing period in average to high precipitation years. Much less re-growth would occur in years of drought. This alternative will not adversely affect the lithosol and basalt talus communities.

Reducing the season of use by 2 months in the early summer may allow grass re-growth while soil moisture is still available. Early spring grazing (3/01 – 4/30) will aid in cattle distribution by allowing the cattle to move further from shade and water during the cooler early spring months. The aspen groves are not expected to be negatively impacted. Under this alternative, the authorized grazing time falls before the hottest temperatures of the summer, so there may be less

grazing and lounging in the aspens during the authorized grazing time.

Soil moisture levels are higher in early spring due to snow melt. During this cooler part of the year, distribution of cattle would be maximized. Cattle will travel further from water and shade to better utilize the uplands, reducing the impact in riparian areas. Overall, soil compaction would be minor under this alternative due to the timing and lower grazing pressure proposed Crust will continue to be absent in areas of highest use, may be maintained as a simplified community in areas of less use and may remain intact in areas of very little use. Weedy species that are already present in the allotment would continue to have the potential of spreading due to soil disturbance caused by grazing.

Adverse impacts under this alternative would be lower than Alternative 1 because of reduced time in the allotment, timing of grazing to fall outside of the critical period for plant growth and reproduction, and lower stocking rate.

The installation of a pump and trough by BLM at Sulphur Springs will help keep cattle out of the riparian area around the springs by attracting cattle to the trough rather than the springs themselves. The proposed water improvement developed by the lessee under this alternative, will greatly benefit BLM lands. This water development on private lands within the boundaries of the allotment would help keep cattle further north and off BLM lands by helping to distribute cattle away from other water sources on public lands by providing water in other areas.

Alternative 3 – Reduced Utilization with Late Summer-Early Fall Grazing.
Alternative 3 proposes a reduction in use and a change in season of use. Both pastures within the allotment would be deferred from grazing during the critical growth period each year. Plant species that set seed prior to September 1, including most of the native perennial forbs and grasses, would be free of grazing pressure during their critical growing period. Bunch grasses would be grazed when the above ground vegetation is dormant and no loss of carbohydrate storage potential would occur. Fall grazing would reduce the height and amount of standing dead material. If this reduction is significant, it could contribute to winter killing in bunchgrasses left without sufficient thermal insulation. A grazing system with light utilization (30%) should not significantly reduce plant vigor in the big sagebrush/bluebunch wheatgrass communities. A deferred rotation system would be expected to cause an increase in key species when utilization is low to moderate (RMP/FEIS Appendix J, Grazing Systems).

The reduction in use from 50% to 30% is not expected to have any effect on the current overall health of the rangeland, the change in season of use from early spring to late summer may. Grazing in late summer could cause adverse impacts to water sources and riparian areas. The average high temperature in September for this area is 78 ºF, with a average monthly precipitation of 0.4 in. (NOAA 2008). During this hot dry time of year, cattle are more likely to congregate in these areas increasing the use on and around wet or shady areas and avoid use of uplands. Cattle are less likely to move very far from water and shade this time of year; therefore utilization would be lighter in the uplands and heavier in the shady riparian zones.

Under this alternative the unfenced aspen groves would be available for grazing and lounging in the month of September when it may still be hot, making it an attractive area for the cattle because of the shade provided by the trees. Aspen are known to be susceptible to damage by grazing and lounging cattle (DeByle 1985). Heavy, uncontrolled use of an aspen community can

result in negative long-term changes (DeByle 1985).

The cryptogamic crust community could be adversely affected by this alternative. Crust species are only actively growing when wet and are brittle when dry so that disturbance in the dry season is generally destructive to the crust (Belnap et.al., 2001).

Weedy species that are already present in the allotment would continue to have the potential of spreading due to soil disturbance caused by grazing. Adverse impact under this alternative would be lower than Alternative 1 because of reduced time in the allotment, timing of grazing to fall outside of the critical period for plant growth and reproduction, and lower stocking rate.

Under this alternative, the only range improvement proposed is the installation of a pump and trough at Sulphur Springs. Most of the water sources in this allotment are not considered to be reliable later in the season. In dry years, the springs and a well in the north pasture could dry up as early as the end of May. In this case, the lessee would be responsible for providing stock water in the event that current water sources are depleted by late summer.

Consequences common to the proposed range improvement.
The proposed range improvement will be a pipe and trough system at the north end of Sulphur Springs with a buck and rail exclosure (approximately 220ft X 178 ft) encompassing the remainder of the springs area and the flat surrounding the spring and will attach to the pasture fence along the road. This exclosure is intended to reduce the impact of cattle in the spring itself while still allowing cattle to water near the spring at the trough. The area around the new trough will be heavily used resulting in trampling of plants and soil compaction. The area within the exclosure will no longer be impacted by cattle, but the plant community within the exclosure area is already dominated by weedy annuals and may not be able to revert back to the native plant components.

Alternative 4 – No grazing
Plant cover in areas that have been impacted by grazing would be expected to increase. Seral stage of all plant communities would be maintained or would advance. The allotment would continue to meet the standards for rangeland health. Vegetation cover would increase in the small areas of disturbance around livestock attractants such as water and salt. Invasive plant populations are anticipated to remain at current levels or be reduced. Weedy species that are already present in the allotment would be less likely to be dispersed throughout the allotment in the absence of grazing. Biological soil crusts could begin the process of rebuilding crust species diversity in the absence of disturbance from cattle trampling, provided that disturbed areas are not infested with weedy annuals, which tend to inhibit the recovery of cryptogamic crust (Belnap et. al 2001).

Consequences common to all action alternatives
None of the proposed alternatives would cause the lithosol or talus communities to be disturbed. Many studies show that livestock grazing, vehicle use and human trampling dramatically reduce lichen/moss cover and species richness of cryptogamic crusts and consequently reduce the positive impacts of crusts on soil stability, nutrient cycling and native perennial seed establishment (Belnap et al 2001). Recovery times for cryptogamic crusts that have been damaged are dependent on many factors. Predicted recovery rates from the literature range from 40 to 400 years and no significant recovery progress has been found at less than ten years (Belnap

et.al. 2001). In general, the only grazing method that is recommended for the preservation of cryptogamic crust is winter grazing, when soils are frozen and snow covered (Belnap et.al. 2001) Any alternative that reduces physical disturbances, such as trampling, on soil crusts would be preferred for maintaining the remaining intact biological soil crust communities on the allotment.

Cumulative Effects

Sagebrush steppe is becoming an endangered habitat in Washington. Only about 40% of the original shrub steppe remains and 60% of the remaining shrub steppe is in private ownership (Dobler et al. 1996). It is estimated that about 27% of the remaining shrub steppe is used or managed such that it resembles the original shrub steppe, and less than 1% is protected in ecological condition similar to the original vegetation (Crawford 1993). Seventy-five percent of natural habitat in Douglas County has been converted for agricultural production (Foster Creek Multiple Species Habitat Conservation Plan, Draft 2008). The natural habitat that is suitable for agriculture is largely the deep soils of the sagebrush steppe. Any actions that contribute to the continued degradation or destruction of sagebrush steppe habitat and the plant communities that are found within it, in the context of the already reduced state of this habitat in Eastern Washington will produce a cumulative effect on this resource.

There are two sub-watersheds included within the boundaries of the allotment. This analysis considers the possibility of potential impacts from activities occurring (past, present and future) in the subwatersheds containing the allotment. The sub-watersheds are the Upper Lower McCarteney Creek and the Burton Draw sub-watersheds.

Some of the effects caused by the past, present, and future activities identified below have not been quantified and/or this data is not available at this time. It is reasonable to assume that to the extent that these other activities are causing similar effects to those described in the environmental consequences section above for the BLM proposed actions, there will be cumulative effects of the proposed actions.

Past, present, and future actions affecting the sagebrush steppe habitat include the following:
Land Development. Development associated with population growth such as housing, transportation, business and industry could result in an incremental reduction in native plant communities due to habitat conversion.

Agricultural Land Conversion. Land conversion for agriculture results in long term destruction of native shrub steppe communities, resulting in an incremental reduction and fragmentation of the shrub steppe habitat over the historic range of the habitat. Habitat conversion for agriculture began in the late 1800's. Most dry land agricultural conversion occurred prior to 1940, while conversion to irrigated agriculture began in the 1950's following development of extensive irrigation systems.

Livestock Grazing. Most land unsuitable for crop production was used for livestock grazing by the 1890's, due largely to the Homestead Act of 1864 and Northern Pacific Railroad land grants. Historic grazing levels were often very high in many areas, resulting in major changes to the shrub-steppe ecosystem including reduction or removal of bunchgrasses and forbs and increases in annual weedy species (Stinson et al. 2004). The majority of shrub steppe habitat on public and an unknown amount on private land is open to livestock grazing. Depending on the timing and

intensity of grazing on these lands outside of the BLM allotment, changes in ecological functions and plant community composition can be expected. These changes in function and composition can lead to habitat degradation such as disturbance of soil crusts, opening bare ground to potential weed invasion, and decreasing diversity of native plant species.

Recreation. The extent of off road recreational vehicle use on public and private lands is not known, but depending on the intensity of use in an area, changes that can be expected are disturbance of soil crusts, opening bare ground to potential weed invasion, and weed dispersal by recreational vehicles.

Wildland Fire. Many acres of sagebrush steppe habitat burn each year. Big sagebrush, a key species in the sagebrush steppe habitat is not adapted to survive hot and frequent fires. Big sagebrush can take 30 years or longer to recover after fire (Lesica et al. 2007), so large fires have the potential to remove significant portions of habitat for long periods of time. Cheat grass, a common invasive species in degraded shrub steppe habitat, contributes to a fire cycle with reduced fire return intervals, and increased fuel loads, and can delay or prevent the re-establishment of native species. As more acres burn each year on federal, state and private lands, intact sagebrush steppe habitat is lost.

Energy Resource Development. Wind energy developments are increasing within the sagebrush steppe habitat in Eastern Washington. While the actual wind towers may not occupy large areas, roads, powerlines, and associated infrastructure created to build and maintain the wind farms displace shrub steppe habitat and create soil disturbance and openings for weed invasions.

Weed Invasion. Weeds can invade native plant communities when there is soil disturbance caused by grazing, off road recreation vehicle use, transportation corridors, agriculture, land and energy resource development and fire. Weed invasions can be difficult to control and cause changes in plant community composition and structure, resulting in irreversible, long term degradation of native shrub steppe habitat and alteration in normal fire regimes and hydrologic function of soils.

Under Alternative 1, the cumulative effects that are expected from the alternative plus the actions and activities listed above that have occurred, are occurring, or may occur in the future through shrub-steppe habitat are: loss in vigor of key species of perennial grasses; decrease in diversity of forb species; damage to cryptogamic crust; potential damage to unprotected aspen, and increased risk of weed invasion due to disturbed soil. In the context of other actions that have cumulative effects on this resource, this alternative would have the most detrimental cumulative effect and would be the least beneficial in the long term, compared to the other three alternatives.

Under Alternative 2, there would be a lower level of impact due to the shorter period of use, use outside of the critical period of growth and decreased allowable utilization. The cumulative effects that are expected from the alternative plus the actions and activities listed above that have occurred, are occurring, or may occur in the future through shrub-steppe habitat are damage to cryptogamic crust in areas of moderate to heavy use, with a continued risk of weed invasion in those areas. When released from grazing during the critical growth period, key species would be expected to increase in vigor. In the context of other actions that have cumulative effects on this resource, this alternative would have minimal detrimental cumulative effect in the long term and will have some beneficial effects on key species in the sagebrush steppe habitat.

Under Alternative 3, there would be a lower level of impact to the general shrub steppe habitat, excluding the aspen grove, due to the shorter period of use, use outside of the critical period of growth and decreased allowable utilization. The cumulative effects that are expected from the alternative plus the actions and activities listed above that have occurred, are occurring, or may occur in the future through shrub-steppe habitat are damage to cryptogamic crust and soils in areas of moderate to heavy use, with a continued risk of weed invasion in those areas, and potential damage to unprotected aspen. A combination of increase ORV use in September and October along with the concentration of livestock near water and shade could have a cumulative impact on the soils integrity. When released from grazing during the critical growth period, key species would be expected to increase in vigor. In the context of other actions that have cumulative effects on this resource, this alternative proposed action would have minimal detrimental cumulative effect on the shrub steppe habitat in general, a slight detrimental cumulative effect on aspen groves, and in the long term, will have some beneficial effects on key species in the sagebrush steppe habitat.

Under Alternative 4, in the context of other actions that have cumulative effects on this resource, no detrimental cumulative effects are expected. Beneficial cumulative effects to the sagebrush steppe habitat that would be expected are increased vigor of key species, repair to damaged cryptogamic crust over time, and a decrease in opportunities for weed dispersal and invasion..

Wildlife Habitat

Affected Environment

Shrub-steppe Wildlife

The area supports a wide variety of animals common to shrub-steppe and riparian habitats of the Columbia Basin (Appendix 1). Common species include mule deer, coyote, porcupine, canyon wren, house finch, black-billed magpie, raven, red-tailed hawk, gopher snake and western rattlesnake. Neotropical migrant birds use the area during migration and a number of species, such as western meadowlark, loggerhead shrike, Brewer's sparrow, sage sparrow, lark sparrow, and vesper sparrow are breeding summer residents.

Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species that are known in the area include habitats: shrub-steppe, riparian, cliffs, talus; and species: mule deer, white-tailed jackrabbit, Washington ground squirrel, golden eagle, sage thrasher, sage sparrow, loggerhead shrike, chukar, sage-grouse, and prairie falcon.

Bureau sensitive species that are known to use the area include greater sage-grouse (Federal candidate and Washington threatened) and Washington ground squirrel (Federal candidate and Washington candidate). There are records that the area supported pygmy rabbit (Federal endangered and Washington endangered) 20 to 30 years ago.

Washington ground squirrel is a poorly understood species that is only active above ground from February through June, spending the rest of the year below ground aestivating and hibernating. Their active period is spent breeding, reproducing and putting on fat and gathering food for the next period of aestivation/hibernation. Washington ground squirrels depend on the seeds of perennial grasses and forbs to survive through hibernation and reproduce successfully (Sherman

and Sherman 2005)

Sage-grouse

Sage-grouse can be considered a focal species for this allotment because it is adapted to late seral sagebrush steppe; is less flexible concerning habitat requirements than other Bureau sensitive or priority species in the area; and habitat management activities designed to provide for sage-grouse will maintain or improve habitat values for other sensitive or priority species found in the area.

Sage-grouse begin returning to breeding areas in late February or early March, where they gather at lek sites early in the morning and late in the evening to do mating displays and courtship rituals. Males continue lek displays until late April or early May. Females begin nesting as early as March, with most nesting activity in April or May. The average date of first nest initiation is mid to late April. Many first nests fail, due to predation or other factors, and average re-nesting date is mid May. Eggs are laid over a 6 to 13 days period, and incubation takes 26 days, making the average hatching date for second nests in late June (Livingston and Nyland, 2002, Schroeder and Robb 2003, Stinson et al. 2004).

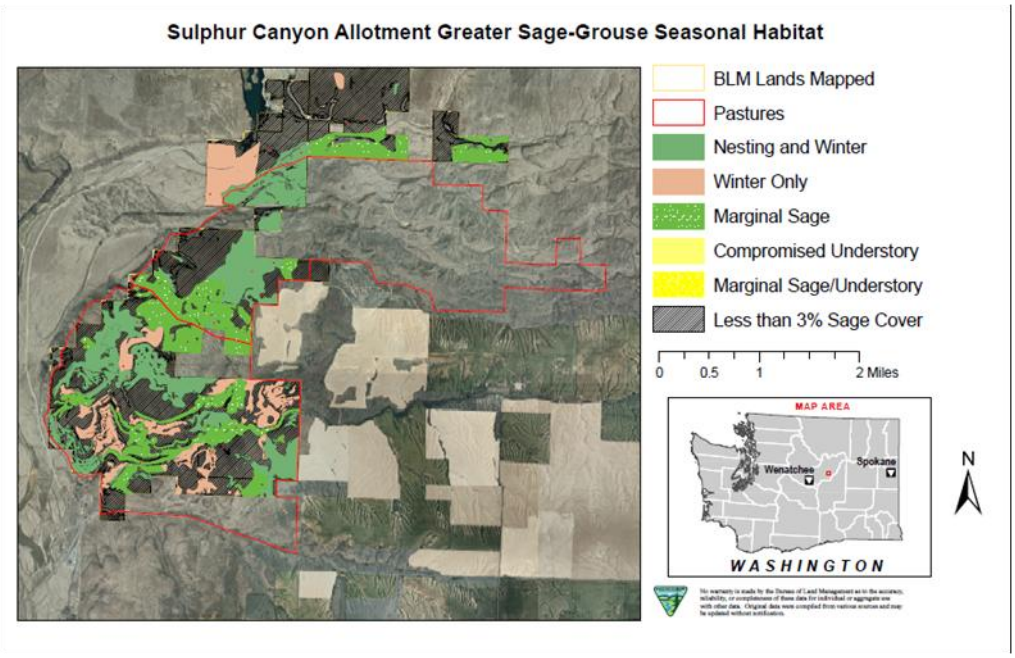
This grazing plan provides an opportunity to improve sage grouse habitat conservation at the local level and begin implementing BLM's National Sage-grouse Conservation Strategy (USDI 2004). The Sulphur Canyon area including the Sulphur Canyon Allotment is a 4,900 acre block of BLM land near the southern edge of the WDFW's Mansfield Plateau Sage-Grouse Management Unit that is occupied by resident, breeding sage-grouse (Stinson et al. 2004). Two active sage-grouse leks (Sulphur Canyon and Davis) lie within four miles and the area is used by sage-grouse year round. The Sulphur Canyon area is important because it is part of the only large contiguous piece of sage-grouse habitat managed by BLM within the Mansfield Plateau Management Unit. Land ownership within the Mansfield Plateau Unit is approximately 84% private, 12% DNR, 1.3% WDFW and 1.6% BLM.

Sage-grouse habitat was evaluated on BLM managed land within the Sulphur Canyon area in 2005 (Musser et al. 2005, Ellis et al. 2006). At that time, the allotment had been rested from livestock grazing for three years. Detailed habitat polygon estimates were mapped, and habitat rankings were supported by random point samples using line intercept and Duabenmire microplots (Figure 1). Of 4,905 acres evaluated, nearly 2,300 acres had greater than 3% big sage cover and were identified as sage-grouse habitat. A similar amount of the area had less than 3% sage cover, which is generally not considered suitable for sage-grouse habitat, but considering the highly interspersed mosaic nature of many of the areas with less than 3% sage cover, much of this probably provides useful brood-rearing habitat. Nearly 1,500 acres of habitat were estimated to be suitable for winter use, and over 1,000 acres of this was considered suitable for nesting. The remaining 800 acres of habitat had less than 10% sage canopy and provide brood-rearing habitat (Ellis et al. 2006, Figure 1).

Over half of the Sulphur Canyon habitat (64%) had understory composed of tall perennial grasses and forbs and cheatgrass was relatively rare. Habitat suitable for nesting and brood rearing totaled 44%. Management objectives for sage-grouse nesting and brood rearing habitat include sagebrush canopy cover of 15-25% percent with a diverse understory of native grasses and forbs at least 18 cm (7") tall (Sather-Blair et al. 2000; Connelly et al. 2000).

Sixty-one percent of Sulphur Canyon habitat evaluated in 2005 was suitable for sage-grouse winter habitats, which are typically low elevation areas and areas with southern exposures that have reduced snow accumulation. Winter sage-grouse habitats have mountain, Wyoming and big sage, and/or three-tipped sage that are tall enough to provide forage above snow level. Within the Sulphur Canyon area, Wyoming sagebrush (*Artemisia tridentata wyomingensis*) is the most common of these sage species. Sage-grouse select areas with greater than 10% sagebrush cover for winter habitat. Understory vegetation is relatively unimportant because sage-grouse feed almost exclusively on sagebrush in winter (Connelly et al. 2000; Stinson et al. 2004).

Figure 1: Greater sage-grouse habitat within the Sulphur Canyon Allotment.



Environmental Consequences

Alternative 1 - No Action (No Action/Continue Under Current Management with Spring–Summer Grazing).

Shrub-steppe Wildlife

The current authorization would allow 50% percent utilization of key forage species – typically dominant bunchgrass such as bluebunch wheatgrass, Idaho fescue, and needle-and-thread – on 3,207 acres of BLM land. In dry years when re-growth might not occur in either pasture, utilization greater than 25-35% percent would reduce rangeland productivity and lead to increased sagebrush density and cover, reduced abundance of understory grass and forbs, and increased abundance of annual species such as cheatgrass (Galt et al. 2000) This could increase the availability of nest sites for some shrub-nesting species such as Brewer's sparrow but it would reduce the sparrow's understory foraging habitat. Species that nest on the ground, such as

vesper sparrow, savannah sparrow, and western meadowlark would respond negatively to grazing (Saab et al. 1995). Grazing could also increase brown-headed cowbird abundance that would result in increased nest parasitism and reduced annual recruitment of host shrub-steppe species. Brewer's sparrow, sage sparrow, and vesper sparrow are known to be affected by cowbirds in central Washington (Vander Haegen and Walker 1998).

Mourning dove, horned lark, loggerhead shrike, sage thrasher, lark sparrow, and Brewer's blackbird would either not respond to moderate grazing or show mixed response. Sage thrasher, for example, is known to tolerate moderate levels of grazing but declines when grazing disturbance crosses some undefined threshold (Saab et al. 1995). Ground squirrels would tolerate moderate levels of grazing as long as sufficient perennial grasses and forbs remain in May and June to meet their nutritional needs during aestivation and hibernation (Fehmi et al. 2005, Tarifa and Yensen 2004). Where natural disturbances such as fire have been excluded from the ecosystem, moderate levels of grazing could maintain favorable plant community composition and structure and forage quality and quantity that would benefit ground squirrels (Sherman and Runge 2002).

Alternative 1 would allow livestock grazing along approximately 1 mile of aspen-dominated intermittent stream and several seeps and springs. During the early part of the season, grazing would result in lighter utilization in riparian areas because livestock would tend to move farther from water and shade than later in the year. Later in the season, cattle would spend more time near shade and water and would have a greater impact on riparian wildlife. Because grazing would occur during the breeding season of many species of wildlife, it would affect birds that nest on or near the ground by increasing disturbance, increasing nest predation, and facilitating cowbird parasitism (Saab et al. 1995, Ammon and Stacey 1997). Grazing would have little effect on cavity and canopy nesters and could increase abundance of habitat generalists such as robin, killdeer, and Say's phoebe. Abundance of small mammals, reptiles, and amphibians that depend on herbaceous cover and litter could also decline (Wales 2002). Removing livestock by the end of June would allow some re-growth and recruitment of new age classes of aspen and other riparian vegetation during summer and fall.

Sage-grouse

Nesting and early brood-rearing are the most critical time in the annual life cycle of sage-grouse and nest cover seems to be critical to nesting success (Connelly et al. 2004). Standing herbaceous vegetation less than 18 cm (7") would not provide sufficient lateral screening cover for sage-grouse nests and would increase the probability of nest predation by raptors, corvids, coyotes, and small mammals (Gregg et al. 1994, Connelly et al. 2000). Grass height measurements averaged 23 cm (9") in the Sulphur Canyon area following three seasons of non-use (Musser et al. 2005). Fifty percent utilization would reduce average grass height and would greatly increase the probability of nest failure. Chick survival would also be compromised because hens with broods prefer tall grass cover during the brood-rearing period that extends up to 12 weeks post-hatching (Sveum et al. 1998).

Over the next 5-10 years, sage density would increase slightly and understory perennial grass and forbs important for sage-grouse would decrease (Beck and Mitchell 2000, Galt et al. 2000, Hockett 2002). Cheatgrass is present in low densities and would be likely to increase with reduced native plant vigor and dispersal of seed by livestock. Cheatgrass poses a threat to sage-grouse habitat by increasing the likelihood of wildfire that could eliminate sage-grouse habitat

for many years (Stinson et al. 2004, Lesica et al. 2007). Livestock rarely trample sage-grouse nests, but their presence could cause females to abandon their nests (Connelly et al. 2004). Sage-grouse in this area initiate nesting in April and over 75% percent of females re-nest in May (Schroeder 1997). Females that have their first nest in the early-use pasture and females that re-nest in the late-use pasture would have higher probabilities of being directly affected by disturbance. An increase in sagebrush cover caused by grazing would provide more sagebrush for wintering grouse but this would be inconsequential since winter habitat is not a limiting factor for recovery in Douglas and Grant Counties (Schroeder et al. 2000).

Alternative 2 – Reduced Utilization with Early Spring Grazing.

Shrub-steppe Wildlife

The effects of alternative 2 to wildlife and habitat would be similar to Alternative 1, with less impact. Utilization would continue to vary depending on distance to water and steepness of slope, but would average 30% percent in key areas, the harvest coefficient recommended by Braun (2006) and others to maintain or improve shrub-steppe habitat (Galt et al. 2000, Hocket 2002, Stinson et al. 2004). Vegetation would have time to re-grow in most years to provide cover and forage for wildlife. Light utilization would spare much of the residual herbaceous cover important for nest screening in the following year and could contribute toward improved seral conditions and plant vigor. Because grazing would occur during the breeding season of many species of wildlife, it would affect birds that nest on or near the ground by increasing disturbance, increasing nest predation, and facilitating cowbird parasitism (Saab et al. 1995, Ammon and Stacey 1997). The lower stocking rate and shortened season of use would result in fewer disturbances and less competition for forage and space with resident wildlife than Alternative 1. Livestock would spend less time in riparian areas than with Alternatives 1 or 3.

Sage-grouse

Alternative 2 meets recommendations for limiting utilization to 30%, percent, but does not meet WDFW's Recovery Plan Conservation Strategy 2.2—"Wherever possible, prevent disturbance in sage-grouse nesting and brood rearing habitat between 1 March and 15 June." Livestock would occupy the allotment when sage-grouse initiate nesting but would leave before May when over 75% percent of females re-nest (Schroeder 1997). Livestock rarely trample sage-grouse nests, but their presence could cause females to abandon their nests (Connelly et al. 2004). Light utilization would spare much of the residual herbaceous cover important for nest screening in the following year, and would help limit the spread of invasive annual species such as cheatgrass that reduce the effectiveness of sage-grouse habitat and increase the chance of wildfire that has the potential to eliminate habitat for many years (Stinson et al. 2004, Lesica et al. 2007).

Alternative 3 – Reduced Utilization with Late Summer-Early Fall Grazing.

Shrub-steppe Wildlife

Alternative 3 would have fewer effects on wildlife and wildlife habitat than Alternative 1 and 2. Utilization would continue to vary depending on distance to water and steepness of slope, but would average 30% percent in key areas, which is the harvest coefficient recommended by Braun (2006) and others to maintain or improve shrub-steppe habitat (Galt et al. 2000, Hocket 2002, Stinson et al. 2004).

Grazing would occur outside the breeding and nesting season of most wildlife. Many migratory

species would have left or would be in migration and would be relatively unaffected. Light utilization would spare much of the residual herbaceous cover important for nest screening in the following year and could contribute toward improved seral conditions and plant vigor. The lower stocking rate would result in fewer disturbances and less competition for forage and space with resident wildlife. Washington ground squirrel would benefit from deferred grazing with light utilization because grazing would occur outside of their active period (February through June) when squirrels are gathering seed stores for aestivation and hibernation (Sherman 2009). Late summer/fall grazing could result in increased livestock use near water and shade, especially during September. Impacts to riparian wildlife would be similar to Alternative 1 and would be greater than Alternative 2.

Sage-grouse

This alternative incorporates recommendations from NRCS and others (Galt et al. 2000) regarding the intensity, rotation, and timing of grazing. It would support the WDFW Recovery Plan (Stinson et al. 2004) and BLM's National Sage-grouse Conservation Strategy (USDI 2004). Grazing would occur well after the sage-grouse nesting and early brood rearing seasons. Timing and intensity of utilization would ensure that adequate perennial grasses and forbs would remain during the following nesting season when screening cover is most important. This could increase nest success and decease mortality (Connelly et al. 2004, Stinson et al. 2004). Light utilization would spare much of the residual herbaceous cover important for nest screening in the following year, and would help limit the spread of invasive annual species such as cheatgrass that reduce the effectiveness of sage-grouse habitat and increase the chance of wildfire that has the potential to eliminate habitat for many years (Stinson et al. 2004, Lesica et al. 2007). This alternative would not affect shrub density or structure; therefore there would be little effect on sage-grouse winter habitat.

Alternative 4 – No grazing

Shrub-steppe Wildlife

Removing livestock from the allotment would allow areas that have sustained heavier utilization to show a gradual increase in species richness and cover of native shrubs, perennial grass, and forbs and a decrease in non-native species (Anderson and Inouye 2001). Although it is impossible to predict with certainty the ecological effects of removing livestock (Connelly et al. 2004) some changes would be expected to begin in the next growing season. Shrub and grass vertical and horizontal cover would move toward site potential and could improve wildlife reproductive success and survival of young. Aspen and riparian vegetation structural and species diversity should increase and progress toward site potential. Species that respond positively to periodic disturbance such as ground squirrels or prefer grasslands in lower seral condition such as grasshopper sparrow may have lower abundance than they would with light grazing (Vander Haegen et al. 2000).

Sage-grouse

Alternative 4 best meets the goals of the WDFW Recovery Plan (Stinson et al. 2004) and BLM's National Sage-grouse Conservation Strategy (USDI 2004). Sage-grouse are adapted to climax vegetation and removal of cattle would allow the habitat to move towards climax (Hockett 2002). Gradual increases in shrub and grass cover would provide additional screening for nesting and hiding cover associated with increased nest success and decreased mortality (Stinson et al. 2004). In addition, removal of cattle would eliminate disturbance during the breeding, nesting and

brood rearing periods, which could improve nesting success as presence of cattle may cause nest abandonment (Connelly et al. 2004, Stinson et al. 2004). Removal of cattle would also help prevent the spread of invasive species within the allotment.

Consequences common to Alternatives 2and 3

A small new fence would be built around Sulphur Spring under alternatives 2 and 3, excluding cattle from the spring and flat surrounding the spring. A pipeline and water trough would be installed to provide water for cattle outside the new fence. Sulphur Spring and the small flat around the spring are heavily impacted by cattle. Most of the remaining vegetation within this area is weedy (cheatgrass, bulbous bluegrass, tumble mustard, diffuse knapweed). The open water at Sulphur Spring is attractive to most of the wildlife using the area. Removing cattle from the spring area would allow the area to be rehabilitated to a more desirable condition for wildlife. More importantly, the additional fence would eliminate the need for the hanging fence directly over the spring channel and reduce cattle entering the riparian pasture above Sulphur Spring.

Cumulative Effects—Affected Environment

This analysis will refer to both general shrub-steppe wildlife habitat and greater sage-grouse habitat, and will focus on the historic range of greater sage-grouse in Washington State, with additional information provided for Douglas County, where available. This extent was chosen because the cumulative effects of past actions have affected the entire historic range, leading to the current condition of sage-grouse populations. In addition, meeting sage-grouse recovery goals outlined by Stinson et al. (2004) will require improving lands that formerly provided sage-grouse habitat (the historic range) to suitable conditions.

Shrub-steppe wildlife habitat, including greater sage-grouse habitat, has been greatly affected by conversion to cropland, removal of sagebrush, excessive grazing, exotic species invasion, wildfire and fragmentation (Schroeder et al. 2000, Stinson et al 2004). The effect has been declines in range and abundance of many shrub-steppe dependent species, and the extinction of the Columbia Basin pygmy rabbit in the wild. There has been an estimated 56% percent reduction in sagebrush habitat within the historic range of sage-grouse in Washington, down from nearly 14,100,000 acres to approximately 6,204,000 acres (Stinson et al. 2004). Within Douglas County, there is currently approximately 550,000 acres of cropland (47% of the county). Large-scale habitat conversion to cropland isn't likely to be a major issue in the foreseeable future, but small scale conversion of remnant habitat continues today and will in the future.

Currently, within the historic range of sage-grouse, BLM livestock grazing leases combined with associated private land total approximately 344,200 acres, or approximately 1.5% of total historic range (BLM 2005). Lands owned by the State of Washington DNR identified as non-cultivated grazing lands total 376,821 acres. (WDNR 2006). Additional private land grazing at the historic range level has not been quantified at this time, but a substantially greater amount of the private land is known to be used for grazing. For example, within Douglas County, the 2002 Census on Agriculture reported approximately 329,000 acres of rangeland used for livestock grazing, most of which is private property. While actual use varies greatly across these grazing lands, nearly all of the BLM and State leases are allowed up to 50% utilization, which is considered excessive for sage-grouse conservation, and private land grazing utilization is not regulated.

Cheatgrass was first recorded in Washington State in 1896. The overgrazed vegetation of the

rangelands was easily invaded and cheatgrass was well established within 30 years (Pellant 1996). Cheatgrass is presently found in all counties in Washington within the historic range of sage-grouse. Effective control methods have yet to be developed at the landscape level, and ground disturbance tends to increase cheatgrass, so cheatgrass will be an ongoing concern in shrub-steppe and sage-grouse habitat.

Large fires burned over 200,000 acres in the year 2000 and 1984, and hundreds of thousands of acres in the Rattlesnake Hills, Hanford and Yakima Training Center recovery units have been removed from habitat by fire throughout the years (Stinson et al. 2004). Some areas, such as near Hanford and the Rattlesnake Hills, have become cheatgrass monocultures that burn regularly, preventing the re-establishment of shrubs necessary for sage-grouse habitat. Fire remains a major threat to sage-grouse habitat, and is expected to increase in the future due to continued cheatgrass invasion, increased fuel loads from fire suppression and climate change (Stinson et al 2004, Westerling et al. 2006, Marlon et al. 2009).

Habitat fragmentation from developing infrastructure has reduced the effectiveness of remaining habitat. Habitat fragmentation can cause a variety of problems for sage-grouse and other shrub-steppe wildlife, including increased mortality due to predation and collision (with vehicles, fences, etc.), increased effects of pesticides from adjacent croplands, increased noxious weed invasion and reduced genetic exchange among the population (Stinson et al. 2004). Besides agricultural conversion, roads, fences and power lines are the most common types of fragmentation, but wind farms, drilling and other infrastructural developments are becoming increasingly common. Cities and towns amount to nearly 200,000 acres within the historic range of sage-grouse in Washington (BLM 2006), not including residential development outside of city limits. United States Census Bureau (2000) reports show that population growth is variable across the area, but has continued to increase steadily throughout the years. Approximately 42,000 miles of road exist within the historic range of sage-grouse in Washington, more than one mile of road for every square mile of land (BLM 2008b). Of this, approximately 6,200 miles (15%) is paved roads and highways, which have the greatest impact on shrub-steppe and sage-grouse habitat. Over 5,000 miles of utility line corridors and 1,500 miles of railroad have been constructed (BLM 2003).

More recently, wind energy developments have begun to affect shrub-steppe and sage-grouse habitat in Washington State. Wind energy developments remove habitat directly while also increasing associated fragmentation with roads and utility lines, and have the potential for direct mortality and avoidance disturbance. Direct habitat loss is often mitigated through purchase and preservation of intact habitat or restoration of degraded land, but restoration is difficult to achieve and is usually less valuable than intact native habitat. The response of different bird species is variable and not well researched, but some wind energy developments have been shown to cause significant mortality to bats and migratory birds (Martin et al. 2009). Sage-grouse usually tend to avoid the towers, with some research showing effects up to 1.5 miles away, resulting in potential for large scale habitat loss and fragmentation (Stinson et al. 2004). At least nine wind energy projects have been constructed within the historic range of sage-grouse in Washington since the 1990's, mostly in Kittitas County and Klickitat County, totaling at least 550 towers (AWEA 2008). The total acreage affected has not been calculated, but two of these projects combined are directly affecting approximately 14,000 acres. One more project is currently under construction, and several others have been proposed and are in various stages of planning. The Withrow Wind Project in Douglas County proposes to construct up to 106 wind turbines and supporting

infrastructure such as power lines and roads, affecting approximately 14,600 acres within occupied sage-grouse habitat. Several other wind energy sites are in the permitting process, including the Desert Claim and Kittitas Valley projects in Kittitas County, proposing to construct an additional 155 towers and affecting nearly 14,000 acres. Monitoring towers have been established in many areas to assess potential for wind energy development, including Moses Stool within occupied habitat, as well as in formerly occupied areas such as Saddle Mountains and Rattlesnake Hills. Currently, Washington is the 5thfifth largest producer of wind energy in the nation, and wind energy is likely to be an ever increasing issue in the future, considering the recent push by the U. S. Department of Energy for increased "alternative" power sources, calling for 20% use of alternative power by 2030.

Oil and gas exploration and extraction sites typically directly remove only a small amount of habitat, but usually also contribute to increased fragmentation from associated roads and pipelines, in addition to causing noise disturbance (Stinson et al. 2004). Petroleum wells have been less of an influence to shrub-steppe habitat in Washington than other parts of the west, due to deep layers of basalt resulting in difficult and costly drilling. However, there is one exploration well currently operating within the historic range of sage-grouse, and two more are likely to begin operating soon, including one on BLM land in the Saddle Mountain Management Unit. Many areas are leased with the potential for development to occur in the future, but large-scale activity isn't likely due to the high cost of drilling.

Concern over both declining range quality and numbers of sage-grouse and other shrub-steppe wildlife species was noted among biologists and naturalists as early as the beginning of the 1900's (Stinson et al. 2004, WAFWA 2008). The Taylor Grazing Act of 1934 began efforts to regulate grazing on public rangeland by providing a permitting system with ten year leases and provisions that would allow land managers to adjust grazing for certain reasons, such as drought. Federal conservation acts such as Nation Environmental Policy Act (1969), Sikes Act (1974), Federal Land Management Policy Act (1976), Public Rangelands Improvement Act (1978) and others have provided additional protection for shrub-steppe habitat on federal land.

In 1985 the Conservation Reserve Program (CRP) was initiated to remove marginal farmland on private land from production and re-establish perennial vegetation. As of 2006 nearly 1.5 million acres have been enrolled in CRP in Washington State, mostly within the historic range of sage-grouse. Currently CRP land in eastern Washington is equal to approximately 10% of the state's total farmland. Some CRP appears to be suitable nesting habitat for sage-grouse with success rates equivalent to shrub-steppe habitat nest success. Use of CRP for nesting/brood rearing also appears to be increasing as shrub cover increases. Since the introduction of CRP, the sage-grouse population in north central Washington (Douglas/Grant Counties), where 17% of the occupied area is CRP, has shown a slight reversal in decline, while the sage-grouse population in south central Washington (Yakima County), where only 2% of the occupied area is CRP, has continued a long term decline. (Schroeder and Vander Haegen 2006) CRP is likely to remain in the future, but agreements are made for 10- years at a time and many of the areas now in CRP will expire in the near future. Because this is a voluntary program, there is no guarantee that these lands will remain in CRP. CRP is limited to 25% of the total cropland within a county, but Douglas County was granted a waiver to that limitation during the last sign-up period. As a result, Douglas County currently has approximately 33.3% (186,000 acres) of its cropland in CRP. The waiver is no longer in place, however, which will remove 46,000 acres (nearly 25% of current acres) from CRP by September 30, 2010. Efforts are being taken to enroll this and

additional acreage into State Acres for Wildlife Enhancement (SAFE) program through USDA (Schroeder and Vander Haegen 2006).

Greater sage-grouse was listed as a candidate species in Washington State in 1991 and was state listed as "Threatened" in 1998. This has resulted in additional efforts to reduce habitat loss/degradation and restore converted/degraded habitat through cooperation with private and public land managers in Washington State. WDFW is working with state and federal agencies as well as private land owners to implement the strategies outlined in the Greater Sage-Grouse Recovery Plan for Washington State (Stinson et al. 2004). In 2008, WDFW began translocation efforts in Lincoln County, in an attempt to re-establish sage-grouse in formerly occupied areas. The program will involve re-locating approximately forty grouse each year in 2008-2010 (Shroeder et al. 2007).

The Nature Conservancy is a private non-profit organization dedicated to conserving natural habitats by acquiring strategic properties for preservation from development, while still allowing some limited use such as grazing. TNC has acquired nearly 35,000 acres of sage-brush habitat within the historic range of sage-grouse in Washington, 25,000 of which is within occupied habitat in Douglas County, with the intent of preserving/enhancing the integrity of the habitat.

Other groups such as the Sage and Columbian Sharp-tailed Grouse Technical Committee of the Western Association of Fish and Wildlife Agencies, the Sage-Grouse Working Group and the Yakama and Colville Indian Tribes are also involved in efforts to protect sage-grouse habitat.

The Foster Creek Conservation District is currently in the process of forming an agreement with USFWS through the Douglas County Multiple Species Habitat Conservation Plan that would promote a wide variety of conservation practices among agricultural producers within Douglas County in exchange for exemption from incidental take laws should species become ESA listed. Participation in the plan will be voluntary, but initial scoping efforts indicated public interest in participation. This has the potential to provide many benefits to a wide variety of shrub-steppe wildlife species and their habitat.

The Washington population of greater sage-grouse was reviewed for listing under the Federal Endangered Species Act in 2001, with a finding that listing was warranted, but precluded by higher priority listings. The Washington population remains a candidate for Federal listing, with a priority of six out of twelve. Range-wide listing of sage-grouse including the Washington population is currently under review.

Cumulative Effects—Environmental Consequences

Alternative 1, would have adverse cumulative effects to understory vegetation that would affect ground nesting birds, including sage-grouse, ground foraging birds and small mammals, reptiles and amphibians that depend on herbaceous cover. There is also potential for increases in brown-headed cowbird abundance, which would have adverse effects on a variety of ground and shrub nesting birds. There are potential beneficial effects to habitat generalists, and possibly Washington ground squirrels that may benefit from low level habitat disturbance in the absence of a normal fire regime. This action would contribute to both beneficial and adverse cumulative effects for general wildlife habitat, but would contribute adverse cumulative effects to sage-grouse habitat.

Alternative 2, would have similar cumulative effects to general wildlife, but would have less of an effect and would be a smaller addition to the cumulative effects, relative to Alternative 1.

Compared to Alternatives 1 and 2, Alternative 3, would contribute the greatest amount of adverse cumulative effects to riparian habitat and the least amount of adverse effects to upland habitat. Changing from Alternative 1 to Alternative 3 would have beneficial cumulative effects for many species because grazing would occur outside of the breeding and nesting periods, and at a time when many migratory species have left the area. Alternative 3 meets many of the recommendations of the WDFW greater sage-grouse recovery plan (Stinson et al, 2004) and would be considered compatible with the habitat needs of sage-grouse. Compared to Alternatives 1 and 2, this action would be the smallest contribution to adverse cumulative effects. Changing from Alternative 1 to Alternative 3 would contribute to beneficial cumulative effects for sage-grouse habitat.

Changing from Alternative 1 to Alternative 4 could have adverse cumulative effects on species that benefit from grazing, but would provide beneficial cumulative effects to species that respond adversely to grazing. Alternative 4 best meets the recommendations to achieve the goals and objectives of the WDFW Greater Sage-Grouse Recovery Plan (Stinson et al. 2004) and therefore would have the greatest beneficial cumulative effects on sage-grouse habitat.

Cultural Resources/Native American Values

Affected Environment

The project area lies approximately 22 miles northeast of the Columbia River on the eastern edge of Moses Coulee, just south of Jameson Lake. The area is within the traditional lands of the Mid-Columbia Salish, or Sinkayuse peoples, who are today members of the Colville Confederated Tribes. Regional ethnohistories and oral histories, dating primarily from the 1930s detailed conditions as they likely existed during the mid-19th century.

Inhabitants of the Columbia Plateau seasonally exploited available resources; they established permanent winter villages along the Columbia River and its tributaries where they subsisted primarily on foodstuffs collected earlier in the year. Sinkayuse resource areas included Grand Coulee, Moses Coulee, Moses Lake, and the Potholes area (Miller 1998, Ray 1936). During certain seasons, favorite camping places were located in Moses Lake, Moses Coulee and Grand Coulee (Teit 1928). Resource areas across the Columbia Plateau were often shared between neighboring tribes. Spring drew villagers to the foothills to collect root crops and plants, including many species found in the allotment such as serviceberry, buckwheat, desert parsleys and bitterroot; small game and fishing began for early runs of steelhead and spring Chinook along the Columbia and tributary streams. Short-term campsites were established at higher elevations near root gathering and hunting grounds, and were often situated along water courses or near springs. Subsistence procurement activities continued into summer months when berries were collected and larger social gatherings took place at major fishing & regional trading centers. By autumn, activities focused on fishing, hunting large game (e.g. deer, elk, bison) and preserving foods for winter consumption.

Four Sinkayuse village sites are known to have existed in the Moses Coulee area (Ray 1936, 1974; Chalfant 1974). Winter village *nq^{w}uláqa?əm* ("raven place") was situated on the

Columbia's right bank at the mouth of Moses Coulee. Three summer villages in Moses Coulee itself included *Ckiakamapáct* ("bottom of the cliff"), a large summer village along Moses Creek ½ mile north of Palisades. This village was originally a root and berry gathering area which became the site of extensive Sinkayuse community gardens in the 1850s when corn, potatoes, squash and watermelons were planted. Another village, whose name has been forgotten, was located in "Moses Coulee on Moses Creek at the junction of the Coulee road and the road which runs northward along the railroad tracks and to McCue" (Ray 1974); individual gardens were located here. The third summer village, whose name was also forgotten, was located at "a small falls in Moses Creek near the point where Highway 10 now crosses". Dip and set nets as well as funnel traps were used to take trout here (Ray 1974). These summer villages appear to have been between 10-15 miles southwest of grazing allotment #0771.

Chief Moses' name appears in connection with several landmarks in and around the Coulee and it is sometimes cited as his birthplace (Ruby and Brown 1995). He is said to have sought spiritual power as a young man on "the rim of *Ckiakamapáct* ", Moses Coulee, (Ruby and Brown 1995). The coulee is also noteworthy as the location of the last sighting of buffalo (*Bison*) in this area (Kingston 1932).

In the decades that followed Lewis and Clark's visit to the region in 1805-1806, indigenous life and activities were severely impacted as a result of European and Euro-American trading, trapping, settlement, and periodic disease epidemics during the late 18th through mid-19th centuries. The loss of traditional territories, due primarily to Euro-American settlement, forced Native participation in the reservation system; in the 1870s, Sinkayuse Chief Moses requested reservation lands for his people and lands within grazing allotment #0771 were included in this original appeal (Ruby & Brown 1995). Claims to these traditional lands in the Columbia Basin were relinquished, however, in exchange for the Moses-Columbia reservation in Okanogan County, created by executive order in 1879. Traditional lands in the project area were thus available for homesteading. Historical records and archives indicate that by the late 19th century Euro-American settlement was well underway in the Moses Coulee area and across the Waterville Plateau, though BLM lands in the allotment were never officially homesteaded.

Previous cultural resource inventories, BLM and Department of Archaeology and Historic Preservation databases have been reviewed for the project area. These records indicate that BLM conducted one Class II survey (#130780126) in portions of the allotment. More intensive Class III surveys were completed by BLM in 1987 (#130870461) and again most recently in 2008 (#130080491) for the current grazing lease/EA proposal. This last survey focused on areas of high archaeological sensitivity. The two earlier surveys identified eight Pre-contact sites (#45DO294, DO295, DO357-59, DO360, DO361 and DO487), one multi-component site (containing both Pre-contact and Historic period artifacts) #45DO356 and a segment of the historic period Waterville-Coulee City road #45DO350. The most recent survey identified and formally recorded two Pre-contact isolates, three Pre-contact talus pits, two Pre-contact lithic débitage scatters, one Pre-contact cairn feature associated with a projectile point fragment, one multi-component site and an Historic period cairn feature.

Washington State Department of Archaeology and Historic Preservation (DAHP) databases indicate that sites #45DO294 and 295 did not meet any of the criteria for listing in the National Register of Historic Places and are thus ineligible. Site #45DO350 did meet at least one criterion for listing and is potentially eligible. This site may have qualified for listing under criterion A, as

it is potentially associated with broader patterns of historic settlement across the local Waterville Plateau and regional Columbia Plateau. All the remaining sites, including those identified during earlier surveys, have yet to be formally evaluated but may possess sufficient integrity to provide information that will significantly increase our knowledge of the past. These sites are therefore potentially eligible for listing in the NRHP under criterion D.

The nature of known cultural resource sites in grazing allotment #0771 indicates that both Native Americans and Euro-Americans exploited the diverse resources available in the area. A review of the available literature and archival sources was completed in 2006 (Perry 2006) in an effort to identify potential TCPs (properties having significant spiritual, cultural, or religious significance) on BLM lands in the allotment. The review was unable to identify specific TCP locations within the allotment; however, given its proximity to Moses Coulee that is historically associated with Chief Moses and the long history of native occupation in the area, the allotment is likely to contain properties having traditional religious and cultural significance to members of the Colville Confederated Tribes. It is possible that tribal members across the Plateau continue to maintain an important cultural tradition by seasonally visiting the Moses Coulee area to collect root crops and plants; if so, BLM parcels in the allotment could potentially be among the collecting locales.

The 2008 Class III survey was not exhaustive and typically sampled those areas potentially impacted by livestock grazing and considered highly sensitive for cultural resources. Most of the steep slopes and rocky ridge lines far from water (greater than ¼ mile away) were not examined since cattle typically assemble where shade and water are readily available and in areas where deeper soils provide better forage. Additional sites may exist in these unsurveyed areas of the allotment, but these areas are not considered to be at risk at the present time. This view is supported by discussions, above, regarding the condition of the allotment's vegetation and plant communities on lithosols and talus slopes; there is no evidence to suggest that these areas are currently at risk of livestock damage.

In 2001, during the term of the previous grazing lease, BLM monitored sites #45DO294, DO350 and DO356. Talus pit site #DO294 and #DO350, the Waterville-Coulee City road segment were both found to be in good condition. Site #DO356, however, appeared trampled and impacted by livestock bedding-down in the site. Some of the site's materials may have been removed by collectors prior to 2001. At that time, there were no recommendations offered for site protection. Most recently, the ten sites recorded prior to 2008 were monitored; six of these sites were relocated and found to be undisturbed. Three sites, including #45DO360, DO361 and DO487 could not be relocated on the ground. The remaining site, #DO356 was also relocated; impacts to the site were evident and similar to ones described in 2001, cattle had trampled the site and had bedded-down in some areas, but there was no evidence of looting. Site protection recommendations have been made and will be addressed during the course of renewing lease #0771; these recommendations are also being consulted upon with the DAHP and concerned Tribal Historic Preservation Officers (THPOs). None of the new sites identified during the course of the 2008 survey appear to have been impacted by livestock.

Environmental Consequences

Impacts on Cultural Resources

Alternative 1 - No Action (No Action/Continue Under Current Management with Spring–Summer Grazing).
With the exception of site #45DO356, noted above, none of the cultural properties in the allotment are being impacted by livestock. As long as measures are taken to protect this site from future impacts, Alternative 1 is not likely to adversely impact identified cultural properties on BLM lands in the allotment. Moderate utilization (50%) of available forage during March-June occurs during the critical growth period for key species in the big sagebrush/blue-bunch wheatgrass community, as noted in the Plant Communities discussion above; this may adversely impact the distribution and quality of root crops and plants potentially seasonally collected by Native tribal members.

Alternative 2 – Reduced Utilization with Early Spring Grazing.
Under this alternative, the impacts to sites would be the same as for Alternative 1; as long as protection measures are implemented for site #45DO356, renewing lease #0771 is not likely to adversely affect the identified cultural properties on BLM lands in the allotment. The number of cattle permitted to graze would be reduced and utilization of available forage would be reduced to 30% (light utilization) and grazing would be allowed from March through the end of April. Since the critical growth period for key species would occur after the period of livestock grazing, key plant communities would not be adversely impacted; with utilization levels at 30% or less, the quality of the rangeland and overall sagebrush-steppe community would be improved. In comparison to Alternative 1, the distribution and quality of root crops and plants potentially seasonally collected by Native tribal members would increase to more optimal levels.

Alternative 3 – Reduced Utilization with Late Summer-Early Fall Grazing.
Under this alternative, the impacts to sites would be the same as for Alternative 1; as long as protection measures are implemented for site #45DO356, renewing lease #0771 is not likely to adversely affect the identified cultural properties on BLM lands in the allotment. Utilization of available forage would be reduced to 30% (light utilization) and grazing would be allowed from September through October. Rangeland quality would improve as would the quality and distribution of most native forbs potentially seasonally collected by Native tribal members.

Alternative 4 – No grazing
Under the no grazing alternative, adverse impacts to cultural resources from livestock grazing would not be likely. With no grazing, native plant communities that have experienced sustained use during past grazing would be allowed to recover. Over time, opportunities for collecting native plants and root crops would be greater than in any of the above Alternatives.

Cumulative Effects on Cultural Resources

The region of concern is the Moses Coulee area which was critical to past Native peoples across the Southern Columbia Plateau for resource acquisition; it is also historically associated with Sinkayuse Chief Moses and is likely to contain properties that are of traditional cultural significance to present-day members of the Colville Confederated Tribes.
The most recent cultural resources inventory (#130080491) of allotment #0771 indicated that the archaeological integrity of cultural properties identified on BLM lands in the allotment are not likely to be adversely impacted under any of the Alternatives above, provided that site #45DO356 is protected. Monitoring of cultural properties in allotment #0771 will help to ensure that sites' integrity is maintained.

Other activities, including adjacent livestock grazing on private lands, recreation on public lands, population growth and development and conversion of adjacent private lands to agricultural production may, over time, result in adverse impacts to cultural properties and traditional-use plants on public lands in the Moses Coulee area.

Recreation, particularly OHV use and hunting, on BLM lands is light but nonetheless evident. Continued recreation on lands within the allotment may result in more ground disturbance that results in adverse impacts to the archaeological integrity of sites (both recorded and as yet unrecorded) and adverse impacts to traditional-use native plant species. Looting of site #45DO356 may have occurred in the past and potential future recreational impacts to cultural properties in the allotment include illegal collection of materials, vandalism and destruction of sites.

Population growth, development and the conversion of shrub-steppe lands to agricultural production in Moses Coulee would also potentially result in adverse impacts to both sites and traditional-use plants species by putting increased pressure on public lands from recreation (hunting, camping and OHV use). Any cultural properties and sagebrush-steppe plant communities located on adjacent private lands would likely be destroyed during land conversion or development efforts, consequently making it all the more important to protect those cultural properties and traditional-use native plants on public lands.

Recreation

Affected Environment

The Sulphur Canyon Allotment is near the popular Jameson Lake area. While this area is well visited for its fishing opportunities, the Sulphur Canyon area is more difficult to access, and as a result, use by recreationists is low. Recreation use in the Sulphur Canyon area is dispersed and not concentrated in any single area and consists mainly of hunting for deer and upland birds and off-highway vehicle (OHV) riding. The area is open to falconry hunting from August 1 to March 15. Archery deer season is open for the month of September. Deer hunting by muzzleloader begins October 1st and modern firearm season begins in mid-October. Upland bird hunting is open from October 4 to January 19. Cottontail rabbits may be hunted from September 1 through March 15. Networks of old jeep trails at the northern end of the allotment provide OHV riding access for both ranchers and recreationists. Problems with OHV hill climbs and unauthorized OHV trails along the hillsides south of Burton Draw are an ongoing management issue. It is likely that some dispersed camping occurs near Burton Draw or some of the more flat areas of the allotment.

Visitor use is mainly by local residents, who live nearby, or from visitors camping along Burton Draw. There are no developed recreation facilities at this location. The BLM OHV designation for this area is "limited to designated roads and trails."

Environmental Consequences

Alternative 1 - No Action (No Action/Continue Under Current Management with Spring–Summer Grazing).

No new impacts are expected. Recreation use would continue in a similar manner as is presently

occurring. No new impacts to visual resources are expected.

Alternative 2 – Reduced Utilization with Early Spring Grazing.
No new impacts are expected. Recreation use would continue in a similar manner as is presently occurring. Proposed range improvements, such as the solar water pump and trough, might prove to be potential targets for vandalism. Early spring grazing will result in cows being better distributed throughout the allotment, resulting in little visual impact of grazing on vegetation and aspen groves in the area. The spring development and fenced exclosure will be visible from the immediate area. the buck and rail fence is different in construction from the other nearby pasture fences in the area, but is still a typical style seen in cattle ranching systems. The fence will concentrate cattle use at the trough, resulting in a trampled area surrounding the trough. The spring itself will likely be obscured by growth of weedy species within the exclosure over time.

Alternative 3 – Reduced Utilization with Late Summer-Early Fall Grazing.
Recreation use under this alternative would most likely continue in a similar manner to what it is now. During September and October visitors to the area might notice additional browsing and compaction by cows in the shaded and riparian areas. Cattle will be in the areas used by hunters and campers during this time of year and potential conflicts could occur. Proposed range improvements, such as the solar water pump and trough, might prove to be potential targets for vandalism. Similar visual effects from the range improvements would occur as in Alternative 2.

Alternative 4 – No grazing
Recreation use would likely continue in a similar manner as is done now. Visitors might notice additional vegetation growth due to the lack of grazing, particularly in the riparian areas. This could potentially affect the hunting in the area, by providing additional cover and forage for wildlife species.

Cumulative Effects
Recreational use in the allotment under all Alternatives will likely continue similarly as is done now. Because of this, cumulative impacts of grazing on recreation will be negligible.

Economic Values

Affected Environment
The BLM land within the allotment plan area represents roughly 56 percent of the rangeland used in the proposed grazing management plan. Currently, an Animal Unit Month, or AUM, is valued by the BLM at $1.35.

In 2005 (the most recent data available), earnings from farming accounted for only 3% of the total personal income for Douglas County. (Headwaters Economics 2007).

U.S. Census Bureau estimates that in 2000 (most recent data available) 11.2% of the families in Douglas County are living below the poverty level (US Census 2000). This is slightly higher than the national average of 9.2%. The largest minority population is Hispanic, which composes 19.7% of the population in the County, compared to 12.5% of the national population (US Census 2000).

Currently the lessee sub-leases the allotment to a rancher who uses this allotment in a rotation system with other grazing leases on Forest Service and other private lands. Early spring is when the sublease on the lessee's private land is issued. In early summer, the cattle are moved to Forest Service lands

Environmental Consequences

Alternative 1 - No Action (No Action/Continue Under Current Management with Spring–Summer Grazing).
No change would occur to the economic values of the allotment. The amount of AUMs authorized would remain the same. Since the percent of total personal income from farming is only 3% of the total per capita income for the County, this alternative would have negligible effect on the local economy. No disproportionately high and adverse human health or environmental effects on minority or low-income populations are expected to result from implementation of this alternative.

Alternative 2 – Reduced Utilization with Early Spring Grazing.
Under this alternative, the amount of AUMs authorized would decrease by 40. This decrease would more than likely have a minimal effect to the BLM of a net loss of approximately $54.00 a year dependant on current AUM values. Since the percent of total personal income from farming is only 3% of the total per capita income for the County, the slight decrease in authorized AUMs would have negligible effect on the local economy. No disproportionately high and adverse human health or environmental effects on minority or low-income populations are expected to result from implementation of this alternative.

Alternative 3 – Reduced Utilization with Late Summer-Early Fall Grazing.

Under this alternative, the amount of AUMs authorized would decrease by 40. This decrease would more than likely have a minimal effect to the BLM of a net loss of approximately $54.00 a year dependant on current AUM values. Currently the lessee sub-leases the allotment to a rancher who uses this allotment in a rotation system with other grazing leases, and this season of use works well in this rotation. If the lease was not renewed with the same season of use, the lessee would lose this sub-lease. Assuming that a new sub-lease is not issued, the loss would cause a financial loss for the lessee because he leases his private lands (44%) along with the BLM lands (56%). Since the percent of total personal income from farming is only 3% of the total per capita income for the County, the slight decrease in authorized AUMs would have negligible effect on the local economy. No disproportionately high and adverse human health or environmental effects on minority or low-income populations are expected to result from implementation of this alternative.

Most of the water sources in this allotment are not considered to be reliable later in the season. In dry years, the springs and a well in the north pasture could dry up as early as the end of May. In this case, the lessee would be responsible for providing stock water in the event that current water sources are depleted by late summer. The approximant cost of hauling water from the nearest location for 200 head of cattle is roughly $95 a day. For 2 months the cost is approximately $5,700 (Oregon State University). In the event that the lessee would have to haul water, the cost incurred may exceed the expected benefit of grazing the lease.

Alternative 4 – No grazing
Since the percent of total personal income from farming is only 3% of the total per capita income for the County, eliminating grazing on this allotment would have negligible effect on the local economy. No disproportionately high and adverse human health or environmental effects on minority or low-income populations are expected to result from implementation of this alternative.

List of Preparers

This allotment management plan and environmental assessment was prepared by an interdisciplinary team of BLM resource specialists representing various resource values, including soils, hydrology, wildlife habitat, cultural values, range, and botany. The following specialists provided input to this environmental assessment:

- Julie Sanderson, Botanist
- Neal Hedges, Wildlife Biologist
- John Musser, Wildlife Biologist
- Erik Ellis, Wildlife Biologist
- Scott Pavey, Planning and Environmental Coordinator
- Joe Kelly, Fisheries
- Angela Link, Rangeland Management Specialist
- Françoise Sweeney, Archaeologist
- Diane Priebe, Outdoor Recreation Specialist

Consultation and Coordination

BLM issued consultation letters regarding the grazing lease #0771 renewal on December 27, 2005; letters were sent to the Washington Department of Archaeology and Historic Preservation (DAHP), the Confederated Tribes and Bands of the Yakama Nation and the Colville Confederated Tribes. On January 3, 2006 DAHP concurred with the definition of the area of potential effect (APE). The Colville Confederated Tribes (CCT) responded on January 31, 2006 with several concerns. They were as follows: 1) the grazing lease issuance could potentially damage root crops as well as the integrity of existing sites in the allotment, 2) there was a need for additional cultural resource surveys in the allotment, 3) livestock may potentially damage any unidentified sites in the allotment, and 4) there was a need to identify potential Traditional Cultural Properties (TCPs) in the allotment. The BLM's cultural resource staff addressed CCT concerns #2 & 3 by sharing the results of the survey inventory of lease #0771 (BLM Cultural Resource Survey Report #130080491) and by providing a TCP review in 2006. A response was not received from the Confederated Tribes and Bands of the Yakama Nation. Final consultation letters requesting concurrences with a determination of "Not Likely to Adversely Affect" were sent on January 27, 2009. Washington State DAHP concurrence with the determination of effect was received on February 2, 2009.

Public Review and EA Availability

This environmental assessment will be made available for public review and comment through a

news release, as well as on the Spokane BLM Internet website www.blm.gov/or/districts/spokane/plans Notices will also be mailed to the grazing lessee, and to members of the public who have expressed interest in the grazing proposal.

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APPENDIX 1. WILDLIFE OF SULPHUR CANYON

BIRDS

Golden Eagle	*Aquila chrysaetos*
Swainson•s Hawk	*Buteo swainsoni*
Ferruginous Hawk	*Buteo regalis* - State Threatened
Prairie Falcon	*Falco mexicanus*
Sage Grouse	*Centrocercus urophasianus* - State Threatened
Long-billed Curlew	*Numenius americanus*
Ring-billed Gull	*Larus delwarensis*
California Gull	*Larus californicus*
Burrowing Owl	*Speotyto cunicularia* - State Candidate
Long-eared Owl	*Asio otus*
Short-eared Owl	*Asio flammeus*
White-throated Swift	*Aeronautes saxatalis*
Say•s Phoebe	*Sayornis saya*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*
Horned Lark	*Eremophila alpestris*
Bank Swallow	*Riparia riparia*
Black-billed Magpie	*Pica pica*
Rock Wren	*Salpinctes obsoletus*
Canyon Wren	*Catherpes mexicanus*
Sage Thrasher	*Oreoscoptes montanus* - State Candidate
Loggerhead Shrike	*Lanius ludovicianus* - State Candidate
Brewer•s Sparrow	*Spizella breweri*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Sage Sparrow	*Amphispizia belli*- State Candidate
Grasshopper Sparrow	*Ammodramus savannarum*
Western Meadowlark	*Sturnella neglecta*

MAMMALS

Merriam•s Shrew	*Sorex merriami* - State Candidate
Western Small-footed Myotis	*Myotis ciliolabrum*
Fringed Myotis	*Myotis thysanodes*
Western Pipistrelle	*Pipistrellus hesperus*
Spotted Bat	*Euderma maculatum*
Pallid Bat	*Antrozous pallidus*
White-tailed Jack Rabbit	*Lepus townsendii*
Pygmy Rabbit	*Brachylagus idahoensis* – Federal and State Endangered
Nuttall•s Cottontail	*Sylvilagus nuttallii*
Yellow-bellied Marmot	*Marmota flaviventris*
Washington Ground Squirrel	*Spermophilus washingtoni* – Federal and State Candidate
Least Chipmunk	*Tamias minimus*
Great Basin Pocket Mouse	*Perognathus parvus*
Northern Grasshopper Mouse	*Onychomys leucogaster*
Western Harvest Mouse	*Reithrodontomys megalotis*
Deer Mouse	*Peromyscus maniculatus*
Sagebrush Vole	*Lemmiscus curtatus*
Bushy-tailed Woodrat	*Neotoma cinerea*

Northern Pocket Gopher	*Thomomys talpoides*
Badger	*Taxidea taxus*
Bobcat	*Lynax rufus*
Coyote	*Canis latrans*
Mule Deer	*Odocoileus hemionus*
Porcupine	*Erethizon dorsatum*
Long-tailed Weasel	*Mustela frenata*

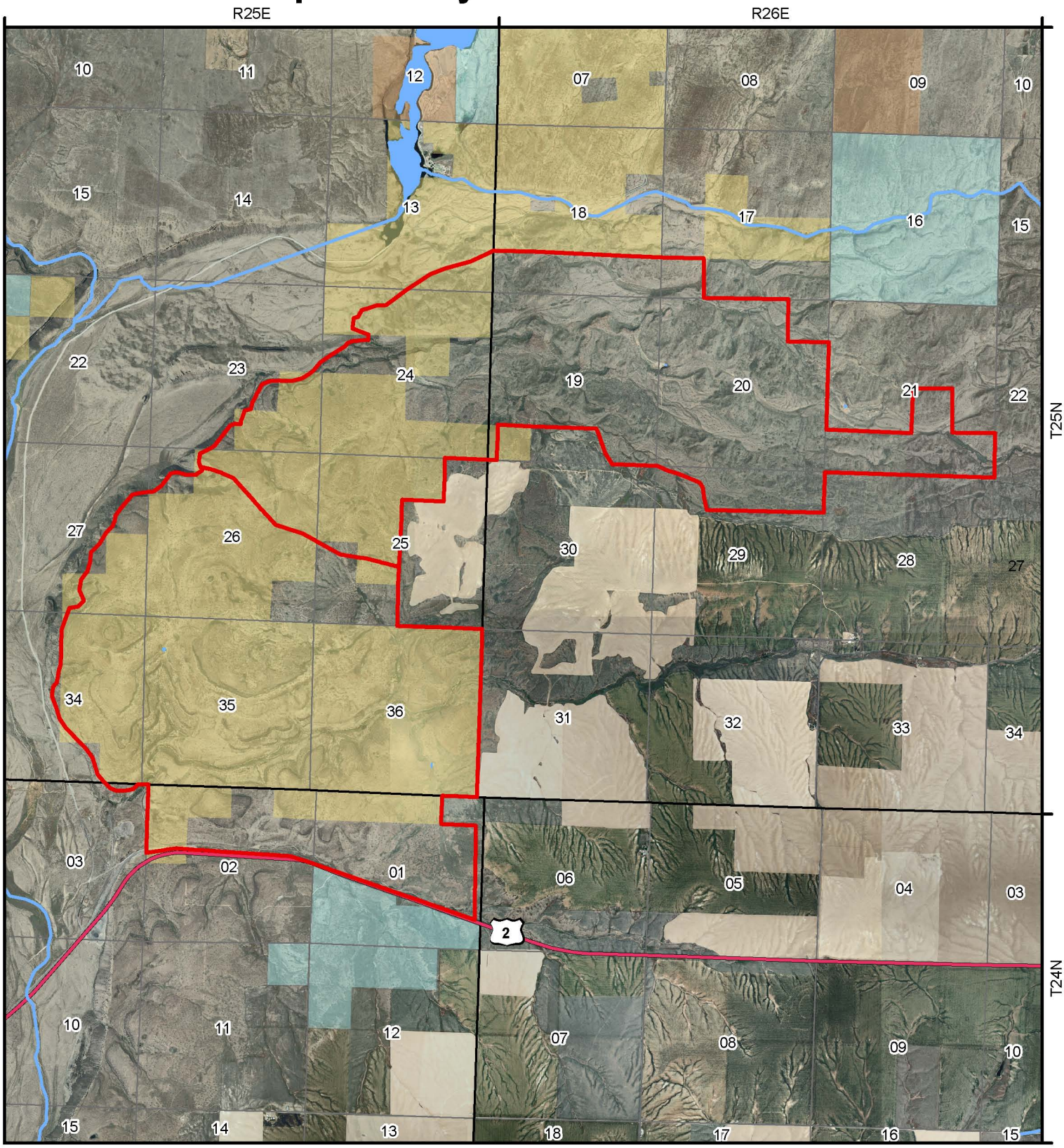
REPTILES

Short-horned Lizard	*Phrysonoma douglassii*
Sagebrush Lizard	*Sceloporus gracious*
Side-blotched Lizard	*Uta stansburiana*
Racer	*Coluber constrictor*
Night Snake	*Hypsiglena torquata*
Gopher Snake	*Pituophis catenifer*
Western Rattlesnake	*Crotalus viridis*

AMPHIBIANS

Tiger Salamander	*Abystoma tigrinum*
Great Basin Spadefoot	*Scaphiopus intermontanus*

Sulphur Canyon Allotment 00771



BLM Administered Land
WA Department of Natural Resources
WA Department of Fish and Wildlife
Private Land
Allotments

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