

**United States Department of the Interior  
Bureau of Land Management**

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**Evaluation and Determination of  
Colorado Standards for Rangeland Health  
on the  
Square S Allotment #06027  
March 21, 2022**

U.S. Department of the Interior  
Bureau of Land Management  
Northwest District  
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**BLM**

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# 1. INTRODUCTION

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## Background

The purpose of this Rangeland Health Evaluation is to summarize, analyze, and evaluate the assessment information to provide an organized overview of the Square S Allotment's current physical and biological conditions and processes. This data allows the evaluation of the area's

- 1.1. status in relation to land health standards, to identify cause and effect relationships, and to draw conclusions about whether, or not, each applicable Rangeland Health Standard is being met for the evaluation area as a whole

## Allotment Description

- 1.2. The Square S Allotment is in central Rio Blanco County (RBC), approximately 25 miles southwest of Meeker, Colorado. The allotment is in an area known as Piceance Basin and it lies generally between RBC Road 5 on the east and RBC Rd 103 on the west and extends southward to the field office boundary. Elevation in the allotment starts at 5,900 feet along the eastern end of the allotment near Piceance Creek and extends upward to 8,600 feet at the west end along the Cathedral Bluffs. The Summer Range which lies several miles further south at the head of the Douglas Creek and Roan Creek watersheds has elevations reaching 8,800 feet. The total acres within the Square S Allotment are 76,000, with a combination of BLM, State, and Private acreage.

### 1.2.1. Location

- 1.3. The Square S allotment is located in the southwest quarter of Rio Blanco County and the northwest quarter of Garfield County, in northwest Colorado. An overview of the allotment and pastures is shown in Figure 1.

## Management Category

Per the 1997 Resource Management Plan, all allotments in the WRFO are placed in one of three management categories (improve, custodial, or maintain) that define the intensity of management. The Square S Allotment is in the improve category. This is due to efforts needed to improve the resources, the conditions of pastures, and improve grazing conditions.

# 2. COLORADO'S RANGELAND HEALTH STANDARDS

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Colorado BLM has adopted the Fundamentals of Rangeland Health that outline the Standards for Rangeland Health and Guidelines for Grazing Management. The Fundamentals of Rangeland Health (CFR 4180.1) and the Standards and Guidelines for Rangeland Health require the BLM to ensure that upland soils, riparian areas, plant and animal communities, special status plants and animals and their habitat, and water quality are functioning properly. Functionality refers to the rangeland health attributes - soil/site stability, hydrologic function, and the integrity of the biotic

community. These attributes of rangeland health serve as indicators of the functional status of the ecological processes and site integrity. Additional information regarding Colorado's Rangeland Health Standards can be found in Figure 2.

### **3. ASSESSMENT AND MONITORING DATA**

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Information from the assessment may include quantitative data from monitoring and inventories, qualitative information, professional knowledge, and knowledge provided by State agencies, public land users, and others. Evidence used to make this determination is trend and RAP data, utilization data, precipitation data, AIM data, and HAF, PFC, and IIRH assessments/ratings.

#### **AIM and Trend Data Summary**

- To verify and support field office data trend analysis, this land health assessment used the
- 3.1. Rangelands Analysis Platform (RAP). This is a western US land cover data set (Jones et al. 2018, Rangeland Analysis Platform, <https://rangelands.app>) that provides continuous (percent cover) estimates of five cover classes (annual forbs and grasses, perennial forbs and grasses, shrubs, trees, and bare ground) at 30-m resolution annually from 1984 to 2019. Twenty-one years (1999–2019) of annual continuous land cover values of each class have been used to show trends.

- All eleven trend sites exhibited a static or downward trend in frequency and/or composition of key forage species (Figure 5). Several years of below average precipitation during the growing season (2002, 2012, 2018, 2020, and 2021) has caused increased stress and mortality of some key forage perennial bunch species throughout the area. All key sites lack at least some of the expected bunch grass species. Assessment, Inventory and Monitoring (AIM) provides the framework to inventory and quantitatively assess the condition and trend of vegetation and soil resources using a suite of indicators including plant species cover and composition, plant height and soil stability. Between 2011 - 2021, a total of 34 AIM plots were sampled and/or resampled
- 3.2. within the Square S allotment in the following pastures and ecological sites (Figure 6).

#### **Habitat Assessment Framework Summary**

Data from AIM plots located in mapped GRSG PHMA and GHMA were evaluated using the Habitat Assessment Framework ((HAF), Stiver et al. 2015). HAF is a multi-scale approach that assesses greater sage-grouse habitat using a suite of indicators. Site-scale assessments of seasonal habitats were conducted on 10 plots in the Square S allotment (Figure 11). All 10 sites were assessed using the indicators for summer/late brood-rearing seasonal habitat and winter seasonal habitat. Plot data used to assess winter habitat was collected during the breeding or brood-rearing season, with the assumption that sagebrush cover and structure does not change substantially throughout the year. In addition, three of the 10 sites were assessed for breeding habitat (nesting and early brood-rearing). Lek site suitability was assessed for the one active lek in the allotment. Figure 7. describes the habitat indicators and suitability characteristics for suitable greater sage-grouse seasonal habitats.

## **Proper Functioning Condition (Riparian) Summary**

Riparian systems in the Square S allotment were evaluated using the Properly Function Condition (PFC) Assessment. This assessment determines how well the physical processes (hydrologic, vegetative, and geomorphic) are functioning. Seventeen attributes are evaluated and based on channel condition, are given one of three ratings: PFC, Functioning-at-risk (FAR) or

- 3.3. Nonfunctional (NF). A FAR rating indicates limited functioning condition of the riparian area, which makes them susceptible to impairment. A NF rating indicates that the system does not provide the adequate physical attributes to dissipate moderate water flow, which leads to erosion, vegetation loss and reduced water quality. Continued livestock grazing and wild horse use have caused a negative impact on riparian areas, as summarized in PFC data available in Figure 8.

## **IIRH Rangeland Health Assessment Summary**

In 2019 Rangeland Health Assessments were completed at six sites using the seventeen

- 3.4. indicators of interpreting indicators of rangeland health (IIRH). Three points were assessed in the Equity Swizer Pasture, and one point each was assessed in the Yellow Creek, Stake Springs, and Horse Draw Pastures. All sites were in key areas, generally located in foothill swale ecological sites. Key areas are sampling units that characterize general range conditions over larger areas such as pastures or grazing allotments. Key areas are selected to monitor changes in range ecological condition or trend across representative areas (BLM Handbook H-4700-1, p 32). In 2021, the previous assessment site in the Stake Springs pasture, which is located inside the PEDHMA was revisited. A full assessment was not completed again at the time; however, the biotic community component was re-assessed using nine of the 17 indicators that evaluate biotic integrity. Additional data can be viewed in Figure 9.

## **4. EVALUATION OF STANDARDS AND GUIDELINES**

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The CEQ Regulations state that environmental assessments (EA)s should “briefly provide sufficient evidence and analysis” for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI) (40 CFR 1501.5) and that agencies should only briefly discuss issues other than significant ones (40 CFR 1500.4(e)). While many issues may arise during scoping, not all of the issues raised warrant analysis in an EA. Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between

- 4.1. alternatives, or 2) if the issue is associated with a significant impact, or where analysis is necessary to determine the significance of the impact. The following sections list the resources considered and the determination as to whether they require additional analysis.

### **Standard 1-Soils**

Healthy soils are a mixture of organic matter, minerals, gases, liquids, and organisms that together provide the foundation for vegetative and biotic communities. Soils provide the foundation for grasslands, woodlands, and forests, safeguard water and air quality, and support numerous public land uses.

Figure 3. provides a breakdown of soil units on the Square S Allotment. The dominant soil in the allotment is Rentsac channery loam accounting for over forty percent of the soils on BLM lands in the allotment. Additional descriptions of the soils shown in the table below can be found in the Rio Blanco and Garfield County soil surveys (USDA, Natural Resources Conservation Service, 1979 and 1977 respectively).

#### Current Standard Status-Soils

1. <input type="checkbox"/> Meeting the Standard	2. <input type="checkbox"/> Not Meeting the Standard but making progress towards.
3. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices are NOT significant factors.	4. <input checked="" type="checkbox"/> Not Meeting the Standard, current livestock grazing practices ARE significant factor.
5. <input type="checkbox"/> Not Meeting the Standard, cause not determined.	

#### Current Conformance-Soils

1. <input type="checkbox"/> Conforms with Guidelines for Livestock Grazing Management Practices	2. <input checked="" type="checkbox"/> Does NOT conform with Guidelines for Livestock Grazing Management Practices
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#### Rationale-Soils

Approximately 3,041 acres as identified below are NOT meeting this standard. Trend associated with the biotic component appears to be downward. Factors contributing to the downward trend are reduced soil surface stability, increased erosion associated with altered plant communities caused by prolonged concentrated grazing by livestock, wild horses, and increased bare ground resulting from continued multi-year drought.

Key forage areas, including areas surrounding riparian, specifically valley bottoms within 200' of riparian channels and open shrubland communities are NOT considered to be meeting Standard 1 for Upland Soils. These sites receive heavy impacts from more concentrated use, have higher amounts of bare ground, and are associated with increased erosion due to altered plant communities. Disturbance associated with more concentrated livestock use contributes to reduced surface stability and increased concentration of flow associated with trails.

Overall, assessments indicated soil stability departure as none-to-slight from expected levels described in Ecological Site Reference Sheets. Soil surface resistance to erosion was adequate with no significant soil loss or degradation beyond expected levels. Multi-year drought has contributed to increased bare ground with reduced expression of the herbaceous community including some mortality of native perennial bunchgrasses. Foothill Swale sites show moderate departure from expected condition with several sites showing reduced soil surface stability, increased rills, pedestals, erosion, and altered hydrologic function. This departure appears to be

associated with shifts in the biotic community where deep-rooted native perennial grasses are reduced and there is increased bare ground and/or increased presence to dominance of shallow rooted non-native annual species. Disturbance associated with more concentrated livestock use, wild horse presence, and continued drought conditions contributes to reduced surface stability and increased concentration of flow associated with trails.

## Standard 2-Riparian Systems

- 4.2. Brush Creek, Clear Creek and Box Elder Gulch are the three main perennial systems in the Square S allotment. Brush and Clear Creek, located in the Summer East Pasture, are higher elevation systems (8,000 – 8,200 ft) that are defined by steeper, narrow channels. Riparian vegetation in these two systems is comprised of both herbaceous and woody obligate species. Box Elder Gulch, located in the Stakes Spring pasture, is a lower elevation system (~6,800 ft) and is largely comprised of a mix of obligate and facultative herbaceous riparian vegetation. All three systems were evaluated using the Properly Function Condition (PFC) Assessment.

### Current Standard Status-Riparian

1. <input type="checkbox"/> Meeting the Standard	2. <input type="checkbox"/> Not Meeting the Standard but making progress towards.
3. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices are NOT significant factors.	4. <input checked="" type="checkbox"/> Not Meeting the Standard, current livestock grazing practices ARE significant factor.
5. <input type="checkbox"/> Not Meeting the Standard, cause not determined.	

### Current Conformance-Riparian

1. <input type="checkbox"/> Conforms with Guidelines for Livestock Grazing Management Practices	2. <input checked="" type="checkbox"/> Does NOT conform with Guidelines for Livestock Grazing Management Practices
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### Rationale-Riparian

The three main perennial riparian systems in the allotment are NOT meeting the standard and show a downward trend. Factors contributing to the downward trend are bank disturbance and over-widening of the channel caused by trampling of both livestock and wild horses. Additionally, there is inadequate riparian vegetation due to prolonged heavy grazing by both livestock and wild horses.

Brush Creek, Clear Creek and Box Elder Gulch, are functioning-at-risk and in some reaches are approaching or have reached a non-functional state. Severe and prolonged disturbance within and along the channels, associated largely with livestock (in the Brush and Clear Creek drainages) and wild horses (Box Elder Gulch), preclude any possibility for recovery of obligate

riparian vegetation. Trampling and trailing by livestock and wild horses, is prominent and widespread along all reaches of these systems, resulting in extensive bank shearing, trampling within the channels, and increased sediment loads. The only areas where recovery is evident are those small, protected spots that are inaccessible to livestock or wild horses. Noxious weeds are pervasive, particularly along the Brush and Clear Creek channels.

### Standard 3-Healthy Plant and Animal Communities

- 4.3. Analysis of the long-term vegetative trend studies indicated a mostly declining trend in the frequency of occurrence, and the composition of key forage plant species. Trend data from key areas can generally be extrapolated to represent conditions in most areas utilized by livestock including valley bottoms, areas with perennial riparian systems, ridges, areas with moderate slope, and areas that are coincident with the Piceance East Douglas (horse) Herd Management (PEDHMA) area. The generally declining conditions are likely the combined result of on-going drought coupled with extended use periods in some pastures, the lack of opportunity for regrowth, reproduction, or recovery, and heavier utilization areas in some parts of the allotment.

The allotment, which encompasses a wide variety of elevation ranges and habitat types, supports both elk and mule deer year-round. Due to the high diversity in the plant community, these areas generally provide forage year-round. In general, diverse plant communities comprised of high quality native perennial grasses and forbs are most beneficial for big game species. Colorado Parks and Wildlife (CPW) 2022 elk management plan provides information on herd population trends and management issues. Issues of concern identified for the Yellow Creek Elk Herd Data Analysis Unit (DAU E-10), included decline in habitat quality, drought, large-scale wildfires, competition with wild horses, oil and gas development, recreation, and disease. CPW 2020 mule deer management plan provides information on herd population trends and management issues of White River Deer Herd Analysis Unit (DAU D-7). Issues of concern identified for this deer herd included poor range conditions (particularly on winter ranges), drought, large-scale wildfires, and disease.

Birds of conservation concern that are known or likely to occur in the allotment include Brewer's Sparrow, Pinyon Jay, Broad-tailed Hummingbird, Long-eared Owl, Clark's Nutcracker, Cassin's Finch, and Virginia's Warbler. In general, diverse and productive plant communities provide the appropriate cover and forage resources for most migratory bird species to complete reproductive (breeding and brood-rearing) functions.

### Current Standard Status-Healthy Plant and Animal Communities

1. <input type="checkbox"/> Meeting the Standard	2. <input type="checkbox"/> Not Meeting the Standard but making progress towards.
3. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices are NOT significant factors.	4. <input checked="" type="checkbox"/> Not Meeting the Standard, current livestock grazing practices ARE significant factor.



5. <input type="checkbox"/> Not Meeting the Standard, cause not determined.	
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### Current Conformance- Healthy Plant and Animal Communities

1. <input type="checkbox"/> Conforms with Guidelines for Livestock Grazing Management Practices	2. <input checked="" type="checkbox"/> Does NOT conform with Guidelines for Livestock Grazing Management Practices
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### Rationale- Healthy Plants

Approximately 3,041 acres as identified below are NOT meeting this standard for Plant Communities with a downward trend. Factors contributing to the downward trend are the altered plant communities caused by prolonged concentrated grazing by livestock, wild horses, and the continued multi-year drought. This has specifically caused an increase in bare ground, the decrease in reproductive capabilities of native grasses and forbs leading to unfavorable alterations in plant community composition. Additionally, noxious and invasive species were variably present throughout the allotment.

Notably, the Foothill Swale sites, a key forage area that was sampled, exhibited anywhere from a moderate to extreme departure from expected conditions. Native perennial bunchgrasses represented only a small portion of the community composition, and there was often a strong reduction in species diversity. Invasive annual grasses and forbs were generally pervasive at these sites. Vigor and reproductive capability of perennial plants was strongly suppressed. Woody species such as basin big sagebrush and greasewood, were often the dominant cover type and were overly mature.

### Rationale-Animal Communities

Unfavorable shifts in community composition (loss of native perennial species, increases in annual grasses and forbs), declines in forage palatability, physical damage to channel and direct herbivory (riparian areas) have substantially reduced the extent and quality of habitats that provide important forage, thermal and nesting cover for most wildlife species to complete life cycle requirements.

### **Big Game Habitat**

Recent monitoring data shows a minimal to moderate departure from expected conditions in the mid-to-upper elevation vegetation communities. Deciduous browse is extensive, although some areas have become overly mature and less palatable. Recent vegetation treatments on ~440 acres have improved forage quality (increased palatability of woody browse and perennial grasses and forbs). Herbaceous cover is intact and representative of higher elevation vegetation communities. However, many sites have exhibited moderate shifts in expected condition of structural functional groups, with the most notable being a decline in perennial bunchgrass cover and an increase in tree cover. Noxious weeds (e.g., houndstongue) and annual species, but rather occur

at varying degrees throughout the allotment. Lower elevation communities that support big game (mule deer) during the winter months have seen deleterious shifts in plant community composition. This includes strong reductions in native perennial bunchgrasses, loss of species diversity, increases in annual grasses and forbs, and mortality and decadence in woody browse. This has reduced forage quality and availability on these winter ranges. These conditions are due to long-term drought and concentrated livestock and wild horse use. These factors impair native plants reproductive capabilities and increases their mortality rate, which decreases the ability to compete with non-native annuals.

### **Migratory Bird Habitat**

Vegetation communities that are not strongly influenced by livestock grazing (e.g., steep, mountain shrub dominated slopes) generally provide adequate nesting substrate, forage and cover resources for game birds, migratory birds, and raptors. Migratory birds associated with lower elevation sagebrush, and open shrubland or grassland communities (typically found in Foothill Swale ecological sites) have been negatively influenced by unfavorable shifts in plant community composition (e.g., loss of native perennial bunchgrasses and increases in invasive annuals such as cheatgrass). Birds associated with riparian communities (258 acres) are negatively impacted due to degraded habitat conditions associated with livestock and wild horse grazing as well as continued drought. Although a minor component of the total allotment (< one percent), riparian areas provide some of the most critical habitat for an array of wildlife species.

## **4.4. Standard 4-Special Status, T&E Species**

Special status animal species that are known to occur in the allotment include greater sage-grouse (GRSG) and Brewer’s sparrow, both sagebrush obligate species. The allotment is located in the Parachute-Piceance-Roan (PPR) greater sage-grouse population. This is a small, isolated population. Due to topographical constraints, habitat is naturally fragmented, with suitable habitat occurring almost exclusively on the ridge tops. There is one active lek on BLM-managed lands in the Stake Springs pasture. No male grouse have been observed on this lek since 2017, at which time six individuals were observed. One female was seen on the lek in 2021. Figure 10. provides a summary of site-scale GRSG habitat suitability ratings for the Square S allotment, while Figures 12 and 13 show the difference between suitable and non-suitable GRSG habitat.

### **Current Standard Status-Special Status, T&E Species**

1. <input type="checkbox"/> Meeting the Standard	2. <input type="checkbox"/> Not Meeting the Standard but making progress towards.
3. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices are NOT significant factors.	4. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices ARE significant factor.

5. <input type="checkbox"/> Not Meeting the Standard, cause not determined.	
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#### Current Conformance- Special Status, T&E Species

1. <input type="checkbox"/> Conforms with Guidelines for Livestock Grazing Management Practices	2. <input type="checkbox"/> Does NOT conform with Guidelines for Livestock Grazing Management Practices
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#### Rationale- Special Status, T&E Species

Ecological sites that can support sagebrush communities are meeting Land Health Standard 4 for special status animal species (namely sage-grouse). Diverse understories of native grasses and forbs are within the suitable range to provide adequate concealment and thermal cover for grouse during the breeding season. The number of preferred forb species were suitable at all sites. Over half of the plots sampled (largely confined to the Summer pasture) were classified as unsuitable/non-habitat due to limits in ecological site potential. Vegetation treatments targeting encroaching pinyon and juniper and taller stature deciduous shrubs have been implemented on 311 acres in the Swizer/Equity pasture and 127 acres in the Stake Springs C pasture, to allow for greater expression of sagebrush and perennial bunchgrasses in support of nesting and breeding functions for sagebrush obligate species.

#### **Bladderpod and Twinpod**

Bladderpod and twinpod are two federally threatened plant species known to occur in Rio Blanco County (RBC) in northwestern Colorado. The two species are endemic to soils developed on shales of the Green River Formation within the Piceance Basin, which is where Square S grazing allotment is located. Grazing, trampling, uprooting, habitat degradation, soil disturbance, and compaction by cattle and wild horses of bladderpod and twinpod have been reported in the Ryan Gulch ACEC (ACEC designated to protect *Physaria* spp.). The BLM constructed a livestock enclosure in the ACEC in response to these reports and noted extensive grazing of twinpod when unauthorized cattle entered. However, Twinpod monitoring at the Ryan Gulch ACEC in an area accessible to cattle found an increase in plant numbers and size from 1994 to 2000.

- 4.5. The magnitude of effects likely varies depending on stocking rate, frequency, duration, and season of grazing, as well as site slope and soil moisture.

#### Standard 5-Water Quality

There are several water wells throughout the allotment for cattle, wildlife, and wild horses with livestock being the beneficial use. Current data available through USGS at monitoring sites much lower in the watershed indicates that water quality standards are being met. It is assumed that all water sources are meeting clean water standards.

### Current Standard Status-Water Quality

1. <input checked="" type="checkbox"/> Meeting the Standard	2. <input type="checkbox"/> Not Meeting the Standard but making progress towards.
3. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices are NOT significant factors.	4. <input type="checkbox"/> Not Meeting the Standard, current livestock grazing practices ARE significant factor.
5. <input type="checkbox"/> Not Meeting the Standard, cause not determined.	

### Current Conformance- Water Quality

1. <input checked="" type="checkbox"/> Conforms with Guidelines for Livestock Grazing Management Practices	2. <input type="checkbox"/> Does NOT conform with Guidelines for Livestock Grazing Management Practices
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### Rationale- Water Quality

There are no known point sources of pollution that would affect State of Colorado water quality standards on the allotment. Recent grazing practices have caused negative impacts in the channels of Clear Creek, Brush, and Box Elder Gulch. Trampling and trailing by domestic and wild ungulates is prominent and widespread along all reaches of these systems resulting in extensive bank shearing, trampling within the channels, and increased sediment loads. Additionally, the continued drought conditions have negatively impacted water sources on the Square S. Allotments. These impacts are tied to long use periods yearly, and the lack of reliable upland water sources due to prolonged drought. Future compliance with Rangeland Health Standards and Guidelines would help ensure that conditions in the perennial channels will improve and water quality standards would continue to be met.

## 5. DETERMINATION AND CAUSAL FACTORS

Apparent causal factors for the determination include disturbance related to livestock grazing, wild horse use, and continued drought conditions. This has caused reduced vigor and reproductive ability of riparian and adjacent vegetation caused by prolonged heavy grazing, and pervasive noxious weeds caused by the low vigor, stressed, and damaged native plant community.

Precipitation levels in the area around the Square S allotment have varied through the last 40 years with wet and dry periods. The average during this timeframe has been roughly 15 percent below the historic average. Rio Blanco County has been in varying degrees of drought since 2020 resulting in long term stress and varying mortality of forage species.

Grazing use through the past ten years has been variable with combined average reported Actual Use of 68% percent of authorized AUMs. In regard to Pasture C (Stake Springs) of the Square S Allotment, it is within the Piceance-East Douglas Herd Management Area (PEDHMA). The current estimated population of wild horses within this area of the HMA is 98 adult horses with an expected total population of 118 wild horses by fall of 2022. The long-term average target population within this geographic area of the HMA is 30 adult horses. The long-term target reserves 360 AUMs of forage for wild horses, forage use by wild horses within the Stake Springs pasture at the current population level is over three times the amount reserved for wild horses.

Relative to actual use and current estimates of available forage, the general decline in apparent trend may be a factor of the lack of a grazing rotation to incorporate rest for each pasture; big game numbers over management objective; and in the Stake Springs pasture, the extremely high horse numbers coupled with year-round horse use. Timing, duration, and intensity of grazing along with environmental conditions such as drought have likely all contributed to the shifts in plant community composition. Specific to grazing factors there is lack of opportunity for native perennial grasses to meet physiological needs and reproduce associated with lack of growth/regrowth opportunity, competition with invasive annuals, and high utilization levels.

## Determination

- 5.1. The majority of Foothill Swale sites and all the riparian areas that are currently not meeting Standard 1, 2 and Standard 3 have the capability and are likely to improve and recover under modified/improved range management. Progress toward meeting the land health standards in these preferred areas would also be indicative of improvements throughout the remainder of the allotment.

Signature: \_\_\_\_\_  
William J. Mills, Field Manager

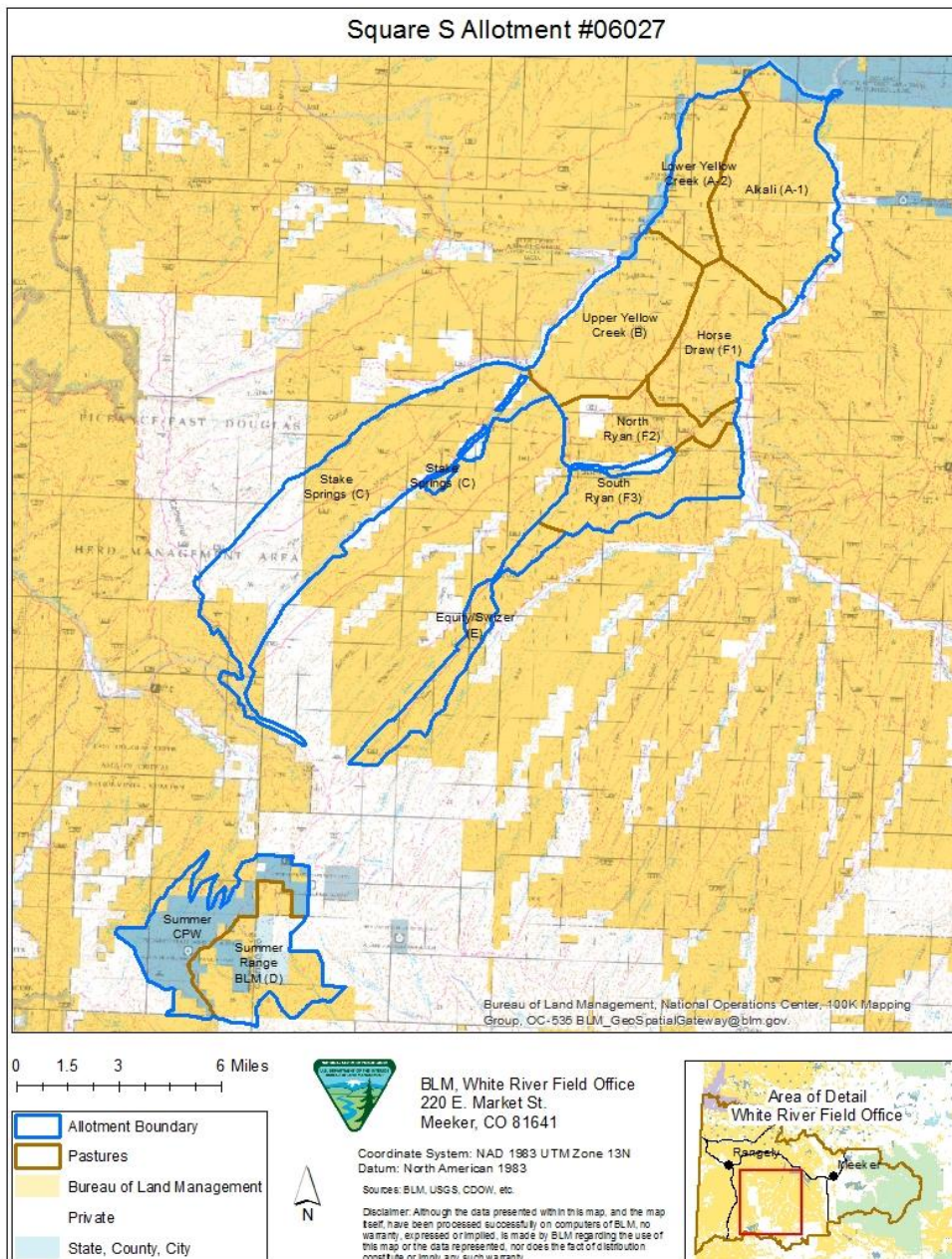
## 6. INTERDISCIPLINARY REVIEW

Name	Title	Area of Responsibility	Date Signed
Tyrell Turner	Rangeland Management Specialist	Upland Soils	5/25/2022
Lisa Belmonte	Wildlife Biologist	Riparian Systems, Migratory Birds and Greater Sage-Grouse, Big Game	5/25/2022
Mary Taylor	Rangeland Management Specialist	Vegetation, Project Lead	5/25/2022
Heather Woodruff	Ecologist	Threatened Plants	5/25/2022
Kyle Arnold	Hydrologist	Water Quality	5/25/2022

Cody Walton	Archaeologist	Cultural Resources	5/25/2022
Pete Doan	Planning & Environmental Coordinator	NEPA Compliance	5/25/2022

# APPENDIX A. FIGURES

Figure 1. Square S Allotment



**Figure 2.** BLM Colorado Standards for Rangeland Health

**Standard 1:** UPLAND SOILS EXHIBIT INFILTRATION AND PERMEABILITY RATES THAT ARE APPROPRIATE TO SOIL TYPE, CLIMATE, LANDFORM, AND GEOLOGIC PROCESSES. ADEQUATE SOIL INFILTRATION AND PERMEABILITY ALLOWS FOR THE ACCUMULATION OF SOIL MOISTURE NECESSARY FOR OPTIMAL PLANT GROWTH AND VIGOR AND MINIMIZES SURFACE RUNOFF

**Standard 2:** RIPARIAN SYSTEMS ASSOCIATED WITH BOTH RUNNING AND STANDING WATER FUNCTION PROPERLY AND HAVE THE ABILITY TO RECOVER FROM MAJOR DISTURBANCE SUCH AS FIRE, SEVERE GRAZING, OR 100-YEAR FLOODS. RIPARIAN VEGETATION CAPTURES SEDIMENT, AND PROVIDES FORAGE, HABITAT AND BIO-DIVERSITY. WATER QUALITY IS IMPROVED OR MAINTAINED. STABLE SOILS STORE AND RELEASE WATER SLOWLY.

**Standard 3:** HEALTHY, PRODUCTIVE PLANT AND ANIMAL COMMUNITIES OF NATIVE AND OTHER DESIRABLE SPECIES ARE MAINTAINED AT VIABLE POPULATION LEVELS COMMENSURATE WITH THE SPECIES AND HABITAT'S POTENTIAL. PLANTS AND ANIMALS AT BOTH THE COMMUNITY AND POPULATION LEVEL ARE PRODUCTIVE, RESILIENT, DIVERSE, VIGOROUS, AND ABLE TO REPRODUCE AND SUSTAIN NATURAL FLUCTUATIONS, AND ECOLOGICAL PROCESSES.

**Standard 4:** SPECIAL STATUS, THREATENED AND ENDANGERED SPECIES (FEDERAL AND STATE), AND OTHER PLANTS AND ANIMALS OFFICIALLY DESIGNATED BY THE BLM, AND THEIR HABITATS ARE MAINTAINED OR ENHANCED BY SUSTAINING HEALTHY, NATIVE PLANT AND ANIMAL COMMUNITIES.

**Standard 5:** THE WATER QUALITY OF ALL WATER BODIES, INCLUDING GROUND WATER WHERE APPLICABLE, LOCATED ON OR INFLUENCED BY BLM LANDS WILL ACHIEVE OR EXCEED THE WATER QUALITY STANDARDS ESTABLISHED BY THE STATE OF COLORADO. WATER QUALITY STANDARDS FOR SURFACE AND GROUND WATERS INCLUDE THE DESIGNATED BENEFICIAL USES, NUMERIC CRITERIA, NARRATIVE CRITERIA, AND ANTI-DEGRADATION REQUIREMENTS SET FORTH UNDER STATE LAW AS FOUND IN (5 CCR 1002-8), AS REQUIRED BY SECTION 303(C) OF THE CLEAN WATER ACT.

These standards are designed to maintain or achieve healthy public lands while allowing for the development of local goals and objectives.



**Figure 3.** Soils on BLM lands in the Square S. Allotment

<b>Soils Square S Allotment (BLM only)</b>		
<b>Soil Unit Name</b>	<b>BLM Acres</b>	<b>Percent of allotment</b>
Barcus channery loamy sand, 2 to 8 percent slopes	1088	1.43%
Castner channery loam, 5 to 50 percent slopes	231	0.30%
Cowdrey-Tampico loams, 15 to 50 percent slopes	19	0.03%
Forelle loam, 3 to 8 percent slopes	261	0.34%
Forelle loam, 8 to 15 percent slopes	57	0.08%
Glendive fine sandy loam	1779	2.34%
Hagga loam	140	0.18%
Havre loam, 0 to 4 percent slopes	27	0.04%
Irigul channery loam, 5 to 50 percent slopes	1031	1.36%
Irigul-Parachute complex, 5 to 30 percent slopes	1684	2.22%
Miscellaneous water	12	0.02%
Northwater loam, 5 to 50 percent slopes	1001	1.32%
Northwater-Adel complex, 5 to 50 percent slopes	279	0.37%
Parachute loam, 25 to 75 percent slopes	417	0.55%
Parachute-Irigul complex, 5 to 30 percent slopes	297	0.39%
Parachute-Irigul-Rhone association, 25 to 50 percent slopes	967	1.27%
Parachute-Rhone loams, 5 to 30 percent slopes	386	0.51%
Piceance fine sandy loam, 5 to 15 percent slopes	2039	2.68%
Razorba channery sandy loam, 30 to 75 percent slopes	31	0.04%
Redcreek-Rentsac complex, 5 to 30 percent slopes	3539	4.66%
Rentsac channery loam, 5 to 50 percent slopes	31317	41.21%
Rentsac-Piceance complex, 2 to 30 percent slopes	3917	5.15%
Rhone loam, 30 to 75 percent slopes	272	0.36%
Rock outcrop	44	0.06%
Starman-Vandamore complex, 5 to 40 percent slopes	1096	1.44%
Torriorthents-Rock outcrop complex, 15 to 90 percent slopes	5868	7.72%
Tosca channery loam, 25 to 80 percent slopes	1	0.00%
Veatch channery loam, 12 to 50 percent slopes	172	0.23%
Yamac loam, 2 to 15 percent slopes	3273	4.31%
<b>Total Allotment 76,000 acres</b>	<b>Total BLM: 61345</b>	<b>80.72%</b>

**Figure 4.** Pasture, Ecological Site, Plot ID, Date Sampled for the 34 AIM Plots in Square S allotment

Pasture	Range/Ecological Site	Most Recent Plot ID	Date Sampled
Alkali	Foothill Swale	SUP-RS-053	8/2/2012, 6/8/2016, 8/6/2018
	Pinyon-Juniper	WyoSage-582	6/8/2016
		WyoSage-598	8/3/2016
		WyoSage-660	7/20/2017
	Stony Foothills	SUP-ST-061	6/27/2012, 7/30/2017, 7/26/2018
Dry Ranch	Foothill Swale	SUP-RS-052	6/18/2012, 7/26/2018
Equity/Swizer	Mountain Loam	TRT-GRSG-LS-001*	7/3/2018, 6/19/2019, 7/7/2020
	Rolling Loam	TRT-GRSG-RL-007*	8/5/2019
Horse Draw	Pinyon-Juniper	WyoSage-645	7/20/2017
		WyoSage-1281	8/12/2020
	Stony Foothills	103	6/18/2012
N Ryan	Foothill Swale	116	6/18/2012
	Pinyon-Juniper	PJ-461	7/22/2019
		PJ-1189	7/14/2020
		WyoSage-802	6/26/2020
S Ryan	Pinyon-Juniper	63	7/20/2011
	Rolling Loam	78*	8/4/2011
		90(2011)	7/20/2011, 6/26/2012
		SUP-RL-057	8/8/2011, 6/26/2012, 7/26/2018
Stake Springs	Brushy Loam	CO-1013	8/6/2020
		LO-088	7/27/2011, 8/11/2016
	Dry Exposure	GOS-106	7/19/2017
		SUP-DE-093A	6/18/2017
		SUP-DE-093B**	7/11/2017
	Pinyon-Juniper	PJ-160	7/28/2011, 6/28/2012, 6/27/2018
		MtnSage-274	6/7/2018
	Rolling Loam	TRT-GRSG-RL-003*	7/10/2018
Summer BLM "D"	Aspen Woodland	9	8/31/2011
	Brushy Loam	PHMA-05	6/19/2019
Summer CDOW	Aspen Woodland	AW-026	9/21/2015, 8/23/2018
		AW-023	9/14/2015, 9/12/2016
		QA-1229	8/18/2020
Upper Yellow Cr	Pinyon-Juniper	WyoSage-630	6/28/2017
		79(2011)	8/8/2011, 6/28/2012
	Rolling Loam	WyoSage-708	7/30/2018
		WyoSage-724	8/22/2018
	Stony Foothills	102	8/1/2012

**Figure 5. Trend Data Summary**

<b>Trend site A-1</b>	(Alkali Pasture, Rolling Loam site) Composition of Functional/Structural (F/S) groups are altered with sagebrush dominating the site over the long term. Several expected bunchgrasses are absent (Bluebunch wheatgrass, native bluegrasses, Indian ricegrass Junegrass, squirreltail) or present below expected levels (needle-and-thread grass, Sandberg bluegrass,). Western wheatgrass is present as expected. There has been an apparent general decline in most perennial forage species since 1981.
<b>Trend site A-2</b>	(Alkali Pasture, Pinyon/juniper site) Site was burned in 1988 and crested wheatgrass has been the dominant grass on this site since that time. Composition shows that expected bunchgrasses are absent (Bluebunch wheatgrass, Salina wildrye, native bluegrasses, Junegrass, squirreltail) or present below expected levels (Indian ricegrass). There has been a notable decline in ricegrass since 1981.
<b>Trend site A-3</b>	(Lower Yellow Creek Pasture, Pinyon/juniper site) Pinyon is increasing since the early 2000s (field sheets). Sagebrush has increased and dominates the site. Some expected bunchgrasses absent (Bluebunch wheatgrass, western wheatgrass, squirreltail) or below expected levels (Indian ricegrass). Composition shows a notable decline in most key forage species present (needle-and-thread, western wheatgrass).
<b>Trend site B-1</b>	Horse Draw Pasture, Rolling Loam site) Sagebrush has decreased but F/S groups altered with sagebrush dominating site over the long term. Composition shows some expected bunchgrasses are absent (Bluebunch wheatgrass, squirreltail) or are present below expected levels (Needle-and-thread, Indian ricegrass, western wheatgrass). Stipa though common has reduced contribution to the composition through time. Junegrass only forage species present at above expected levels. There was a low-level presence of cheatgrass as of the late 1990s
<b>Trend site B-2</b>	Upper Yellow Creek Pasture (Pinyon Juniper site) Sagebrush has been variable but generally has decreased since 1981. Western wheatgrass has varied but continues to be dominant grass. Indian ricegrass is absent. There has been some decline in other bunch grasses (needle-and-thread, Junegrass) as well, but they are still well represented. This site has fair diversity of forage species. Shifts in composition are potentially associated with increases in tree cover.
<b>Trend Site F-1</b>	(Horse Draw Pasture, Pinyon Juniper site) This site has not been re-read since 1998. At that time data from 1981 through 1998 showed a notable decline in Indian ricegrass and in both Western and Bluebunch wheatgrasses, Cheatgrass had increased steadily through time and was common in the plant community. Needle-and-thread grass and Sagebrush remained as low-level components. This site is within old chaining area and aerial photography shows a notable increase in tree cover over last ten to 15 years. Most forage species were present at lower-than-expected levels.
<b>Trend Site C-1</b>	(Stake Springs Pasture, Rolling Loam site) This site is dominated by sagebrush. Wheatgrasses are static or show a slight decrease and are below expected levels. Other native perennial forage species are absent. This site is also in an area preferred and used by wild horses year-round, which is likely influencing plant community health. See data below from Piceance Basin HMA 2018-2021 Utilization Report.
<b>Trend Site C-3</b>	(Stake Springs Pasture, Mountain Loam site) Data showed this site's functional and structural groups were altered with the site being dominated by sagebrush. Listed dominant and subdominant grass species were either absent (Mountain brome, native fescues) or present well below expected levels. This site is also in an area preferred and used by wild horses nearly year-round. See data below from Piceance Basin HMA 2018-2021 Utilization Report.
<b>Trend Site D-1</b>	(Summer BLM Pasture, Loamy Slopes/Mountain Loam site) Sagebrush has been variable through time but continues to dominate site. Kentucky bluegrass is the dominant grass species recorded. Except for Needle-and-thread grass, most expected grasses are absent (Indian ricegrass, Junegrass, fescues, and mountain brome) or present below expected levels (wheatgrasses).
<b>Trend Site D-2</b>	(Summer BLM Pasture, Mountain Swale site) Vegetation on this site has varied through time. Sagebrush has been increasing through the last ten years. Currently basin wildrye is absent. Needlegrasses are present as expected. There has been a general decrease in wheatgrass. Some other expected grasses are absent. Kentucky bluegrass has remained a variably present undesirable component of the plant community.
<b>Trend Site D-3</b>	(Summer CPW Pasture, Loamy slopes/Mountain Loam site) Sagebrush has declined slightly but is still present at expected levels. Except for Muttongrass, there has been a slight to moderate decrease in other grasses present (wheatgrass, Needle-and-thread). There is fair diversity though several expected species absent (fescues, native blue grasses, native bromes, Junegrass, squirreltail).

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**Figure 7.** Site-scale Habitat Indicators and Suitability Characteristics for Breeding, Late Summer/Brood-rearing, Winter and Lek habitats.

Vegetation Variable	Breeding Habitat (Nesting/Early Brood-rearing) (March 1 – June 15)	Late Summer/Brood- rearing (June 16 – October 31)	Winter Habitat (November 1 – February 28)	Lek Suitability
Sagebrush Canopy Cover (mean)	20-30% Mesic 15-30% Arid	10 – 25%	>25% >20%	
Sagebrush Height (mean)	40-80 cm Mesic 30-80 cm Arid	35-80 cm Mesic 30-80 cm Arid	>10 inches (above snow) 10 inches (above snow)	
Predominant Sagebrush Shape	Spreading			
Perennial Grass/Forb Height (mean)	>=15 cm			
Perennial Grass/Forb Canopy Cover (mean)		>=25% Mesic >=15% Arid		
Perennial Grass Canopy Cover (mean)	>=20% Mesic >=10% Arid			
Perennial Forb Canopy Cover (mean)	>=15% Mesic >=5% Arid			
Preferred Forb Availability (relative to site potential) -# of preferred forb species	Preferred forbs are common; 5 or more species present	Preferred forbs are common; 5 or more species present		
Availability of Sagebrush Cover				Lek has adjacent protective sagebrush cover (within 100m)
Proximity of Detrimental Land Uses				Detrimental land uses are not within line of sight of lek and absent to uncommon within 3 km of lek
Proximity of Trees or Other Tall Structures				Trees or other tall structures are not within line of sight of lek and none to uncommon within 3 km of lek

**Figure 8.** Proper Functioning Conditions Summary Data

Riparian - Proper Functioning Condition		Comment
System	Brush Creek	All elements are present to allow recovery, however excessive trampling and repeated disturbance (largely from livestock) prevent possibility for improvements along the channel. Obligate herbaceous riparian vegetation is sparse and discontinuous. Herbaceous plants exhibit low vigor. Mostly early seral species, with some remnant sedges and willows in protected areas. Willows are small and lack vigor and exhibited excessive hedging. Only notable improvements are in areas that are inaccessible to livestock Channel is over widened with excessive bank shearing. In some areas channel is not evident (saturated bottom). Noxious weeds including Canada thistle, bull thistle and houndstongue. Little to no change noted from 2009 assessment. Low water flow in some reaches. Extended drought.
Site	Riparian 1	
Pasture	Summer BLM D	
Soil Stability departure	n/a	
Hydrologic Function departure	n/a	
Biotic Integrity departure	n/a	
Assessment	Functioning at Risk - Trend Downward	
Riparian - Proper Functioning Condition		Comment
System	Clear Creek	Comments for Brush Creek PFC are directly applicable to this system. The system is narrowly functioning at risk and in many areas is approaching or has reached a non-functional state. This is due in large part to excessive and prolonged disturbance and heavy grazing which has resulted in loss of obligate vegetation (both herbaceous and woody), over widening and loss of sinuosity in the channel, increased sediment loads, and eroding and down cut banks.
Site	Riparian 2	
Pasture	Summer BLM D	
Soil Stability departure	n/a	
Hydrologic Function departure	n/a	
Biotic Integrity departure	n/a	
Assessment	Functioning at Risk - Trend Downward	
Riparian - Proper Functioning Condition		Comment
System	Box Elder Gulch	The bottom three reaches (1-3) are functioning at risk. All elements are present to allow recovery, however excessive trampling, trailing and repeated disturbance (largely from livestock and wild horses) prevent possibility for improvements along the channel. There is marginal riparian vegetation in both distribution and density along the banks. Noxious weeds (houndstongue, bull and Canada thistle) are present throughout. Adjacent terrace dominated by invasive annuals which contributes to heavy sediment loads. Lack of sinuosity. Bank shearing and bank caving are common. The top three reaches (4 – 6) are non-functional. The channel is severely entrenched with little to no access to the floodplain. Banks are undercutting and the channel lacks sinuosity (overly straight). These reaches essentially lack any form of
Site	Riparian 3	
Pasture	Stake Springs C	
Soil Stability departure	n/a	
Hydrologic Function departure	n/a	
Biotic Integrity departure	n/a	
Assessment		

Assessment	Functioning at Risk to non-functional - Trend Not Apparent to downward	obligate riparian vegetation. Wild horse use is evident along the channel.
Riparian - Proper Functioning Condition		Comment
System	Stake Springs Draw, Reach 2	This reach was last assessed in 2013. At that time, it was noted that there was low to moderate riparian potential due to ephemeral flows, and sparse riparian vegetation. Livestock impacts such as trailing and trampling were noted as a definitely affecting the channels ability to recover and diminishing the overall potential.
Reach	Riparian 4	
Pasture	Stake Springs C	
Soil Stability departure	n/a	
Hydrologic Function departure	n/a	
Biotic Integrity departure	n/a	
Assessment	Functioning at Risk - Trend Not Apparent	

**Figure 9.** Rangeland Health Assessment Summary for Square S Allotment

Rangeland Health Assessment Summary		
Square S Allotment		Comment
Site	1	Site was in an area that burned ~20 years ago. Soil and hydrologic functions appear to be functioning as expected. Diverse biotic community, although Basin wildrye still only a minor component. Heavy rabbitbrush, which is expected after disturbance. Invasive annuals are somewhat common throughout. Annual production slightly reduced due to extended drought conditions. Overall, site is functioning as expected for an early seral site.
Ecological Site	Foothill Swale	
Pasture	Equity Swizer	
Soil Stability departure	None to Slight	
Hydrologic Function departure	None to Slight	
Biotic Integrity departure	None to Slight	
Assessment	Functioning	
Square S Allotment		Comment
Site	2	Soil and hydrologic functions exhibit a slight to moderate deviation from expected conditions. Soil stability is lower than expected with increased levels of bare ground. The biotic community has deviated considerably from expected conditions. Invasive annuals almost completely dominate the site. There is minimal contribution from desired native grasses. Reproductive capability of perennial plants is reduced due to competition with invasive annuals. Portions of this site are in an old burn scar that was likely seeded with crested wheatgrass.
Ecological Site	Foothill Swale	
Pasture	Equity Swizer (lower)	
Soil Stability departure	Slight to Moderate	
Hydrologic Function departure	Slight to Moderate	
Biotic Integrity departure	Moderate to extreme	
Assessment	Not Functioning	
Square S Allotment		Comment
Site	3	Functioning near expected given natural site limitations (e.g., drought). Biotic community is vigorous, with diverse native perennial grasses and forbs. Higher levels of PASM than expected. Diverse woody component with some decadence in ARTR noted. Minimal presence of invasive annuals.
Ecological Site	Foothill Swale	
Pasture	Equity Swizer (upper)	
Soil Stability departure	None to Slight	
Hydrologic Function departure	None to Slight	
Biotic Integrity departure	None to Slight	
Assessment	Functioning	
Square S Allotment		Comment
Site	4	Soil functions are near expected, however, extreme shifts in the biotic community have reduced soil surface stability. Hydrologic functions are slightly to moderately reduced, with higher levels of bare ground and increased litter accumulation. Biological integrity is severely compromised. The entire valley bottom is dominated by shrubs and invasive annuals, with a near complete lack of native perennial
Ecological Site	Foothill Swale	
Pasture	Horse Draw	
Soil Stability departure	None to Slight	
Hydrologic Function departure	Slight to Moderate	



Biotic Integrity departure	Moderate to Extreme	bunchgrasses. Reproductive capability of perennial plants is heavily reduced due to competition with annual plants.
Assessment	Not Functioning	
Square S Allotment		Comment
Site	5	Absence of deep-rooted perennial grasses has negatively influenced the soil and hydrologic functions of the site, resulting in reduced soil stability and infiltration and increased moisture loss due to runoff and surface evaporation. Biotic community is severely altered. The entire site is dominated by shrubs and invasive annuals. Native perennial bunchgrasses are severely reduced with only small, isolated areas with intact communities remaining. Competition with weedy annuals has reduced the reproductive potential for remaining native grasses.
Ecological Site	Foothill Swale	
Pasture	Upper Yellow Creek	
Soil Stability departure	Slight to Moderate	
Hydrologic Function departure	Slight to Moderate	
Biotic Integrity departure	Moderate to Extreme	
Assessment	Not Functioning	
Square S Allotment		Comment
Site	6	Shifts in the biotic community have resulted in slight to moderate changes in soil and hydrologic functions. Increased bare ground has resulted in slight erosion and soil surface loss. Year-long grazing by wild horses has reduced the vigor and frequency of perennial grasses throughout the entire area. Native perennial bunchgrasses are common, but sparse. Invasive annuals are common, but do not dominate the site.
Ecological Site	Foothill Swale/ Rolling Loam	
Pasture	Stake Springs (HMA)	
Soil Stability departure	Slight to Moderate	
Hydrologic Function departure	Slight to Moderate	
Biotic Integrity departure	Moderate	
Assessment	Functioning	
Square S Allotment		Comment
Site	7	Flow patterns in interspaces. Infiltration likely reduced to excessive bare ground. Virtually no herbaceous litter present except for underneath shrubs. Reproductive capability of perennial plants is severely compromised. No seed heads observed on grasses, heavy utilization, grasses are short in stature and lack vigor. Wild horse use/sign (e.g., manure) is common throughout site. Year-long grazing pressure by wild horses prevents perennial grasses from meeting physiological needs to restore root reserves or produce seed.
Ecological Site	Pinyon-Juniper/ Rolling Loam	
Pasture	Stake Springs (HMA)	
Soil Stability departure	Slight to Moderate	
Hydrologic Function departure	Slight to Moderate	
Biotic Integrity departure	Moderate to Extreme	
Assessment	Not Functioning (for biotic community)	

**Figure 10.** Seasonal Habitat Suitability Rating for Plots in GRSG PHMA and GHMA in the Square S Allotment.

GRSG Seasonal Habitat	Number of Points Analyzed	Suitable	Marginal	Unsuitable/Non-habitat
Lek	1	1 (100%)	0	0
Breeding (Nesting and early brood-rearing)	3	1 (33%)	1 (33%)	1 (33%)
Summer /Late Brood-rearing	13	3 (23%)	3 (23%)	7 (54%)
Winter	13	0	5 (38%)	8 (62%)

**Figure 11.** Values for HAF Suitability Analysis by Plot.

Site#	Date Sampled	Pasture	Sagebrush Cover	Sagebrush Height (cm)	Sagebrush Shape (S=Spreading, C=Columnar)	Perennial Grass/Forb Height (cm)	Perennial Grass/Forb Cover	Perennial Grass Cover	Perennial Forb Cover	Annual Grass Cover	# of Preferred Forb Species
TRT-GRSG-LS-001	6/18/19	Equity/Swizer	22.6%	61.4	S	32.3	70.0%	60%	21.3	0.0%	26
TRT-GRSG-RL-007	8/4/19	Equity/Swizer	14.7%	68.9	S	37.3	48%	41.3%	10.0%	6.7%	32
LO-088	8/11/16	Stake Springs	1.3%	56.5	—	69.0	54.6%	11.3%	51.3%	0.0%	14
GOS-106	7/18/17	Stake Springs	0.0%	—	—	16.9	4.7%	4.0%	0.7%	0.0%	7
SUP-DE-093B	7/18/17	Stake Springs	9.3%	57.6	C	36.0	54.7%	32.7%	29.3%	0.0%	28
TRT-GRSG-RL-003	7/10/18	Stake Springs	9.3%	69.0	C	27.5	52.0%	42.0%	14.7%	6.0%	24
CO-1013	8/5/20	Stake Springs	4.0%	74.0	S	35.3	32%	6.7%	26.7%	0.0%	28
SUP-DE-093A	6/17/17	Stake Springs	11.3%	24	S	26.9	56.6%	46.6%	16.6%	0.0%	33
HAF-9	8/30/11	Summer	0.0%	—	—	—	91%	79.0%	49.0%	0.0%	9
HAF-PHMA-05	6/19/19	Summer	2.0%	97	S	39.4	72.6%	64.6%	28.0%	1.3%	19

**Figure 12.** Example of suitable GRSG late-summer/brood-rearing habitat. Appropriate sagebrush cover and height. Understory comprised of diverse native perennial grasses and forbs.



**Figure 13.** Example of GRSG unsuitable/non-habitat. Dense aspen and conifer intermixed with deciduous mountain shrub detract from site suitability. Ecological site not capable of supporting sagebrush.

