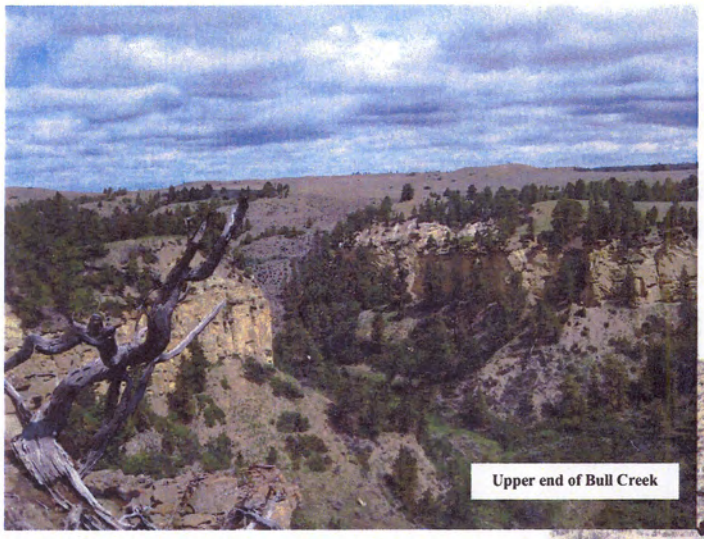
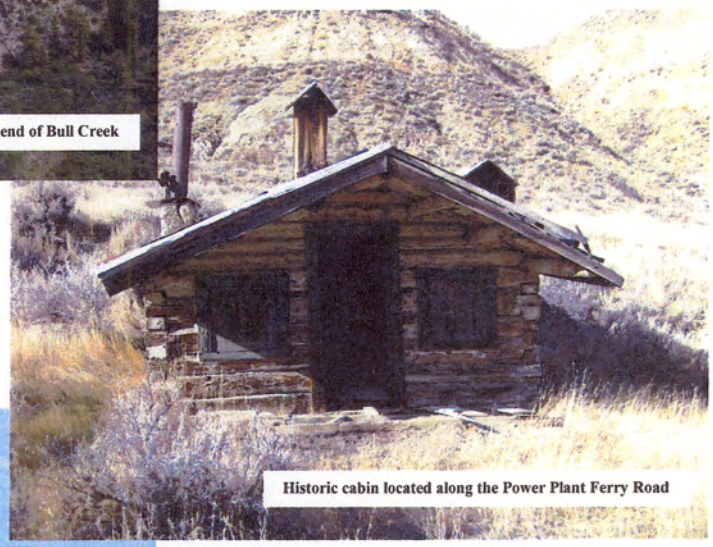
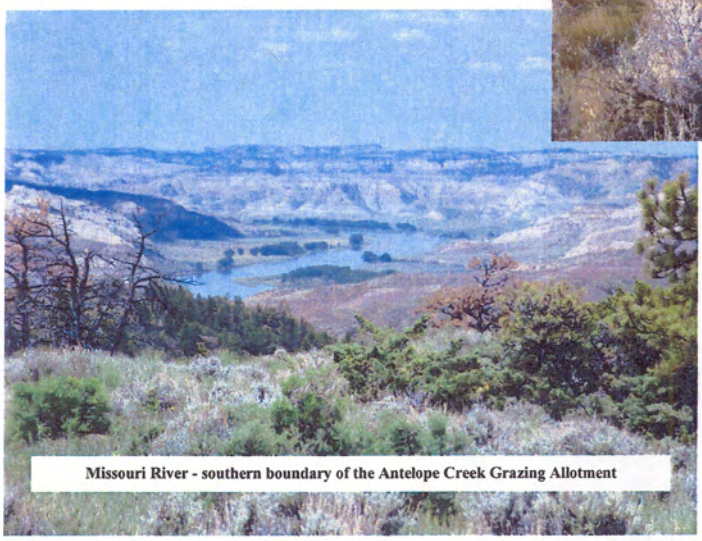
US Department of the Interior
Bureau of Land Management
Upper Missouri River Breaks National Monument
Havre & Lewistown Field Office



Upper end of Bull Creek



Historic cabin located along the Power Plant Ferry Road



Missouri River - southern boundary of the Antelope Creek Grazing Allotment

Antelope Creek Grazing Allotment #05610
Allotment Evaluation Report

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Introduction

This report summarizes land health conditions for public lands administered by the Bureau of Land Management (BLM) in the Antelope Creek Grazing Allotment (Allotment Map).

An Interdisciplinary Team (ID Team) consisting of resource specialists representing backgrounds in range, wildlife, soils and hydrology reviewed the resource conditions and trends within the Antelope Creek Grazing Allotment. The ID Team reviewed existing vegetation inventories and range and wildlife monitoring data collected from 1974 through the present. This information was supplemented with a representative number of upland and riparian health assessments along with establishment of permanent range, riparian and wildlife monitoring studies to determine whether land health standards are still being met within the Antelope Creek Grazing Allotment[1].

The information and results presented in this evaluation is the first step in the process for determining if land health standards are being met in the Antelope Creek Grazing Allotment. The findings of this report indicate that Standard #1 (Uplands) and Standard #5 (Habitat) are not being met or making significant progress toward achievement. If a standard is not being met then a determination document is required identifying the significant causal factors for failing to meet land health standards.

In the determination document, if existing livestock grazing management or level of use is determined to be a significant causal factor for not achieving Standards or not making significant progress toward achievement, the authorized officer must take appropriate action as soon as practicable but no later than the beginning of the next grazing year (43 CFR 4180.1). The determination document also must state whether existing grazing management practices conform to the guidelines for grazing livestock on public land.

Following completion of the evaluation report and determination document, an environmental analysis (NEPA) document must be prepared identifying changes to the current grazing management activities that would make significant progress toward achieving land health standards. Changes modifying existing grazing permit terms and conditions (seasons of use, number of livestock, and level of use), along with any proposed structural range improvements to improve livestock grazing management, would be implemented by decision before the start of the next grazing year.

Background

Upper Missouri River Breaks National Monument

All the public land within the Antelope Creek Grazing Allotment is located within the Upper Missouri River Breaks National Monument (Monument). The Monument was established by Proclamation issued by President Clinton on January 17, 2001. The Record of Decision (ROD) on the Proposed Resource Management Plan and Final Environmental Impact Statement for the Monument became effective on December 30, 2008 and now guides all management actions and activities occurring on public land.

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[1]As part of the process for renewing the grazing permits in the Antelope Creek Grazing Allotment, resource conditions were assessed in the late 1990's and used to conclude whether the Standards of Rangeland Health were being achieved, or if significant progress was being made toward meeting the standards, and whether existing grazing management conformed to the guidelines (Standards for Rangeland Health and Guidelines, August 1997). The determination that land health standards were being met in the Antelope Creek Grazing Allotment was reported in the Beauchamp Watershed Plan (October, 2001). Following completion of the determination and watershed plan, an Environmental Assessment (MT-090-03-058) was prepared analyzing the renewal of all grazing permits within the Beauchamp Watershed area. In March of 2006, the Antelope Creek grazing permits were renewed for a term of 10 years.

Wilderness Study Areas

The Antelope Creek Wilderness Study Area (WSA) and portions of the Cow Creek WSA lie within the Antelope Creek Grazing Allotment. Both were identified in the Montana Wilderness Inventory (BLM 1980). A final suitability study and environmental impact statement completed by the BLM in 1987 recommended wilderness designation for portions of both WSA's. These areas will continue to be managed according to the Interim Management Policy and Guidelines for Land under Wilderness Review (July 1995, BLM Manual H-8550-1) until Congress takes action on the recommendations.

Upper Missouri National Wild & Scenic River

The Antelope Creek Grazing Allotment also lies within the Upper Missouri National Wild and Scenic River (UMNWSR) corridor. The Missouri River forms the southern boundary of the allotment covering approximately 12 river miles; includes public, private and state land. Management of the UMNWSR was guided by BLM's 1993 River Plan Update. Future management actions within the corridor will conform to the Monument Resource Management Plan.

Livestock Grazing

The Antelope Creek Grazing Allotment is located in the southwest corner of Phillips County, the very east end of the Monument, north of the Missouri River and west of Highway 66. The size of the allotment is 50,599 acres with a carrying capacity of 5,251 AUMs[2]. This includes 45,010 acres of public land, capacity of 4,598 AUMs; 2,302 acres of private land, capacity of 336 AUMs; and 3,287 acres of other lands with a capacity of 317 AUMs (tabulation record dated 10/13/1977). The 1977 allotment carrying capacity included a 7% reduction for wildlife implemented on public, private and state land. During the 2007 field season the allotment boundary fences were mapped electronically and the acres and AUMs recalculated (tabulation record dated March, 2009). The more accurate mapping resulted in only minor differences in the amount of acres and AUMs when compared to the 1977 allotment tabulation.

The average stocking rate for the allotment is 9.6 acres per AUM.

The Antelope Creek Grazing Allotment is a "common allotment" permitted to two individuals and the Square Butte Grazing Association[3]. The term of the current grazing permits are from March 1, 2006 to February 28, 2016. The current grazing authorization for the allotment is:

<u>Permittee A</u>
215 Cows from 5/1 to 12/31
90% Public Land with a grazing preference of 1559 AUMs (Common Use Area)

<u>Square Butte Grazing Association</u> (Grazed by Permittee A through a Trade-In-Use Agreement with, and as a member of, the Square Butte Grazing Association)
284 Cows from 5/1 to 12/31
84% Public Land with a grazing preference of 1925 AUMs (Common Use Area)

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[2] Animal Unit Month (AUM) is the amount of forage necessary to support a cow or its equivalent for a period of 1 month.
[3] The Square Butte Grazing Association (Association) and Permittee A entered into a Trade-In-Use Agreement in 1978. Permittee A exchanges 740 AUMs in the CMR Wildlife Refuge located in the Cyprian Grazing Allotment to the Association for use of 750 AUMS in the Antelope Creek Grazing Allotment. In addition, Permittee A exchanges 708 AUMs located in the Cyprian Grazing Allotment to the Association for 631 AUMs in the Antelope Creek Grazing Allotment and 77 AUMs in the Upper Cyprian Grazing Allotment. Permittee A, as a member of the Association, also uses 554 AUMs of grazing preference in the Antelope Creek Grazing Allotment.

Permittee B
148 Cows from 5/1 to 11/15
94% Public Land with a grazing preference of 908 AUMs (Common Use Area)

The allotment is grazed seasonlong from May 1st to November 15th with 650 cow-calf pairs. Following this grazing period, the stocking level is reduced to 500 cows and grazing continues until December 31st.

The allotment has not been fenced and divided into pastures or separate areas of use. In the late 1970's, plans were considered to implement a rest or deferred rotation grazing system, which would require fencing the allotment into at least three pastures. Fencing the allotment and implementing a rotational grazing system was eliminated from consideration because of rough topography, impacts to other resources such as WSA's and wildlife, and the high cost of maintenance.

Instead of installing fences to implement a rotational grazing system, a simple rotation formula was proposed where cattle would be turned out at different locations each year and allowed to drift naturally. This approach was modified somewhat because the rough topography along Bull Creek creates a natural barrier to livestock movement. Today, two herds are turned out at different locations. At the beginning of the grazing season, one herd of 150 cows is turned out north of Bull Creek near the north end of the allotment. The remaining herd of 500 cows is turned out south of Bull Creek, more toward the center of the allotment, and driven farther south. No effort is made to keep the herds separated and some mixing does occur by midsummer or early fall. This approach has worked fairly well in most years. However, one concern is that the number of AUMs harvested north of Bull Creek may be more than the grazing capacity. Also, stock water conditions north of Bull Creek are less than desirable and can be critically short by the end of summer.

Herding and the use of supplements have been effective grazing management practices used to influence and control livestock distribution within the allotment. To further reduce the areas of over and under use by livestock, stock water pipelines have been installed in areas to the south of Bull Creek. Turning stock water tanks on and off has been used successfully to rotate livestock in and out of grazing areas without the use of fences to control their movement. All of these practices and improvements have resulted in better distribution of livestock when compared to historic grazing patterns.

Findings and Analysis

Standards of Rangeland Health are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Achieving or making significant and measurable progress towards these functions and conditions is required of all uses of public rangelands (BLM, Environmental Impact Statement Record of Decision for Standards for Rangeland Health and Guidelines for Livestock Grazing Management in Montana, North Dakota and South Dakota, 1997).

The following summarizes the existing conditions of public land within the Antelope Creek Grazing Allotment, whether Lewistown Standards 1 through 5 are being met, and if not, the factors and rationale for the rating.

Lewistown Standard #1 - Uplands are in proper functioning condition.

Appendix 1 summarizes the data collected from various range monitoring studies established from 1974 through 1998. The general view photographs were repeated for some of the studies in 2007.

The data collected from 1974 through 1998 was a good source of historical information to give some indication of resource conditions or management concerns. However, the data is old and was collected infrequently making it difficult to establish any trends. In some cases, the studies are located on ecological sites that do not respond to changes in management and located in areas that would not be representative or an indicator to measure the effectiveness of current management. As an example of the latter, many of the studies are located

next to stock water reservoirs. It is expected that grazing use will be high in these areas, and not surprisingly, the studies would have limited value in measuring the effectiveness of management actions.

To update resource conditions, upland health assessments were completed during the 2008 and 2009 field season using the assessment technique found in BLM Technical Reference 1734-6, Interpreting Indicators of Rangeland Health. This assessment method is a qualitative approach that uses 17 indicators to rate soil stability, hydrologic function and biotic integrity, six of which focus on vegetation health and condition. This technique is a way of ascertaining achievement or non achievement of the upland health standard. The assessment also helps in identifying areas that may be at risk of degradation or where resource problems currently exist. The assessments were completed by an interdisciplinary team of resource specialists representing skills in vegetation, wildlife, hydrology, soils, riparian and range management. Using this process 27 upland health assessments were completed on four dominant ecological sites. The ecological sites included (16) clayey, (4) claypan, (1) dense clay and (6) silty. Appendix 2 provides the results of the Upland Health Qualitative Assessments and their degree of departure from expected conditions.

Of the sixteen clayey ecological sites evaluated, one received a moderate departure from expected conditions in soil stability, three a moderate departure in hydrologic function and five a moderate departure in the biotic attribute. Reasons for the moderate ratings included reduced amounts of litter; higher percentage of bare ground; and, reduced amounts of cool season bunchgrasses.

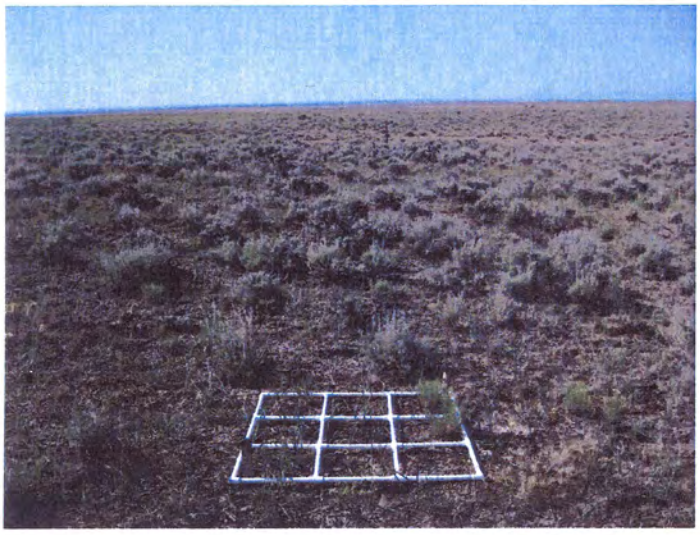

Figure 1. Functioning at risk Wyoming big sagebrush and western wheatgrass plant community on a clayey ecological site.

Figure 2. Wyoming big sagebrush with mixed understory of western and bluebunch wheatgrass and green needlegrass in proper functioning condition.

The four claypan sites evaluated exhibited the largest departure from expected conditions in the biotic attribute; ranging from moderate to moderate to extreme. Claypan ecological sites have unique physical and chemical properties that affect what plant species can grow on the site. These sites have layers of heavy clay forming near the soil surface that can become very hard during dry periods (see Figure 3). This feature in combination with the accumulation of salts in the soil profile, affect root penetration, favor shallow-rooted plants and limit forage production.

Figure 3. Extremely hard clay layer found near the soil surface. These layers restrict root growth and water movement favoring shallow-rooted plants.

These ecological sites may respond to changes in grazing management where the depth to an extremely hard clayey argillic horizon is greater than 4 inches from the soil surface and salt accumulation levels do not exceed tolerable thresholds for less salt tolerant plant species.

Of the six silty ecological sites assessed, two had a moderate departure, both in the biotic integrity rating resulting from reduced amounts of higher successional species, reduced amounts of litter and areas of dense clubmoss and blue grama.

Of the 27 sites evaluated, 11 were determined to be Functioning at Risk (FAR). A FAR rating would apply where there is at least a moderate departure in one of the three attributes evaluated. This represents about 15% of the upland areas within the allotment (FAR Allotment Map). Therefore, the majority of the allotment meets the upland land health standard. As summarized above for the ecological sites evaluated, for those considered at risk, the most significant departure occurred in the biotic rating or the indicators that focus on vegetation conditions.

Generally, the high percentage of Wyoming big sage *(Artemisia tridentata* subsp. w*yomingensis)* canopy cover, the small percentage of litter, the amount of bare ground, the lack of residual cover and the reduced amounts of taller, deeper rooted perennial grasses was enough evidence to warrant a Functioning at Risk rating. Most of these sites are dominated by Wyoming big sagebrush with an understory of western wheatgrass. Forbs do not contribute much toward canopy cover. Although some shift has occurred away from the expected plant community, the FAR sites are still in a mid successional level, possess good species composition and are diverse represented by a variety of native herbaceous plant species. With the exception of the claypan ecological sites, where the hard clayey layer is within 2 to 4 inches of the soil surface, the plant communities functioning at risk will respond positively to improvements in grazing management.

No BLM Threatened and Endangered or special status plant species were found at any of the assessment sites or likely to occur within the Antelope Creek Grazing Allotment. In addition, the Montana Natural Heritage Program has identified five BLM sensitive plant species that occur or could occur within Phillips County. These include hot spring phacelia *(Phacelia thermalis)*, Slender-branched popcorn-flower *(Plagiobothrys leptocladus)*,

dwarf woolly-heads *(Psilocarphus brevissimus)*, long-sheath waterweed *(Elodea bifoliata)* and slender bulrush *(Schoenoplectus heterochaetus)*. None of these plant species were found during assessment of upland and riparian sites.

Cheatgrass *(Bromus tectorum)* or downy brome was the principle non-native and invasive species found in rangeland areas throughout the grazing allotment. In the last 7 to 10 years cheatgrass in the Missouri River breaks region is becoming a more familiar part of the landscape occurring at more locations and at higher densities than historic levels. Although present at 15 of the 27 rangeland sites evaluated, it is only occurring in trace amounts (<2% canopy cover) and has not reached a level where it is interfering with ecological processes.

Recommendations

1. Implement a grazing management strategy that provides for growing season rest. Consider changes in timing (season of use) and the length of the grazing period. The seasonal availability of stock water should also be considered.

2. Establish target utilization levels in key upland areas, such as sage grouse habitat and other areas at risk, not as an objective, but to ensure there is adequate residual cover remaining for nesting birds.

3. Establish target utilization levels on woody browse species. Where woody browse utilization by cattle becomes excessive, if becoming a management concern for big game species, further adjustments in the season of use, stocking levels and length of the grazing period may be necessary.

4. Evaluate livestock distribution patterns in both upland and riparian areas. Practices such as salting, herding, temporary fencing and reliable water developments should be considered to manage livestock use patterns.

No reliable trends could be established in comparing the record of historical information and existing rangeland studies with current resource conditions determined through land health assessments. As noted in the Technical Reference, Interpreting Indicators of Rangeland Health, qualitative assessments of range health is not to be used to make independent grazing management decisions or determine trend. Therefore, additional quantitative range studies were established in 2009, and existing studies repeated, to document trend and provide baseline measurements for future comparisons with reference areas. The principal criteria used in selecting these sites was their response and sensitivity to changes in management, location in important wildlife habitat areas and within areas where current conditions are not meeting land health standards. For example, repeating the pace point transects and establishing others in representative areas, would provide information about changes in plant community composition, the amount of bare ground, the amount of litter and vegetative cover, all of which are indicators used in evaluating soil/site stability, hydrologic function and biotic integrity in interpreting rangeland health and determining the departure from reference conditions.

Lewistown Standard #2 - Riparian and wetland areas are in proper functioning condition.

Within the Antelope Creek Grazing Allotment, riparian-wetland sites are primarily associated with lotic areas, or those areas that have energy from flowing water associated with them. These areas can be found along the Missouri River, Bull Creek, Antelope Creek and Winter Creek within the allotment. Under Lewistown Standard #2, riparian areas are defined as land directly influenced by permanent water. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil. Although Antelope Creek is discussed below, it does not contain riparian-wetland vegetation or exhibit intermittent or perennial stream flow.

Lentic sites within the allotment, or those areas without energy from flowing water such as lakes or ponds, are limited to man-made features. Small amounts of riparian-wetland vegetation may have developed or be found around constructed, livestock watering sites. Small areas on Bull Creek and Winter Creek may exhibit

borderline lentic conditions around springs or in areas that lack a defined channel; however, these areas were evaluated as inclusions within the lotic assessments.

Missouri River

There are about 4.6 miles of Missouri River shoreline managed by BLM in the Antelope Creek Grazing Allotment. The monitoring of lotic riparian communities along the Missouri River has occurred since 1993 and was based upon Hansen's Inventory, Classification, and Management of Riparian Sites along the Upper Missouri National Wild and Scenic River (1989). Six areas (polygons) were originally chosen for monitoring because of the interest in developing woody riparian communities. The majority of public land along the river consists of steep banks with a narrow floodplain. As such, limited potential exists for woody riparian community development. However, narrow communities of herbaceous riparian-wetland vegetation such as sedge and rush were well established at most sites. The PFC rating within the table below was based on the opinion by the examiner using the Upper Missouri National Wild and Scenic River Monitoring Form rather than an interdisciplinary assessment of conditions. Monitoring results of the six areas are as follows:

Polygon #	Date Monitored	Rating	Remarks
2306	1990	PFC	
2333	1993	PFC	Low riparian potential; dropped from monitoring schedule
2391	1994	PFC	
2466	2009	PFC	Impacts from noxious weeds and utilization by wildlife and livestock
2470/2473	2008	PFC	
2493	1996	FAR	Impacts from ice, water scour and utilization by livestock and wildlife

While valuable information, an update of riparian conditions using BLM's standard Proper Functioning Condition protocol was needed. Proper functioning condition refers to an on-the-ground method for assessing the condition and how well the physical processes are functioning in a riparian area, and review of existing information is necessary. The proper functioning condition assessment relies on the observation of visual indicators focusing on aspects of hydrology, vegetation, soil and landform. Three categories are used to describe the areas condition: 1) Proper Functioning Condition (PFC); 2) Functional at Risk (FAR); or 3) Non-functional (NF). PFC is also an appropriate starting point for determining and prioritizing areas that would require more intensive inventory and monitoring. Technical Reference 1737-15 (1998), A User Guide to Assessing Proper Functioning Condition and Supporting Science for Lotic Areas, describes the procedure for performing PFC assessments.

Using this methodology a BLM Interdisciplinary Team conducted an assessment of riparian conditions along the Missouri River during the 2010 field season. The assessment covered all of the areas listed earlier; those inventoried by Hansen and monitored by BLM. Based on a diverse age class and composition of riparian-wetland species, stable and well vegetated streambanks dominated by deep-rooted plants, healthy and vigorous plants and communities, the public land evaluated rated as Proper Functioning Condition. The assessment did identify noxious weeds and invasive species as a problem.

Also during the 2010 field season, BLM completed a survey for noxious and invasive plant species along the Upper Missouri River National Wild & Scenic River corridor which included both private and public land within the Antelope Creek Grazing Allotment (see table below).

Common Name	Total Acres	BLM Acres
Russian Knapweed	9	3
Canada Thistle	13	6
Leafy Spurge	28	6
Field Bindweed	1	1
Russian Olive	0.3	0
Perennial Pepperweed	0.3	0

Most of the species documented have a very limited range within the Antelope Creek Grazing Allotment and do not yet occur at levels where they affect soil and vegetation conditions or interfere with ecological processes.

BLM implemented a weed treatment strategy along the Missouri River corridor in the mid 1980's emphasizing chemical and biological control and weed awareness and education. The program has been very effective in maintaining "weed free" areas and locating, with the goal of eliminating, noxious weeds new to the area such as perennial pepperweed *(Lepidium latifolium)*, saltcedar *(Tamarix ramosissima)*, purple loosestrife *(Lythrum salicaria)*, houndstongue *(Cynoglossum officinale)*, hoary cress *(Cardaria draba)* and Dalmatian toadflax *(Linaria dalmatica)*. Control strategies will continue with the emphasis on reducing current infestation levels and eradicating new starts and noxious weeds new to the area.

Upland Riparian

Three significant drainages are located in the Antelope Creek Grazing Allotment, and they include Bull Creek, Winter Creek, and Antelope Creek. In preparation of updating the assessments on these drainages, a review of existing information was completed. These drainages were evaluated in the 1990's using the Montana Wetland Riparian Association (MWRA) small stream assessment form (see table below).

Drainage	Rating	Year Assessed	Remarks
Antelope Creek	FAR	1998	
Winter Creek	FAR	1998	Identified small springs being impacted
Bull Creek	FAR	1998	Identified small springs being impacted
Bull Creek	FAR	1998	
Bull Creek	FAR	1998	
Bull Creek	PFC	2003	

In reviewing the field forms and assessments it appears that many of the sites evaluated lacked riparian-wetland species, or if found, were very limited in both size and spacing. Soils were also identified as a major component limiting or affecting riparian development and conditions on Bull Creek, Antelope Creek and Winter Creek. All of these drainages flow in response to spring snowmelt, early summer rainfall and intense summer thunderstorms. Based on photographs, plant lists and written assessments, other than small areas or springs on upper Bull Creek and Winter Creek, most of the stream reaches evaluated appear to be ephemeral drainages. This then gives reason to doubt whether they meet the BLM definitions for riparian areas found in Montana/Dakotas Standards for Rangeland Health and Guidelines for Livestock Grazing Management (1997). To clarify their status, Antelope Creek, Winter Creek and Bull Creek were reassessed during the 2008 field season the results of which are summarized below.

Antelope Creek

The Antelope Creek Drainage is approximately 11 miles long. Three sites along Antelope Creek, representing the upper, middle and lower sections were assessed during June of 2008 by an interdisciplinary team represented by range, riparian, wildlife and hydrology.

To meet the definition as a riparian area, the channel is directly influenced by permanent water and will have visible vegetation or physical characteristics reflective of permanent water influence. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependant on free water in the soil. The sites visited and evaluated along Antelope Creek were dominated primarily by facultative upland[4] and upland plant species. Most of the streambank, point bars and channel bottom are composed of Kentucky

[4] Plants are ranked according to their probability of occurrence in riparian-wetland areas. Obligate plants occur 99% of the time; facultative wetland plants occur 67 - 99%; facultative plants are equally likely to occur in riparian-wetlands and uplands; facultative upland plants occur only occasionally in riparian-wetland areas and upland plants seldom if ever occur in riparian-wetland areas.

bluegrass *(Poa pratensis)*, Canada wildrye *(Elymus Canadensis)*, American licorice *Glycyrrhiza lepidota)*, rabbitbrush *(Chrysothamnus nauseosus)*, silver sagebrush *(Artemisia cana)*, fringed sage *(Artemisia frigid)*, cudweed sagewort *(Artemisia ludoviciana)*, American vetch *(Vicia Americana)*, western yarrow *(Achillea millefolium)*, broom snakeweed *(Gutierrezia sarothrae)*, prickly-pear cactus *(Opuntia polyacantha)*, western wheatgrass *(Agropyron smithii)*, green needlegrass *(Stipa viridula)*, cheatgrass *(bromus tectorum)* and common dandelion *(Taraxacum officinale)*. Those riparian-wetland plant communities found were herbaceous and consisted of small, discontinuous islands of alkali bulrush *(Scirpus maritimus)*, inland saltgrass *(Distichlis stricta)* and alkali cordgrass *(Spartina gracilis)*. These communities were estimated to make up 1-2% of the drainage.

Figure 4. Typical stream channel type and upland vegetation found along Antelope Creek.

Based on the Interdisciplinary Team assessment, the Antelope Creek drainage does not meet the BLM definition of a riparian area. The consensus reached was that Antelope Creek is an ephemeral drainage with small isolated seeps, estimated to be less than 1-2% of the drainage, which support some riparian-wetland species. The rest of Antelope Creek, because it does not have free water in the soil, lacks the potential for riparian community development.

Bull Creek and Winter Creek Riparian Complexes

The riparian complexes supported by Bull Creek and Winter Creek are a function of an intricate interaction of landform, geology, soils, and water. Bull Creek and Winter Creek can best be described as interrupted systems of alternating ephemeral reaches and intermittent reaches, which support communities of riparian-wetland vegetation. Rather than split the assessments at each change in complex, Bull Creek and Winter Creek were evaluated as interrupted systems.

The location of areas supporting riparian-wetland vegetation can partially be explained by landform, geology, soils, and water availability. The geology of the watersheds is predominantly Bear Paw Shale; however, inclusions of Judith River Sandstone are also present. Because of the location of the Missouri River, which is new in geologic time, the side tributaries are also adjusting through an entrenched landform of shale and sandstone. As such, various channel types are present such as Rosgen F channel types (typical of entrenched landforms), Rosgen C and Rosgen E channel types, or small amounts of C and E channels within historic F channels. The different channel types have different bank storage capacities and affect the amount of water that is stored through dry periods.

At the lower end of Bull Creek (below the confluence of Winter Creek), an alluvial floodplain is present, narrower width/depth ratios exist, the watershed is at its largest point, and most streambanks are dominated by riparian-wetland vegetation. As one goes up the watershed in both Bull Creek and Winter Creek, channel types vary with different levels of confinement. Areas in Bear Paw Shale tend to be less confined, have higher

width/depth ratios, and exhibit more ephemeral conditions. Ephemeral drainages tend to have higher width/depth ratios than equivalent perennial drainages because of the lack of riparian-wetland vegetation for narrowing channel width. Reaches within the Judith River Sandstone, although confined by landform, tended to have higher percentages of riparian-wetland vegetation. Although these confined channels may have less capacity for bank storage of flow, the possibility may exist that shallow groundwater moving though the system may be discharged to the channel as it is forced into a narrower valley. Regardless, areas within the Judith River Sandstone tended to have higher percentages of riparian-wetland vegetation, smaller width/depth ratios, and exhibit more intermittent conditions.

Bull Creek

The Bull Creek drainage covers approximately 21 miles on public land. An ID Team in June and August of 2008 completed a PFC assessment using five representative locations covering the lower, middle and upper segments. The team determined Bull Creek was riparian based on the occurrence of riparian-wetland species; common spikesedge *(Eleocharis palustris)*, alkali bulrush *(Scirpus maritimus)* and three-square bulrush *(Scirpus pungens)*. Although still discontinuous islands, the riparian communities along Bull Creek are more frequent, longer and cover a larger portion of the active floodplain. Some areas are very alkaline, having stagnant pools of standing water remaining until late in the summer, limiting plant establishment. Combining the results of the assessment areas, Bull Creek rated in proper functioning condition. In addition, seven general view photo stations were established that can be repeated in future years showing the makeup and structure of riparian plant communities.

Figure 5. View of Bull Creek showing three-square bulrush community along the stream channel.

Winter Creek

The Winter Creek drainage is 10 miles in length and was evaluated in mid September of 2008. Four lotic assessments were completed on representative sites covering the lower, middle and upper segments. In addition, two general view photo stations were established.

Very few obligate plant communities were found along the lower end of the drainage, although the channel banks are well vegetated with native species. Midway up the drainage the parent material changes from shale to sandstone. Here, riparian-wetland plant communities become more frequent and are dominated by three-square bulrush. The very upper end has similar plant communities but shows more grazing use. This area, estimated to be less than 10% of the Winter Creek drainage, is of concern to the ID team. However, the overall functional rating was still determined to be proper functioning condition.

Figure 6. Three-square bulrush community along the bottom of Winter Creek. Note the high concentration of salts on the surface and outcrop of Judith River Sandstone.

Springs

There are (3) developed springs located along the bottom of Bull Creek; Bull Creek Spring (lower end), Stogie Spring (middle) and Mud Spring (upper end). The source of Mud Spring is fenced to exclude livestock, whereas the other two spring sites are not. All three springs were developed in the 1960's to provide livestock water. Both Stogie and Bull Creek springs were reconstructed in the 1980's. When inspected in 2008, Stogie Spring was not functioning as originally planned and will need repaired or abandoned.

Leafy spurge *(Euphorbia esula)*, Russian knapweed *(Centaurea repens)*, spotted knapweed *(Centaurea maculosa)* and Canada thistle *(Cirsium arvense)*, which are common along the Missouri River, were not found along Antelope Creek, Bull Creek and Winter Creek.

Lewistown Standard #3 - Water quality meets Montana state standards.

The Missouri River from Bullwhacker Creek to Fort Peck Reservoir is listed as water quality impaired by Montana Department of Environmental Quality (MDEQ). Probable causes include alteration in stream-side vegetative cover, arsenic, and copper. Probable sources listed by MDEQ include agriculture, grazing in riparian or shoreline zones, and impacts from abandoned mine lands. No water quality determination for Bull Creek and Winter Creek has been made by MDEQ.

In BLM's water quality standard determination process, when a State water quality standard is not being met, BLM reviews the permitted activities and determines whether they are contributing pollutants of concern to the impaired waterbody. In this case, the Missouri River borders the allotment and is the immediate receiving water for Bull Creek. If it is determined that BLM lands are not contributing to impairment, the allotment would meet the water quality standard (or vice versa).

Because the cause of impairment on the Missouri River is listed as alteration in stream-side vegetative cover, BLM completed an evaluation of riparian conditions within the allotment on the Missouri River, Bull Creek, and Winter Creek using standard PFC protocol. BLM considers PFC to be an acceptable level of impacts and evaluation technique for identifying areas of nonpoint source pollution. This is supported by the Montana Nonpoint Source Management Plan developed by Montana Department of Environmental Quality. MDEQ's goal for sustainable rangeland management is to support the long term ecological health of grazing resources and meet water body beneficial uses. Their Objective 6.1 is to "support PFC, as a first tier assessment approach for riparian grazing management and monitoring, on private, state, and federal riparian areas in Montana".

The riparian conditions on this allotment were in proper functioning condition. Although proper functioning condition does not necessarily imply "good" water quality, it does imply that cattle are spending less time in riparian areas and adequate vegetation remains to trap and filter sediments and decrease the amount of fecal coliform and nitrates entering the waterbody.

Lewistown Standard #4 - Air quality meets Montana State standards.

The allotment is not located within an air quality non-attainment area. Air quality meets standards for a class II airshed.

Lewistown Standard #5 - Habitats are provided to maintain healthy, productive and diverse populations of native plant and animal species, including special status species (federally threatened, endangered, candidate or Montana species of special concern as defined in BLM Manual 6840, Special Status Species Management).

There are no threatened and endangered species or species proposed for listing within the Antelope Creek Grazing Allotment.

Several BLM designated sensitive species occur or could occur within the allotment. Of primary concern is sage grouse which occurs year round within the allotment. There are 9,931 acres of sage grouse habitat designated within the Antelope Creek Grazing Allotment (Sage Grouse Allotment Map). Based on the results of the upland health assessments, 4,264 acres or 43% of the habitat is functioning at risk. Lack of herbaceous cover at the end of the grazing season, the health and vigor of grasses and species diversity are the reasons for the rating.

The allotment provides year round habitat for elk, mule deer, pronghorn and likely big horn sheep.

The Antelope Creek Grazing Allotment also provides habitat for a wide variety of migratory birds in several habitat types. The most limiting and important migratory bird habitat within this allotment is relic riparian woodlands with a shrub understory. Although this habitat is limited along the Missouri River, it is well represented on an island and at the Hideaway Primitive Boat Camp. This community type provides nesting, feeding, roosting and migratory habitat for many species from raptors, large and small, down to small songbirds. While this habitat is in excellent condition the current risk comes primarily from recreationists using Hideaway Primitive Boat Camp area. The potential for introduction of additional noxious weeds by campers or man caused wildfire are the biggest concerns and threat at this time.

Currently, based on the results of the upland assessments and monitoring data, wildlife habitat within the Antelope Creek Grazing Allotment is not being maintained in conditions suitable for maintaining healthy and diverse wildlife populations. Specifically, residual cover and health of key species is not adequate for maintaining healthy populations of sage grouse, mule deer and pronghorn. Therefore, this standard is not being met over portions of the Antelope Creek Grazing Allotment.

Recommendations

1. To improve habitat conditions for big game and residual cover in sage grouse nesting habitat, a later turnout date is recommended and the use of shrubs should be monitored during and following the grazing season to determine degree of competition, particularly with deer in December. The date livestock are removed from the allotment should be based on herbaceous and shrub utilization levels.

Utilization Transects

Utilization transects were completed in 2008, 2009 and 2010 late in the grazing season, from mid November to

mid December. Utilization data and residual measurements are important in evaluating the effects of grazing and browsing, help to identify use patterns and aid in adjusting the stocking rate. The results of these are summarized in Appendix 4. Grazing use levels, using both the Landscape Appearance Method and Height-Weight Method, ranged from 36% to 51% in 2008, 18% to 70% in 2009 and 3% to 21% in 2010. Western wheatgrass and green needlegrass were used as key species. What was notable in 2008 and again in 2009 was the amount of use on rubber rabbitbrush and greasewood at nearly all transect locations. Both shrubs were severely hedged from past years and already in the 95% to 100% utilization range at the start of winter. These two shrubs are key forage components for wildlife in big game wintering areas.

To evaluate the use on big game browse species (rubber rabbitbrush) ten permanent Cole browse transects were established. The browse transects are intended to monitor livestock impacts on important wildlife browse species.

Conformance with the Guidelines for Grazing Livestock

The permitted grazing use (livestock numbers, season of use and amount of use) must also conform to the guidelines for grazing livestock on public land. Grazing guidelines are types of grazing management methods and practices used to ensure that the standards can be met or that significant progress can be made toward meeting the standards. Guidelines are "best management practices" such as grazing systems, vegetative treatments or improvement projects which could be used to achieve rangeland health standards. The Lewistown District has developed 14 Grazing Management Guidelines to maintain or improve resource conditions in upland and riparian habitats (BLM, Environmental Impact Statement Record of Decision for Standards for Rangeland Health and Guidelines for Livestock Grazing Management in Montana, North Dakota and South Dakota, 1997).

After reviewing the current livestock grazing use, the ID Team determined the Antelope Creek Grazing Allotment is not in conformance with Guidelines 5, 8 and 11.

Guideline #5: Grazing will be managed to promote desired plants and plant communities of various age classes, based on the rate and physiological conditions of plant growth. Management approaches will be identified on a site-specific basis and implemented through terms and conditions. Caution should be used to avoid early spring grazing use when soils and streambanks are wet and susceptible to compaction and physical damage that occurs with animal trampling. Likewise, late summer and fall treatments in woody shrub communities should be monitored closely to avoid excessive utilization.

Guideline #8: When provided, supplemental salt and minerals should not be placed adjacent to watering locations or in riparian-wetland areas so not to adversely impact streambank stability, riparian vegetation, water quality, or other sensitive areas (i.e., key wildlife wintering areas). Salt and minerals should be placed in upland sites to draw livestock away from watering areas or other sensitive areas and to contribute to more uniform grazing distribution.

Guideline #11: Grazing management should maintain or improve habitat for federally listed threatened, endangered, and sensitive plants and animals.

Conformance with the Upper Missouri River Breaks National Monument Resource Management Plan Decisions

Both the Federal Land Policy and Management Act (FLPMA) and the public land grazing regulations require that grazing management activities authorized on public land must conform to the approved land use plan. The following are guidelines taken from the Upper Missouri River Breaks National Monument Record of Decision and Approved Resource Management Plan.

Wildlife

Sage-grouse management will utilize the 2005 Management Plan and Conservation Strategies for Sage-Grouse in Montana – Final for overall guidance and direction.

Grazing permittees will avoid the placement of salt or mineral supplements near leks during the breeding season (March 1 to June 15). The placement of salt or mineral supplements by other entities will not be allowed. Supplemental winter feeding will not be allowed on sage-grouse winter habitat and around leks.

Concentrations of livestock near leks or winter habitat can disturb or displace sage-grouse. Therefore, concentrations of livestock on leks or other key sage-grouse habitats could be avoided by using conservative stocking levels, locating salt or other supplements away from leks or winter habitat, adjusting grazing seasons and locating water facilities where they would not jeopardize habitat.

A conservative stocking level is a stocking rate that will result in a moderate utilization level (or less) by livestock at the end of the grazing period for the year. A conservative stocking level will be established based on resource management goals including maintaining healthy vegetation; acceptable livestock performance; expected normal weather; and annual plant production consistent with the Standards for Rangeland Health and Guidelines for Livestock Grazing Management.

Vegetation

In general, about 60% of the annual vegetation production is allocated to watershed protection, plant health and/or wildlife forage and cover, and about 40% is allocated to livestock. However, as specific management goals are refined and changes in resource conditions become apparent through monitoring, the actual percentage of vegetation allocated may change. For example, if the area grazed is very steep and far from water the actual allocation to livestock could be substantially less than 40%.

Livestock Grazing

To protect the objects for which the Monument was designated livestock grazing will continue to be managed under the Lewistown District (Lewistown and Malta Field Offices) Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997).

Guidelines for Livestock Grazing Management practices will be followed to protect the objects of the Monument and rangeland resources and, where necessary, to mitigate conflicts with other Monument uses and values.

Plans and grazing prescriptions will be developed with multiple use objectives to enhance vegetation production and diversity; maintain and enhance wildlife habitat; protect watersheds; reduce bare ground; and minimize livestock/recreation conflicts.

Summary and Recommendations

Recently, the steps in the process for evaluating the status of land health were changed. Instruction Memorandum No. 2009-007 (IM), issued in October of 2008, outlines the requirements for evaluating land health, when a determination is prepared, and if needed, developing appropriate actions that will make significant progress toward achieving land health standards. The most significant change involved the determination document. Now, determination documents are only prepared if the evaluation report documents that land health standards are *not* being met.

As indicated in this report, rangeland health standard #1 and #5 are not being met in the Antelope Creek Grazing Allotment; therefore, a determination document is needed.

Prepared By:

Mitch Forsyth 1/4/2011

Mitch Forsyth, Range Specialist Date

Jody Peters 1/4/2011

Jody Peters, Wildlife Biologist Date

Josh Sorlie 1/5/2011

Josh Sorlie, Soil Scientist Date

Chad R Krause 1/7/2011

Chad Krause, Hydrologist Date

Reviewed By:

Gary Slagel 1/10/2011

Gary Slagel, Manager Date
Upper Missouri River Breaks National Monument

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Montana Natural Heritage Program Website; Plant Species of Concern Report for Phillips County; http://mtnhp.org/

Appendix 1. Antelope Creek Historic Upland Vegetation Studies

TYPE	DATE	RANGE COND	TREND	RATING	PHOTO	BARE GROUND	LITTER	VEG	BIG SAGE	LOCATION
CHIEF JOSEPH 3X3	8/20/1998	75% [1]	5 [2]	PFC	Yes	5% [4]	10% [4]	75% [4]		T23N R23E SEC6 NENW
BUTCH CASIDY 3X3	8/19/1998	75% [1]	8 [2]	PFC	Yes	15% [4]	20% [4]	65% [4]		T23N R23E SEC33 SWNE
	9/20/1999									
KID CURRY 3X3	9/3/1974				Yes					T23N R23E SEC21 SWNE
	5/8/1987	55% [1]	2 [2]		No					
PLOVER RES 3X3	8/19/1998	65% [1]	6 [2]	PFC	Yes	5% [4]	10% [4]	85% [4]		T23N R23E SEC14 NENE
RIVER UPLAND ASSESS	8/20/1998	75% [1]	6 [2]	PFC	Yes	Trace [4]	10% [4]	85% [4]		T23N R22E SEC22 SWSE
IR#1 KID CURRY RES	9/28/1976				Yes	30% [3]	11% [3]	46% [3]	18% [4]	T23N R23E SEC21 NWSWNE
	1985				Yes					
	1987				Yes					
	1990				Yes					
	7/12/2007				Yes					
IR#2 MITCH RES	9/30/1976				Yes	41% [3]	5% [3]	47% [3]	5% [4]	T24N R23E SEC20 NESW
IR#3 DEAD CEDAR	10/8/1976				Yes	52% [3]	16% [3]	29% [3]	1% [4]	T23N R22E SEC1 SWNW
	7/2/2007				Yes					
IR#4 TWIN SAG RES	10/8/1976				Yes	65% [3]	15% [3]	10% [3]	12% [4]	T23N R22E SEC12 NESW
	7/2/2007				Yes					
IR#5 BULL CREEK	10/9/1976				Yes	64% [3]	13% [3]	23% [3]	0%	T23N R22E SEC5 SWSE
IR#6 PLOVER RES	10/12/1976				Yes	62% [3]	17% [3]	10% [3]	21% [4]	T23N R23E SEC14 NENE
	7/2/2007				Yes					

[1] *Range Condition: 0-25% equals "Poor" Condition, 26-50% equals "Fair" Condition, 51-75% equals "Good" Condition,* & 76-100% equals "Excellent" Condition.

[2] *Range Trend: The direction of change in range health over time described as up, down, or not apparent. Scored on a scale of -10 to 10.*

[3] *The data recorded for IR Transects #1 through #6 completed in 1976, do not accurately depict the percentage of bare ground at each location. Bare ground should always be the area not covered by vegetation, rocks or litter. The field forms recorded "hits" on bare ground and nearly always noted vegetation or litter in the canopy above.*

[4] *Canopy Cover or the amount of ground covered by the vertical projection of the outer foliage and branches of a plant.*

Appendix 2. 2008 & 2009 Qualitative Upland Health Assessments

Note: the blocks highlighted in yellow indicate at least a moderate or greater departure in one or more of the rangeland health attributes (soil, hydrology, biotic).

Upland Assessment	Ecological Site	Major Plant Community Types	Degree of Departure		
			Soil Site Stability	Hydrologic Function	Biotic Integrity
AC #1-2008 7/14/08	Clayey	Mid to Tall Cool Season Grasses	None to Slight	None to Slight	None to Slight
AC#2-2008 7/14/08	Claypan	Warm Season Grasses	Slight to Moderate	Moderate	Moderate
AC#3-2008 7/14/08	Clayey	Big Sagebrush with understory of cool season mid grasses	None to Slight	None to Slight	Slight to Moderate
AC#4-2008 7/14/08	Clayey	Big Sagebrush with understory of cool season mid grasses	None to Slight	Slight to Moderate	Slight to Moderate
AC#5-2008 7/14/08	Clayey	Big Sagebrush with understory of cool season mid grasses	None to Slight	Slight to Moderate	Slight to Moderate
AC#6-2008 7/15/08	Dense Clay	Big Sagebrush with understory of cool season mid grasses	None to Slight	Slight to Moderate	Slight to Moderate
AC#7-2008 7/15/08	Clayey	Big Sagebrush with understory of mid to tall cool season grasses	Slight to Moderate	Slight to Moderate	None to Slight
AC#8-2008 7/15/08	Clayey	Big Sagebrush with understory of mid to tall cool season grasses	None to Slight	Slight to Moderate	Slight to Moderate
AC#9-2008 9/11/08	Clayey	Big Sagebrush with understory of mid cool season grasses	Slight to Moderate	Moderate	Moderate
AC#10-2008 8/13/08	Clayey	Big Sagebrush with understory of mid to tall cool season grasses	Slight to Moderate	Slight to Moderate	Slight to Moderate
AC#11-2008 8/13/08	Silty	Big Sagebrush with understory of mid cool season grasses	Slight to Moderate	Slight to Moderate	Moderate
AC#13-2008 8/26/08	Silty	Silver Sagebrush with understory of cool season mid grasses	None to Slight	None to Slight	Slight to Moderate
AC#14-2008 8/26/08	Silty	Silver Sagebrush with understory of mid to tall cool season grasses	None to Slight	None to Slight	None to Slight
AC#15-2008 8/26/08	Clayey	Big Sagebrush with understory of mid to tall cool season grasses	Slight to Moderate	Slight to Moderate	Slight to Moderate

AC#16-2008 8/27/08	Clayey	Big Sagebrush with understory of mid cool season grasses	Slight to Moderate	Slight to Moderate	Slight to Moderate
AC#17-2008 8/27/08	Clayey	Big Sagebrush with understory of mid to tall cool season grasses	Slight to Moderate	Slight to Moderate	Slight to Moderate
AC#18-2008 9/9/08	Silty	Cool season mid to tall grasses	None to Slight	None to Slight	None to Slight
AC#19-2008 9/9/08	Clayey	Big Sagebrush with understory of mid to tall cool season grasses	Moderate	Moderate	Moderate
AC#20-2008 9/9/08	Claypan	Big Sagebrush with understory of warm season grasses	None to Slight	None to Slight	Moderate to Extreme
AC#21-2008 9/11/08	Clayey	Big Sagebrush with understory of mid cool season grasses	Slight to Moderate	Moderate	Moderate
AC#22-2008 9/11/08	Clayey	Big Sagebrush with understory of mid cool season grasses	None to Slight	Slight to Moderate	Moderate
AC#23-2008 9/11/08	Clayey	Big Sagebrush with understory of mid cool season grasses	Slight to Moderate	Slight to Moderate	Moderate
AC#24-2008 9/29/08	Claypan	Big Sagebrush with understory of mid cool season grasses	None to Slight	None to Slight	Moderate
AC#25-2008 9/29/08	Claypan	Big Sagebrush with understory of mid cool season grasses	None to Slight	Slight to Moderate	Moderate
AC#26-2008 9/29/08	Silty	Big Sagebrush with understory of mid cool season grasses	None to Slight	Slight to Moderate	Moderate
AC#27-2008 10/2/08	Silty	Big Sagebrush with understory of mid cool season grasses	None to Slight	None to Slight	Slight to Moderate
AC#1-2009 8/13/09	Clayey	Big Sagebrush with understory of tall and mid cool season grasses	Slight to Moderate	Slight to Moderate	Slight to Moderate

Appendix 3. Sites with the Greatest Degree of Departure from Expected Conditions

Assessment #	Explanation for Rating
AC#2-2008 Claypan Ecological Site Bordering Prairie Dog Town	Prairie dog town located to the east of evaluation area; low productivity site; salt accumulations in soil profile affecting production and capability; root penetration restricted by extremely hard clay layer within 2 to 8 inches of the soil surface favoring shallow rooted plants. Site dominated by short grass species (blue grama, Sandberg bluegrass) and fringed sagewort. Forage production can be severely limited on this site by soil chemical and physical properties.
AC#9-2008 Clayey Ecological Site Sage Grouse Nesting & Winter Habitat	Higher amount of bare ground; higher percentage of big sagebrush canopy cover; little standing dead material; remnant tall, cool season bunchgrasses underneath big sagebrush plants. Western wheatgrass is the dominant grass; green needlegrass and bluebunch wheatgrass are still present but in smaller amounts than expected.
AC#11-2008 Silty Ecological Site Upland terrace bordering Bull Creek	Less litter than expected; higher percentage of big sagebrush canopy cover; shift from cool season bunchgrasses to short grass plants. Remnant key forage plants underneath big sagebrush plants.
AC#19-2008 Clayey Ecological Site Northwest Corner of Allotment	Rills and water flow patterns are evident; little standing dead material; higher percentage of bare ground; higher percentage of big sagebrush canopy cover; reduced amounts of tall, cool season bunchgrasses and cool season rhizomatous grasses, remnant key forage plants underneath sagebrush plants.
AC#20-2008 Claypan Ecological Site Northwest Corner of Allotment	Low productivity site; salt accumulations in soil profile affecting production and capability; root penetration restricted by extremely hard clay layer within 2 to 8 inches of the soil surface favoring shallow rooted plants. Site dominated by short grass species (blue grama, Sandberg bluegrass, junegrass) and dense clubmoss. Remnant western wheatgrass plants underneath big sagebrush plants and around cactus. Forage production can be severely limited on this site by soil chemical and physical properties.
AC#21-2008 Clayey Ecological Site Sage Grouse Nesting & Winter Habitat	Higher percentage of big sagebrush canopy cover; little standing dead material; higher percentage of bare ground; low amount of herbaceous cover; less litter than expected; western wheatgrass showing signs of low vigor (plant height/leaf width); green needlegrass is still present but in smaller amounts than expected.
AC#22-2008 Clayey Ecological Site Sage Grouse Nesting & Winter Habitat	Higher percentage of big sagebrush canopy cover; little standing dead material; deeper rooted perennial grasses present but in smaller amounts than expected; less litter than expected; soil surface contains a high percentage of gravel increasing evaporation and creating drier site conditions.

AC#23-2008 Clayey Ecological Site Sage Grouse Nesting & Winter Habitat	Little standing dead material; less litter than expected; higher percentage of big sagebrush canopy cover; deeper rooted perennial grasses (green needlegrass) still present but in smaller amounts than expected; soil surface contains a high percentage of gravel increasing evaporation and creating drier site conditions.
AC#24-2008 Claypan Ecological Site Northwest Corner of Allotment	Low productivity site; salt accumulations in soil profile affecting production and capability; root penetration restricted by extremely hard clay layer within 2 to 8 inches of the soil surface favoring shallow rooted plants. High density of clubmoss; some soil compaction in surface layer; small amount of litter; remnant key forage plants located underneath big sagebrush plants; higher percentage of big sagebrush canopy cover; plant interspaces dominated by short grass species. Forage production can be severely limited on this site by soil chemical and physical properties.
AC#25-2008 Claypan Ecological Site Northwest Area of Allotment	Low productivity site; salt accumulations in soil profile affecting production and capability; root penetration restricted by extremely hard clay layer within 2 to 8 inches of the soil surface favoring shallow rooted plants. High density of clubmoss; key forage plants underneath big sagebrush plants; shift to shorter and shallow rooted species. Forage production can be severely limited on this site by soil chemical and physical properties.
AC#26-2008 Silty Ecological Site North End of Allotment	Remnant, tall, cool season bunchgrasses located under sagebrush plants; less litter than expected; site producing below potential due to dense clubmoss and blue grama; western wheatgrass showing signs of low vigor (plant height/leaf width).