

**Rangeland Health Assessment
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**

Spring Gulch Allotment No. 00531

November 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 Spring Gulch 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-General Description

The allotment is located approximately three (3) miles southwest of Grass Creek, Wyoming. The allotment is comprised of 1,982 public land acres. BLM maintained rain gauges near the allotment indicate that the area receives 8.5-9.5 inches of precipitation annually. That defines the allotment as being at the upper end of the 5-9 inch precipitation zone or the lower end of the 10-14 inch precipitation zone. The elevation ranges from approximately 6,450 feet in the southeastern area of the allotment to 5,840 feet along Spring Gulch on the eastern border of the allotment. Spring Gulch, an ephemeral drainage, dissects the allotment from west to east. There are no live perennial water sources on the allotment. The landform varies from rolling topography dissected by ephemeral drainages to steep ridges and cliffs.

2.2 Hydrology

Hydrology

The Spring Gulch Allotment is located in the watershed in Upper Bighorn River sub-basin. Within the allotment there are two different level #6 sub-watersheds that are identified by the United States Geological Survey (USGS) by name and Hydrologic Units Codes or (HUC) (Map 3). Both of the sub-watersheds are tributaries to Cottonwood Creek and drain the foothills of the Absaroka Range and flow in an eastern direction toward the center of the Bighorn Basin.

The vast majority (99%) of the allotment is located in the Middle Grass Creek sub-watershed and consists of 6.1% of the total sub-watershed area. A very minor portion is in the Prospect Creek sub-watershed is along the southern boundary where a minor portion of the allotment drains into the Prospect Creek watershed to the south (Table 1). The area is in the middle of the overall watershed and contains peaks, steep drainages, with public land throughout the allotment in the sub-watershed.

The hydrogeology of the allotment consists of surface outcrops of Tertiary formations of the Willwood and Fort Union formations of fine grained mudstones and shales that outcrop at lower elevations. The upper elevations consist of mainly sandstones, shales and terrestrial deposits of Cretaceous age formations along the foothills of the Absaroka Mountain range. There are two shallow water wells in the allotment in Section 1 with total depths of 72 and 60 feet that suggest limited groundwater is available at shallow depths of the main drainage of Spring Gulch. One of the wells is an historic windmill and is nonfunctional. The other well is pumped and has a static water level of 62 feet below surface elevation. There are two small reservoirs in the allotment. These small water impoundments were constructed to capture runoff events to provide a livestock water source in the allotment. These reservoirs are dependent on capturing surface water runoff following storm events. These reservoirs (Thrain and Spring Gulch) had storable surface water in the years of 2009 and 2011 that were visited in the summer months.

Table 1: Watershed Area

Watershed Name-Level #6 (HUC #)	Total (Mi ²)	(Mi ²)within allotment	(%) Mi ² of watershed in the allotment
Middle Grass Creek (100800070607)	48.9	3.0	6.1
Prospect Creek (100800070605)	41.5	0.1	0.2

There are no known or natural perennial streams on public land that are present in the allotment. Other areas around pits and reservoirs do not have riparian characteristics due to the lack of necessary permanent water to create wetlands.

2.3 Climate

The following climate data was prepared by the UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE for a Shallow Loamy (SwLy) range site. Annual precipitation ranges from 10-14 inches per year. The normal precipitation pattern shows the least amount of precipitation in December, January, and February, increasing to a peak during the latter part of May. Amounts decrease through June, July, and August and then increase some in September. 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 exceeds 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.

Winds are generally not strong as compared to the rest of the state. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph.

Growth of native cool-season plants begins about April 15 and continues to about July 15. 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 “Thermopolis 2” climate station:

Minimum Maximum 5 yrs. out of 10 between
 Frost-free period (days): 74 149 May 23 – September 16
 Freeze-free period (days): 112 180 May 8 – October 1
 Annual Precipitation (inches): 7.6 21.9

Mean annual precipitation: 12.35 inches

Mean annual air temperature: 46.2 F (30.1 F Avg. Min. to 62.3 F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include” Grass Creek 1E”, “Thermopolis”, Thermopolis 25NW”, “Buffalo Bill Dam” and “Black Mountain”.

2.4 Soils

The soils reflect the piedmont environment in which they formed. They are highly variable, reflecting differences in parent material (shale, sandstone and/or mixed alluvium), position on the landscape, slope and aspect. The Spring Gulch allotment is located on piedmont slopes of the Absaroka Mountain range, characterized by rolling hills, ridges and escarpments that are dissected by ephemeral drainages. Soil depth ranges from a 10 to over 60 inches with sandstone and soft shale bedrock common below the substratum. The soils typically have a light brown surface layer. Surface soil textures consist of loams and sandy loams. Gravel and cobble size rock fragments are common on the surface and are often account for a significant percent of the surface cover. Typically the subsoil has an increase in clay content that is expressed as an argillic horizon. Slopes range from 0 to 60 percent.

The Spring Gulch Allotment is situated in the lower end of the 10 to 14 inch precipitation zones as depicted by NRSC spacial data. This is supported by soil survey data which was based on the ecological sites for the 10- to 14 inch precipitation zone.

Based on the soil survey data for Hot Springs County, the dominant ecological sites found in the in the allotment are listed below:

Shallow Loamy 10-14 in. pz.	R032XY362WY
Loamy 10-14 in. pz.	R032XY322WY

Three rangeland health assessments utilizing the methodology described in *Interpreting Indicators of Rangeland Health, Technical Reference 1734-6* were relied upon in the analysis of the Spring Gulch Allotment. All were conducted at monitoring sites selected for this analysis.

The first monitoring plot was located in map unit 730 Forelle-Diamondville-Loams. The soils at this location support a Loamy 10-14 in pz. ecological site. The soils at this location are similar to the Diamondville soil series except that the argillic horizon is not well developed.

The second monitoring plot was located in map unit 724 Blazon-Brownsto complex. The soils at this location support a Loamy 10-14 in pz. ecological site. They are similar to the Brownsto soil series.

The third monitoring plot (referred to Site 4) was located in map unit 722 Blazon loam. The soils at this location support a Shallow Loamy 10-14 in pz. ecological site. They are similar to the Blazon soil series except that the argillic horizon is not well developed.

Refer to the *Map 2 - Soil and Ecological Sites* that follows this discussion.

2.5 Vegetation

Vegetation of the allotment is variable and dependent upon the range site. The uplands are comprised primarily of grasses such as bluebunch wheatgrass, idaho fescue, green needlegrass, needleandthreadgrass, junegrass, western wheatgrass, sandberg bluegrass, blue grama, upland sedges. Other vegetation commonly observed includes sagebrush, junipers, fringed sagewort, rose pussytoes, lupines, and biological soil crusts. This list is not all inclusive however the vegetation noted are those that are quite evident and readily available.

2.6 Invasive Species

Noxious weed species documented within the allotment include Canada, musk and bull thistle. Infested areas are confined to small patches along roads and drainages. This allotment lies within the Grass Creek Weed Management Area, which is intensively managed and monitored for noxious and invasive weed species using a cooperative, integrated pest management strategy. Hot Springs County Weed and Pest district personnel monitored and treated noxious weeds within the area during the summer of 2011. During monitoring of the allotment in 2011 *Bromus tectorum* was documented

Grazing use of the allotment has varied since 2000 in AUMs and season of use. The average number of AUMs utilized during the last decade has been 127 (43%) of the 295 permitted. Growing season (May and June) use has been documented (through monitoring and billing) 4 of the last 10 years with an average of 95 AUMs used during that period. The average number of AUMs used (95) is higher than the current permit of 88 because it was not until 2007 that the limit of 88 AUMs became a term and condition of the permit.

As currently permitted, growing season use can vary from 0 AUMs to a maximum of 88 AUMs and non-growing season use can vary from 0 AUMs to a maximum of 296 AUMs. The variance occurs due to the Term and Condition that allows any AUMs not utilized in the spring to be utilized during the non-growing season. All grazing must still occur during the defined dates of use and no more than 88 AUMs are used in the growing season and no more than 296 AUMs are used annually.

The Ecological Site Description (Natural Resource Conservation Service) provides a stocking rate range of 5.9 to 12.5 acres per animal unit month for a shallow loamy range site (10-14/5-9 inch precipitation zones). It should be noted that the stocking rates established by the NRCS assume continuous season long grazing and therefore provides a conservative stocking rate as a base to establish proper stocking rates. Grazing on this allotment is not continuous season long grazing. As stated above, growing season use is limited and optional while the majority of AUMs are allocated to the non-growing season. The annual stocking rate for the allotment is 6.7 acres per AUM, the stocking rate during the growing season is 22.5 acres per AUM and the stocking rate during the non-growing season would vary dependent upon the amount of spring AUMs carried over for fall use. The non-growing season stocking rate will not be less than 6.7 acres per AUM and that is if all 296 permitted AUMs are utilized in the non-growing season.

2.8 Wildlife

The Spring Gulch Allotment provides habitat for several big game species, as well as many other none game wildlife species, during all seasons of the year. Throughout the summer and early fall small numbers of resident elk, mule deer and antelope use the allotment. From late fall through spring this area provides crucial winter range for larger herds of mule deer and winter range for elk. Winter and spring elk use of this area has been increasing over the past 5 to 10 years. Numbers of mule deer will use the area as transition range in the spring and again in late fall during the rut as well. Antelope can also occasionally be observed throughout this allotment, particularly in the spring and summer. During sage-grouse lek monitoring in April it is common to observe several hundred elk and mule deer in the uplands at or near the leks. Other species like the Mountain lion, and a variety of other passerines, raptors, small mammals and predator species inhabit this allotment throughout the year.

2.9 Threatened or Endangered Species

Occasional Grey wolf occurrence is possible, and this occurrence would most likely occur during winter and early spring when larger elk concentrations are present. There have been no documented wolf depredations of livestock in this or any of the neighboring allotments. The sagebrush steppe habitats mentioned above, in addition to being big game winter range, are all within Core sage-grouse habitat and provide wintering, breeding, nesting and early brood rearing habitat for a migratory population of sage-grouse that migrate up in elevation as the summer progresses, into Little Grass, Prospect and Cottonwood creeks for late brood rearing habitats. There are 3 leks within the Spring Gulch allotment. Spring Gulch #1 lek, the largest of the three leks averaged approximately 9 males before the year 2000 and 30 males after 2000. Spring Gulch #3 lek averaged 13 males before and 7 males after, and Spring Gulch South Ridge lek has not shown any activity since 2005 where it had a maximum of 2 males. The uplands around these leks historically have received light livestock use (<20%), and in recent years has been receiving patchy light elk use as well, and typically there is adequate standing herbaceous residue going into the sage-grouse nesting season (April – May). These same sagebrush steppe habitats also likely provide habitat for other sagebrush obligates like the sage thrasher, sage sparrow, and Brewers sparrow. Other than the Grey wolf, there are no other known threatened or endangered wildlife species, or their habitats within the proposed project area, but the sage-grouse, sage thrasher, sage and Brewers sparrow are all BLM sensitive species.

3.0 Summary of Monitoring/Assessment Data

Monitoring of the allotment for the purpose of observing and recording the indicators of rangeland health occurred during the summer of 2011 over multiple field visits.

Within the allotment 3 different sites were identified as representative of the public lands. Two assessment sites were done on the ridges/uplands of the allotment which represent the shallow loamy range sites and one was done on a loamy range site representing the gulch/draws of the allotment. At these sites the 17 indicators were observed/noted/measured, cover transects were completed, measurements of production was completed, and photographs were taken and/or replicated.

Within the transect areas the 17 indicators of rangeland health were observed and recorded. The 17 indicators are broken into 3 categories - soil stability, hydrologic function, biotic integrity. The measurement of these indicators is based upon a departure from that which would be expected for the specific range site. The “measuring stick” to judge against is provided by the United States Department of Agriculture, Natural Resources Conservation Service in the form of an Ecological Site Description and Reference Sheet for each specific range site and precipitation zone. The indicators and the assessed departure are found in the Table 1 below.

Table 1 Rangeland Health Indicators/Ratings

Indicator	Departure from Reference Sheet		
	Site 1-loamy	Site 2-shallow loamy	Site 4-shallow loamy
1. Rills	N-S	N-S	N-S
2. Water-flow patterns	N-S	N-S	N-S
3. Pedestals and/or terracettes	N-S	N-S	N-S
4. Bare ground	N-S	N-S	N-S
5. Gullies	N-S	N-S	N-S
6. Wind-scoured, blowouts, and/or deposition areas	N-S	N-S	N-S
7. Litter movement	N-S	N-S	N-S
8. Soil surface resistance to erosion	N-S	N-S	N-S
9. Soil surface loss or degradation	N-S	N-S	N-S
10. Plant community composition and distribution relative to infiltration	N-S	N-S	N-S
11. Compaction layer	N-S	N-S	N-S
12. Functional / structural groups	N-S	N-S	N-S
13. Plant mortality / decadence	N-S	N-S	N-S
14. Litter amount	N-S	N-S	N-S
15. Annual production	N-S	N-S	N-S
16. Invasive plants	M	S-M	S-M
17. Reproductive capability of perennial plants	N-S	N-S	N-S
Soil and Site Stability Rating (1,2,3,4,5,6,7,8,9,11)	N-S	N-S	N-S
Hydrologic Function Rating (1,2,3,4,5,8,9,11,14)	N-S	N-S	N-S
Biotic Integrity Rating (8,9,11,12,13,14,15,16,17)	N-S	N-S	N-S
N-S None to Slight S-M Slight to Moderate M Moderate M-E Moderate to Extreme E-T Extreme to Total			

Range/Upland Vegetation

There were two assessed upland sites (labeled site 2 and 4) in the allotment which are located on a shallow loamy range site in the 10-14 inch precipitation zone (Shallow Loamy ESD was used). The Historic Climax Plant Community for this site is a Bluebunch wheatgrass/Needleandthread plant community. This community would be dominated by cool season grasses (75%) followed by a nearly even balance of woody species (15%) and forbs (10%). With moderate continuous season long grazing or extended droughts a transition from HCPC to a Perennial Grass/Mixed shrub state may occur. This state is dominated by cool season grasses but short warm season grasses and various forbs are present and shrubs would be a conspicuous part of the site. The state has a hydrologic, soil, and biotic community that is stable and intact. From this state, with frequent and severe grazing, lack of fire, or a severe grazing in conjunction with wildfire or brush control the vegetative state can be converted to a Mixed Shrub/Bare ground community, a Blue grama sod sod

community, a salt tolerant shrub/ bare ground community and from there to a salt tolerant shrub/rhizomatous wheatgrass state. States beyond the Perennial grass/Mixed shrub community are likely to have a biotic, soil, and hydrologic function that is at risk or not functioning. Herbaceous production will decline, the undesirable species increase as the desirable species decrease, and the ability to move towards HCPC becomes is greatly diminished without mechanical treatments, reseeding efforts, soil remediation efforts, and intense grazing management.

At Site 2 the ground cover was determined to be 95% which yields 5% bare ground. The ESD/Reference Sheet prescribes a range of 10-30% bare ground. Of the vegetative hits encountered in the cover transect; grasses accounted for approximately 48%, forbs accounted for 31%, and woody species accounted for 16% while lichens and biological soil crusts accounted for 4%. Herbaceous production was determined to be 567 pounds per acre – woody species was not included in the production measurement. The ESD/Ecological Reference Worksheet describes and expectation of total production to be 350-700 pounds per acre-which would include woody species. The data collected indicates that the site is in the Bluebunch wheatgrass/needleandthread community state (HCPC). There is an abundance and dominance of perennial cool season grasses such as needleandthread, bluebunch wheatgrass, and junegrass. Complementing the grass community is a community of sagebrush and varied forbs as well as biological soil crusts and lichens on site. The vegetative community, the ground cover, and soil surface attributes were noted, measured and compared to the Ecological Site Description (ESD) produced by the NRCS to determine a rating to apply to the Biotic Integrity portion of the assessment through the use of the 17 indicators of rangeland health (Indicators 8, 9, and 11 through 17). The rating is dependent upon the assessment of the indicators and can vary from “none to slight” to “extreme to Total” deviation from the applicable ESD and corresponding reference sheet. The Biotic Integrity for this site was rated as a “none to slight” departure from the ESD/Reference Sheet.

At Site 4 the ground cover was determined to be 90% which yields 10% bare ground. The ESD/Reference Sheet prescribes a range of 10-30% bare ground. Of the vegetative hits encountered in the cover transect; grasses accounted for approximately 60%, forbs accounted for 13%, and woody species accounted for 15% while lichens and biological soil crusts accounted for 12%. Herbaceous production was determined to be 675 pounds per acre – woody species was not included in the production measurement. The ESD/Ecological Reference Worksheet describes and expectation of total production to be 350-700 pounds per acre-which would include woody species. The data collected indicates that the site is in the Bluebunch wheatgrass/needleandthread community state (HCPC). There is an abundance and dominance of perennial cool season grasses such as needleandthread, bluebunch wheatgrass, and junegrass. Complementing the grass community is a community of sagebrush and varied forbs as well as biological soil crusts and lichens on site. The vegetative community, the ground cover, and soil surface attributes were noted, measured and compared to the Ecological Site Description (ESD) produced by the NRCS to determine a rating to apply to the Biotic Integrity portion of the assessment through the use of the 17 indicators of rangeland health (Indicators 8, 9, and 11 through 17). The rating is dependent upon the assessment of the indicators and can vary from “none to slight” to “extreme to Total” deviation from the applicable ESD and corresponding reference sheet. The Biotic Integrity for this site was rated as a “none to slight” departure from the ESD/Reference Sheet.

Within the allotment there was 1 assessment site on a loamy range site (Site 1) within the 10-14 inch precipitation zone (Loamy ESD). The Historic Climax Plant Community for this site is a Bluebunch wheatgrass/Rhizomatous wheatgrass plant community. This community would be dominated by cool season grasses (75%) followed by a nearly even balance of woody species (15%) and forbs (10%). With moderate continuous season long grazing or extended droughts a transition from HCPC to a Perennial Grass/Big sagebrush state may occur. This state is dominated by cool season grasses but short warm season grasses and various forbs are present and shrubs would be a conspicuous part of the site. The state has a hydrologic, soil, and biotic community that is stable and intact. From this state, with frequent and severe grazing, lack of fire, extended droughts or a severe grazing in conjunction with wildfire or brush control the vegetative state can be converted to a Blue grama sod community, a Big Sagebrush/bare ground community, a salt tolerant shrub/ bare ground community and from there to a salt tolerant shrub/rhizomatous wheatgrass state. States beyond the Perennial grass/Big sagebrush community are likely to have a biotic, soil, and hydrologic function that is at risk or not functioning. Herbaceous production will decline, the undesirable species increase as the desirable species decrease, and the ability to move towards HCPC is diminished without mechanical treatments, reseeding efforts, soil remediation efforts, and intense grazing management.

At Site 1 the ground cover was determined to be 95% thereby yielding 5% bare ground. The ESD/Reference Sheet prescribes a range of 10-30% bare ground. Herbaceous production was determined to be 532 pounds per acre – woody species was not included in the production measurement. The ESD/Ecological Reference Worksheet describes and expectation of total production to be 500-1100 pounds per acre-which would include woody species. Of the vegetative hits encountered; grasses accounted for approximately 58%, forbs accounted for 27%, and woody species accounted for 13%, while lichens and biological soil crusts accounted for the 2%. The data collected indicates that the site is in the Perennial Grass/Big sagebrush community state. There is an abundance and dominance of perennial cool season grasses such as needleandthread, bluebunch wheatgrass, and greenneedle grass. Complementing the grass community is a pronounced community of sagebrush on site. The vegetative community, the ground cover, and soil surface attributes were noted, measured and compared to the Ecological Site Description (ESD) produced by the NRCS to determine a rating to apply to the Biotic Integrity portion of the assessment through the use of the 17 indicators of rangeland health (Indicators 8, 9, and 11 through 17). The rating is dependent upon the assessment of the indicators and can vary from “none to slight” to “extreme to Total” deviation from the applicable ESD and corresponding reference sheet. The Biotic Integrity for this site was rated as a “none to slight” departure from the ESD/Reference Sheet.

3.2 Riparian Hydrology

There was no wetland or riparian areas that were found in the allotment following initial inventory and field visits to the allotment. Due to the lack of available surface water and ephemeral flows in the Spring Gulch drainages that consist of 99 percent of the allotment, no wetland areas were present. The Spring Gulch reservoir located at the bottom of the allotment did not have any riparian characteristics. The Thrain reservoir located in the northeast corner of the allotment did not have any riparian characteristics likely due to the wide fluctuation of available water runoff. The ephemeral characteristics of the drainages are likely due to Spring Gulch being located in a small basin with limited amount of surface area and lower elevations where much of the available water is lost to evaporation throughout the year.

The allotment is located in the Middle Grass Creek sub-watershed. The hydrologic indicators for the upland areas were rated with a none to slight departure from the reference state. The amount and type of bare ground is a very important indicator of potential upland sheet and rill erosion that may occur on the landscape. The hydrologic indicators of none to slight rating suggest that sufficient upland cover suggests sufficient cover is present in the upland areas and the erosion and runoff from the allotment are within suggested appropriate levels to minimize runoff and provide for groundwater infiltration within the allotment.

Water Quality

There is no available water quality data from the BLM, USGS, DEQ or other sources. This is likely due to the ephemeral nature of Spring Gulch. There is no established water quality monitoring sites within the allotment.

3.4 Soils/Site Stability and Hydrologic Function

Data collected for the Rangeland Health Assessments were used to evaluate soil and site stability on the allotment. 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 10-14” pz. and Shallow Loamy 10-14 in. pz. to determine departures from normal.

Monitoring Site 1

Rill formation was not observed. Water-flow patterns are difficult to discern on the landscape. Few pedestals were observed. Terracettes are less than 2 feet in size and are pooling water and slowing runoff. Transect data determined bare ground to be 5 percent and litter cover to be 27 percent. Both bare ground and litter are well within the guidelines described in the reference sheet. Bare areas are small with minimal connectivity. There is no active gully formation in the allotment. No wind scour or blows-out areas were observed. Only minimal litter movement was observed, well in keeping with the site characteristics. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 4.1. Biological soil crusts account for 2 percent of the total cover. When the SSI is combined with vegetation, biological soil crusts and litter cover, the soil is stable and resistant to rain drop impact and to the erosive force of overland flow. The plant community composition and distribution adds further hydrologic stability to the soil surface.

Though only 2 inches thick, the surface horizon is rich in organic matter indicating the surface is stable with little or no soil loss. No soil compaction was observed.

Monitoring Site 2

Rill formation was not observed. Water-flow patterns are difficult to discern on the landscape. Few pedestals were observed. Small terracettes are pooling water and slowing runoff. Transect data determined bare ground to be 5 percent and litter cover to be 26 percent. Both bare ground and litter are well within the guidelines described in the reference sheet. Bare areas are small with minimal connectivity. There is no active gully formation in the allotment. No wind scour or blows-out areas were observed. The cobble-strewn surface is not indicative of wind erosion. Only minimal litter movement was observed, well in keeping with the site characteristics. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 4.9. Biological soil crusts and lichens account for 4 percent of the total cover. When the SSI is combined with vegetation, biological soil crusts, litter cover and the high level of organic matter in the upper-most soil horizon the soil is stable and resistant to rain drop impact and to the erosive force of overland flow. The plant community composition and distribution adds further hydrologic stability to the soil surface. A 3-inch thick surface horizon that is rich in organic indicates that the soil is stable with little or no soil loss. No soil compaction was observed.

Monitoring Site 3

Rill formation was not observed. Water-flow patterns are difficult to discern on the landscape. Few pedestals were observed. Small terracettes are pooling water and slowing runoff. Transect data determined bare ground to be 10 percent and litter cover to be 35 percent. Both bare ground and litter are well within the guidelines described in the reference sheet. Bare areas are small (6-18 inches) with minimal connectivity. There is no active gully formation in the allotment. No wind scour or blows-out areas were observed. Only minimal litter movement was observed, well in keeping with the site characteristics. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 4.6. Biological soil crusts and lichens account for 14 percent of the total cover. When the SSI is combined with vegetation, biological soil crusts, litter cover and the high level of organic matter in the upper-most soil horizon the soil is stable and resistant to rain drop impact and to the erosive force of overland flow. The plant community composition and distribution adds further hydrologic stability to the soil surface. An 8-inch thick surface horizon that is rich in organic indicates that the soil is stable with little or no soil loss. No soil compaction was observed.

Wildlife

Below is a summary of the data sheets from the 2 sage-grouse habitat assessment transects that were run in this allotment, (see wildlife resources map), and sage-grouse nesting habitat monitoring photo, taken pre-nesting season in early April, where adequate amounts of standing herbaceous residue for nest concealment was observed.

Date: 7/19/2011

Observers: W Wittkop, E Hake

Allotment Name & #: Spring Gulch 531

Location T. 44 R. 99 Sec. 2 QQ SWSW Zone 12 UTM 0684209 4862490

Transect 1

Line Intercept Canopy Cover					
Species		% Cover			
Live Big Sagebrush		10%			
Dead Big Sagebrush		2%			
Other SPP: (Fringed)		4%			
Other SPP: (Rabbit Brush)					
Shrub Species		Average Height			
Live Big Sagebrush		15"			
Other SPP: (Fringed)		5"			
Other SPP: (Rabbit Brush)		10"			
Belt Transect					
Species	%Young	%Mature	%Decadent	%Dead	
Big Sagebrush		50	41	9	
Fringed		100			
Rabbit Brush			100		
Daubenmire Cover Class & Vegetation Height Data					
Summary of Vegetation Height	New Herbacious Mean Ht: 12"		Residual Herbacious Mean Ht: 5"		
Summary of Cover Class (%)	New Perennial Grass: 31%	New Annual Grass: 0%	Perennial Forb: 6%	Residual Herbacious: 9%	Other: 44%
Browse Utilization					
ATTR			Moderate		
Other Species: Fringed Sagebrush			Low		
Other Species: Rabbitbrush			High		

Date: 7/19/2011

Observers: W Wittkop, E Hake

Allotment Name & #: Spring Gulch 531

Location T. 44 R. 99 Sec.11 QQ SWNE Zone 12 UTM 0684990 4861355

Transect 2

Line Intercept Canopy Cover					
Species		% Cover			
Live Big Sagebrush		11%			
Dead Big Sagebrush		2%			
Other SPP: (Fringed)		1%			
Other SPP: (Rabbit Brush)		0			
Shrub Species		Average Height			
Live Big Sagebrush		8.2"			
Other SPP: (Fringed)		5.5"			
Other SPP: (Rabbit Brush)					
Belt Transect					
Species	%Young	%Mature	%Decadent	%Dead	
Big Sagebrush		59	41		
Fringed		100			
Rabbit Brush		100			
Daubenmire Cover Class & Vegetation Height Data					
Summary of Vegetation Height	New Herbacious Mean Ht: 11.7"		Residual Herbacious Mean Ht: 7"		
Summary of Cover Class (%)	New Perennial Grass: 30.75%	New Annual Grass: 4.75%	Perennial Forb: 2.5%	Residual Herbacious: 13.5%	Other: 42.75%
Browse Utilization					
ATTR			Moderate		
Other Species: Fringed Sagebrush			Low		
Other Species: Rabbitbrush			High		

Sage-grouse nesting habitat photo taken near Spring Gulch #1 Lek on 4/5/2011.



LekID	Year	Males	Females	Observer
Spring Gulch South Ridge	1982	7	0	C. King
Spring Gulch South Ridge	1983	14	0	Denton,
Spring Gulch South Ridge	1983	1	0	Kachinski,
Spring Gulch South Ridge	1983	1	2	Kachinski,
Spring Gulch South Ridge	1983	2	0	Denton,
Spring Gulch South Ridge	1992	0	0	Hurley
Spring Gulch South Ridge	1992	0	0	Hurley
Spring Gulch South Ridge	1992	1	1	Hurley
Spring Gulch South Ridge	1994	0	0	T. Stephens
Spring Gulch South Ridge	1995	0	0	M. Atkins
Spring Gulch South Ridge	1998	2	0	T. Stephens
Spring Gulch South Ridge	2000	1	10	J. Wolf
Spring Gulch South Ridge	2001	0	1	J. Wolf
Spring Gulch South Ridge	2002	0	0	T. Stephens
Spring Gulch South Ridge	2003	0	0	K. Idema
Spring Gulch South Ridge	2003	4	0	K. Idema
Spring Gulch South Ridge	2005	2	0	T. Stephens
Spring Gulch South Ridge	2005	1	0	T. Stephens
Spring Gulch South Ridge	2005	0	0	T. Stephens
Spring Gulch South Ridge	2006	0	0	T. Stephens
Spring Gulch South Ridge	2007	0	0	T. Stephens
Spring Gulch South Ridge	2009	0	0	T. Stephens

LekID	Year	Males	Females	Observer
Spring Gulch 3	1985	17	0	Denton
Spring Gulch 3	1986	36	0	Denton
Spring Gulch 3	1992	6	0	Hurley
Spring Gulch 3	1995	7	2	M. Atkins
Spring Gulch 3	1995	1	0	M. Atkins
Spring Gulch 3	2002	0	0	K. Idema
Spring Gulch 3	2003	0	0	K. Idema
Spring Gulch 3	2003	0	0	K. Idema
Spring Gulch 3	2005	6	0	T. Stephens
Spring Gulch 3	2005	4	0	T. Stephens
Spring Gulch 3	2005	0	0	T. Stephens
Spring Gulch 3	2006	5	2	T. Stephens
Spring Gulch 3	2007	17	0	T. Stephens
Spring Gulch 3	2008	7	0	T. Stephens
Spring Gulch 3	2009	9	0	T. Stephens
Spring Gulch 3	2010	4	0	T. Stephens
Spring Gulch 3	2010	3	0	T. Stephens

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. **MET**

Rationale:

This standard is being met in the spring Gulch Allotment. Water is being adequately retained on the landscape and the soils are stable and capable of supporting healthy plant communities. Runoff characteristics are barely observable even on slopes approaching 10 percent. Bare areas are small with little connectivity. Small terracettes are capturing water and slowing runoff. Pedestalling beneath grasses and shrubs is minimally expressed. There is no active gully formation. All indications are that the soils are stable and capable of supporting healthy plant communities. Water is being retained on the landscape and runoff is being minimized. Throughout the allotment, the soil structure, and vegetation and litter cover are adequate to protect the soil from rain drop impact and the erosive forces of overland flow.

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. **N/A**

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 lack of available perennial surface water, low precipitation rates, no other spring or seep areas, there is likely no potential for natural riparian areas to occur.

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. **MET**

Rationale:

The assessment sites represented a 10-14" shallow loamy and a loamy ecological sites. These sites were characterized as currently representing the Bluebunch wheatgrass/Needleandthead (HCPC) state (shallow loamy), and the Perennial Grass/Big sagebrush state (loamy) in the State and Transition Model of the NRCS Tech Reference. These sites are in a dynamic equilibrium with the Historic Climax Plant Community. This means that at this time these sites have appropriate pathways available to them to respond to proper grazing strategies, favorable environmental conditions, and environmental events such as wildfires. The actual grazing use – not the permitted - has been such that the sites and current states have remained in that dynamic equilibrium with the Historic Climax Plant Community. This situation lends further credence to the current plant communities being “resilient, diverse, and able to recover from natural and human disturbance”.

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: The leks in the Spring Gulch Allotment, as well as a winter concentration areas, are all at the higher upland elevations within the south and western portions of the allotment, (see map). Suitable nesting and early brood rearing habitats are more dispersed throughout this and neighboring allotments. Lek monitoring data for Spring Gulch 1 lek show the average sage-grouse attendance through the 1980s was in the single digits, the 90s was 11, and for the 2000s was 35 sage-grouse. For Spring Gulch 3, the 1980s was 27, the 90s was 5, and the 2000s was 7, and for Spring Gulch South Ridge lek it has never averaged more than a couple birds. While attendance at one lek has increased since the 1980s, it has decreased during this time period for the other lek. This most likely represents a rather static population with a change in preference for leks. Lek counts can be quite variable, and are not always the best indicator of habitat quality. Weather and/or predators can often affect lek activity and lek monitoring. As stated earlier sagebrush habitats in the southern and western portions of the allotment are providing sage-grouse winter concentration areas. This wintering use has been documented with both ground and air surveys within the past 5-7 years. And because of the proximity to the leks, sage-grouse nesting and early brood rearing are likely occurring throughout these habitats as well. Other species like the Mountain lion, chukar, and a variety of passerines, raptors, small mammals and predator species inhabit this allotment throughout the year.

Grey wolf occurrence is possible in this allotment, and would most likely occur during winter when elk concentrations are present.

Five key area transect locations were chosen in the allotment for monitoring and evaluation purposes. Two of these transects were primarily for sage-grouse habitat and assessment, and the other three to measure soil and vegetative parameters, and to conduct the evaluation of the 17 indicators of rangeland health, (see Allotment Map). The Sage-grouse habitat key area transect locations were in the west central and southwestern portion of the allotment, close to leks, and were intentionally located in what appeared to be some of the better sage-grouse habitat in the allotment with gentle topography and continuous sagebrush, (see transect photos). These locations were also within mule deer crucial winter range and elk general winter range. The sage-grouse habitat key areas are shown on the wildlife resources map below.

The other key area transect locations where the 17 indicators of rangeland health were assessed are north central (site # 1), the west central (site # 2), and south central (site # 4) portions of the allotment, and were more representative of the allotment in general. Sage-grouse habitat transect # 1 was approximately .25 miles south of the Spring Gulch # 1 lek already mentioned. Sagebrush canopy cover measured at this key area transect was found to be 10%, which for Wyoming is within the suitable range of sagebrush canopy covers anticipated for sage-grouse wintering, but low for recommended nesting habitat (15-25%). The second transect # 2 at the west central location was approximately .25 miles west of Spring Gulch # 3 lek and sagebrush canopy cover was found to be 11%. This is also a bit low for suitable nesting habitat, but desirable for winter concentration areas, which is what both this site and transect #1 are mapped as. For the Standards and Guides field evaluations, plant community composition and distribution as well as the functional structural groups (indicator #s 10 and 12) were found to be none to slight deviation from those anticipated for all three rangeland health transect locations talked about above, (see Table 1 under Summary of Monitoring/Assessment Data).

Habitats within the rangelands evaluated here are providing wildlife forage and cover needs, and are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to these habitats.

4.5 Standard 5

Water quality meets State standards. MET

None of the drainages are listed on the Wyoming DEQ 2010 305(b) Integrated State Water Quality Assessment Report and 2010 303 (d) List of Waters Requiring TMDLs.

Many studies have documented the effects of heavy grazing on riparian vegetation and soil erosion rates, but few studies have directly assessed impacts on water quality. Potential management impacts to water quality from rangelands as outlined in (Binkley, 1993) such as: excessive livestock waste production, resource extraction, stream channel modification, bank erosion from floods, erosion following wildfires, or erosion from overgrazing in uplands. The allotment was reviewed for any of these potential impacts to water quality. None of the above water quality associated impacts are applicable for this allotment. There is no BLM, USGS, or other state agency water quality data for these segments. Therefore compliance with Wyoming State Water Quality Standards is unknown, but nothing within available data indicates Standard Number 5 is not being met.

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 SPECIALIST SIGNATURES

X 

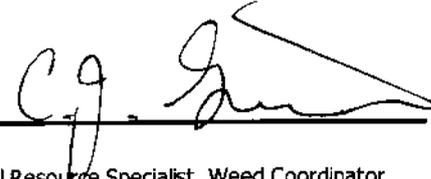
Rangeland Management Specialist

X 

Supervisory Rangeland Management Specialist

X 

Wildlife Biologist

X 

Natural Resource Specialist, Weed Coordinator

X 

Hydrologist

X _____

Other _____

X 

Natural Resource Specialist, Soils

X _____

Other _____

6.0 DETERMINATION

Based on the information provided in this assessment, *I have determined that all standards ARE being met, with the exception of Standard 5, Water Quality and Standard 6, Air Quality, which are determined to be UNKNOWN. Current livestock grazing IS in conformance with the standards.*

X  11/01/2012

Rebecca Spurgin
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

Rebecca Spurgin
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

Rebecca Spurgin
Field Manager, Worland Field Office

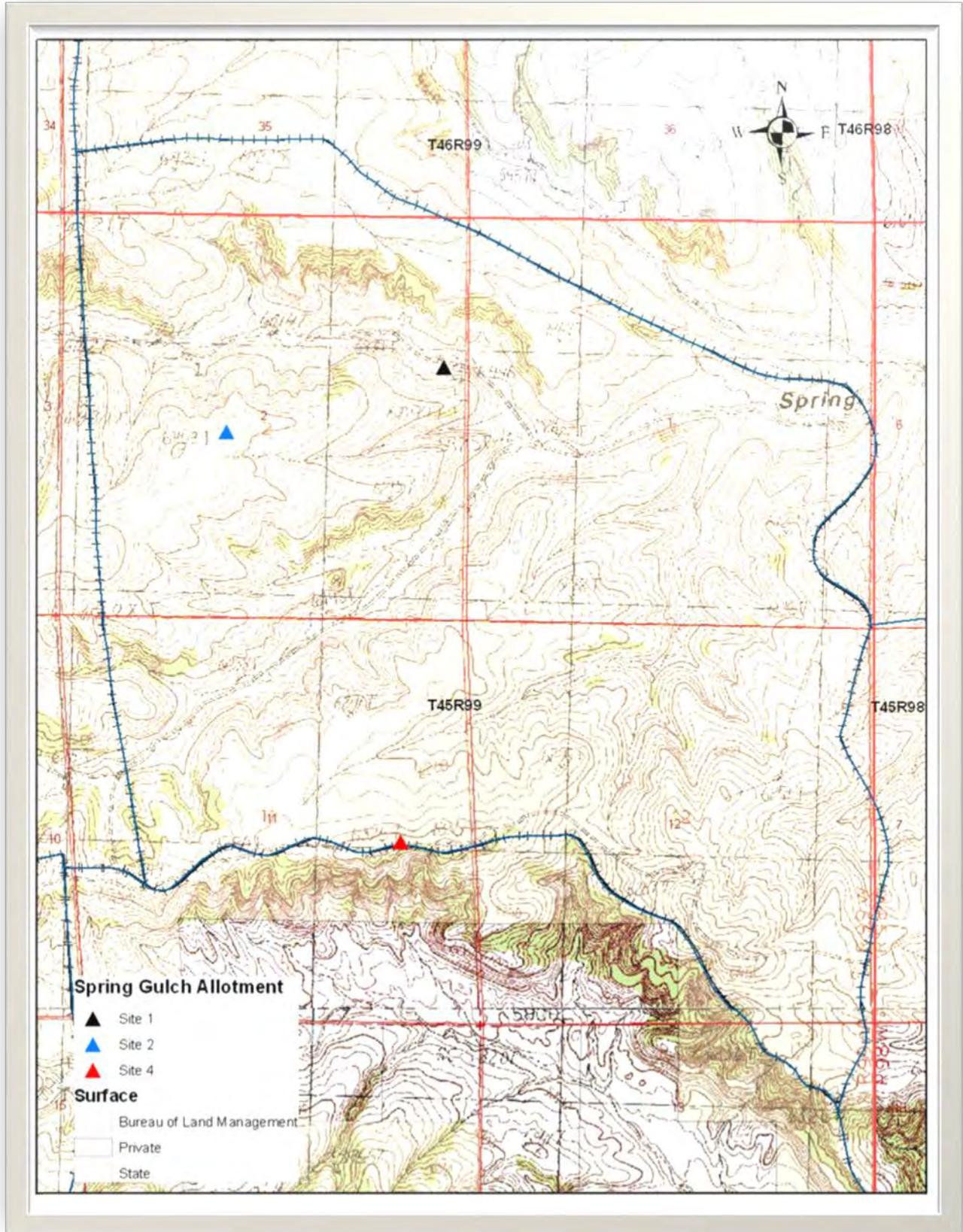
7.0 REFERENCES

Binkley, D., Brown, T. 1993. Management Impacts on Water Quality of Forests and Rangelands. USDA Forest Service. General Technical Report RM-239. pp 5-6.

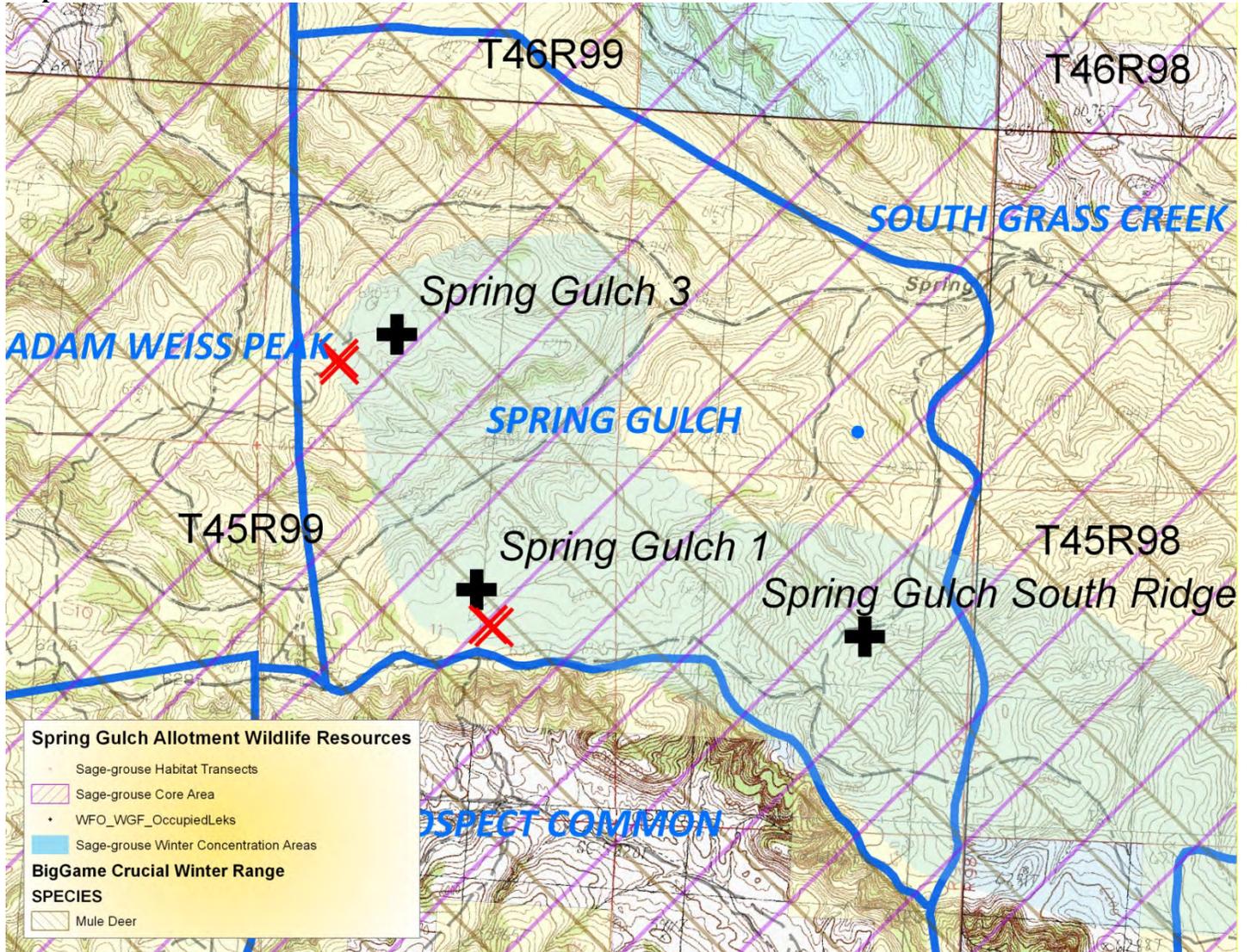
Rosgen, D., 1996. Applied River Morphology, Wildland Hydrology, Pagosa Springs, Colorado.

SHE, 2007. Cottonwood/Grass Creek Watershed Management Plan Level 1 Study, Wyoming Water Development Commission, Cheyenne Wyoming.

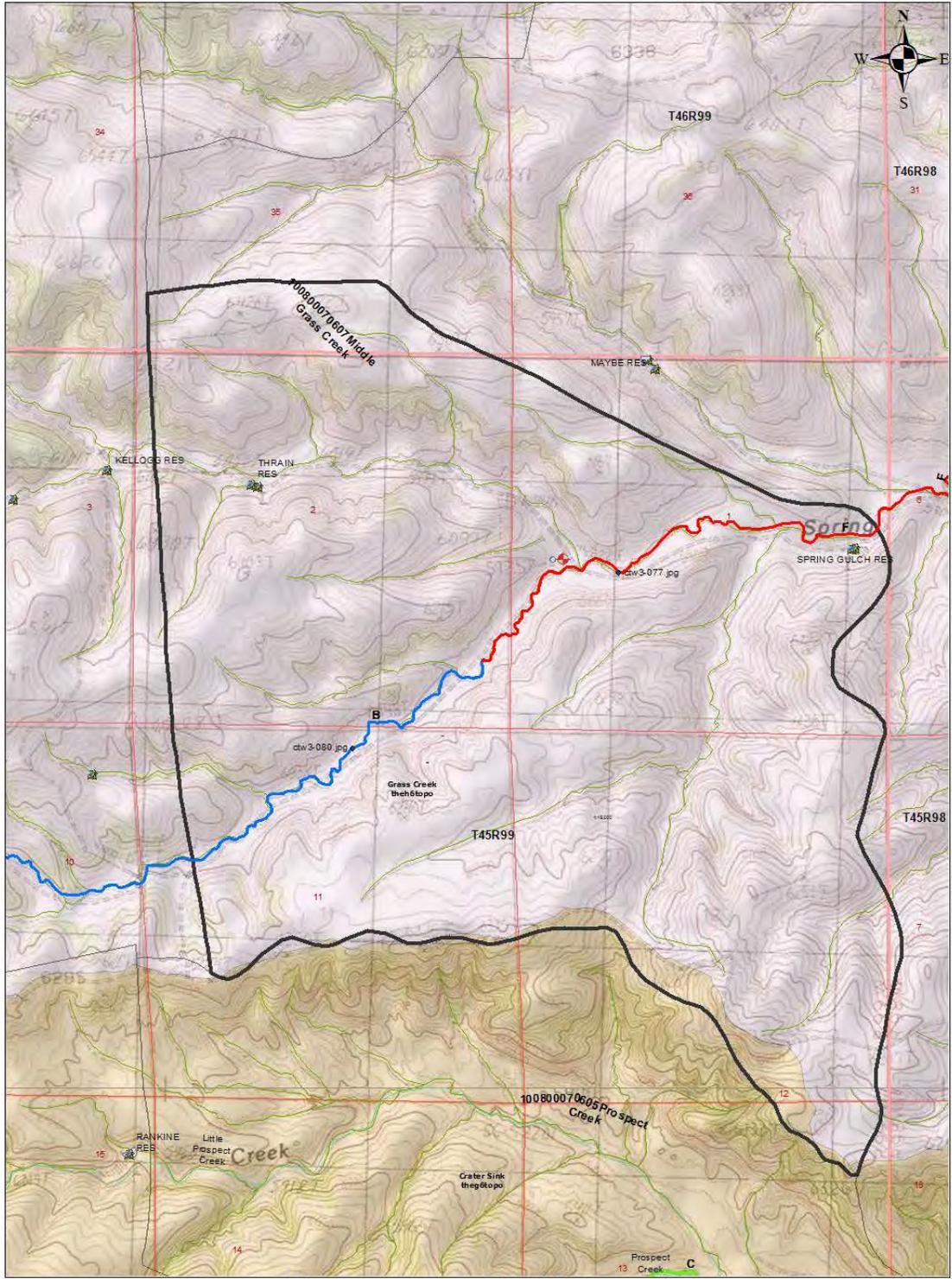
Map 1: Allotment



Map 2: Wildlife Resources



Map 3: Hydrology/Riparian

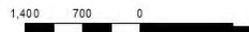


Spring Gulch Allotment #00531 Hydrology/Watershed Map

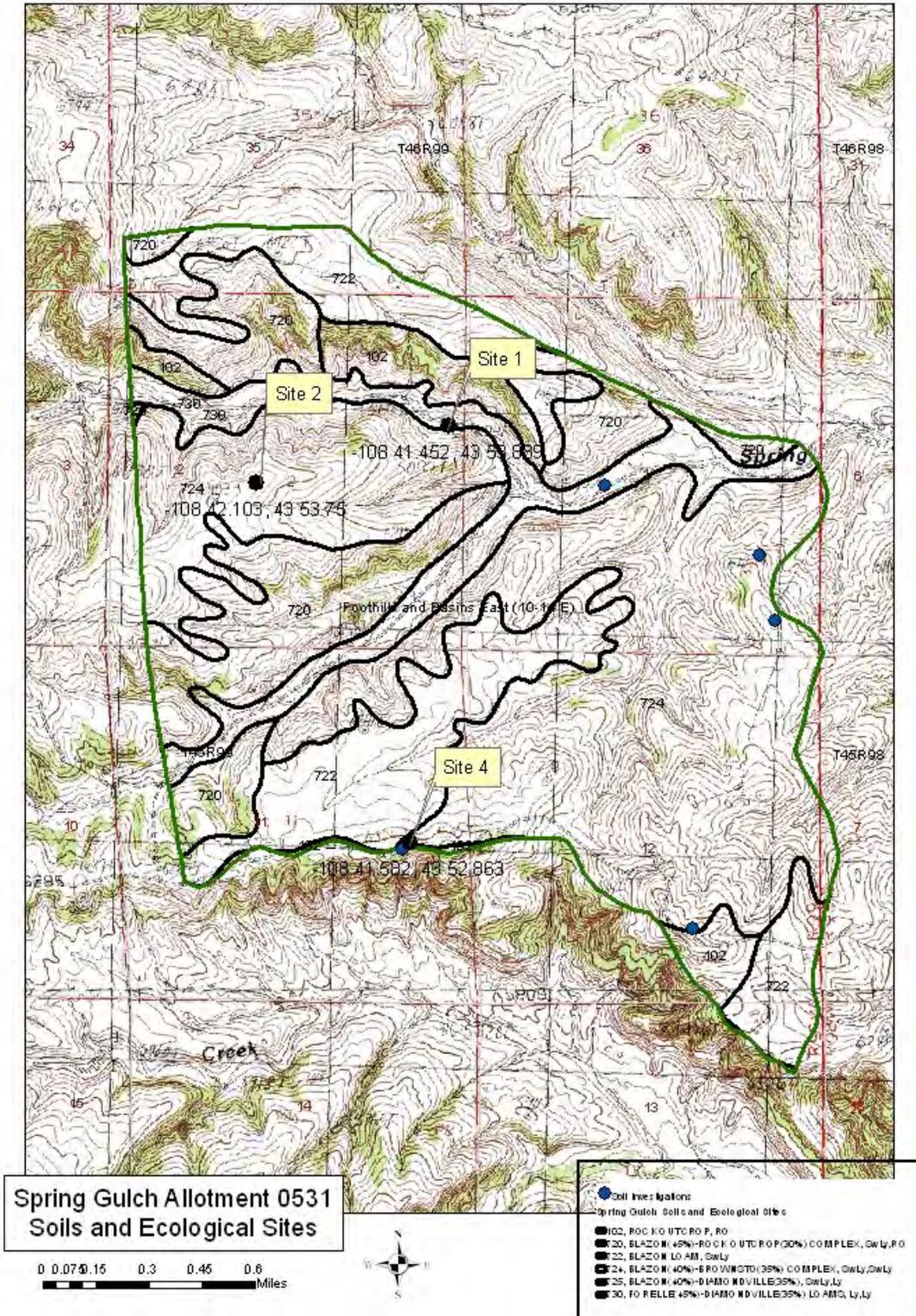
1 in = 1,250 feet

- ACE_Rosgen_Classification_Type
Rosgen Classification
- A
 - B
 - C
 - E
 - F
 - G
 - USGS NHD Drainage
 - WFO Reservoirs
 - + USGS NWIS Data Site

No Warranty is made by the BLM as to the accuracy, reliability, or completeness of this data. Original data were compiled from various sources. This information may not meet National Map Standards. This product was developed through digital means and may be updated without notification.



Map 4: Soils



ONSITE PHOTOS

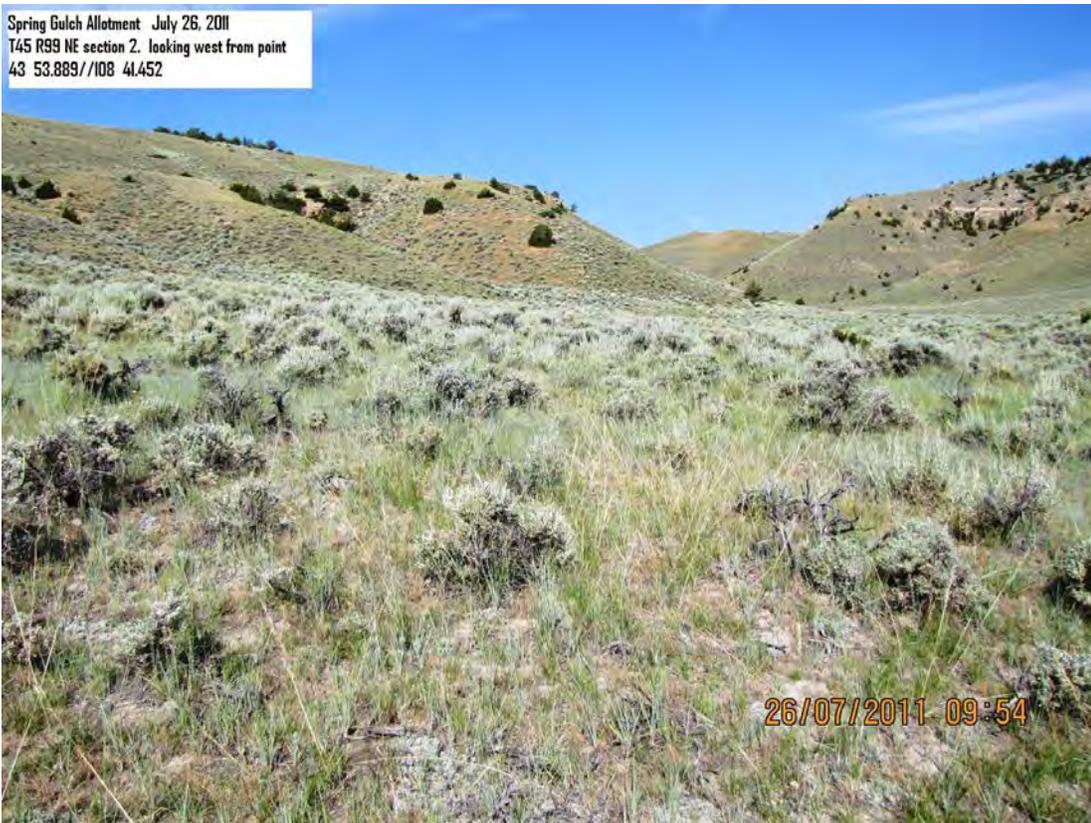
Spring Gulch Allotment 7/26/11
T45 R99 SE section II. looking NW from
43 52.863/108 41.582



26/07/2011 12:44

Site 4

Spring Gulch Allotment July 26, 2011
T45 R99 NE section 2. looking west from point
43 53.889/108 41.452



26/07/2011 09:54

Site 1

Spring Gulch Allotment 7/26/11
T45 R99 SW section 2. looking sw from point
43 53.750//108 42.103



26/07/2011 10:42

Site 2

Spring Gulch Allotment
T45 R99 SE section I
Looking WNW



01/06/2011 10:21

Spring Gulch Allotment
T45 R99 NE Section I2
Looking SW



Spring Gulch Allotment T45 R 99 Sect. II
SE 1/4. Pic depicts ground cover and veg.
component dominated by AGSP.





Photo of Western Sage-grouse Habitat Key Area Transect #2

