

Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management

for

**Public Lands Administered by the Bureau of
Land Management in the State of
Wyoming**

Demer Nowater Allotment #00163

MARCH 2011



The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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1.0 INTRODUCTION

The Bureau of Land Management (BLM) grazing regulations at 43 CFR 4130.3-1(c) require that grazing permits issued by the BLM contain terms and conditions that ensure conformance with BLM regulations at 43 CFR 4180, which are the regulations under which the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Land Administered by the Bureau of Land Management in the State of Wyoming were developed. Recently, the Worland Field Office completed an assessment of the achievement of these standards on the Demer Nowater Allotment. The results of this assessment are presented in this report. This assessment will serve to inform the BLM's determination as to whether these standards are being met, and, if they are not met, whether existing grazing management practices contribute to their lack of attainment.

1.1 Standards

The approved standards for rangeland health are as follows:

- Standard #1: Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.
- Standard #2: Riparian and wetland vegetation has structural, age and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide ground water recharge.
- Standard #3: Upland vegetation on ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.
- Standard #4: Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.
- Standard #5: Water quality meets State standards.
- Standard #6: Air quality meets State standards

2.0 Affected Environment-Allotment Description, Resource Values, and Uses

2.1 Location and Land Ownership

The Demer Nowater Allotment #00163 is located in T45N and R91W and R92W, which is approximately 7.5 miles southeast of Worland, WY in Washakie County. The allotment consists of approximately 6,483 acres with 6,237 public acres and 246 acres of State of Wyoming lands. The allotment is separated into two pastures and the West Pasture has 3,924 acres and the East Pasture has 2,559 acres. Elevations within the allotment range from 4,400 to 4,700 above sea level. The allotment is easily accessible via the Nowater Trail Road (BLM 1404) which runs just west of the allotment (see Map 1).

2.2 Hydrology/Riparian

The allotment is located in three different watersheds known by the US Geologic Survey as a Level #6 Hydrologic Unit, or by (HUC #) as listed below in Table 1.

Table 1. Watershed/HUC #

Watershed (HUC) Level #6	Acres (mi²)	Acres (mi²) (Within Allotment)	% of Acres of Watershed in the Allotment
Denver Jake Draw #100800070904	14,970 (23.4)	4,237 (6.6)	28.3
Nowater Creek-Zimmerman Draw #100800070804	49,448 (77.3)	1,344 (2.1)	2.7
East Fork Nowater Creek- #100800070903	32,589 (50.9)	833 (1.3)	2.6

All of the watersheds are located in the upper Bighorn level #5 watershed and when flowing confluence with Nowater Creek eventually into the Bighorn River downstream 5.5 miles west of the allotment. The area is located in a highly erosive area with high amounts of runoff and very low permeability due to very fine grained geologic outcrops of primarily Tertiary aged outcrops of the Willwood and Fort Union Formations. The overall slopes are gentle <5 percent with some slopes at the watershed divide around 10 percent along with steeper slopes (see Photo 1 and Map 2). These watersheds have a high drainage density that is indicative in low precipitation areas that are common throughout Wyoming in the Bighorn Basin. The watershed carry very large amount of sediment loads and have very turbid water during times of the year.

The larger desert type drainages in the allotment have ephemeral or intermittent flow regimes, depending on climatic precipitation received during the year, with flow in the channel 10-80% of the year. Many smaller drainages are considered ephemeral with flow in the channel <10% of the year, as determined from a thirty year average as determined by (Hedman, 1982). The larger drainages are considered to have a desert cottonwood type riparian community with a dominant over-story of Cottonwood trees as evidenced on the East Fork of Nowater Creek just north of the allotment.

2.3 Air Quality/Climate

An air quality monitoring station was recently established in the Bighorn Basin, but no monitoring data is available at this time.

Annual precipitation ranges from 5-9 inches per year. The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins about April 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the “Emblem” climate station:

	Minimum	Maximum	5 yrs. out of 10 between
Frost-free period (days):	98	171	May 13 – September 19
Freeze-free period (days):	120	184	May 1 – October 5
Mean Annual Precipitation (inches):	3.22	10.97	

Mean annual precipitation: 7.42 inches
Mean annual air temperature: 45.01°F (31.2°F Avg. Min. to 58.7°F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service (NRCS) National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include “Basin”, “Deaver”, “Lovell”, and “Worland”, (United States Department of Agriculture (USDA) NRCS Technical Guide Section IIE Rev. 08/12/05).

2.4 Soils

The soils reflect the desert environment in which they formed. They are highly variable, reflecting differences in parent material (sandstone, shale and/or mixed alluvium), position on the landscape, slope and aspect. Soil depth ranges from a few inches to over 60 inches. These soils typically have a light brown surface layer. Surface textures are fine sandy loams, loams, clay loams and silty clay loams. The subsoil commonly reflects an increase in clay and calcium carbonate, being expressed argillic or natriargid horizons. Slopes range from 0 to 40 percent.

Based on the Soil Survey for Washakie County, the dominant ecological sites found in the in the allotment are listed below:

Loamy 5-9 in. pz.	R032XY122WY
Saline Upland 5-9 in. pz.	R032XY144WY
Shale 5-9 in. pz.	R032XY154WY
Sandy 5-9 in. pz.	R032XY150WY

Five (5) rangeland health assessments were conducted as part of this investigation. Two (2) assessments were conducted in the West Pasture and two (2) in the East Pasture. A fifth assessment was conducted in the Demer Exclosure that has been excluded from livestock grazing since 1958 (see Map 3).

The first assessment was conducted in Map Unit 23 Fruita-Neiber-Muff Association; the soil at this location is a good representation of the Neiber soil series supporting a Loamy 5-9” pz. ecological site. The second assessment was also conducted in Map Unit 23; the soil at this location it is a good representation of the Fruita soil series supporting a Loamy 5-9” pz. ecological site. The third assessment was conducted in Map Unit 84 Youngston-Uffens-Lostwells Complex; the soil at this location is a good representation of the Uffens soil series supporting a Saline Upland 5-9” pz. The fourth assessment was conducted in Map Unit 84 Youngston-Uffens-Lostwells Complex; the soil at this location is an inclusion within the map unit representing the Neiber soil series and supporting a Loamy 5-9” pz. ecological site. The fifth assessment was conducted in Map Unit 23 Fruita-Neiber-Muff Association; the soil at this location is a good representation of the Fruita soil series supporting a Loamy 5-9” pz. ecological site.

2.5 Vegetation

The Demer Nowater Allotment lies in a 5 to 9 inch precipitation zone. The nearest BLM rain gauge, Demer, is located in the West Pasture of the allotment and the average annual precipitation from 1984 to 2009 was 7.75 inches. Average annual growing season precipitation from 1984 to 2009, as defined from April to June, was 3.84 inches. The growth of native cool season plants in the allotment begins about April 1 and continues to July 1 with some green-up occurring in September with fall precipitation.

An Allotment Evaluation and Allotment Management Plan were completed for this allotment in 1968 prior to the establishment of the 3x3 trend plots in 1969. At that time the allotment was divided into three pastures, Northwest, Southwest, and East. The vegetation type in the Northwest was described as sagebrush (*Artemisia tridentata ssp. Wyomingensis*) – cheatgrass (*Bromus tectorum*) – Sandberg bluegrass (*Poa secunda*) – cactus (*Opuntia polyacantha*). The vegetation type in the Southwest pasture was described as Sagebrush – western wheatgrass (*Pascopyrum smithii*) – bluebunch wheatgrass (*Pseudoroegneria spicata*). And the East pasture had a vegetation type described as sagebrush – cheatgrass – Sandberg bluegrass – cactus. The evaluation further stated that the yearly forage production outside the Demer Exclosure for a five year period (not specified) averaged 174.74 pounds/acre and ranged from 92.02 pounds/acre to 238.56 pounds/acre. The evaluation also stated that production inside the Demer Exclosure was higher but did not specify any numbers. The allotment evaluation provided a chart comparing density of several plant species inside and outside the exclosure. Western wheatgrass, Sandberg bluegrass, and cheatgrass were at higher density inside the exclosure, while blue grama was higher outside the exclosure. The evaluation stated that the overall forage condition was rated as poor and erosion and soil loss was evident by advancing gullies. The AMP prescribed a three pastures, six year, rest – rotation system to improve watershed conditions by reducing runoff, improve production of quantity and quality of livestock and wildlife forage, enhance wildlife habitat, and protect fragile soils. Livestock use was by sheep, season of use was spring (May 1 to June 10) and fall (October 1 to November 30), and the allowable AUMs were 803. The stocking rate for the entire allotment at this time was 7.9 acres/AUM and livestock density would have been 5 acres/animal (sheep). There is no indication in the file how long this AMP was in effect.

The 1984 vegetation inventory classified range sites within the allotment as 3,018 acres of Loamy, 798 acres of Shallow Loamy, 453 acres of Saline Upland, 248 acres of Sandy, 274 acres of Very Shallow, 135 acres of Shallow, and 1450 acres of Unclassified but approximately 60% of the total acreage within the allotment is classified as Loamy range sites. Native plant communities within the allotment include needle-and-thread (*Hesperostipa comate*), bottlebrush squirreltail, bluebunch wheatgrass, Indian ricegrass (*Achnatherum hymenoides*), western wheatgrass, prairie junegrass (*Koeleria macrantha*), blue grama (*Bouteloua gracilis*), alkali sacaton (*Sporobolus airoides*), Sandberg bluegrass, cactus, cheatgrass, sagebrush, phlox (*Phlox hoodii*), larkspur (*Delphinium bicolor*), scarlet globemallow (*Sphaeralcea coccinea*), seago lily (*Calochortus nuttallii*), paintbrush (*Castilleja angustifolia*), wooly plantain (*Plantago patagonica*), woody aster (*Xylorhiza glabriuscula*), sunflower (*Helianthus petiolaris*), bud sagebrush (*Picrothamnus desertorum*), fourwing saltbush (*Atriplex canescens*), and halogeton (*Halogeton glomeratus*).

Grass species noted within the loamy range sites during the 1984 vegetation inventory on soil unit 23, which is the same soil unit as four of the 2010 cover transects included bluebunch wheatgrass, needle-and-thread, Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, western wheatgrass, blue grama, and cheatgrass. Cheatgrass ranged from 10% to 28% of the composition on loamy sites sampled during the inventory.

Grass species noted within the loamy range sites during the 2010 assessments included needle-and-thread, bluebunch wheatgrass, western wheatgrass, bottlebrush squirreltail, Indian ricegrass, Sandberg bluegrass, blue grama, and cheatgrass.

2.6 Invasive Species

Several invasive non-native plant species are established on the allotment. They include Russian knapweed, Tamarisk (saltcedar), Canada thistle, hoary cress (whitetop), curly dock, cheatgrass and desert alyssum. The highest concentrations of invasive plants occur near previously disturbed areas such as roads, reservoirs, and corrals (see Photos 3 and 15).

2.7 Range

The Demer Nowater Allotment is authorized for use by cattle. The water sources for livestock are numerous reservoirs located on public land. A portion of the annual forage production is removed by grazing livestock during the critical growing season; which amounts to 133 AUMs or 57% of the active use (April 16 to June 14). The remaining 101 AUMs or 43% of the active AUMs are used prior to the critical growing season (March 1 to April 15). The stocking rate on the allotment is 17 acres/AUM in the West Pasture and 11 acres/AUM in the East Pasture. Livestock density is 45 acres per animal in the West Pasture and 29 acres per animal in the East Pasture. The allotment is categorized as an “I3” (Improve) in the Washakie RMP.

This allotment was rated for Rangeland Health Standards in 2000 and failed. As a result the permit was changed from sheep to cattle, the season of use was changed from October 15 - January 2 and April 15 - May 15 to April 1 - June 14, a two pasture rest rotation grazing system was implemented, and the active public AUMs were reduced from 658 to 234. In

2005 the season of use was further changed to March 1 - June 14 and utilization levels were limited to fifty percent of the current year's growth on key forage species.

Livestock are currently authorized on the allotment as follows:

Demer Nowater #00163 87 Cattle 03/01 to 06/14 100% Public Land 233 AUMs

Terms and Conditions:

Use in this allotment is on a two pasture rest rotation system. Each pasture would have complete rest every other year. The scheduled grazing use is as follows: West Pasture 2006, East Pasture 2007, West Pasture 2008, East Pasture 2009, and West Pasture 2010.

Utilization levels on key forage plant species shall not exceed 50 percent of current year's growth.

Base property lease with Mark and Blaine Burton expires 2/28/2011.

Permitted Use (AUMs): 234 Active 501 Suspended 735 Total

2.8 Wildlife

The Demer Nowater allotment is characterized by gently sloping sage brush and grass covered drainages flowing generally north into the East Fork of Nowater Creek. The allotment provides habitat for multiple wildlife species during all seasons of the year. Nearly the entire allotment is designated as big game crucial winter range for mule deer and pronghorn. Two active sage grouse leks, Demer Cabin and Denver Jake Draw are within the boundaries of the allotment. The entire allotment is included in a sage grouse core area, and there are two small sage grouse wintering areas surrounding each of the occupied leks. There are also numerous, small white-tail prairie dog towns within the allotment boundary. Wild turkeys have also been observed using the area. The habitat is also suitable for numerous passerines, chukars, gray partridge, small mammals and predators such as coyote, badger, fox, and bobcat, and numerous raptor species.

2.9 Threatened or Endangered Species

2.9.1 Threatened, Endangered, Candidate, and BLM Sensitive -- Plant Species

No threatened and endangered or sensitive plant species have been found in the Demer Nowater Allotment.

2.9.2 Threatened, Endangered, Candidate, and BLM Sensitive – Wildlife Species

No threatened or endangered species have been observed or recorded using the habitat within the Demer Nowater Allotment. Sage grouse use the habitat extensively during most seasons of the year for breeding, nesting, early brood-rearing, and wintering as well as breeding, nesting and foraging habitat for other sagebrush obligate bird species like the sage thrasher, sage, Brewer's, Baird's and vesper sparrow and loggerhead shrike.

3.0 Summary of Monitoring Data/Assessments

3.1 Range

1969

Two 3x3 trend photopoints were established in the allotment in 1969. The NW photopoint was relocated in the West Pasture in April of 2010 but the SW photopoint was not relocated. The location of the NW 3x3 trend plot is shown on Map 1.

Data was only collected for NW 3x3 Trend Plot #1 and summarized key species composition at .1%, live vegetative cover at 14.3 %, no seedlings observed, and litter at 12.9%. Grasses listed by basal cover included blue grama (6.5%), Sandberg blue grass (.4%), western wheatgrass (.1%), and cheatgrass (.1%). Other species by basal cover included cactus (5.6%)

and plantain (.2%). Foliar cover of sagebrush was 1.4% and litter was 12.9%. Data was not collected for Plot #2 but listed Sandberg bluegrass, blue grama, cactus, and annuals as species within the plot.

No data was collected SW 3x3 Trend Plot #1 other than a diagram of the plot frame showing blue grama and cactus within the plot. Data collected for SW 3x3 Trend Plot #2 only includes a listing of blue grama, cheatgrass, and sagebrush within the plot.

1992

A low intensity monitoring (LIM) photopoint was established in the West Pasture on June 29, 1992 adjacent to the existing Demer Exclosure but the fence post marking the site is now missing. The photopoint was never retaken.

2000

A Rangeland Health Assessment was completed for the allotment on July 24, 2000 in the East and West pastures. Attribute ratings in the West Pasture for *Soil & Site Stability* was rated as “not stable”, attribute ratings for *Integrity of the Biotic Community* was rated as “not intact”, and the attribute ratings for *Hydrologic Function* was rated as “non-functioning”.

Attribute ratings in the East Pasture for *Soil & Site Stability* was rated as “at risk”, attribute ratings for *Integrity of the Biotic Community* was rated as “not intact”, and the attribute ratings for *Hydrologic Function* was rated as “at risk”.

2004

An allotment inspection and use pattern map was completed on July 1, 2004 in the West Pasture. The majority of the grazing use appeared to be in the west 1/3 of the pasture, which was noted as heavy on key forage species, and grazing use in the east half of the pasture was light. Key species included needle-and-thread, bluebunch wheatgrass, Indian ricegrass, and western wheatgrass. Large amounts of cheatgrass and yellow alyssum were present. No photos were taken.

2005

An allotment inspection was done on March 9, 2005 in the East Pasture. Soil surface was dry and residual vegetation was observed from 2004. Reservoirs that were observed were dry. Sandberg bluegrass, needle-and-thread, Indian ricegrass, alkali sacaton, blue grama, western wheatgrass, and cheatgrass were observed. The flat in the northeast corner is predominately cheatgrass and Sandberg bluegrass (Demer #1). Ridges interspersed throughout the allotment had sagebrush and needle-and-thread communities (Demer #2). Average leaf length for Sandberg bluegrass was 5”, needle-and-thread 14”, and Indian ricegrass 9”.

2006

An allotment inspection was completed on June 20, 2006 in the West Pasture. Most reservoirs observed were dry. It was observed the pasture was dominated by cheatgrass and mustard with poor production noted on perennial grasses. The east half of the pasture received light use while the west half of the allotment received heavy use, with blue grama grazed to 1/2”. Average heights of plants in the east half of the pasture were Sandberg bluegrass 2-4”, bluebunch wheatgrass 6-8”, bottlebrush squirreltail 4-6”, needle-and-thread 6-8”, and Indian ricegrass 6-10”. The cheatgrass dominated flat located in the northeast part of the allotment had no use.

2007

An allotment inspection and height/weight utilization study was completed on June 22, 2007 in the East Pasture. Soil surface was dry and crusted. Bare ground was estimated at >50% on loamy range sites. Needle-and-thread, bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, Sandberg bluegrass, prairie Junegrass, cheatgrass, sagebrush, cactus, and phlox were noted. Cheatgrass is a major vegetative component within this community on the flats and within the draws. Sagebrush and perennial grasses are found on the slopes and ridges away from water sources, but perennial grasses were not abundant. Utilization on needle-and-thread was 23%.

2008

An allotment inspection was completed on April 18, 2008 in the West Pasture. Cattle were well distributed throughout the pasture. Reservoirs were full and holding water. Soil surface was dry with no signs of recent precipitation; soil moisture was detected in an open area at 3” depth. Last year’s residue had been grazed where available. Average leaf lengths were measured on Sandberg bluegrass 2”, needle-and-thread 4”, Indian ricegrass 6”, and western wheatgrass 4”. Blue grama was dormant. Some microbiotic crusts were observed. Sage grouse sign consistently observed in Sec. 12.

A height/weight utilization study was completed on May 29, 2008. Utilization on needle-and-thread was 14%.

2009

An allotment inspection was completed on April 7, 2009 in the West Pasture. This pasture was the rest pasture this year. Sandberg bluegrass and cheatgrass were greening up. Other perennial grasses, such as needle-and-thread were just beginning to green up. Larkspur was also present. Soil surface was moist with recent signs of precipitation (puddles in road). Ten cattle were observed in this pasture but the permittee was out checking gates and moved the cattle into the East Pasture while BLM employees were there. Reservoirs observed from the road were holding water. No pictures were taken.

An allotment inspection and height/weight utilization study was completed on June 23, 2009 in the East Pasture. Soil surface was dry. Cheatgrass was cured out. Cattle use is evident throughout the entire pasture as evidenced by tracks and manure and use seems to be consistent throughout. Sagebrush, Sandberg bluegrass, bottlebrush squirreltail, blue grama, cactus, western wheatgrass, needle-and-thread, bluebunch wheatgrass, and prairie Junegrass were observed in the pasture. Utilization on Sandberg bluegrass was 14% and utilization on needle-and-thread was 22%.

2010

An allotment inspection was completed on April 15, 2010 in the West Pasture. The majority of the cattle were located in the east half of the West Pasture. Needle-and-thread, bottlebrush squirreltail, and Sandberg bluegrass were greening up. Phox was in bloom. Grazing use was noted on Sandberg bluegrass. Reservoirs observed all held water. The NW 3x3 trend plot #1 that was established in 1969 was located in the West Pasture.

An allotment inspection and height/weight utilization study was completed on June 18, 2010 in the West Pasture. Utilization was done in the vicinity of the 1969 NW 3x3 trend plot location. Cattle were again located in the east half of the west allotment. All reservoirs observed were full. Soil surface was moist with puddles in the road. Cheatgrass was not yet cured out. Areas along the main road are dominated by cheatgrass but approximately .1 to .2 miles north of the road sagebrush and several species of native perennials begin appearing including bottlebrush squirreltail, needle-and-thread, bluebunch wheatgrass, blue grama, Sandberg bluegrass, western wheatgrass, scarlet globemallow, larkspur, asters, seago lily, Indian paintbrush, clover, and rabbitbrush. Utilization on needle-and-thread was 19%.

Rangeland Health Assessment and Cover Transect

Rangeland Health Assessments was completed for the public land portion of the allotment on July 14 and 21, 2010 using the “*Interpreting Indicators of Rangeland Health*”, Technical Reference 1734-6, Version 4. A total of five cover transects were completed within the allotment. Two in the West Pasture, two in the East Pasture, and one in the Demer Exclosure, which is located in the West Pasture. The Demer Exclosure was constructed in 1958 and encompasses over 7 acres. These sites were selected because they are accessible to and used by cattle while in the pasture, except the exclosure which was chosen for comparison purposes. Transects 1, 2, 4, and 5 were completed on Loamy 5 to 9 inch range sites (LY 5-9) and Transect 3 was completed on a Saline Upland 5 to 9 inch range site (SU 5-9). See Map 5.

The tables displayed on this and the following pages show the individual ratings for each transect/assessment area. Transect #2 is located in the same area as the 1969 NW 3x3 trend plot as well as Sagebrush Transect #1 that was done as part of the Sage-grouse Habitat Assessment. And Transect #4 is located in the same area as Sagebrush Transect #4 that was done as part of the Sage-grouse Habitat Assessment. The table below (Table 2) summarizes the attribute rating for soil and site stability, hydrologic function, and biotic integrity for each transect.

Table 2. Summary of Attribute Ratings

	Transect 1 West Pasture	Transect 2 West Pasture	Transect 3 East Pasture	Transect 4 East Pasture	Demer Exclosure West Pasture
Soil Site and Stability	<i>Moderate</i>	<i>Moderate</i>	<i>Slight to Moderate</i>	<i>Slight to Moderate</i>	<i>Slight to Moderate</i>
Hydrologic Function	<i>Moderate</i>	<i>Moderate</i>	<i>Slight to Moderate</i>	<i>Slight to Moderate</i>	<i>Slight to Moderate</i>
Biotic Integrity	<i>Slight to Moderate</i>	<i>Slight to Moderate</i>	<i>Extreme to Total</i>	<i>Moderate</i>	<i>Slight to Moderate</i>

Table 3. Transect #1 - West Pasture (LY 5-9) - Rangeland Health Summary

Indicator	Departure from Reference Sheet
1. Rills	<i>Slight to Moderate – observed on weakly vegetated slopes >10%. More common on bare areas (5% slope)</i>
2. Water Flow Patterns	<i>Moderate to Extreme – 10-15 feet, mostly connected</i>
3. Pedestals and/or Terracettes	<i>Moderate- sage pedestals 4-6 inch, terracettes not common, (fsl-cfsl soil surface) (5% slope)</i>
4. Bare Ground <u>41</u> %	<i>Moderate-large bare areas 1-3 meter; connected by water flow patterns. (Ref. 25-35%)</i>
5. Gullies	<i>Slight to Moderate – few observed-restricted to rock outcrops slopes >10%</i>
6. Wind- Scoured, Blowouts, and /or Deposition Areas	<i>Slight to Moderate – wind scar associated with ant hills, could be some wind loss in bare areas.</i>
7. Litter Movement	<i>Slight to Moderate – none observed, 1-2' movement on 5% slopes</i>
8. Soil Surface Resistance to Erosion - 4.7 (9% cryptos)	<i>Slight to Moderate (Ref. 5 or >)-soil further stabilized by cryptos</i>
9. Soil Surface Loss or Degradation	<i>Moderate – “A” horizon only 1” thick</i>
10. Plant Community Composition and Distribution Relative to Infiltration	<i>Moderate to Extreme – Vegetation not adequate to reduce runoff and allow for infiltration</i>
11. Compaction Layer	<i>None to Slight-verified with soil pit – none observed</i>
12. Functional/Structural Groups 31% Veg Cover	<i>Moderate – Artr dominates site; little BRTE @ 4%; lack of perennials.</i>
13. Plant Mortality/Decadence	<i>None to Slight-dead sage w/in reason for decadent site ; sage lacks vigor</i>
14. Litter Amount <u>19%</u>	<i>Slight to Moderate (Ref. 20-30%)- low litter cover</i>
15. Annual Production	<i>None to Slight – within site potential</i>
16. Invasive Plants (4% BRTE)	<i>Slight to Moderate – clumps of Brte though few hits on transect.</i>
17. Reproductive Capability of Perennial Plants	<i>None to Slight – all species producing seedheads</i>

A cover transect was completed and litter cover was determined to be 19%, bare ground was 41%, rock and cryptogamic crust was 9%, and vegetative cover was 31% of which 22% was sagebrush. Vegetation observed along the transect included sagebrush, cheatgrass, bluebunch wheatgrass, bottlebrush squirreltail, Sandberg bluegrass, aster spp., cactus, lichens, pepperweed, and broom snakeweed.

Table 4. Transect #2 - West Pasture (LY 5-9) - Rangeland Health Summary

Indicator	Departure from Reference Sheet
1. Rills	<i>Slight to Moderate- few observed; healing</i>
2. Water Flow Patterns	<i>Moderate to Extreme –10-12’; connected 4% slope</i>
3. Pedestals and/or Terracettes	<i>Moderate –pedestals 4-6”, terracettes & debris dams in water flow patterns</i>
4. Bare Ground <u>48</u> %	<i>Moderate-average 4’diameter; not often connected (Ref. 25-35%)</i>
5. Gullies	<i>None to Slight – none observed</i>
6. Wind- Scoured, Blowouts, and /or Deposition Areas	<i>Slight to Moderate – associated with ant hills</i>
7. Litter Movement	<i>Moderate-Artr twigs and fine grasses in water flow patterns</i>
8. Soil Surface Resistance to Erosion – 5.4 Cryptos 8%	<i>None to Slight - Soil stabilizing (Ref. 5 or >)- soil stabilizing</i>
9. Soil Surface Loss or Degradation	<i>Slight to Moderate-though soil pit has 4” A horizon-water flow patterns reflect soil loss</i>
10.Plant Community Composition and Distribution Relative to Infiltration	<i>Slight to Moderate-ARTR dominated site, p grasses species present; little Brte</i>
11. Compaction Layer	<i>None to Slight – none observed</i>
12. Functional/Structural Groups BRTE 1%	<i>Slight to Moderate – ARTR reducing infiltration; low % p grasses</i>
13. Plant Mortality/Decadence	<i>None to Slight</i>
14. Litter Amount 26%	<i>None to Slight (Ref. 20-30%)</i>
15. Annual Production	<i>None To Slight</i>
16. Invasive Plants 1% BRTE	<i>Moderate – despite low % BRTE on transect - scattered thru site</i>
17. Reproductive Capability of Perennial Plants	<i>Slight to Moderate</i>

A cover transect was completed and litter cover was determined to be 26%, bare ground was 48%, cryptogamic crust was 8%, and vegetative cover was 18% of which 14% was sagebrush. Vegetation observed along the transect included sagebrush, needle-and-thread, cheatgrass, blue grama, bottlebrush squirreltail, Sandberg bluegrass, western wheatgrass, and cactus.

A sagebrush canopy cover transect was also completed on a loamy 5-9 inch pz. range site in the same area as the rangeland health assessment area. The canopy cover of live sagebrush was determined to be 15% with an average height of 13 inches. Age classes of the sagebrush along the transect was determined to be 57% mature, 33% decadent, 9% dead, and 1% young.

Table 5. Transect #3 - East Pasture (SU 5-9) - Rangeland Health Summary

Indicator	Departure from Reference Sheet
1. Rills	<i>None To Slight-slope to low @ 1%</i>
2. Water Flow Patterns	<i>None to Slight-low slope, BRTE cover</i>
3. Pedestals and/or Terracettes	<i>Slight to Moderate-pedestals 1-2" @ Blue grama</i>
4. Bare Ground <u> 14 </u> %	<i>None to Slight (Ref. 30-40%)-BRTE cover dominates</i>
5. Gullies	<i>None to Slight – drainage stable due to BRTE</i>
6. Wind- Scoured, Blowouts, and /or Deposition Areas	<i>None to Slight – None – BRTE protecting</i>
7. Litter Movement	<i>None to Slight-slope too low @ 1%</i>
8. Soil Surface Resistance to Erosion – 3.2	<i>Slight to Moderate (Ref. 4 or >)- 3.2 ←low, no cryptos – BRTE protecting soil</i>
9. Soil Surface Loss or Degradation	<i>None to Slight – 5" horizon</i>
10. Plant Community Composition and Distribution Relative to Infiltration	<i>Slight to Moderate-BRTE reducing infiltration; no runoff indicators</i>
11. Compaction Layer	<i>None to Slight-none observed</i>
12. Functional/Structural Groups	<i>Extreme to Total – BRTE dominant; trace blue gramma, cactus</i>
13. Plant Mortality/Decadence	<i>None to Slight-Though few in number, Native species are healthy</i>
14. Litter Amount 42%	<i>Moderate (Ref. 10-15%) –site guide - rate down if ↑ litter due to exotics.</i>
15. Annual Production	<i>None to Slight-still BRTE; BRTE accounts for most of production.</i>
16. Invasive Plants	<i>Extreme to Total – BRTE dominates</i>
17. Reproductive Capability of Perennial Plants	<i>Extreme to Total – BRTE dominates; few native spp. to reproduce</i>

A cover transect was completed and litter cover was determined to be 42%, bare ground was 14%, rock and vegetative cover was 44%. Vegetation observed along the transect included cheatgrass, blue grama, mustards, and cactus.

Table 6. Transect #4 - East Pasture (LY 5-9) - Rangeland Health Summary

Indicator	Departure from Reference Sheet
1. Rills	<i>None to Slight - none</i>
2. Water Flow Patterns 7% slope	<i>Moderate- 6-10' long, connected, some areas of sheet flow</i>
3. Pedestals and/or Terracettes	<i>Moderate – ARTR not very pedestalled; pedestals limited to herbaceous species indicating water flow</i>
4. Bare Ground <u>35</u> %	<i>Moderate – upper end of site guide; large and connected (Ref. 25-35%)</i>
5. Gullies	<i>None to Slight – none observed</i>
6. Wind- Scoured, Blowouts, and /or Deposition Areas	<i>Slight to Moderate – similar to enclosure</i>
7. Litter Movement	<i>Slight to Moderate – observed in water flow patterns</i>
8. Soil Surface Resistance to Erosion – 4.4	<i>Slight to Moderate (Ref. 5 or >) – only 2% cryptos</i>
9. Soil Surface Loss or Degradation	<i>None to Slight – 5" A horizon; could be deposition on leeward side of hill</i>
10. Plant Community Composition and Distribution Relative to Infiltration	<i>Slight to Moderate – too low p grasses; large bare areas</i>
11. Compaction Layer	<i>None to Slight - none</i>
12. Functional/Structural Groups	<i>Moderate- sage dominant; slightly ↑ BRTE – sub-dominant; p grasses low but present – minor component</i>
13. Plant Mortality/Decadence	<i>None to Slight -none</i>
14. Litter Amount 18%	<i>Slight to Moderate (Ref. 20-30%) – low amount litter</i>
15. Annual Production	<i>None to Slight - none</i>
16. Invasive Plants*	<i>Moderate to Extreme-cheatgrass common throughout site</i>
17. Reproductive Capability of Perennial Plants	<i>None to Slight - production</i>

*This indicator was discussed and changed from moderate (scattered throughout site) to moderate-extreme (common throughout site) during the field tour on September 21, 2010.

A cover transect was completed and litter cover was determined to be 18%, bare ground was 35%, cryptogamic crust was 2%, and vegetative cover was 44% of which 8% was cheatgrass. Vegetation observed along the transect included sagebrush, needle-and-thread, Indian ricegrass, bluebunch wheatgrass, western wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, cheatgrass, blue grama, cactus, and pepperweed.

A sagebrush canopy cover transect was also completed on a loamy 5-9 inch pz. range site in the same area as the rangeland health assessment area. The canopy cover of live sagebrush was determined to be 22% with an average height of 16 inches. Age classes of the sagebrush along the transect was determined to be 66% mature, 16% decadent, 12% dead, and 6% young.

Table 7. Transect #5 – Demer Exclosure (LY 5-9) - Rangeland Health Summary

Indicator	Departure from Reference Sheet
1. Rills	<i>Slight to Moderate – associated with wind scour and ant hills</i>
2. Water Flow Patterns	<i>Moderate – most are 3-5 ft with a few up to 10ft. Often connected</i>
3. Pedestals and/or Terracettes	<i>Slight to Moderate – Blue grama 1-2””; ARTR 2-3””; Associated with flow patterns</i>
4. Bare Ground <u> 39 </u> %	<i>Slight to Moderate (Ref. 25-35%); many have seedlings</i>
5. Gullies	<i>None to Slight – none observed</i>
6. Wind- Scoured, Blowouts, and /or Deposition Areas	<i>None to Slight – a few observed about 10’ in diameter</i>
7. Litter Movement	<i>Slight to Moderate – observed in water flow patterns; twigs up to 1/8 “ diameter</i>
8. Soil Surface Resistance to Erosion – 4.6 7% cryptos	<i>Slight to Moderate (Ref. 5 or >) – 7% cryptos; 61% cover</i>
9. Soil Surface Loss or Degradation	<i>None to Slight – 4” A horizon</i>
10. Plant Community Composition and Distribution Relative to Infiltration	<i>Slight to Moderate – plant community is stable and aiding infiltration and reducing runoff; cryptos further add stability</i>
11. Compaction Layer	<i>None to Slight – none observed in pit</i>
12. Functional/Structural Groups	<i>Slight to Moderate – dominated by ARTR(25%) 6% grasses</i>
13. Plant Mortality/Decadence	<i>None to Slight</i>
14. Litter Amount 21%	<i>None to Slight (Ref. 20-30%)</i>
15. Annual Production	<i>Slight to Moderate – herbaceous production low</i>
16. Invasive Plants BRTE 1%	<i>Moderate – BRTE scattered thru-out site</i>
17. Reproductive Capability of Perennial Plants	<i>None to Slight</i>

A cover transect was completed and litter cover was determined to be 21%, bare ground was 39%, cryptogamic crust was 7%, and vegetative cover was 33%. Vegetation observed along the transect included sagebrush, needle-and-thread, western wheatgrass, Sandberg bluegrass, cheatgrass, blue grama, cactus, phlox, larkspur, and pepperweed.

3.2 Hydrology

There were five upland range transects that were collected in the allotment for this assessment. The hydrologic upland indicators were analyzed to give evidence of the rangeland health conditions and to determine if they are providing for the proper cover, moisture storage, infiltration, and producing minimal runoff during and after storm events in the allotment. The sites selected in the pastures were chosen based on soil type, range use, along with the appropriate ecological site guide using the “*Interpreting Indicators of Rangeland Health*”, Technical Reference 1734-6, Version 4. The sites were also selected to determine the potential and variance from the potential of the natural ecological state of the rangeland. The hydrologic indicators evaluated are rills, water-flow patterns, pedestals and or terracettes, bare ground percentage, gullies, soil surface resistance to erosion, soil surface loss or degradation, plant community and distribution relative to infiltration, compaction layer and litter amount. The results for each indicator at each evaluation location are given in the tables above in section 3.1.

The hydrologic indicators were rated to have a moderate departure at transects 1 and 2 and a slight to moderate departure at transects 3, 4, and the inside the exclosure. There was evidence of water movement and rather lengthy water flow patterns at the sites where less invasive species were present. The amounts of bare ground also varied from very low at 14

percent site 3 where cheatgrass was abundant to 48 percent at transect 2 in the west pasture. There were also extensive water flow patterns observed at all of the evaluation locations except for transect 3 where there was extensive cheatgrass cover and a very low degree of slope. There is evidence of large amounts of surface runoff from the high amounts of bare ground and other water flow patterns. Rills are common along hills slopes and are a natural feature of this highly erosive landscape. The presence of the enclosure also provided a historical element of past erosion and any changes to the landscape that may have occurred with the exclusion of grazing. The transect inside the enclosure did have slightly improved hydrological indicators with a slight reduction in bare ground 39 percent compared to 48 percent bare ground on the adjacent location at transect 2. The location inside the enclosure was rated overall as a slight-moderate departure from the reference state. The plant community and erosion indicators indicate historic grazing impacts have been apparent in the allotment. Significant reductions and other changes to grazing as outlined in section 3.1 have caused slight improvement, however the complete recovery will take a significant amount of time to improve the current hydrologic conditions.

There are no perennial or other surface water gauging stations located in the allotment. The nearest USGS gauging station ([USGS Site 06267400](#)) is located at latitude 43°54'55", longitude 107°55'46" this station provides average and peak flow records along with water quality samples from 1971 through 1991 when the station was discontinued due to lack of funding. For access to the complete data click on the link above.

There are fifteen small reservoirs that are located in the allotment, these reservoirs are mostly over 30 years old and have been monitored periodically for water holding capacity and function. All of the reservoirs generally have turbid to very turbid water with high amounts of suspended sediment. A few of the reservoirs have some random Cottonwood trees that have become established around their perimeters. The useful lifespan of the reservoirs in this area is shortened by high amounts of incoming sediments that reduces the available storage area for useful water.

There is no groundwater wells found in the allotment. The allotment is located over the lower Tertiary Willwood and Fort Union formations. This is generally not a primary aquifer but does contain some intermittent sandstone layers where water has been encountered at relatively shallow depths of 300 feet or less at other well sites in the basin.

The drainages are classified by the WYDEQ as class 3B streams by default.

3.3 Soil and Site Stability

As part of this investigation, five (5) rangeland health determinations were conducted on July 14 and 21, 2010 encompassing both the West and East Pastures and the Demer Enclosure which has been excluded from livestock grazing since 1958. Standard 1 for Healthy Rangelands was evaluated based on the attribute ratings for *Soil and Site Stability* and *Hydrologic Function* using rangeland health indicators 1 through 11 and 14. Field observations were compared to the Reference Sheet for the Loamy 5-9" pz. (R032XY122WY) ecological site dated 5/2/2008 and the Saline Upland 5-9" pz. (R032XY144WY) ecological site dated 5/2/2008 to determine departures from normal.

Monitoring Site 1

Rills are present in bare areas and in areas of reduced cover once slope approaches 10 percent or more. Waterflow patterns are 10 to 15 feet long and are often connected. Four to six inch pedestals are common at the base of sagebrush. No terracettes were observed. Transect data determined bare ground to be 41 percent. Bare areas are large often 10 feet in diameter. The amount of bare ground exceeds that described in the reference sheet (Loamy 5-9" pz.) which sites 35 percent as the upper limit for bare ground; the reference sheet qualifies bare areas as "occurring in small areas throughout site". Litter cover was determined to be 19 percent; the reference sheet describes litter cover as being between 20 and 30 percent. Few gullies were observed; where present they have formed below rock outcrop areas where runoff has been concentrated. These gullies are stable and no active nick points or headcuts were observed. A few wind-scour areas were observed usually in association with ant hills. There could be some wind erosion on the larger bare areas. No significant litter movement was observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 4.7; this is a slight departure from the reference sheet which sets the SSI at 5. Soil stability is being enhanced by the presence of the soil biological crusts which comprise 9 percent of the surface cover. All indications are that the soil and site stability are still significantly compromised, exposing the soil to the forces of rain drop impact and overland flow. The A horizon is only 1 inch deep, indicating that there has been some historic soil loss. Perennial grasses are less than described in the Ecological Site Description (ESD); this combined with bare ground indicates that runoff is greater than expected with a corresponding reduction in infiltration. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic-Function* were rated as “Moderate”.

The soils at this location will not pass Standard #1 due to the presence of erosion indicators (most notably, waterflow patterns, pedestals, terracettes, litter movement and wind-scouring) combined with higher than expected bare ground, the historic loss of the A horizon and the lack of perennial grasses and sagebrush dominated plant community. Nonetheless, the site is decidedly in an upward trend when compared against the photos from August of 1969 and trend data from the same period. Current grazing management is not a contributing factor.

Monitoring Site 2

This assessment was conducted at the same location as photos taken in August 1969. A few rills were observed; all were had muted features and were healing. On slopes in excess of 4 percent waterflow patterns are 10 to 12 feet long and are often connected. Four to six inch pedestals are common. Terracettes are occasionally present in association with flow patterns. Transect data determined bare ground to be 48 percent. Bare areas are not overly large with most being less than 4 feet in diameter. The amount of bare ground exceeds that described in the reference sheet (Loamy 5-9” pz.) which sites 35 percent as the upper limit for bare ground; the reference sheet qualifies bare areas as “occurring in small areas throughout site”. Litter cover was determined to be 26 percent; the reference sheet describes litter cover as being between 20 and 30 percent. No gullies were observed. A few wind-scour areas were observed in association with ant hills. Significant litter movement was observed; debris dams consisting of twigs and grasses are present in water flow patterns. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 5.4 which is consistent with that described in the reference sheet. The stability is further enhanced by the presence of the soil biological crusts which comprise 8 percent of the surface cover. All indications are that the soil and site stability are still compromised, exposing the soil to the forces of rain drop impact and overland flow. The A horizon at this location is 4 inches deep. Perennial grasses are less than described in the ESD; this combined with bare ground indicates that runoff is greater than expected with a corresponding reduction in infiltration. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic-Function* were rated as “Moderate”.

The soils at this location will not pass Standard #1 due to the presence of erosion indicators (most notably, waterflow patterns, pedestals, terracettes, litter movement and wind-scouring) combined with higher than expected bare ground, and the lack of perennial grasses and sagebrush dominated plant community. Nonetheless, the site is decidedly in an upward trend when compared against the photos from August of 1969 and data from the same period. Current grazing management is not a contributing factor.

Monitoring Site 3

Rills were not observed. Waterflow patterns are being muted by cheatgrass and are not readily observable. Pedestals at the base of blue gramma are 1 to 2 inches. Transect data determined bare ground to be 14 percent and litter cover to be 42 percent. No terracettes were observed. According to the reference sheet (Saline Upland 5-9” pz.), bare ground should be between 30 and 40 percent and litter cover ranges between 10 to 15 percent. This departure is due in large part to the amount of cheatgrass on the site. No gullies were observed and all drainages are stable, again due in large part to the amount of cheatgrass. No wind-scour areas or blowout areas were observed. No litter movement was observed as would be expected on a nearly level slope. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 3 and there are no biological soil crusts. The reference sheet indicates that the SSI should be 4 or greater. Nonetheless, due to the cheatgrass, the site is stable and the soil surface is protected from the forces of rain drop impact and overland flow. The A horizon at this location is 5 inches deep, attesting to the stability of this site. The near cheatgrass monoculture (broken only by occasional blue gramma) is protecting the soil from runoff but is limiting the amount of infiltration. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic-Function* were rated as “Slight to Moderate”.

Monitoring Site 4

Rills and terracettes were not observed. Waterflow patterns are 6 to 8 feet in length and are often connected. In addition to the water flow patterns, evidence of sheet flow observed. Pestalling is limited to herbaceous species; little was observed at the base of sagebrush. Transect data determined bare ground to be 35 percent and litter cover to be 18 percent.

Bare ground is at the upper end of that described in the reference sheet (Loamy 5-9" pz.) while litter is at the lower end. No gullies were observed and all drainages are stable. There are a few wind-scour areas or blowout areas. Litter movement is observable in the water flow patterns. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 4.4; this is a slight departure from the reference sheet which sets the SSI at 5. Biological soil crusts account for only 2 percent of the cover. The soil and site stability are somewhat compromised exposing the soil to the forces of rain drop impact and overland flow. Perennial grasses are less than described in the ESD; this combined with bare ground indicates that runoff is greater than expected with a corresponding reduction in infiltration. The A horizon at this location is 5 inches deep. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic-Function* were rated as "Slight to Moderate".

Monitoring Site 5

Rills and terracettes were observed only in wind-scour areas and in the vicinity of ant hills. Waterflow patterns are generally 3 to 5 feet in length with a few extending to 10 feet; they are often connected. Blue gramma is sitting on 1 to 2 inch pedestals while the sagebrush is sitting on 2 to 3 inch pedestals; these are generally associated with flow patterns. Transect data determined bare ground to be 39 percent and litter cover to be 21 percent. Bare ground slightly exceeds that described in the reference sheet (Loamy 5-9" pz.) while litter is at the lower end. No gullies were observed. Wind-scour areas or blowout areas are few in number and where they exist they are less than 10 inches in diameter. Litter movement, including $\frac{1}{8}$ inch twigs, is observable in the water flow patterns. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 4.4; this is a slight departure from the reference sheet which sets the SSI at 5. Biological soil crusts were greater than outside the enclosure accounting for 7 percent of the cover. The soil and site stability are only slightly compromised offering reasonable protection from the forces of rain drop impact and overland flow. Sagebrush is greater than that described in the ESD and the perennial grasses are less; this combined with bare ground indicates that runoff could be greater than expected with a corresponding reduction in infiltration. The A horizon at this location is 5 inches deep. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic-Function* were rated as "Slight to Moderate".

4.0 Conclusions

This section draws conclusions and makes determinations regarding:

- A. Progress towards or attainment of the standards for rangeland health, and
- B. Whether livestock management is in conformance with the guidelines, and
- C. Whether existing grazing management or levels of grazing use are significant factors in failing to achieve the standards or conform to the guidelines.

4.1 Standard 1

*Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff. **NOT MET BUT MAKING SIGNIFICANT PROGRESS TOWARDS MEETING STANDARD***

Rationale: The attribute ratings for *Soil and Site Stability* and *Hydrologic Function* were rated as “Moderate” for the assessments conducted in the West Pasture. The enclosure also located in the West Pasture was rated as “Slight to Moderate”. The East Pasture, where cheatgrass dominates the herbaceous plant community, an attribute rating of “Slight to Moderate” was assigned to *Soil and Site Stability* and *Hydrologic Function*. Throughout the allotment the soil surface is susceptible to slaking or dispersing in water. In the West Pasture, vegetative and litter cover are not adequate to protect the soil from rain drop impact and the erosive forces of overland flow, as evidenced by the presence of erosion indicators (waterflow patterns, pedestals, terracettes, litter movement and wind-scouring). In the enclosure (Evaluation Area 5), these same erosion indicators were observed but not to the same extent as what were observed outside the enclosure. The erosion indicators were not as well defined in the East Pasture due in large part to the cheatgrass that dominates the herbaceous part of the plant community. Historic soil loss as evidenced by a shallow A horizon was only documented at Transect #1, which occurred on a slope. Soil compaction was not observed.

The soils at this location will not pass Standard #1 due to the presence of erosion indicators (most notably, waterflow patterns, pedestals, terracettes, litter movement and wind-scouring) combined with higher than expected bare ground, and the low abundance of perennial grasses and sagebrush dominated plant community. Current grazing management is not a contributing factor. And the site is decidedly in an upward trend when compared against the photos from August of 1969 and data from the same period.

4.1.1 Factors relating to non-conformance with Standard

Factors are soil surface indicators of erosion including water flow patterns, pedestals and terracettes, litter movement and wind scouring from historic grazing practices. Current grazing management practices are not a contributing factor and the site is in an upward trend when compared to historic photos from 1969.

4.1.2 Selected Guidelines to implement change in grazing use (if applicable)

1. Timing, duration, and levels of authorized grazing will ensure that adequate amounts of vegetative ground cover, including standing plant material and litter, remain after authorized use to support infiltration, maintain soil moisture, stabilize soils, allow the release of sufficient water to maintain system function, and to maintain subsurface soil conditions that support permeability rates and other processes appropriate to the site.
2. Grazing management practices on uplands will maintain desired plant communities or facilitate change toward desired plant communities.

4.1.3 Identification of specific actions including permit/lease terms and conditions

This allotment was rated for Rangeland Health Standards in 2000 and failed. As a result the permit was changed from sheep to cattle, the season of use was changed from October 15 - January 2 and April 15 - May 15 to April 1 - June 14, a two pasture rest rotation grazing system was implemented, and the active public AUMs were reduced from 658 to 234. In 2005 the season of use was further changed to March 1 - June 14 and utilization levels were limited to fifty percent of the current year’s growth on key forage species. No additional grazing management changes are proposed as the allotment is in an upward trend.

4.2 Standard 2

Riparian and wetland vegetation has structural, age and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide ground water recharge. NOT APPLICABLE

Rationale: There are no inventoried or other riparian areas that are found in the allotment. There is no evidence of historic riparian areas or likely potential to develop natural riparian areas in the allotment. Due to the desert environment with low precipitation rates, no perennial water sources, and lack of any major drainage in the allotment there is likely no potential for natural riparian areas to occur. There are a few scattered Cottonwood trees along a few of the reservoirs; however these areas are not currently being managed for riparian characteristics.

4.3 Standard 3

Upland vegetation on ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance. NOT MET BUT MAKING SIGNIFICANT PROGRESS TOWARDS MEETING STANDARD

Rationale: The attribute ratings for the Biotic Integrity for the two assessment areas outside the Demer Enclosure in the West Pasture were rated as “Slight to Moderate”. This determination was made using rangeland health indicators 8, 9, and 11 through 17. The attribute ratings for the Biotic Integrity for the two assessment areas in the East Pasture were rated as “Extreme to Total” for the saline upland range site and “Moderate” for the loamy range site. This determination was made using the rangeland health indicators 8, 9, and 11 through 17. The attribute rating for the Biotic Integrity for the Demer Enclosure in the West Pasture was rated as “Slight to Moderate”. This determination was made using rangeland health indicators 8, 9, and 11 through 17.

The ecological site description developed by the Natural Resources Conservation Service describes the Historic Climax Plant community as a Bluebunch Wheatgrass/Rhizomatous Wheatgrasses/Needleandthread Plant Community. This community evolved with grazing by large herbivores and periodic fires. Potential vegetation is 75% grasses, 10% forbs, and 15% woody plants. The major grasses include bluebunch wheatgrass, western wheatgrass, needleandthread, and bottlebrush squirreltail. A variety of forbs and half shrubs occur and big sagebrush is conspicuous and makes up 5 to 15% of the annual production. This plant community is extremely stable and well adapted to the Northern Intermountain Desertic Basins climate conditions.

As this site deteriorates species such as blue grama, Sandberg bluegrass, and big sagebrush will increase. Plains prickly pear and weedy annuals will invade. Cool season-grasses such as, bluebunch wheatgrass, rhizomatous wheatgrasses, needleand thread, and Indian ricegrass will decrease in frequency and production.

Due to the amount and pattern of precipitation, the big sagebrush component may not be resilient once it has been removed or severely reduced if a vigorous stand of grass exists and is maintained. On these areas, blue grama may become dominant if the area is subjected to a combination of frequent and severe grazing, especially yearlong grazing. As a result, a dense sod cover of blue grama will become established.

In 1969 the ecological site description that best described the native plant community would be the Blue Grama Sod Community due to the frequent and severe almost yearlong grazing by sheep. When compared to the Historic Climax Plant Community, blue grama, threadleaf sedge, and pricklypear cactus have increased. Cool season mid-grasses, forbs, and most shrubs have been greatly reduced. Production has been significantly reduced. This sod is extremely resistant to change and water infiltration. While the sod protects the site itself, off-site areas are affected by excessive runoff that can cause rills and gully erosion. Water flow patterns are obvious in the bare ground areas and pedestalling is apparent along the sod edges. The site guide states a suggested stocking rate for cattle under continuous season-long grazing under normal growing conditions as 20 acres/AUM. In 1969 the stocking rate was 5 acres/AUM with sheep and the overall forage condition was rated poor.

The present ecological site description that best describes the plant community is the Perennial Grass/Big Sagebrush, although this transition is on the borderline between the Blue Grama Sod and Perennial Grass/Big Sagebrush communities. When compared to the Historic Climax Plant Community, big sagebrush and blue

grama have increased. Blue grama may also be contributing to the water flow patterns and erosion indicators on the loamy range sites seen during the assessments. Pricklypear cactus will also have increased, but only occurs in small patches. Indian ricegrass and bluebunch wheatgrass have decreased and may occur in only trace amounts under the sagebrush canopy or within the patches of pricklypear cactus. Although the description does not mention bottlebrush squirreltail, it was present and abundant within the sagebrush understory in June of 2010. Forbs that were observed in June of 2010 within the sagebrush understory included scarlet globemallow, larkspur, phlox, daisy, seago lily, Indian paintbrush, penstemon, and clover. Rabbitbrush was present but not abundant. The site guide states a suggested stocking rate for cattle under continuous season-long grazing under normal growing conditions as 6.25 acres/AUM. The present stocking rate for this allotment under a rest rotation grazing cycle during the spring and summer is 11 or 17 acres/AUM depending on which pasture is being used.

The West Pasture rated “Slight to Moderate” and the East Pasture “Moderate” for the biotic indicators on loamy range sites due to the difference in the amount of cheatgrass in the understory. Cheatgrass and blue grama were present and documented in the 1984 vegetation inventory on the same soil map units (23) and range sites (Loamy) as the assessments were done. Cheatgrass on these sites ranged from 10 percent to 28 percent of the composition and blue grama ranged from 2 percent to 15 percent of the composition. In the West Pasture even though cheatgrass is scattered throughout the site and occurs in the understory of the sagebrush/grass areas in the pasture the number of functional/structural groups were slightly reduced – cool season bunchgrasses that are expected for the site are present although in some areas are lacking in abundance and the relative dominance of functional/structural groups has been modified from that expected with sagebrush being higher than expected. In the East Pasture cheatgrass is common throughout the site within the sagebrush/grass areas in pasture and the number of functional/structural groups has been moderately reduced – low abundance of perennial grasses and sagebrush more dominant than expected but a more subdominant functional/structural group has been replaced by one not expected for the site – cheatgrass. Cool season bunchgrasses in the allotment were stressed by extreme drought conditions from 2000 to 2004 and moderate drought conditions until around 2008 have been in recent years able to express themselves and become more visible in the landscape with adequate growing season moisture and temperatures. Current grazing management is not a contributing factor and these sites are in an upward trend in comparison to historic photos and data from 1969 and are making significant progress towards meeting this standard.

Areas in the allotment that are totally dominated by cheatgrass, as evidenced by Transect #3, were rated as “Extreme to Total” for biotic indicators. These include the area next to the main road and around the corrals in the West Pasture and the northeast part of the East Pasture where Transect #3 is located and where the topography is relatively flat and includes both saline upland and loamy range sites. The relative dominance and number of species within the functional/structural groups have been dramatically altered by historical grazing and recent drought with the dominant species now being cheatgrass. Although cheatgrass allows the site to meet the soil and site stability and hydrologic function criteria by producing copious amounts of litter, it does not allow the site to meet the biotic integrity criteria due to the dominance of one structural group, cheatgrass, which is also a nonnative invasive. There are 192 acres of mapped cheatgrass dominated rangeland within the allotment at this time although it is obvious more acreage is affected. Any acreage within the allotment dominated by cheatgrass does not meet this standard at this time.

4.1.1 Factors relating to non-conformance with Standard

Factors are low abundance of perennial grasses and sagebrush more dominant than expected for the site and a more subdominant functional/structural group has been replaced by one not expected for the site – cheatgrass. However current grazing management is not a contributing factor and these sites are in an upward trend in comparison to historic photos and data from 1969.

4.1.2 Selected Guidelines to implement change in grazing use (if applicable)

1. Timing, duration, and levels of authorized grazing will ensure that adequate amounts of vegetative ground cover, including standing plant material and litter, remain after authorized use to support infiltration, maintain soil moisture, stabilize soils, allow the release of sufficient water to maintain system function, and to maintain subsurface soil conditions that support permeability rates and other processes appropriate to the site.

2. Grazing management practices on uplands will maintain desired plant communities or facilitate change toward desired plant communities.

4.1.3 Identification of specific actions including permit/lease terms and conditions

This allotment was rated for Rangeland Health Standards in 2000 and failed. As a result the permit was changed from sheep to cattle, the season of use was changed from October 15 - January 2 and April 15 - May 15 to April 1 - June 14, a two pasture rest rotation grazing system was implemented, and the active public AUMs were reduced from 658 to 234. In 2005 the season of use was further changed to March 1 - June 14 and utilization levels were limited to fifty percent of the current year's growth on key forage species. No additional grazing management changes are proposed as the allotment is in an upward trend.

4.4 Standard 4

Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced. MET

Rationale: Although large areas of the allotment are characterized by encroaching cheat grass, much of which is the result of wildfire, large areas of healthy sage brush and native grass dominated vegetation remain that are capable of sustaining viable populations of wildlife.

Four separate vegetation monitoring transects performed during the summer of 2010 indicated that live sage brush canopy cover was 15, 20, 19, and 20 per cent live sage brush canopy cover. Average sage brush height at the four transect locations ranged from 13 to 16 inches. Additional plant species recorded on the allotment are squirrel tail, six weeks fescue, erigeron, bud sage, slender wheatgrass, sego lily, and prickly pear.

Sage grouse are observed and counted annually during the breeding season within the allotment boundaries. Numbers of strutting males on the Denver Jake Draw lek range from 1 to as many as 31 birds in one day within the last ten to twelve years, and numbers of males on the Demer Cabin lek range from 4 to over 50 birds per day. Both historic and recent use of the allotment by breeding sage grouse indicates the capability of the habitat to sustain viable populations of sage grouse. Sage grouse sign in the form of feathers and droppings is often observed on the allotment at different times of the year.

Additional species observed on the allotment at various times of the year are white-tail prairie dogs, mule deer, coyote, badger, pronghorn, lark bunting, meadowlark, and a wide variety of grassland passerine species. Range monitoring and transect records indicate sustained use by a variety of wildlife species on the allotment on a year round basis.

4.5 Standard 5

Water quality meets State standards. UNKNOWN

Rationale: Nowater Creek is listed in the Washakie Resource Management Plan as a high priority sensitive watershed for the reduction of soil erosion and sediment yields. The use of Best Management Practices is recommended for this watershed to improve cover and range conditions. There are no major drainages of significant size to be listed in the WYDEQ 2010 report. The nearest downstream tributary is the Nowater Creek. The following is taken from the most recent *WYDEQ 2010 305b Water Quality Assessment Report*.

“Nowater Creek (Bighorn River Basin) - WCCD data show that the recreational use support status from the confluence with the Bighorn River upstream an undetermined distance should be changed from threatened to not supporting due to E. coli exceedence.”

It is important to note that the listing is a non-point source pollutant and there is no determined point source for the E. coli exceedence. There are also numerous other allotments in the Nowater watershed along with private land where the sampling occurs that may contribute to the listing of Nowater Creek. The contribution of grazing

on this allotment to the impairment downstream is unknown. The use classifications defined (WYDEQ, 2001) for the drainages in the allotment are considered to be Class 3B waters.

“Class 3B waters are tributary waters, including adjacent wetlands that are not known to support fish populations or drinking water supplies and where those uses are not attainable. Class 3B waters are intermittent and ephemeral streams with sufficient hydrology to normally support and sustain communities of aquatic life, including invertebrates, amphibians, or other flora and fauna that inhabit waters of the State at some stage of their life cycles.”

Therefore as per BLM state office policy, compliance with Wyoming State Water Quality Standards is unknown.

4.6 Standard 6

Air quality meets State standards. UNKNOWN

Rationale: No information is currently available to indicate that this standard is or is not being met. An air quality monitoring station was recently established in the Bighorn Basin, but no monitoring data is available at this time. Until specific data becomes available, the determination for this standard is UNKNOWN, per direction from the BLM Wyoming State Office.

5.0 Resource Specialist Signatures

X Jeany Shryack

Rangeland Management Specialist

X Mike Tutman

Supervisory Rangeland Management Specialist

X Ted Z. Schelen

Wildlife Biologist

X C.G. Durr

Natural Resource Specialist, Weed Coordinator

X Janel Deitman

Hydrologist

X Michael J. Kelly

Other APM-Resource

X Steph Duvall

Natural Resource Specialist, Soils

X _____

Other _____

6.0 DETERMINATION

Based on the information provided in this assessment, *I have determined that Standard #1 Soils and Standard #3 Upland Vegetation, ARE not being met but ARE MAKING SIGNIFICANT PROGRESS towards meeting the standards; Standard #4, Wildlife, IS being met; Standard #2, Riparian, is determined to be Not Applicable; Standard #5, Water Quality, is determined to be UNKNOWN and Standard 6, Air Quality, is determined to be UNKNOWN (per direction from the BLM Wyoming State Office). Current livestock grazing IS in conformance with the standards because of changes made to the grazing permit in 2001 after the 2000 rangeland health assessment and evaluation and again in 2005 after further evaluation.*

X 

Michael J. Phillips
Field Manager, Worland Field Office

Based on the information provided in this assessment, *I have determined that all of the standards are NOT being met but that livestock grazing is in conformance with the standards.*

X

Michael J. Phillips
Field Manager, Worland Field Office

Based on the information provided in this assessment, *I have determined that all of the standards are NOT being met and that livestock grazing is NOT in conformance with the standards.*

X

Michael J. Phillips
Field Manager, Worland Field Office

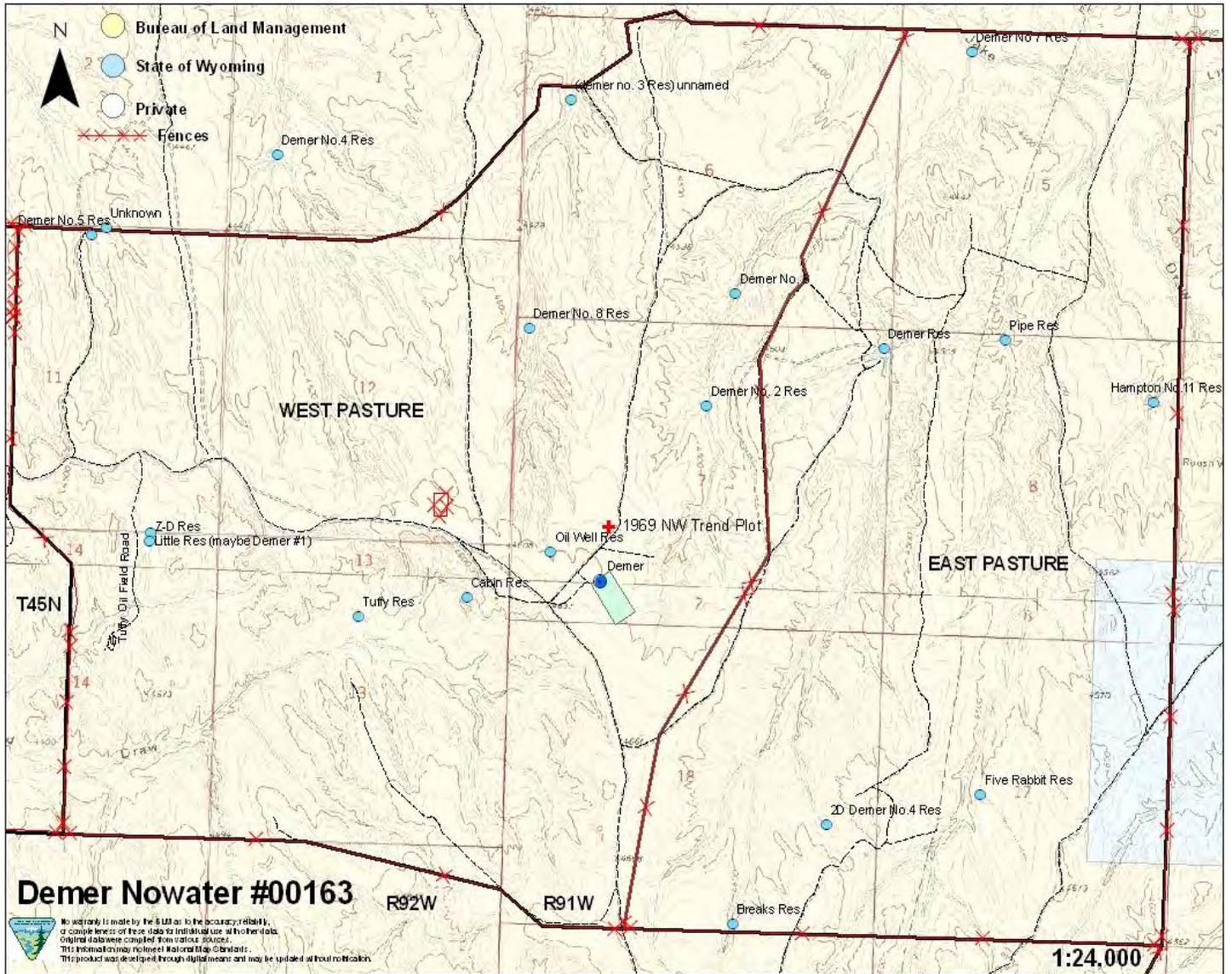
7.0 REFERENCES

Hedman, E.R. Osterkamp, W.R. 1982. Streamflow characteristics Related to Channel Geometry of Streams in Western United States. U.S Geological Survey Water Supply Paper 2193. pp 12-13.

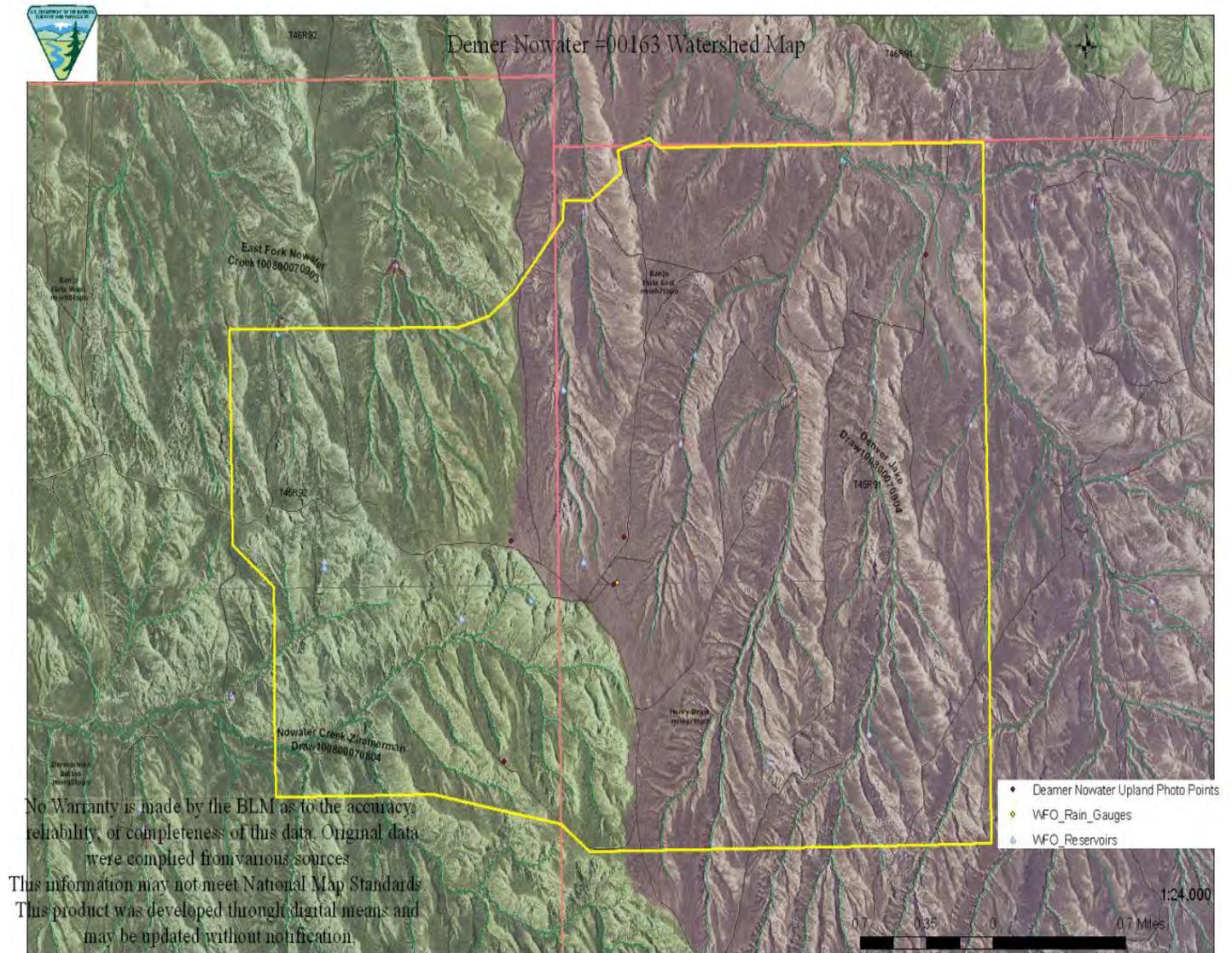
WYDEQ, 2001. Wyoming Surface Water Classification List June 2001. Wyoming Department Environmental Quality. p A.15.

WYDEQ,2010. Wyoming Water Quality Assessment and Impaired Waters List 2010 Integrated 305(B) and 303 (d) Report Wyoming Department of Environmental Quality. p 24.

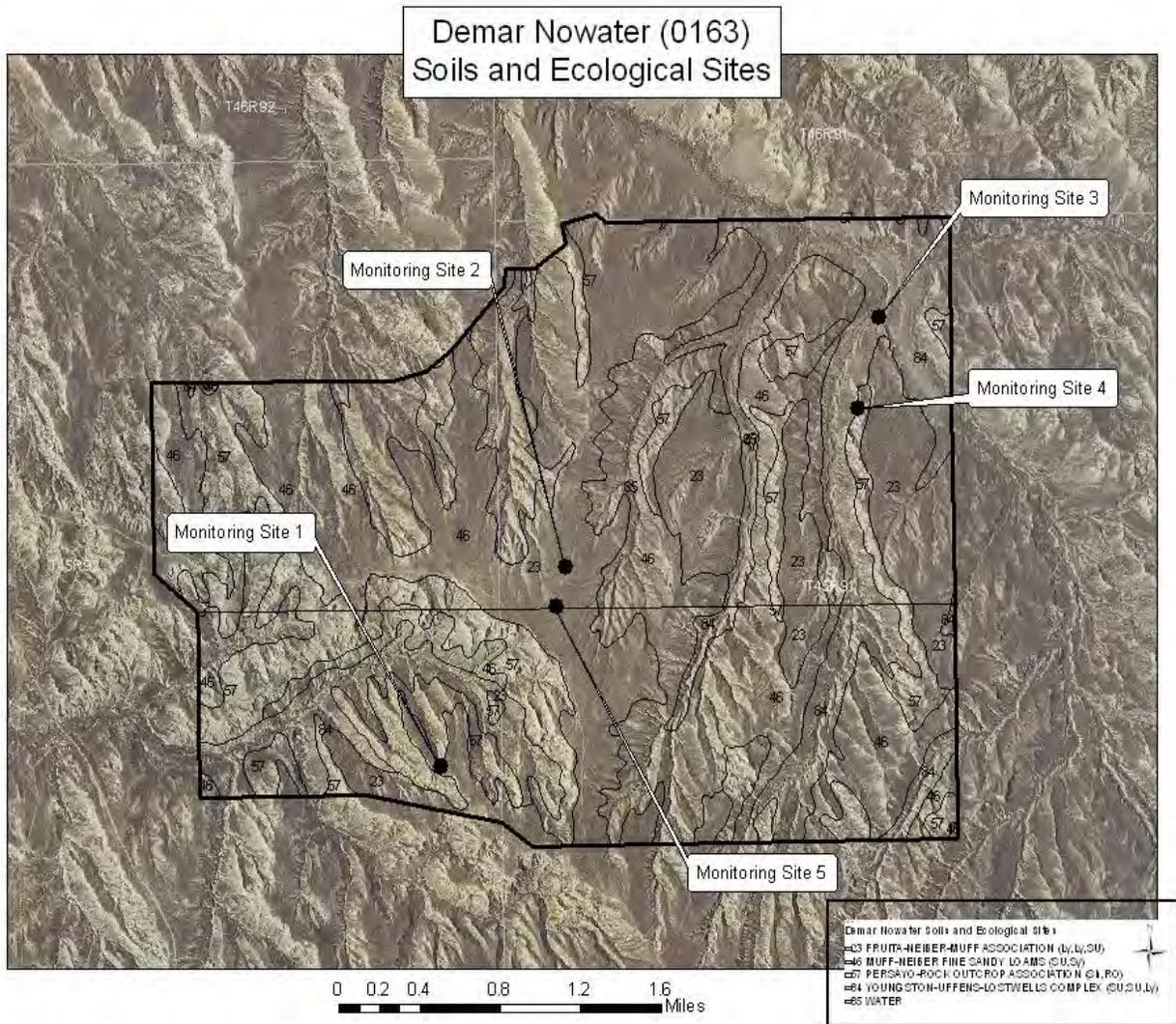
Map 1. Allotment Map



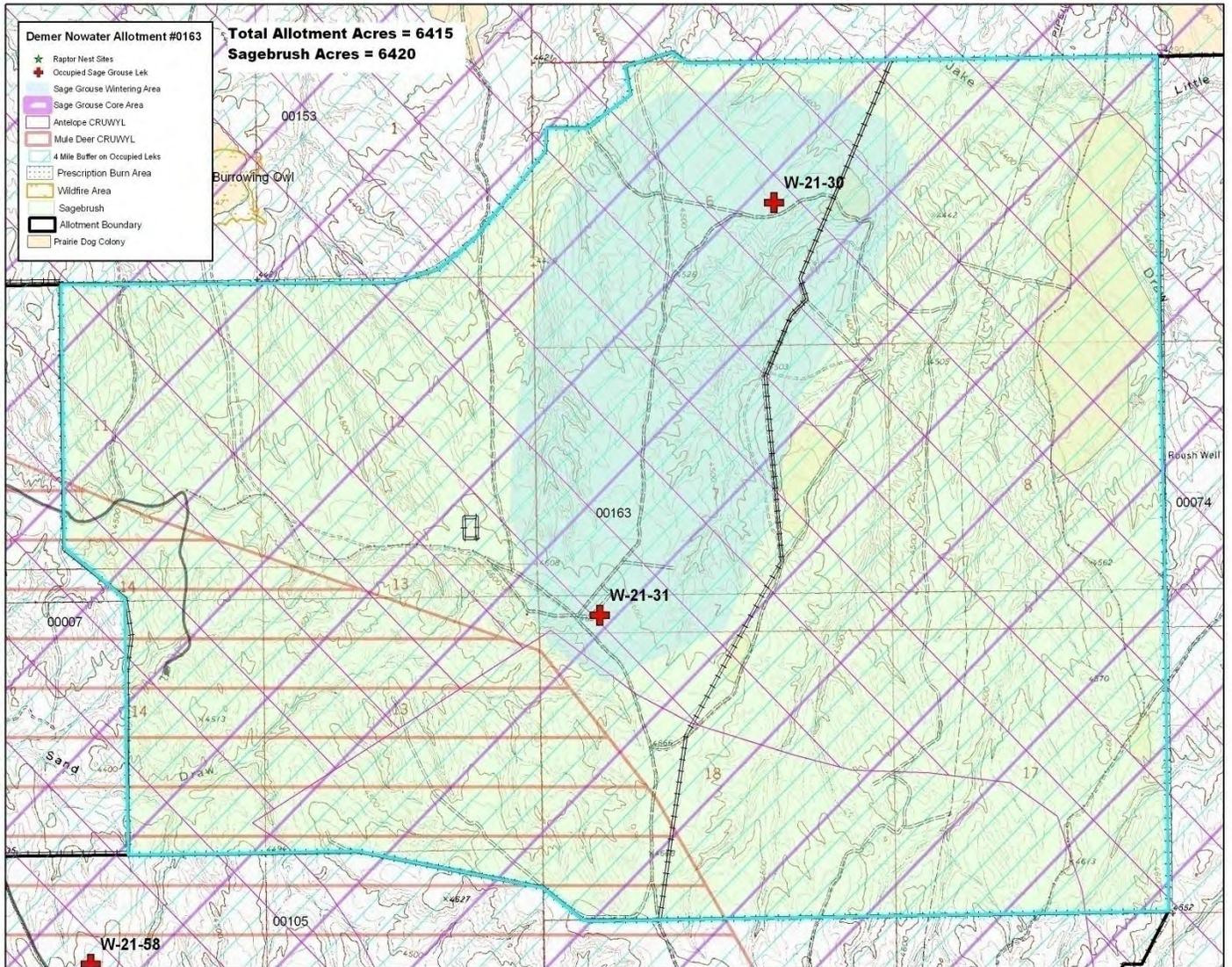
Map 2. Deamer Nowater #00163 Watershed Map



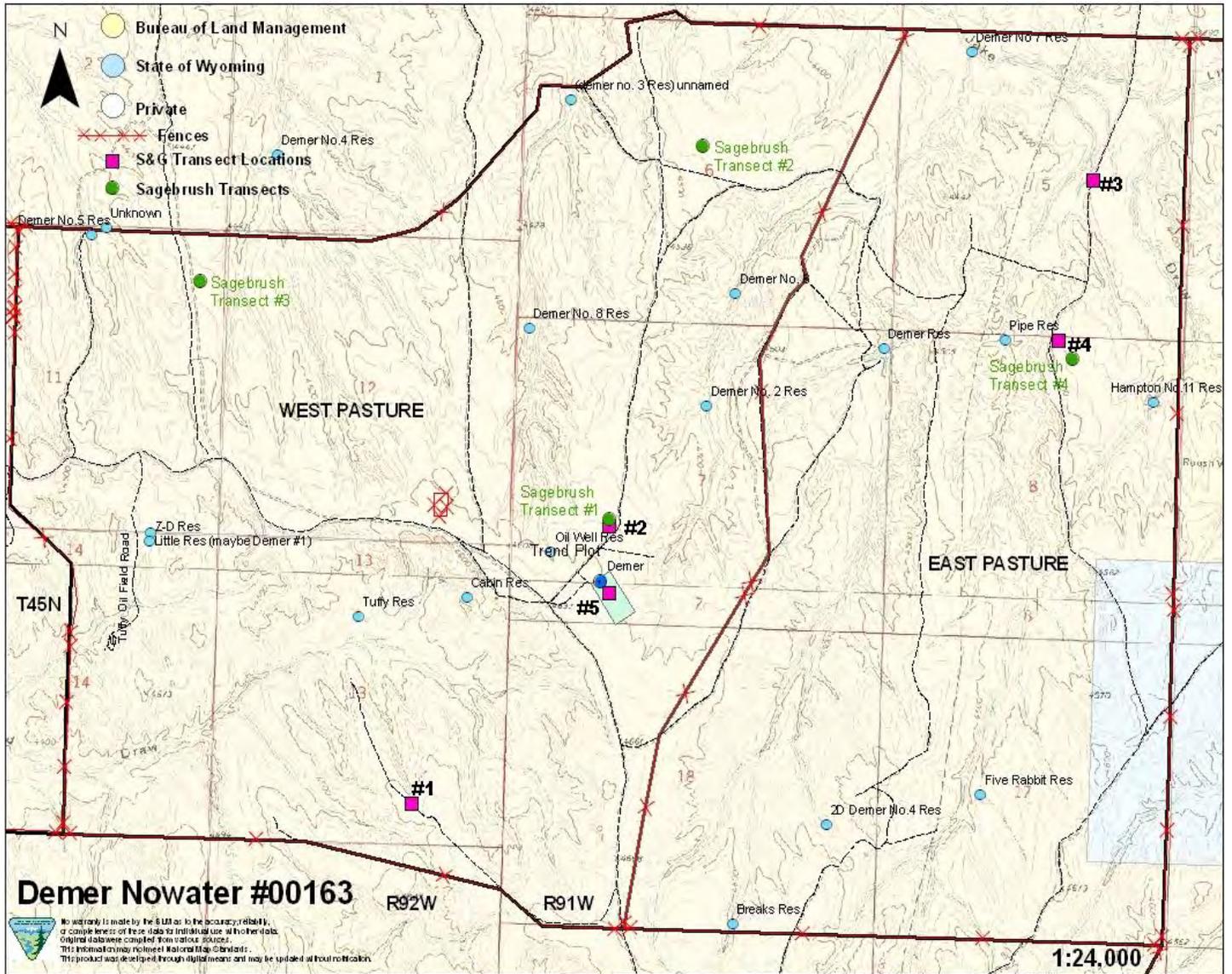
Map 3. Soil and Ecological Sites



Map 4. Wildlife Habitat



Map 5. 2010 Transect/Assessment and Sage-grouse Habitat Assessment Area Locations



ONSITE PHOTOS

Photo 1. View of Watershed

Deamer Nowater #00163
45N 92W Sec 13 NENE
View of typical slopes >10% of upper watershed
Willowood Formation- Looking southeast into Nowater watershed
7-14-2010



Photo 2. View Looking Northeast at Corrals

Deamer-Nowater #00163
View looking northeast @ corrals
43.8777;-107.838388
45N 92W Sec 12 SESE
7-14-2010



Photo 3. Sage-grouse Habitat Assessment Key Area #1 (Same area as S&G Transect #2)

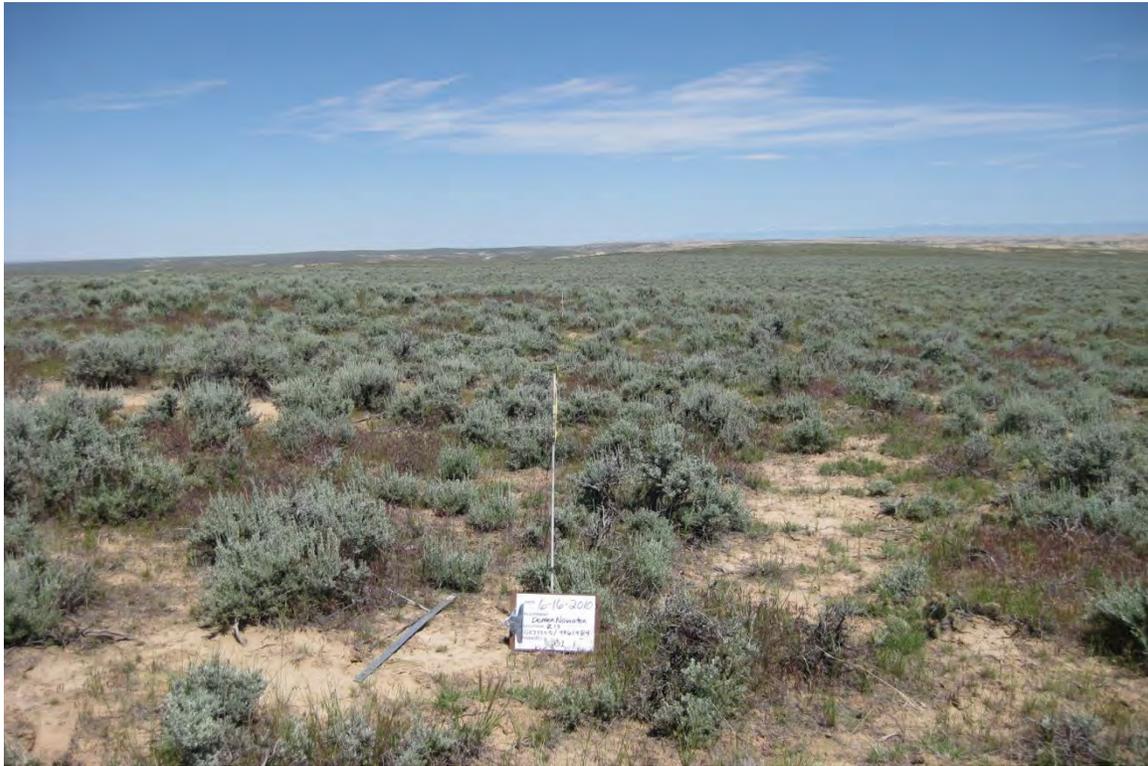


Photo 4. Sage-grouse Habitat Assessment Key Area #2

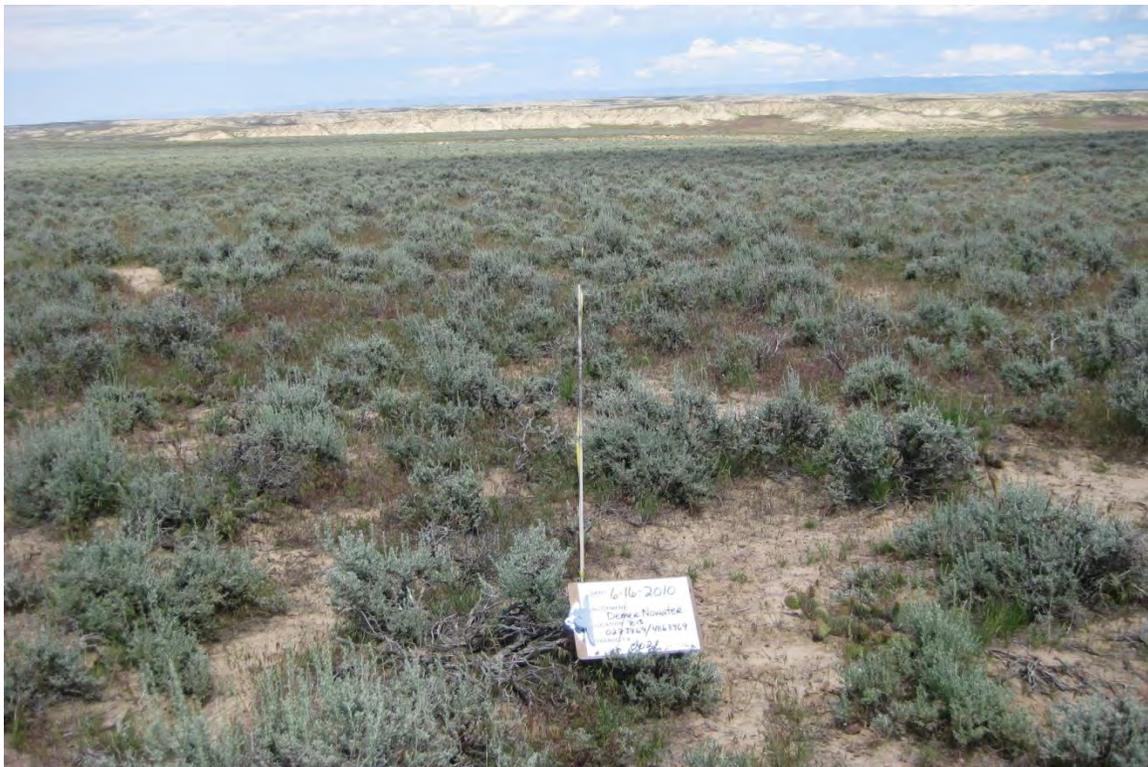


Photo 5. Sage-grouse Habitat Assessment Key Area #3

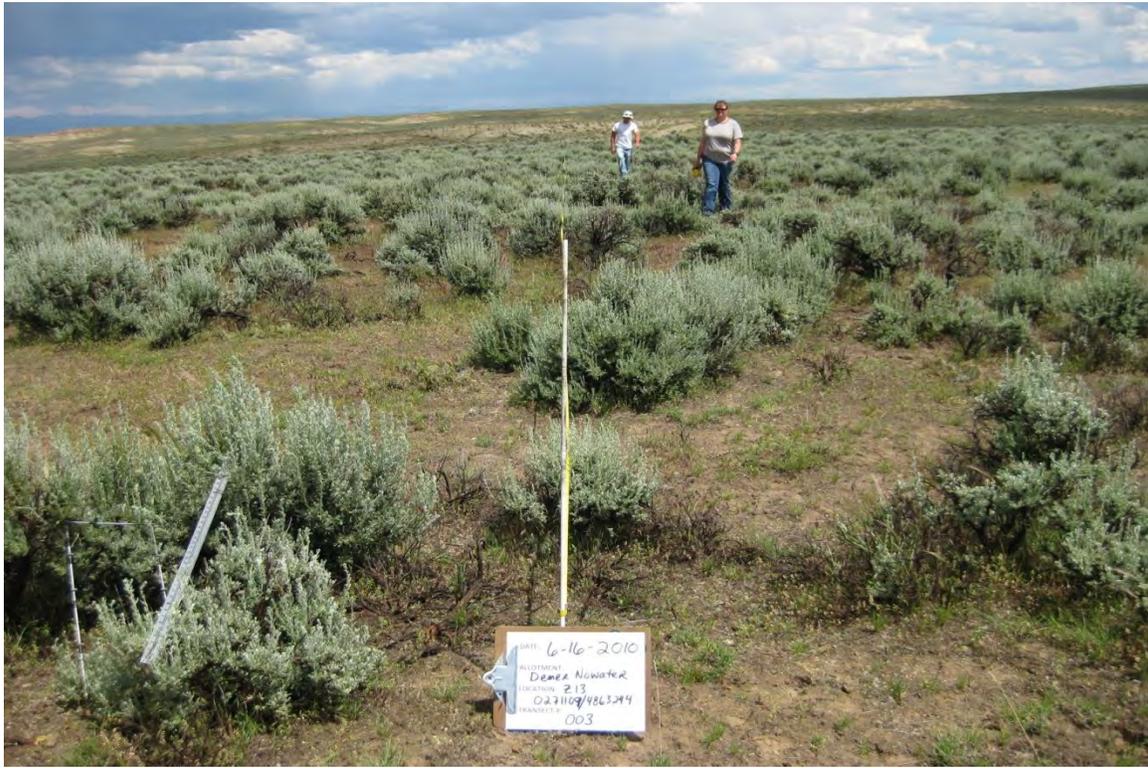


Photo 6. Sage-grouse Habitat Assessment Key Area #4 (Same area as S&G Transect #4)



Photo 7. Transect #1 – General View of Transect (West Pasture)

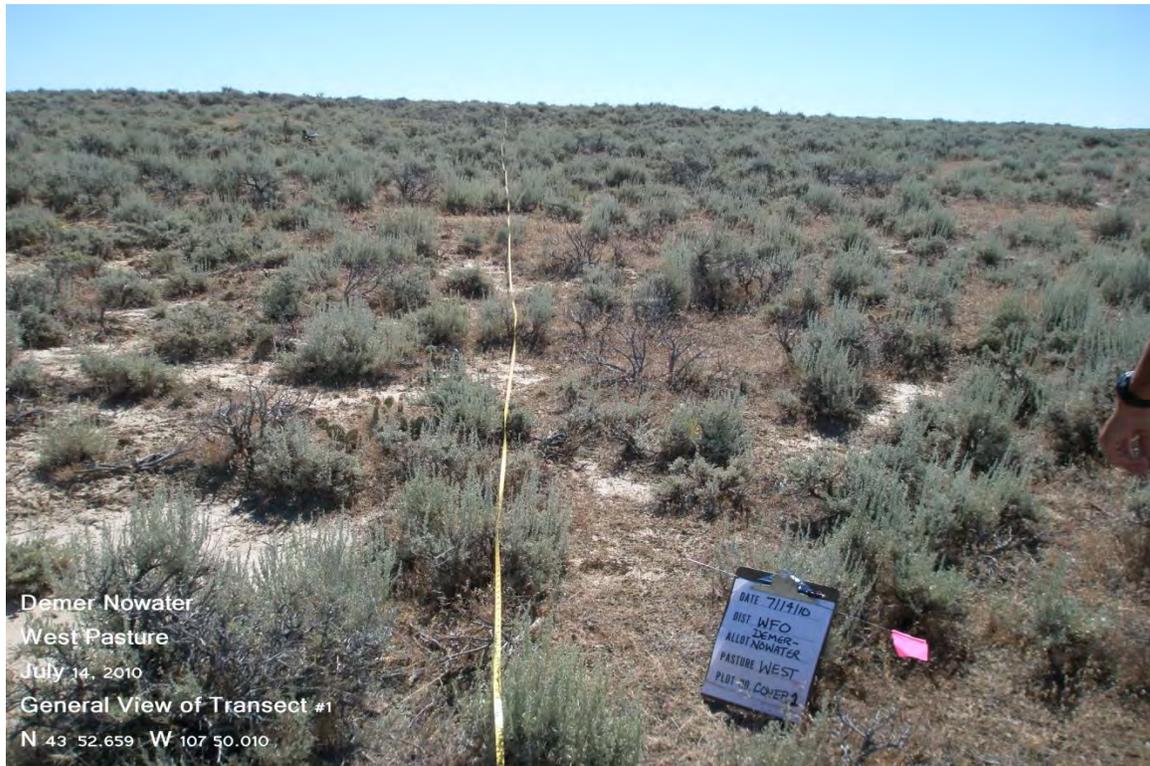


Photo 8. Transect #1 – Close Up at 100' Mark



Photo 9. Hydrologic Indicators – Transect #1



Photo 10. Water Flow Patterns/Large Bare Areas – Transect #1

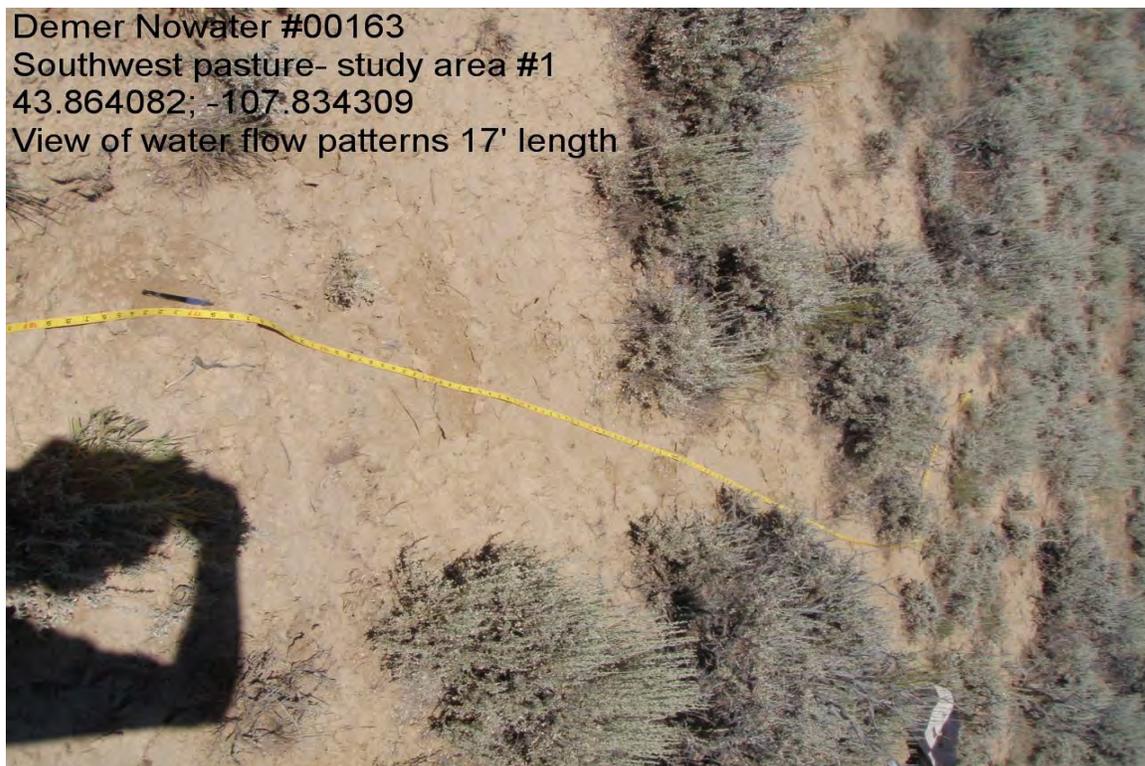


Photo 11. Transect #2 – General View of Transect (West Pasture)



Photo 12. Transect #2 – Close Up at 100' Mark



Photo 13. Hydrologic Indicators – Transect #2

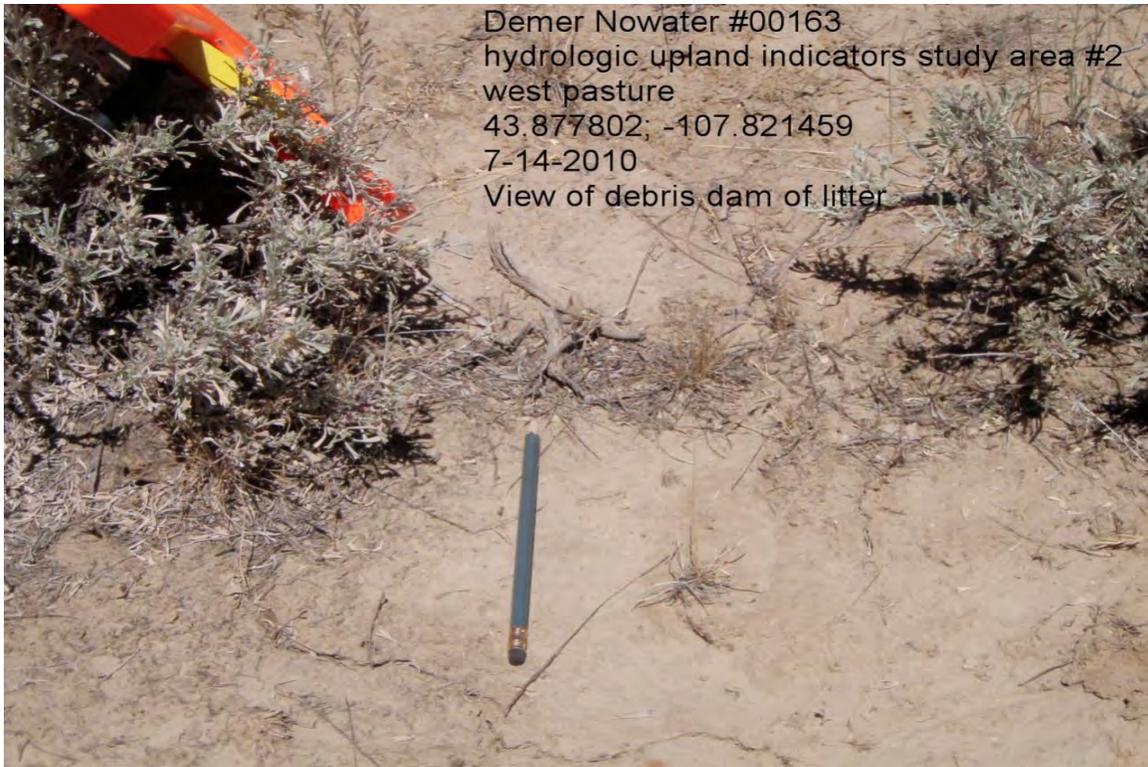


Photo 14. View of Bare Areas – Transect #2



Photo 15. Transect #3 – General View of Transect (East Pasture)

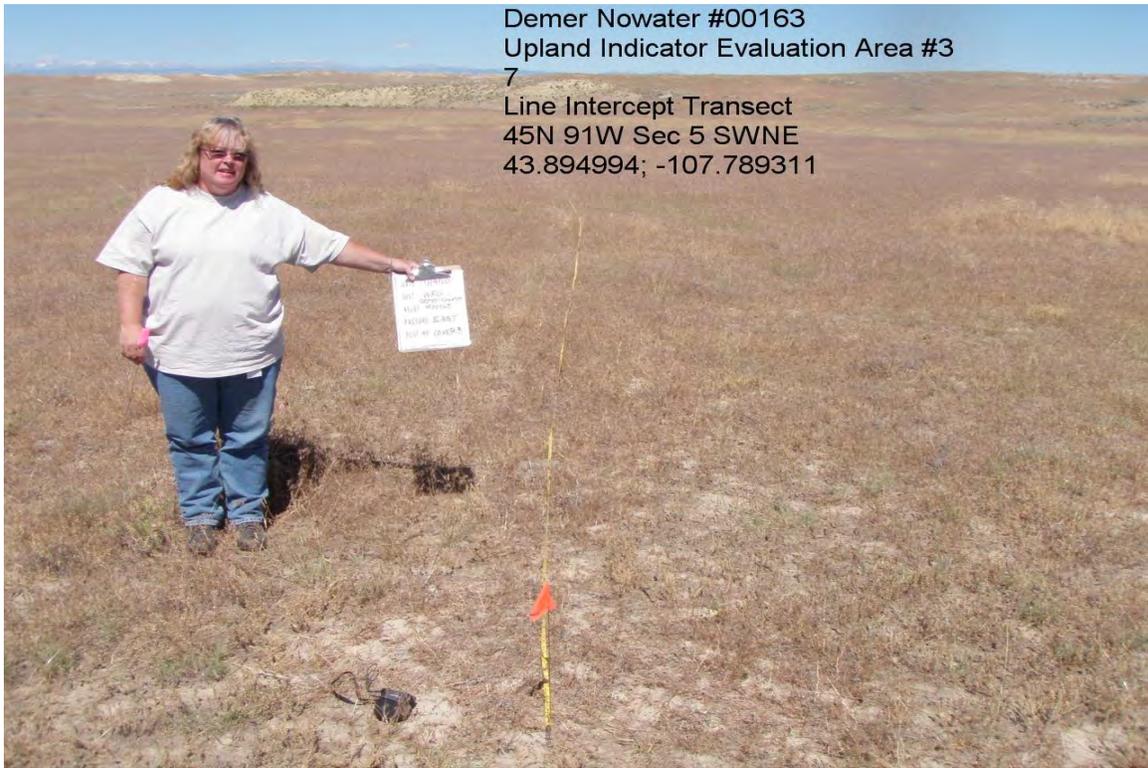


Photo 16. Transect #3 – Close Up at 100' Mark



Photo 17. View of Hydrologic Indicators – Transect #3

Demer Nowater #00163
Upland Indicator Evaluation Area #3
43.894994; -107.789311
View of pedestals of Blue Grama on flat terrace area
45N 91W SWNE Sec 5
7-14-2010



Photo 18. Transect #4 – General View of Transect (East Pasture)



Photo 19. Transect #4 – Close Up at 100' Mark



Photo 20. Transect #5– General View of Transect (Demer Exclosure)



Photo 21. Transect #5 - Close Up at 100' Mark (Demer Exclosure)



HISTORIC PHOTOS – 1969 3x3 Plots

Photo 22. NW Photopoint – general view looking south



Photo 23. NW Photopoint – 3x3 Trend Plot #1



Photo 24. NW Photopoint – general view looking north



Photo 25. NW Photopoint – 3x3 Trend Plot #2



Photo 26. SW Photopoint – general view looking south



Photo 27. SW Photopoint – 3x3 Trend Plot #1



Photo 28. SW Photopoint – general view looking north



Photo 29. SW Photopoint – 3x3 Trend Plot #2

