United States Department of the Interior
Bureau of Land Management

RANGELAND HEALTH ASSESSMENT AND EVALUATION REPORT
CEDAR CREEK CANYON ALLOTMENT #01023

November 13, 2015

DRAFT

U.S. Department of the Interior
Bureau of Land Management
Jarbidge Field Office
2878 Addison Avenue East
Twin Falls, Idaho 83301
Phone: 208-736-2350
FAX: 208-735-2076

BLM

This page intentionally left blank.

DRAFT

TABLE OF CONTENTS

Allotment Information **1**
Current Permitted Livestock Grazing Use 1
Allotment Profile **3**
Climate 3
Grazing Management 6
Vegetation 8
Noxious Weeds 12
Idaho Rangeland Health Standards Assessment **14**
Rangeland Health Assessment 20
Evaluation of Standard 1 23
Standard 2 (Riparian Areas & Wetlands) 24
Rangeland Health Assessment 24
Evaluation of Standard 2 26
Standard 3 (Stream Channel/Floodplain) 29
Rangeland Health Assessment 29
West Pasture 29
Evaluation of Standard 3 29
Standard 4 (Native Plant Communities) 31
Standard 5 (Seedings) 31
Evaluation of Standard 5 35
Standard 6 (Exotic Plant Communities, Other than Seedings) 36
Standard 7 (Water Quality) 36
Rangeland Health Assessment 36
Evaluation of Standard 7 36
Standard 8 (Threatened, Endangered and BLM Sensitive Plants and Animals) 37
Rangeland Health Assessment 37
Evaluation of Standard 8 47
Literature Cited **50**
Appendix A: Species list accumulated during upland assessments **54**
Appendix B: Process for Generating Sage-grouse Habitat Assessment Framework Sample Sites **56**

DRAFT

LIST OF TABLES

Table 1: Cedar Creek Canyon acres 1

Table 2: Assessment participants 1

Table 3: Deferred Rotation Grazing System in the Cedar Creek Canyon Allotment. 6

Table 4: Actual Use and Utilization in the Cedar Creek Canyon Allotment from 2003 to 2008... 7

Table 5: Actual Use and Utilization in the Cedar Creek Canyon Allotment from 2009 to 2013... 7

Table 6: Vegetation Community by Pasture (Acres) 9

Table 7: Summary of the Ecological Site Description and 2006 Production Data (Total Dry Weight) 11

Table 8: Applicable Standards by Pasture. 14

Table 9. Percent of BLM lands by ecological site description and pasture for the Cedar Canyon Creek Allotment. 18

Table 10: Summary of 17 rangeland health indicators 18

Table 11: Rangeland Health Attribute Rating and Degree of Departure by Site 19

Table 12. Total Cover at the 2006 ESI and 2010 HAF sites in the Cedar Creek Canyon Allotment. 20

Table 13. Condition Assessment Ratings by Reach and Year 25

Table 14. Vegetation Item Ratings from Functional Assessments by Stream Reach and Year... 27

Table 15. Hydrology and Erosion/Deposition Items from Functional Assessments by Stream Reach and Year. 29

Table 16. Cover (All Layers) by Species at HAF (2010) Sites and ESI Sites (2006). 32

Table 17. Slickspot Peppergrass Potential Habitat (Acres). 38

Table 18: Sage-grouse Attendance at Occupied Leks within Five Miles of the Cedar Creek Canyon Allotment, 2000-2014 41

Table 19. Sage-grouse Habitat Assessment Worksheet for Nesting and Early Brood Rearing Habitat (Arid Site) 43

Table 20. Overall Habitat Suitability for BLM Sensitive Wildlife Species by Pasture. 47

DRAFT

LIST OF FIGURES

Figure 1: Annual Precipitation (2004 – 2013) at the Horse Butte RAWS Station 5

Figure 2: Annual Average Spring Temperature (^{O}F) (2004 – 2013) at the Horse Butte RAWS Station 6

LIST OF MAPS

Map 1. Allotment Vicinity 2

Map 2. Range Infrastructures and Key Utilization Sites 4

Map 3. Vegetation Communities and Ecological Site Inventory (ESI) 10

Map 4. Noxious Weed Management 13

Map 5. Interpreting Indicators of Rangeland Health (IIRH) & Sage-grouse Habitat Assessment Framework (HAF) Sites 16

Map 6. Slickspot Peppergrass Potential Habitat 39

Map 7. Shrubland Habitat and Sage-grouse Leks 42

DRAFT

This page intentionally left blank.

DRAFT

ALLOTMENT INFORMATION

Field Office: Jarbidge Field Office (JFO)
Name of Permittee: Brian Davis
Allotment Name/Number: Cedar Creek Canyon (1023)
Date of Field Assessment: May 1 and May 3, 2013
Stream Miles on Public Land (miles): 2.7 miles (approximately 0.6 miles of perennial stream, 2.1 miles dry nearly year round).

Table 1: Cedar Creek Canyon acres

Total Acres	BLM Acres	State Acres	Private Acres	Other Acres
2,539	2,490	0	49	0

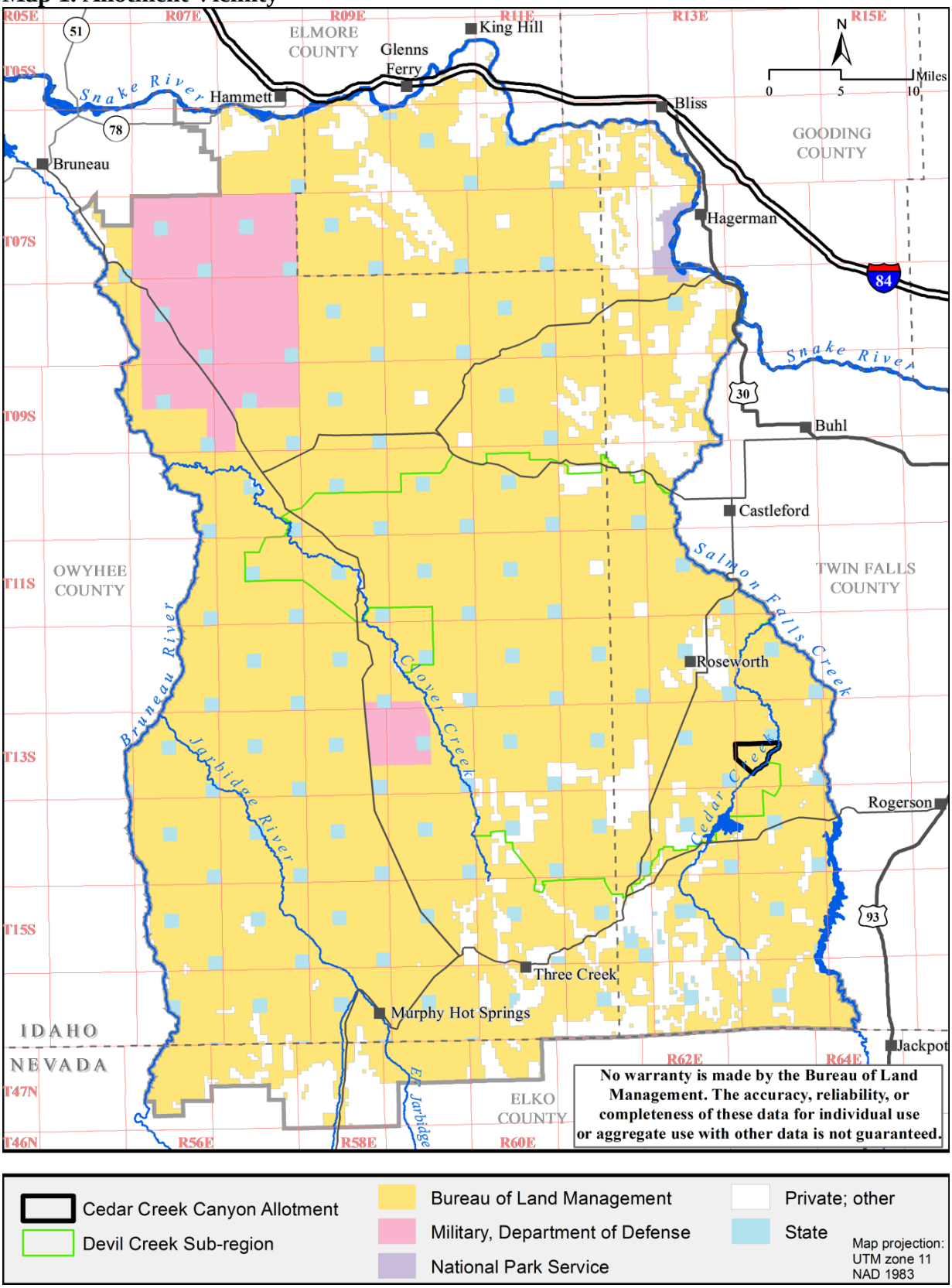
Table 2: Assessment participants

Name	Position
Kate Crane	TFD Fisheries Biologist
Jim Klott	JFO Wildlife Biologist
Michael Haney	JFO Wildlife Biologist and Botanist
Dan Strickler	JFO Rangeland Management Specialist
Bonnie Ross	TFD GIS Specialist

Current Permitted Livestock Grazing Use
Total Active Use: 320 Animal Unit Months (AUMs)
Livestock Type: Cattle
Livestock Numbers: 158 Cattle
Season of Use: 04/01 to 05/31
Current Land Use Plan: 2015 Jarbidge Resource Management Plan (RMP)
Current Stocking Level: 7.8 Acres/AUM

DRAFT

Map 1. Allotment Vicinity



ALLOTMENT PROFILE

The Cedar Creek Canyon Allotment (Map 1) is located approximately 11 miles northwest of Rogerson, Idaho. Most of the allotment is relatively flat, with slopes averaging approximately 2 percent, except for Cedar Creek Canyon where slopes map exceed 50 percent located on the allotment's east border. Cedar Creek Canyon, approximately 2.7 miles long on BLM administered land lies on the south/eastern boundary of the allotment. Elevation ranges from 4,800 feet to 5,120 feet.

Approximately 5.6 miles of fence form the north, west, and south boundaries of the allotment. The allotment's eastern boundary consists of short gap fences (20 to about 100 feet in length) and natural barriers (i.e. cliffs, rim rock, etc.) on the east side of Cedar Creek Canyon. Allotment boundary fences are composed of four strands of barbed wire. The allotment is divided into two pastures (East Pasture and West Pasture) by approximately 1.7 miles of fence (Map 2). The pasture boundary fence is a three strand fence; the top two strands are barbed and the bottom wire is smooth. The pasture fence was previously a netted wire fence but was changed to an antelope friendly fence in 2007.

About three miles of Cedar Creek is within the Cedar Creek Canyon Allotment. Water in Cedar Creek is diverted into a siphon pipe approximately 0.6 miles downstream from the allotment's southern boundary, leaving the remaining portion of the Cedar Creek dry most of the year. Water is typically diverted into the siphon from spring through the late summer/fall, after crops are harvested. The siphon transports the water about 1.6 miles to the Cedar Mesa Canal, where it then flows to Cedar Mesa Reservoir and is distributed to private farmlands located four miles northwest of the allotment. Four small ponds are located in the bottom of Cedar Creek Canyon downstream of the diversion. These ponds are filled whenever water is released from the diversion. Upstream of the diversion, Cedar Creek only has water when it is released from Cedar Creek Reservoir, usually for irrigation. Idaho Department of Environmental Quality (IDEQ) classified Cedar Creek as an intermediate stream below the diversion (IDEQ, 2008).

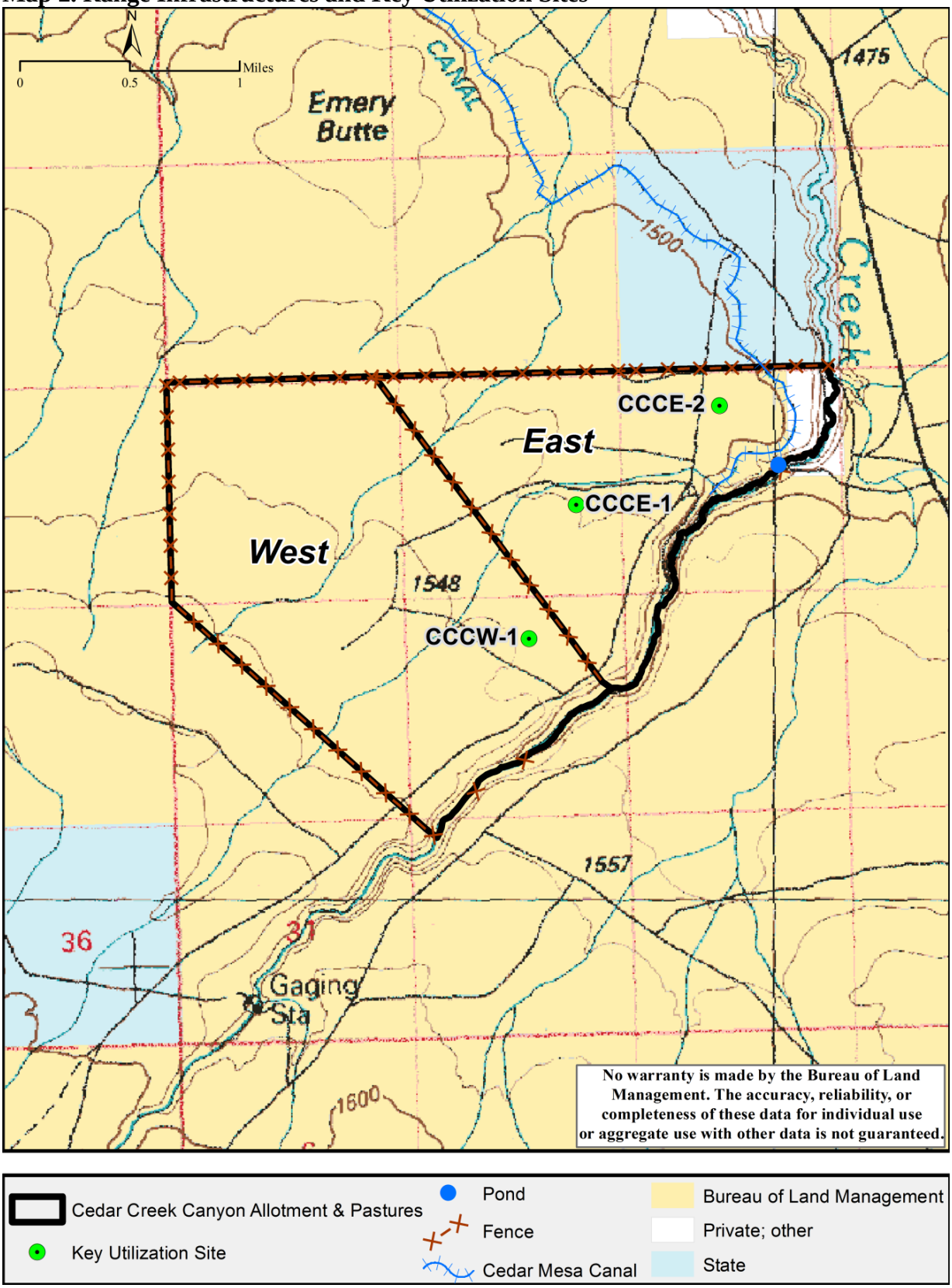
Approximately 0.6 mile of Cedar Creek is the only reliable source of water for livestock in the West Pasture. This section of Cedar Creek is located upstream of the siphon where water is diverted out of the creek. Livestock access the same area of Cedar Creek from the adjacent Pigtail Butte Allotment. Livestock in the East Pasture of the Cedar Creek Canyon Allotment have access to water in the ponds along Cedar Creek and in the Cedar Mesa Canal.

Climate

Climatic conditions in the allotment are characterized by low humidity, clear skies, large diurnal variation in temperature, and wind patterns reflecting the westerly direction of the prevailing storm track. Annual rainfall in the Cedar Canyon Creek Allotment ranges from 10 to 13 inches. Moisture typically falls as rain and snow from late-fall through late-spring.

DRAFT

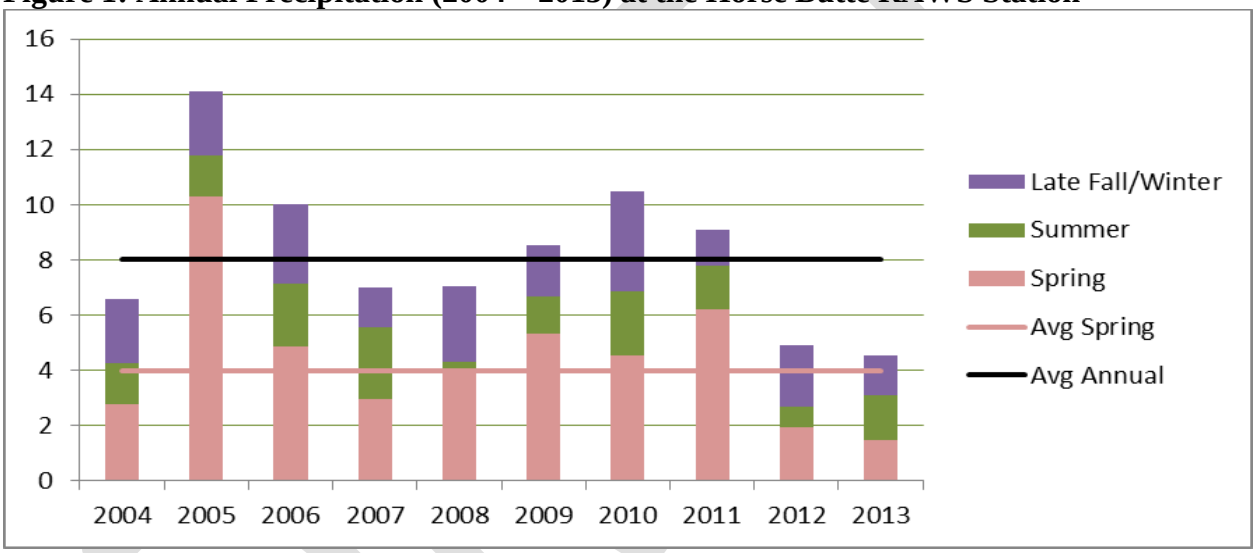
Map 2. Range Infrastructures and Key Utilization Sites



Weather data collected at the Horse Butte RAWS station is used to assess precipitation and temperature trends from 2004 to 2013 in the Cedar Creek Canyon Allotment. The RAWS station is located in an 8 to 10 inch precipitation zone about 21 miles northwest of the allotment. This area is a little drier than the Cedar Creek Canyon Allotment; however, the data collected at the RAWS station is expected to reflect any trends in temperature and precipitation due to its general proximity to the allotment.

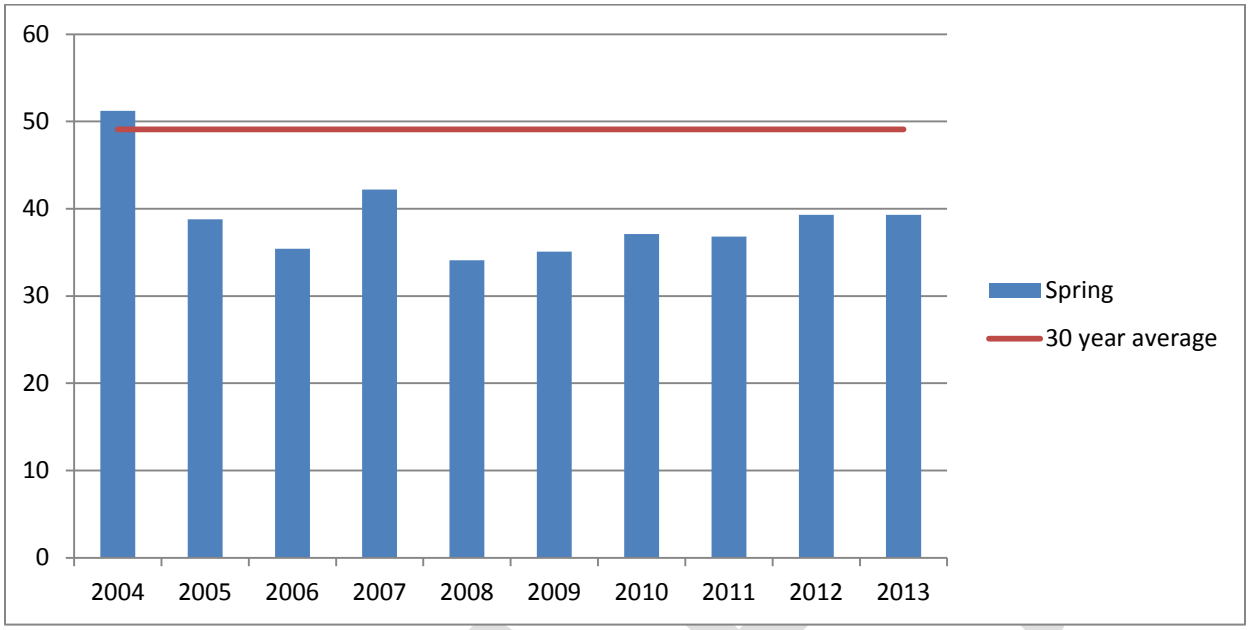
The thirty-year annual average precipitation at the Horse Butte RAWS station is 8.1 inches (Figure 1). Annual precipitation at the station was below the thirty-year average during five of the ten year evaluation period, especially in 2012 and 2013 (Figure 1). Total rainfall in 2012 was 4.89" and in 2013 it was 4.52". Rainfall was above the thirty-year average the remaining five years. Moisture exceeded the thirty-year average by at least two inches in 2005 (14.12 inches), 2006 (10.1 inches), and 2010 (10.46 inches).

Figure 1: Annual Precipitation (2004 – 2013) at the Horse Butte RAWS Station



The thirty- year average for rain that fell during the growing season (March–June) is 4 inches. Growing season precipitation was below the thirty-year average during four of the ten years (2004, 2007, 2012, and 2013) (Figure 1). Rainfall was especially low in 2012 (1.92 inches) and 2013 (1.48 inches). . Spring rainfall was above average in 2005 and 2011 (2" or more above the spring average). Except for 2004, temperatures during the growing season were cooler than the thirty-year average (Figure 2).

Figure 2: Annual Average Spring Temperature (^{O}F) (2004 – 2013) at the Horse Butte RAWS Station



Grazing Management

Between 1997 and 2008, the number of cattle grazing the allotment was about 60 animals (cow/calf pairs) rather than the permitted 158 animals. The grazing season was extended to allow use of the 320 permitted AUMs in the allotment. Livestock grazing typically occurred between April and October with both pastures being grazed concurrently during this time frame.

Since 2009, livestock management in the Cedar Creek Canyon Allotment has been subject to Chief District Judge Winmill's Decision and Order of February 26, 2009. The court order directs the Bureau of Land Management (BLM) to adjust livestock grazing practices so to maintain and enhance sage-grouse, pygmy rabbit, and slickspot peppergrass habitats. As such, the allotment is jointly managed with the Cedar Creek Field Allotment using a deferred rotation system. The rotation system defers livestock grazing in the spring (April through May) two years out of three years (Table 3).

Table 3: Deferred Rotation Grazing System in the Cedar Creek Canyon Allotment.

Year	Pasture	April				May				June				July				August				September				October			
2009	West																												
	East																												
2010	West																												
	East																												
2011	West																												
	East																												
2012	West																												
	East																												
2013	West																												
	East																												
2014	West																												

Year	Pasture	April	May	June	July	August	September	October
	East							

*Shaded area denotes grazing period

Actual use and utilization for the Cedar Creek Canyon Allotment is shown in Tables 4 and 5. Table 4 describes actual use from 2004 to 2008 (pre-court order management) and Table 5 shows the information from 2009 to 2013 (post-court order management).

Table 4: Actual Use and Utilization in the Cedar Creek Canyon Allotment from 2003 to 2008.

Year	Pasture	Season of Use	Actual Use (AUMs)	% Utilization				
				Crested Wheatgrass	Sandberg Bluegrass	Bluebunch Wheatgrass	Idaho Fescue	Squirreltail
2004	N/A	5/1 – 10/15	331	-	-	-	-	-
2005	N/A	5/15 – 10/15	314	-	-	-	-	-
2006	West	4/1 – 09/25	322	20	-	-	20	12
	East			19	-	7	16	4
2007	West	4/1 – 09/25	322	N/A*	-	-	-	-
	East			20	-	-	-	-
2008	West	4/1 – 07/15	190	20	-	-	-	-
	East			19	12	-	-	-

-Utilization data was not measured
*the ground was covered with snow which may have skewed the readings so data not used, see study file located at the JFO for more information.

Table 5: Actual Use and Utilization in the Cedar Creek Canyon Allotment from 2009 to 2013.

Year	Pasture	Season of Use*	Actual Use (AUMs)	% Utilization		
				Crested Wheatgrass	Sandberg Bluegrass	Thurber's Needlegrass
2009	West	1	137	22	-	-
	East	2	97	-	-	-
2010	West	3	138	20	-	-
	East	1	104	52	37	32
2011	West	2	171	10	-	-
	East	3	200	11	-	-
2012	West	1	135	17	-	-
	East	2	154	22	-	-
2013	West	3	116	-	-	-
	East	1	138	-	-	-

*1 = April – June, 2 = June – August, 3 = August - October
-Utilization data was not measured

Since 2004, actual use within the Cedar Creek Canyon Allotment has averaged 286 AUMs. The number of AUMs used from 2004 to 2007 was near the permitted use of 320 AUMs. In 2008 use was less than 60 percent of permitted use. Except for 2011, active use ranged from 234 AUMs to 289 AUMs from 2009 to 2013. Active use exceeded permitted use in 2011. Spring precipitation in 2011 exceeded the 30 year average which likely resulted in more forage production.

DRAFT

Livestock utilization was measured on crested wheatgrass (*Agropyron cristatum*) seven years out of the ten year study period. Utilization was also measured intermittently on Sandberg bluegrass (*Poa secunda*), Thurber's needlegrass (*Achnatherum thurberianum*), squirreltail (*Elymus elymoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Idaho fescue (*Festuca idahoensis*). Use levels on all the grass species were consistently slight (0 – 20%) to light (21% to 40%), except for 2010 when use levels on crested wheatgrass in the East Pasture were moderate (41% to 60%). Locations of key utilization sites are shown on Map 2. Utilization data was collected by the Height-Weight Method (Cooperative Extension Service et al., 1999).

Vegetation

Vegetation in the Cedar Creek Canyon Allotment was initially mapped in 2006 using field observations, field cover data, and 2004 National Agriculture Imagery Program (NAIP) imagery. The vegetation map was updated in 2013 using field observations and NAIP imagery (Map 3). Vegetation communities were classified and mapped based on dominant plant cover using a minimum mapping unit of 20 acres, which is appropriate for landscape-level planning but is not intended to show the complexity of vegetation communities at a finer-scale. With this, fifty-three vegetation communities were classified and mapped based on dominant plant cover. These vegetation communities were subsequently organized into five classes and six sub-classes according to national standards (Grossman et al., 1998), with the exception of evergreen shrublands dominated by sagebrush; these communities were defined as having 10 percent or more shrub cover rather than the national standard of more than 25 percent shrub cover. This was done to provide consistency with defined habitat needs (Wisdom et al., 2000) and proposed management objectives for greater sage-grouse (sage-grouse).

Vegetation in the Cedar Creek Canyon Allotment is mapped as a shrub steppe plant community. Wildfire has not occurred in the allotment in more than 50 years. In 1967, Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) was treated with herbicides and crested wheatgrass was seeded in the treated area (Diversion Aerial Herbicide Spraying Project). Since then, sagebrush has reestablished in the treated area. Sagebrush cover is currently near, or has exceeded, 10 percent (Photo 1). Other plant species, both native and non-native, are also present in the communities (Appendix A).

DRAFT

Photo 1: Sagebrush Re-establishment in the West Pasture that was treated in the 1967 Diversion Aerial Spraying Project.

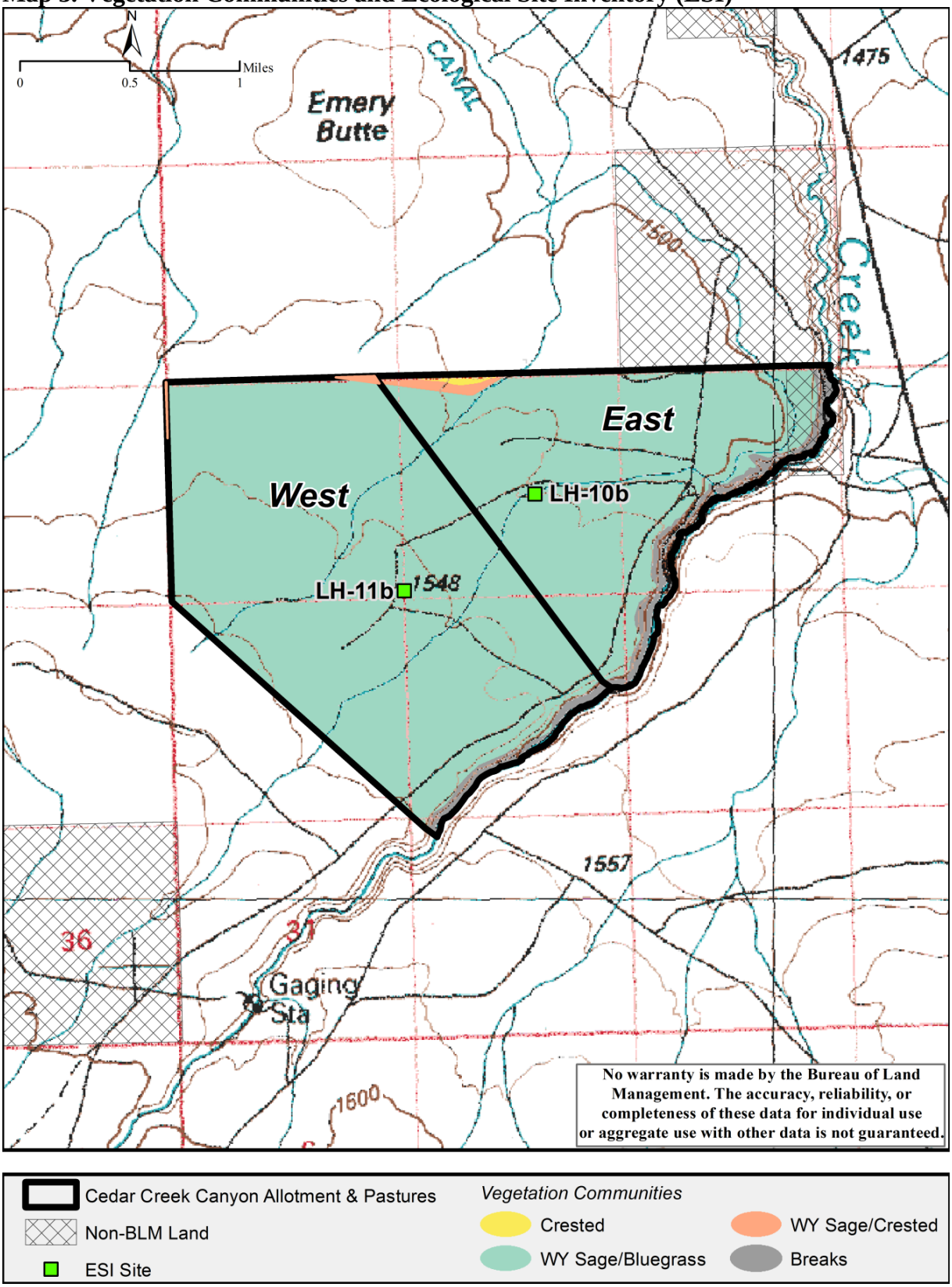
The majority of the vegetation in the allotment is mapped as Wyoming big sagebrush/Sandberg bluegrass (Table 6, Map 3). Other native perennial grasses such as Thurber's needlegrass and squirreltail, as well as some remnant crested wheatgrass are also found in the allotment (Table 7). The allotment contains a diverse forb component (Appendix A), with 22 perennial forbs and 8 annual forbs noted during the Interpreting Indicators of Rangeland Health (IIRH) field assessments. Steep canyon slopes with cliff, rim rock, and talus (i.e. Breaks) form Cedar Creek Canyon on the east side of the allotment. A few Western juniper (*Juniperus occidentalis*) trees are sparsely scattered on the slopes within the canyon. Riparian vegetation found along the creek include mountain rush, Kentucky bluegrass, willows, and forbs (this list is not inclusive of all the riparian plant species).

Table 6: Vegetation Community by Pasture (Acres)

Vegetation Community*	East Pasture	West Pasture
Wyoming big sagebrush/Bluegrass	842	1,538
Crested wheatgrass	22	1
Breaks	53	34

* Vegetation community is listed by dominate cover species. Numerous other plant species, both native and non-native, are present in the plant communities.

Map 3. Vegetation Communities and Ecological Site Inventory (ESI)



An Ecological Site Inventory (ESI) site is established in each of the pastures in the Cedar Creek Canyon Allotment (Map 3). Production data was collected at these sites in 2006 and is summarized in Table 7. The ESI site in the East Pasture is located on a loamy 10-13" ecological site (Photo 2). Meanwhile, the site in the West Pasture is found on a loamy 8-12" ecological site. The data indicates perennial grass production is similar to late seral condition (USDA and NRCS, 2013a). Due to the 1967 vegetation treatment, crested wheatgrass has replaced bluebunch wheatgrass as the dominant bunchgrass at both sites. Sandberg bluegrass production was higher in the West Pasture while crested wheatgrass production was lower. Thurber's needlegrass production was low at both sites. Perennial forb production was also down at both sites. Sagebrush production was low in the East Pasture and high in the West Pasture at the sites sampled.

Table 7: Summary of the Ecological Site Description and 2006 Production Data (Total Dry Weight)

Class	Species	Loamy 10 – 13 Ecological Site		Loamy 8 -12 Ecological Site	
		ESD Ref. Sheet # R025XY019ID (lbs/acre)	2006-LH-10b East Pasture (lbs/acre)	ESD Ref. Sheet # R011XY001ID (lbs/acre)	2006-LH-11b West Pasture (lbs/acre)
Perennial Grasses	Squirreltail	12 – 33	17.0	20 - 45	49.5
	Crested wheatgrass*	0	383.0	0	146.1
	Sandberg bluegrass	12 – 33	21.0	20 - 45	200.4
	Thurber's needlegrass	6 – 17	3.0	80 - 180	19.7
	Idaho fescue	0	4.7	0	0.0
	Bluebunch wheatgrass	160 – 440	10.0	100 - 125	0.0
	Total Perennial Grass	**200 – 600**	**438.7**	**220 - 450**	**396.0**
Annual Grasses	Cheatgrass	0	T	0	**
Perennial Forbs	Sagebrush phlox	8 – 22	T	0 - 5	30.8
	Longleaf phlox	8 – 22	T	0 - 5	**
	Milkvetches spp.	1 – 11	**	0 - 5	0.0
	Total Perennial Forb	**55 – 170**	**0.0**	**60 - 175**	**30.8**
Annual Forbs^	Gayophytum spp.	**	T	**	**
	Blue-eyed Mary	**	T	**	**
	Willowherb spp.	**	**	**	T
	Tall tumble mustard	0	**	0	T
Shrubs	Rubber rabbitbrush	*	17.6	0 - 9	T
	Wyoming big sagebrush	100 – 275	31.1	100 - 225	759.3
	Total Shrub	**225 – 330**	**48.7**	**120 - 275**	**759.3**
Total Production		**480 – 900**	**487.4**	**450 - 900**	**1105.8**

*Seeded non-native species
^ESD does not include production for annual grasses or forbs
**This species was not sampled at the ESI site during production.
T = this species was present in trace amounts but contributed less than 1 pound per acre.

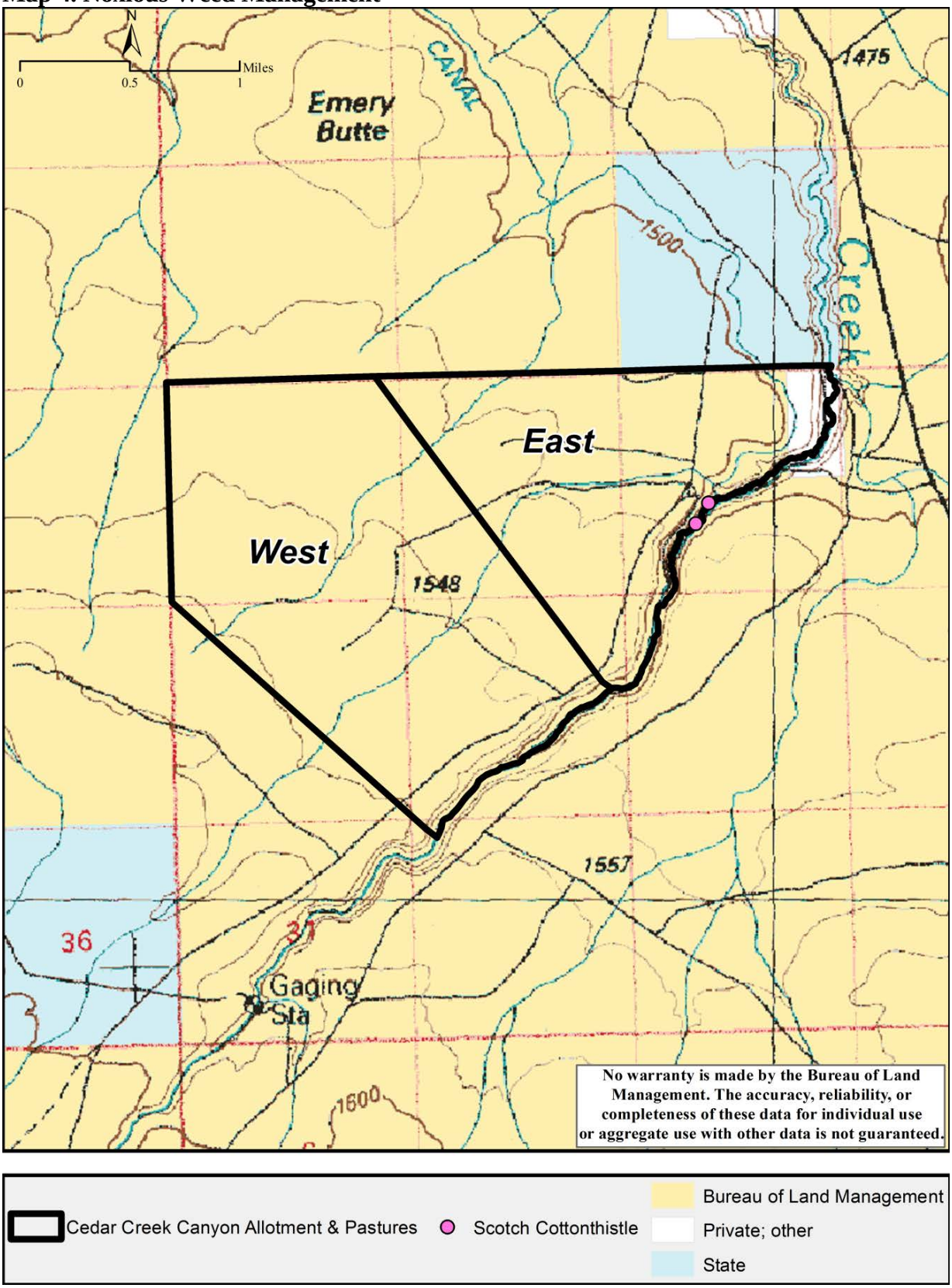
Photo 2: Overview of ESI Site LH-10b in the East Pasture

<u>Noxious Weeds</u>

The State of Idaho has listed 65 plant species as noxious weeds. Scotch cottonthistle (*Onopardum acanthium*) also known as Scotch thistle, Canada thistle (*Cirsium arvense*) and bull thistle (*C. vulgare*) are known to occur within the Cedar Creek Canyon Allotment. The two known scotch cottonthistle occurrences in the allotment were chemically treated in 2011 (Map 4). Canada thistle and bull thistle were noted to occur within the riparian area during the 2013 IIRH field evaluation in the West Pasture.

The BLM works to prevent the establishment of new noxious weed species and infestations in areas where they presently do not occur. Many of the known noxious weed infestations are found and treated through the Twin Falls District (TFD) Emergency Stabilization and Rehabilitation (ESR) program. Approved ESR plans allow three year funding for weed control and play a vital part in the reestablishment of naturally recovering vegetation, as well as in the successful establishment of newly seeded areas. Weed personnel grid burned areas and treat noxious weed occurrences in order to allow for reduced competition during reestablishment of desired vegetation. Crews also treat road corridors throughout the field office which helps prevent the spread of weeds from vehicles that may be transporting weed seeds to new areas. Control methods used within the TFD for the treatment of noxious weeds include biological, mechanical, and chemical.

Map 4. Noxious Weed Management



IDAHO RANGELAND HEALTH STANDARDS ASSESSMENT

There are eight standards for healthy rangelands that apply to BLM lands in the state of Idaho. Not all of the Standards apply to the Cedar Creek Canyon Allotment or every pasture in the allotment due to variances in the land type, vegetation and geographical area. Table 8 lists the standards applied for each pasture. Of the eight Idaho Standards for Rangeland Health, the following six standards are applicable to the Cedar Creek Canyon Allotment:

- **Standard 1 –** Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, vegetation, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 2** – Riparian-wetland areas are in properly functioning condition appropriate to soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 3** – Stream channels and floodplains are properly functioning relative to the geomorphology (e.g., gradient, size, shape, roughness, confinement, and sinuosity) and climate to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

- **Standard 5 –** Rangelands seeded with mixtures, including predominately non-native plants, are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

- **Standard 7 –** Surface and ground water on public lands comply with the Idaho Water Quality Standards.

- **Standard 8 –** Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species.

Standards 4 and 6 do not apply to the Cedar Creek Canyon Allotment

Table 8: Applicable Standards by Pasture.

Standard	Pastures
1	East and West Pastures
2	West Pasture
3	West Pasture
4	Not Applicable.
5	East and West Pastures
6	Not Applicable
7	East and West Pastures
8	East and West Pastures

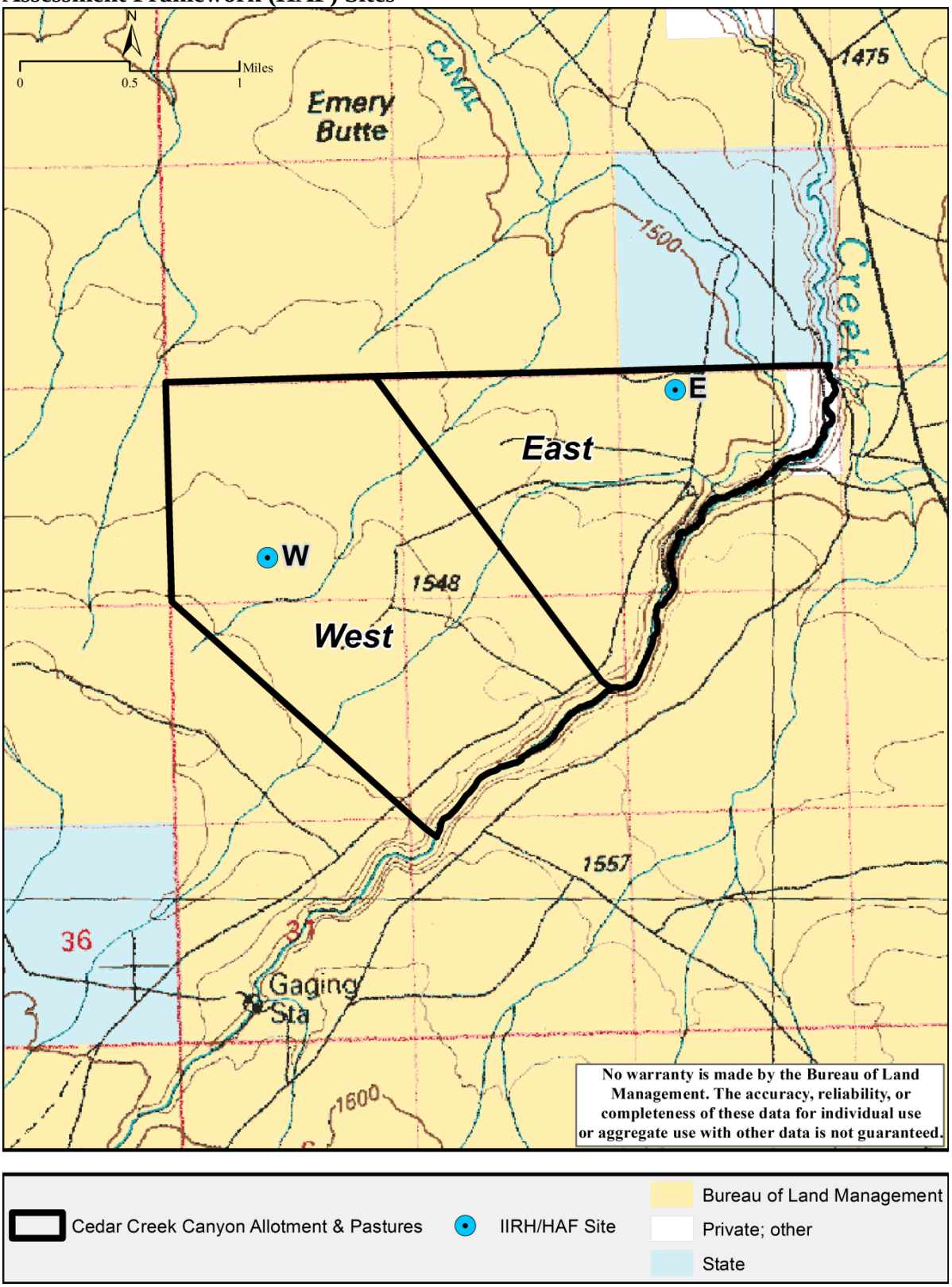
A JFO interdisciplinary team conducted Interpreting Indicators of Rangeland Health (IIRH) field assessments at two random sites representative of the Cedar Creek Canyon Allotment during

DRAFT

May of 2013. Each of the East and West pastures contains one site in areas of both native and seeded non-native plant species. Map 5 shows the location of the 2013 IIRH evaluation sites.

DRAFT

Map 5. Interpreting Indicators of Rangeland Health (IIRH) & Sage-grouse Habitat Assessment Framework (HAF) Sites



HAF sites were randomly generated through a GIS process (Appendix B). Key utilization sites were selected in representative areas based on the presence of key forage species, distance from livestock water, and accessibility of the area to livestock grazing. When the ID Team conducted IIRH field evaluations, the HAF sites were visited first. If the HAF site(s) was not representative of the vegetation community, an ESI site was then selected if available within that vegetation community. If no ESI site was available, a key utilization site was used. When the ID Team determined that none of the pre-determined sites were representative of the vegetation community, a new location was selected that was representative of the vegetation community.

Indicators of rangeland health (Table 9) were used to evaluate three rangeland health attributes (Table 10): Soil and Site Stability, Hydrologic Function, and Biotic Integrity (Pellant et al., 2005). The IIRH evaluation sheet was completed at each site, photographs were taken, and a list of plant species observed was recorded. In addition, general field notes were recorded for the allotment that included such items as presence of noxious weeds, wildlife sign, recreation impacts, and presence or condition of range infrastructure.

Cover transects to determine vegetative cover were recorded at both IIRH sites following the line point intercept method as described in the Sage-grouse Habitat Assessment Framework (BLM 2010) protocol. Because forbs are important to sage-grouse, the line point intercept method was augmented using Daubenmire frames. Forb species were recorded in 7.9 inch by 19.7 inch (20 cm by 50 cm) Daubenmire frame placed at each point along the line intercept. This resulted in more comprehensive data on forb species diversity present than could be obtained by the line point intercept alone.

In addition to evaluating rangeland health indicators at each of the IIRH sites, the ID Team also examined other areas to ensure evaluation sites were representative of the vegetation communities throughout each pasture. Data collected at the evaluation sites were compared to the Natural Resource Conservation Service's (NRCS) ecological site description (ESD) reference sheet for the soil types and potential vegetation communities in the Cedar Creek Canyon Allotment. The ESD reference sheet describes the expected condition of the ecological site in State 1, Phase A of the reference state.

Two ecological sites dominate the Cedar Creek Canyon Allotment. The largest ecological site is the Loamy 10-13" Wyoming big sagebrush/Bluebunch wheatgrass, followed by the loamy 8-12 Wyoming big sagebrush/bluebunch wheatgrass/Thurber's needledgrass. The ESD reference sheets for these range sites were used to evaluate the allotment. The reference sheet for the Loamy 10-13" Wyoming big sagebrush/Bluebunch wheatgrass ecological site (R025XY019ID; USDA NRCS, 2013a) was used for the East Pasture, and the reference sheet for the Loamy 8-12" Wyoming big sagebrush/Bluebunch wheatgrass-Thurber's needlegrass ecological site (R011XY001ID; USDA NRCS, 2013b) was used for the West Pasture. The percent of each range site for each pasture is shown in Table 9. Canyon breaks are not included as an ecological site and were classified as unknown.

Table 9. Percent of BLM lands by ecological site description and pasture for the Cedar Canyon Creek Allotment.

Ecological Site Description	West Pasture	East Pasture
Loamy 10-13” Wyoming Big Sagebrush/Bluebunch wheatgrass	67	88
Loamy 8-12” Wyoming Big Sagebrush/Bluebunch wheatgrass-Thurber’s needlegrass	30	4
Unknown	3	8

The evaluation site in the East pasture occurred in the Loamy 10-13” Wyoming Big Sagebrush/Bluebunch wheatgrass ecological site. This plant community is expected to have Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Thurber’s needlegrass, Sandberg bluegrass, squirreltail, and arrowleaf balsamroot (*Balsamorhiza sagittata*) should be sub-dominant herbaceous species. Other significant species in the plant community can include Indian ricegrass (*Achnatherum hymenoides*), Idaho fescue (*Festuca idahoensis*), longleaf phlox (*Phlox longifolia*) and spiny phlox (*P. hoodii*), and rabbitbrush (*Chrysothamnus* spp. or *Ericameria* spp.). There can be a variety of other grasses and forbs present in minor amounts. The natural fire frequency should be 50 to 70 years.

The site in the West Pasture occurred in the Loamy 8-12” Wyoming Big Sagebrush/Bluebunch wheatgrass-Thurber’s needlegrass ecological site. . The Loamy 8-12” Wyoming big sagebrush/bluebunch wheatgrass/Thurber’s needlegrass (R011XY001ID) reference phase plant community is expected to have Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Thurber’s needlegrass should be the subdominant grass. Other significant species included in the ESD are Sandberg bluegrass, squirreltail, and arrowleaf balsamroot. There can be a variety of other grasses, forbs, and shrubs in minor amounts. The natural fire frequency should be 50-70 years.

Indicator ratings for each IIRH site in the Cedar Creek Canyon Allotment are shown in Table 10. Rangeland health attributes ratings are shown in Table 11.

Table 10: Summary of 17 rangeland health indicators

Indicators	Attributes	Degree of Departure from Reference Sheet				
	S = Soil & Site Stability H=Hydrologic Function B = Biotic Integrity	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills	S, H					E, W
2. Water-flow Patterns	S, H					E, W
3. Pedestals and/or terracettes	S, H					E, W
4. Bare ground	S, H					E, W
5. Gullies	S, H					E, W
6. Wind-scoured, blowouts, and/or deposition areas	S					E, W
7. Litter movement	S					E, W

Indicators	Attributes S = Soil & Site Stability H=Hydrologic Function B = Biotic Integrity	Degree of Departure from Reference Sheet				
		Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
8. Soil surface resistance to erosion	S, H, B					E, W
9. Soil surface loss or degradation	S, H, B					E, W
10. Plant community composition and distribution relative to infiltration	H					E, W
11. Compaction layer	S, H, B					E, W
12. Functional/structural groups	B				E	W
13. Plant mortality/decadence	B					E, W
14. Litter amount	H, B					E, W
15. Annual production	B					E, W
16. Invasive plants	B		E		W	
17. Reproductive capability of perennial plants	B					E, W

E = East Pasture, W = West Pasture

The ratings of the 17 indicators do not result in a single rating of rangeland health for a site. The 17 indicators are related to three components of rangeland health known as attributes (soil and site stability, hydrologic function, and biotic integrity). The second column of Table 9 identifies which indicators are related to each of the three attributes. The JFO ID team arrived at attribute departure ratings by considering the preponderance of evidence of departure for the group of indicators related to each attribute. Indicators showing departure from reference conditions may be weighted more heavily, based upon the effect of the departure on ecological function of the site being evaluated. The degree of departure ratings for each of the three attributes of rangeland health are shown in Table 11.

Table 11: Rangeland Health Attribute Rating and Degree of Departure by Site.

Rangeland Health Attribute	Degree of Departure				
	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil and Site Stability					E, W
Hydrologic Function					E, W
Biotic Integrity				E	W

E = East Pasture, W = West Pasture

DRAFT

Standard 1 (Watersheds)

Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, vegetation, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

Rangeland Health Assessment

Subsequent to the 2013 assessment, several ESD reference sheets were adjusted based on available local monitoring data to more accurately reflect expected field conditions specific to the field office. Acceptable bare ground levels were therefore reduced and are 10 to 30 percent for Loamy 10-13" and 5 to 20 percent for Loamy 8-12". Expected litter levels were raised to be within 20 to 40 percent for Loamy 10-13" and 30 to 40 percent for Loamy 8-12". To also include a more comprehensive display of presence and distribution to all ground cover within this section, any discussion regarding ground cover percentages reflect 'all layers' which means total cover (vegetative, non-vegetative and bare ground) may total more than 100 percent (Table 12). This is because grasses, forbs, litter, and biotic crusts may lie below vegetation above it. Bare ground is only counted as bare ground when the soil is exposed. Average percent bare ground recorded in the 2006 ESI data, as well as the 2010 HAF data (Table 12) ranges from 14 to 27 percent cover (top layer). For the soil stability test (Pellant et al., 2005), the expected values range from 4 to 6 on a scale of 1 to 6 for both ESDs.

Multiple soil series exist within the Cedar Creek Canyon Allotment and typically consist of silt loam soils that cover much of the rhyolite and basalt flats that make up the majority of the Jarbidge Field Office landscape. Most of the allotment lacks any relevant topographic changes except for Cedar Creek and its associated canyon along the southern and eastern border. Soils are generally shallow, restricted by an underlying cemented hardpan, and are further limited by shallow rooting depths and low available soil water capacity, especially when precipitation is below average during the growing season.

The Soil Survey Geographic (SSURGO) data base (NRCS 2012) shows that 88 percent of the allotment has a moderate wind erosion hazard, 7 percent has a non-erosional factor, and 4 percent has no data for wind erosion hazard and is associated with the rocky areas of Cedar Creek Canyon. The same data base indicates that water erosion hazard is rated severe at 4 percent, primarily within the canyon breaks, high at 70 percent, and medium at 26 percent.

Table 12. Total Cover at the 2006 ESI and 2010 HAF sites in the Cedar Creek Canyon Allotment.

	2006 ESI# Percent Cover by Pasture		2010 HAF Percent Cover by Pasture	
Cover Attribute	**East**	**West**	**East**	**West**
Shrubs	17	16	19	8
Native perennial grasses	31	41	17	32
Non-native perennial grasses	3	18	6	7
Native annual grasses	0	0	0	0
Non-native annual grasses	6	0	0	0
Native perennial forbs	<1	<1	3	3
Non-native perennial forbs	0	0	0	0
Native annual forbs	<1	0	0	0

Cover Attribute	2006 ESI# Percent Cover by Pasture		2010 HAF Percent Cover by Pasture	
	East	West	East	West
Non-native annual forbs	0	0	4	0
Total Vegetative Cover	55	57	49	50
Biological soil crust*	8	20	44	48
Litter ground	50	49	9	12
Gravel/Rock	6	0	0	0
Total Other Cover	64	69	53	60
Cover Total	**109**	**126**	**102**	**110**
Bare Ground	**27**	**16**	**21**	**14**

#Note the 2010 HAF sites were not at the same location as the 2006 ESI sites
*Biological soil crust include: algae, fungi, lichens, and mosses; Total cover may exceed 100% because one species of vegetation may occur above other vegetation, litter, or biotic crusts Bare ground is recorded only when no other cover is hit.

East Pasture - Loamy 10-13"

IIRH Site 1

The IIRH site (Map 5) is co-located with the HAF-1 site in the northeastern part of the East Pasture. A sage grouse habitat assessment (Map 5) was undertaken in June of 2010 and provides cover information for this site (Table 12). Total shrub cover was at 19 percent with an understory of native and non-native perennial bunchgrass cover consisting of Sandberg bluegrass at 17 percent and crested wheatgrass at 6 percent (Table 16). The ESDs dominance values are based on production rather than cover. Crested wheatgrass was found primarily within the sagebrush canopy and had less presence in the interspaces. Total vegetative cover was 49 percent. Biological soil crusts were abundant at a total of 44 percent of cover, helping reduce bare ground to 21 percent. Total non-vegetative (litter, rock, biological soil crusts) cover was 53 percent.

The IIRH site showed none-to-slight departure ratings for all indicators related to the Soil and Site Stability and Hydrologic Function attributes during the assessment in May 2013 (Tables 10 and 11). No rills, gullies, water flow patterns, wind scour, or depositional areas were observed. Pedestaling associated with Sandberg bluegrass was determined to be inactive and possibly caused by frost heaving. Bare ground was at 21 percent based on data from the 2010 cover transect, and no soil surface loss or degradation was noted. Soil surface resistance to erosion was rated as none-to-slight based on the soil stability rating for the adjacent pasture of 5.1. It was assumed the soil stability rating in this pasture would be similar due to the same history of grazing and vegetation treatments.

The plant community indicator, as it relates to hydrologic function, was rated none-to-slight due to the presence of mature sagebrush vegetation providing for water infiltration and storage.

2006 ESI Site

The ESI site in the East Pasture (Map 3) was assessed in September of 2006 and is located near the western boundary of the pasture just above a low-lying ephemeral drainage. . Vegetative cover at the ESI site in the East Pasture (Table 12) shows that vegetation provides 55 percent of cover while non-vegetative cover, such as litter, biological soil crust, and rocks accounts for 64 percent, leaving 27 percent bare ground.

Mature sagebrush and some rabbitbrush contributed to 17 percent of the vegetation cover. A mix of native and non-native deep-rooted perennial bunchgrasses was present. Shallow-rooted Sandberg bluegrass contributed 25 percent cover. Biological soil crust comprised 8 percent of cover. Biological soil crusts were less abundant in the interspaces (1 percent) than under vegetation canopy (8 percent). Similarly, litter was of lower cover (18 percent) in the interspaces compared to under vegetative canopy (50 percent). Cheatgrass, an invasive annual, was recorded at 6 percent of total ground cover.

West Pasture - Loamy 8-12"

IIRH Site 2

The IIRH site (Map 5) is co-located with the HAF-2 site near the western boundary of West Pasture. A sage grouse habitat assessment (Map 5) was undertaken in June of 2010 and provides cover information for the West Pasture. Table 12 shows that vegetation provides 50 percent of cover while non-vegetative cover, such as litter, biological soil crust, and rocks account for 60 percent, leaving 14 percent bare ground. Total shrub cover was at 8 percent with an understory of native and non-native perennial bunchgrass cover consisting of Sandberg bluegrass at 20 percent and crested wheatgrass at 7 percent (Table 16). The ESDs dominance values are based on production rather than cover. Biological soil crusts were abundant at 51 percent of total cover. Bare ground comprised 14 percent (top layer) and non-persistent litter was 19 percent (all layers).

No invasive annual grasses or forbs, such as cheatgrass and curveseed butterwort, were encountered along the cover transect. Curveseed butterwort was noted to be rare and sparse.

The IIRH site showed none-to-slight departure ratings for all indicators related to the Soil and Site Stability and Hydrologic Function attributes during the assessment in May 2013 (Tables 10 and 11). . No rills, gullies, water flow patterns, pedestaling, wind scour, or depositional areas were observed. Bare ground was low at 14 percent based on data from the 2010 cover transect, litter was as expected for the site, and no soil surface loss or degradation or compaction were noted. Soil surface resistance to erosion was rated as none-to-slight since soil stability results fell within the expected range (4 to 6), measuring 5.0 in interspaces and 5.25 under canopies, with an overall average 5.1.

The plant community indicator, as it relates to hydrologic function, was rated none-to-slight due to the presence of mature sagebrush vegetation and deep- and shallow-rooted bunchgrasses providing for infiltration and moisture capture.

2006 ESI

The ESI site (Map 3) was assessed in June of 2006 and is located just southeast of the center of West Pasture. Table 12 shows that vegetation provides 57 percent of cover while non-vegetative cover, such as litter, biological soil crust, and rocks account for 69 percent, leaving 16 percent bare ground.

Mature sagebrush comprised 16 percent of the vegetation cover. Deep-rooted perennial bunchgrasses comprised21 percent of total cover and Sandberg bluegrass cover totaled 32

percent. Biological soil crust comprised 20 percent of cover and bare ground was low at just16 percent (top Layer) of cover. Litter was recorded at 49 percent of total cover and was more prevalent under vegetation canopies rather than in interspaces. No invasive annual grasses or forbs were observed.

Evaluation of Standard 1

The 2013 IIRH concluded all the indicators related to soil and site stability and hydrologic function attributes to be at a none-to-slight departure from the reference condition; therefore, the soil and site stability and hydrologic function attributes were rated none-to-slight departure from the reference condition. Soil stability ratings fall within expected ESD levels and are further enhanced by the presence of biological soil crust, including the interspaces. . Shrubs, perennial grasses, and other ground cover, including biological soil crusts and litter, are presently limiting exposure of the soil to erosion. Topography over most of the allotment has a gentle slope which further reduces the chance of water erosion.

Evaluation Finding – Allotment (East and West Pastures) is:

_X_ Meeting the Standard
____ Not meeting the Standard, but making significant progress towards meeting
____ Not meeting the Standard

Rationale for Evaluation Finding

Abundant perennial vegetation, as well as biological soil crusts and litter, is present within the Cedar Creek Canyon Allotment to provide protection for site stability. Additionally, bare ground is within what is expected throughout the allotment and topography is relatively flat; therefore, Standard 1 is being met in the East and West Pastures of the Cedar Creek Canyon Allotment.

Bare ground was within the range expected across the allotment. A soil stability test (Pellant et al., 2005) was completed in the allotment and resulted in an average soil stability value of 5.1, indicating adequate soil surface resistance to erosion. Pedestals observed in the East Pasture were stable, indicating no recent erosion.

Shrub cover (Table 12) is present throughout the allotment and contributes to the capture and storage of precipitation. Deep-rooted perennial bunchgrasses are also present in amounts to support hydrologic function. Sandberg bluegrass, a shallow rooted species, provides site protection and supports the deep-rooted species. The presence of cheatgrass (6%) at the ESI site in the East Pasture is of concern; however, invasive species do not appear to be altering the nutrient, energy, or hydrologic cycles at this time.

Plant composition and abundance, extent of biological soil crusts, and the lack of rills, gullies, or flow patterns indicate that soil and site stability and hydrology are functioning appropriately. Standard 1 is met in the East and West Pastures of Cedar Creek Canyon Allotment.

DRAFT

Standard 2 (Riparian Areas & Wetlands)

Riparian-wetland areas are in properly functioning condition appropriate to soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

Rangeland Health Assessment

East Pasture:

_X_Standard Doesn't Apply

Surface water is not present in Cedar Creek in the East Pasture of the allotment due to the diversion and siphon that removes the entire streamflow into the Cedar Mesa Canal. Because the lower reach of Cedar Creek is completely dewatered by the diversion/siphon, Standard 2 does not apply to the East Pasture of the allotment. The Cedar Mesa Canal (0.9 miles) provides livestock with water in the eastern part of the East Pasture. The canal banks are generally steep and support limited riparian vegetation. Some seepage associated with the canal has created some artificial wetlands.

There are four small ponds located in the bottom of Cedar Creek Canyon downstream of the diversion that were constructed for livestock watering. The ponds fill when water is infrequently released past the diversion. . Because these wetlands are man-made, Standard 2 does not apply to the allotment for wetlands.

West Pasture:

Cedar Creek is the only stream that occurs within the Cedar Creek Canyon Allotment and forms the eastern boundary of the allotment (Map 3). The National Hydrologic Database (USGS 2014) lists 0.6 mile of Cedar Creek within the West Pasture (from the upstream allotment boundary at stream mile 15.8) downstream to a siphon (stream mile 15.2) as being a perennial stream, but this stream reach primarily contains flowing water during the irrigation season (typically April-October) when water is released from Cedar Creek Reservoir (also known as Roseworth Reservoir). The entire flow of Cedar Creek is removed from the channel by the siphon into the Cedar Mesa Canal. Outside of the irrigation season (March into early April), small amounts of water may occur below the siphon from seepage from the reservoir or groundwater recharge. Natural fluvial processes are not occurring due to the Cedar Creek Dam and dewatering. The dam for Cedar Creek Reservoir was originally constructed around 1910 and flow alteration and subsequence altered fluvial process have been occurring since that time.

All of the streamflow of Cedar Creek within the West Pasture is diverted into a siphon that feeds the Cedar Mesa Canal to distribute water for irrigation to private land at Roseworth. Cedar Creek downstream of the diversion/siphon contains a minimal riparian signature because of the lack of water. The only water downstream of the siphon is what seeps past the diversion. The portion of Cedar Creek in the West Pasture that is upstream of the diversion/siphon contains enough surface water for riparian conditions to occur. Therefore, Standard 2 applies to the West Pasture of the allotment for riparian areas.

DRAFT

There is a wetland area in the West Pasture at a man-made reservoir just upstream of the diversion/siphon. This pond was constructed to collect water for the siphon. Because this wetland is man-made, Standard 2 does not apply for wetlands.

Two reaches of Cedar Creek have been assessed using the BLM Technical Reference 1737-15 for assessing Proper Functioning Condition (PFC) of streams (BLM, 1998) (Table 13). The reaches stretch from the diversion/siphon upstream to the allotment boundary. The most recent assessments from 1998, 2002, and 2007 are displayed in Table 13.

Table 13. Condition Assessment Ratings by Reach and Year.

Cedar Creek Reach (miles)	Pasture	1998 Rating	2002 Rating	2007 Rating
15.2-15.7	West	NF	NF	FAR
15.7-15.8*	West	NF	NF	Functional

NF= Non-Functional, FAR=Functional-At-Risk; Functional= Functioning Condition give flow alteration
*2007 Functional assessment reach miles were from 15.7-16.7, but only stream miles 15.7-15.8 are within the Cedar Creek Canyon Allotment.

Stream miles 15.2-15.8 are within the Cedar Creek Canyon Allotment, but livestock from the allotment are only able to access the stream miles 15.5-15.7 due to fencing and topography. Livestock from the Pigtail Butte Allotment (Three Mile Crossing Pasture) east of Cedar Creek have access to the stream miles 15.2-15.5. A fence across Cedar Creek limits livestock access from the Pigtail Butte Allotment further upstream. A second fence crossing Cedar Creek generally limits livestock from the West Pasture to a roughly 0.2 mile (15.5 to 15.7) portion of Cedar Creek (Photo 5). At this point (stream mile 15.7) another fence across Cedar Creek limits livestock use from the West Pasture further upstream. High flow conditions associated with the release water from the Cedar Creek Reservoir for irrigation can damage the fences across Cedar Creek which limits their effectiveness in preventing livestock from accessing Cedar Creek and movements within the canyon. Unless fences are damaged, livestock are prevented from grazing along Cedar Creek between stream mile 15.7 and 15.8. There are areas on the old floodplain terrace that are dominated by exotic annuals (Photo 5) which generally lack the root structure to stabilize soils adjacent to the streambank.

DRAFT

Photo 5. The downstream water gap fence (stream mile 15.5) for the West Pasture of the Cedar Creek Canyon Allotment.

Near side of the photograph shows primarily upland plants (Kentucky bluegrass, curveseed butterwort, crossflower [*Chlorispora tenella*], etc.) to the edge of the streambank and extending downslope toward the water's edge. Far side of the photograph shows an area with streambank alteration within the designated water gap. The photo represents livestock grazing impacts in the watergap throughout the assessment reach (15.5 to 15.7).

Cedar Creek downstream of the diversion/siphon is functioning as an ephemeral stream. Ephemeral streams only contain surface flows in direct response to precipitation and have a stream channel that is above the water table at all times (BLM 1998). Vegetation along the stream channel downstream of the diversion/siphon is comprised primarily of upland species. Seepage from the siphon dam maintains some wetland plants immediately downstream of the dam. The few riparian plant species present, such as Baltic rush, are generally tolerant of extended dry periods. Condition assessments have not been conducted downstream of the diversion/siphon as the stream reach does not contain a riparian signature and lacks flows most of the year. Canada thistle and bull thistle are present but sparse in the old floodplain. In 2013, the stream was field reviewed and photos were taken at established photo points.

Evaluation of Standard 2

The results of the condition assessments within West Pasture of the Cedar Creek Canyon Allotment are displayed in Table 14.

Table 14. Vegetation Item Ratings from Functional Assessments by Stream Reach and Year.

Vegetation Criteria from Functional Assessment Form	Reach 15.2-15.7			*Reach 15.7-15.8		
	1998	2002	2007	1998	2002	2007
There is a diverse age class distribution of riparian-wetland vegetation (recruitment for maintenance and recovery) (6)	No	No	No	No	No	Yes
There is a diverse composition of riparian-wetland vegetation (for maintenance/recovery) (7)	Yes	No	Yes	Yes	No	Yes
Species present indicate maintenance of riparian-wetland soil moisture characteristics (8)	Yes	Yes	No	Yes	Yes	Yes
Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-stream flow events (9)	No	No	No	No	No	Yes
Riparian plants exhibit high vigor (10)	No	No	No	No	No	Yes
Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows (11)	No	No	No	No	No	N/A
Plant communities in the riparian area are an adequate source of coarse and/or large woody material (for maintenance/recovery) (12)	N/A	N/A	N/A	N/A	N/A	Yes

*Condition assessment reach is from stream mile 15.7-16.7 but only stream mile 15.7-15.8 are in the allotment.

<u>Stream Reach 15.2-15.7</u>

In 2007, stream reach 15.2-15.7 was rated as FAR due a narrowing floodplain, encroachment of Kentucky bluegrass (*Poa pratensis*) or other upland species, actively eroding streambanks, and sedimentation in the stream channel (Table 13, Table 14). In this reach, a few willows are present, but are generally more common near the pond associated with the diversion/siphon. Juniper is a potential source of large woody debris but overall, coarse and/or large woody debris is lacking in this portion of Cedar Creek. The assessment determined that riparian vegetation is not adequate to protect streambanks or dissipate energy during high flows. However, the streamflow within this reach results from infrequent water releases from Cedar Creek Reservoir. The natural, historic high flow regimes no longer occur within the reach. The result of the altered flow regime, combined with livestock being able to access the stream, is riparian vegetation is not sufficient to maintain streambank stability. The herbaceous riparian vegetation had a diverse composition of species, but only mature willows were observed. This indicates recruitment of woody plants was limited or not occurring. Riparian herbaceous plants did not exhibit high vigor which was indicated by a lack of seed heads. Kentucky bluegrass, which is a poor stabilizer of streambanks, was noted as encroaching in the riparian-wetland area and had reduced or replaced sedges (*Carex* spp.) and rushes (*Juncus* spp.) in many areas. A few small Canada thistle patches were present.

DRAFT

Stream Reach 15.7-15.8

In 2007, stream reach 15.7-15.8 was determined to be properly functioning (Table 13). This reach of Cedar Creek is functionally different than the downstream dewatered reach (15.2-15.7). The stream channel substrate includes more large rock and boulders and junipers are common along the streambank. This stream reach is naturally more protected and less accessible to livestock grazing by the steep canyon topography than in condition assessment reach 15.2-15.7. Vegetation ratings from the condition assessments conducted within the allotment are displayed in Table 14. All items related to riparian vegetation for the 2007 condition assessment were marked "yes", indicating that the stream attribute is appropriate for the reach. Throughout this reach, a diverse composition of riparian species was present and exhibited high vigor. Although sedges and rushes were present, their extent along the streambank was somewhat limited and they had been replaced by less desirable plants such as Kentucky bluegrass in some areas. The occurrence of sedges was also likely influenced by the streamside shading produced by the abundant juniper within the reach. Streambank vegetation root mass, primarily junipers, was sufficient to withstand high stream flows in areas where they are present. The large substrate (cobbles and small and large boulders) within this reach also aids in dissipating stream energy. Actively eroding stream banks were not observed to the extent present in reach 15.2-15.7.

Evaluation Finding – West Pasture is:

___ Meeting the Standard
___ Not meeting the Standard, but making significant progress towards meeting
_X_ Not meeting the Standard

Rationale for Evaluation Finding

Stream reach 15.2-15.7 is not meeting Standard 2 in the West Pasture of the Cedar Creek Canyon Allotment. The reach was rated as FAR during the most recent condition assessment (2007). Riparian vegetation (sedges and rushes) throughout this reach is not sufficient to stabilized streambanks and control erosion, and actively eroding streambanks were observed throughout the reach. Age class and structural diversity of riparian species is not appropriate for this reach due to the lack of woody riparian species and recruitment of the woody riparian species. The stream channel width at the water gap is over widened (approx. 0.5 mile of reach) which contribute to streambank alteration over the entire reach. Concentrated livestock use along accessible segments of the streambanks, combined with impacts related to dewatering of the stream, has resulted in upland species being dominant to the stream margin (Photo5). Much of the streambed is down to bedrock or is dominated by boulders and large cobbles which contributes to the overall stability of the stream.

Stream reach 15.7-15.8 is meeting Standard 2 in the West Pasture of the Cedar Creek Canyon Allotment. Stream reach 15.7-15.8 was determined to be functional during the most recent condition assessment (2007). Riparian vegetation along this reach includes diverse age-classes and composition of riparian-wetland vegetation species. Riparian vegetation established within the reach includes species with sufficient roots to stabilize streambanks with the present flow regime. Noxious weeds are not increasing. Streambanks are partially protected by large rocks in several areas. Also the upper gap fence is being effective in restricting livestock access to the reach. Much of the streambed has reached bedrock or is armored by boulders and large cobbles which minimizes the chance of future down cutting.

Standard 3 (Stream Channel/Floodplain)
Stream channels and floodplains are properly functioning relative to the geomorphology (e.g., gradient, size, shape, roughness, confinement, and sinuosity) and climate to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

Rangeland Health Assessment

East Pasture

_X_Standard Doesn't Apply

A description of the water resources within the allotment is provided under Standard 2. Because the lower reach of Cedar Creek is completely dewatered by the diversion/siphon, Standard 3 does not apply to the East Pasture of the Cedar Creek Canyon Allotment.

West Pasture
A description of the water resources within the allotment is provided under Standard 2. Standard 3 applies to the portion of Cedar Creek in the West Pasture that is upstream of the diversion/siphon and artificial wetland. This reach of Cedar Creek contains enough surface water for a stream channel and floodplain to be present within the pasture.

Evaluation of Standard 3

Stream Reach 15.2-15.7
During the most recent condition assessment (2007), stream reach 15.2-15.7 was rated as FAR based on a "no" response on six of the eight applicable indicators. There were two indicators on the data form (^) that were marked as "yes" but should have been "no" based on the comments provided on the data sheet. The condition assessment ratings for Hydrology and Erosion/Deposition for the West Pasture are summarized in Table 15.

Table 15. Hydrology and Erosion/Deposition Items from Functional Assessments by Stream Reach and Year.

Hydrology and Erosion/Deposition Item from Functional Assessment Form	Reach 15.2-15.7			Reach 15.7-15.8		
	1998	2002	2007	1998	2002	2007
Floodplain above bank-full inundated in "relatively frequently" events (1-3 years) (1)	Yes	Yes	^Yes	Yes	Yes	Yes
Active/stable beaver dams, where present (2)	N/A	N/A	N/A	N/A	N/A	N/A
Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region) (3)	No	No	No	No	No	Yes
Riparian zone is widening or has achieved potential extent (4)	No	No	No	No	No	Yes

Hydrology and Erosion/Deposition Item from Functional Assessment Form	Reach 15.2-15.7			Reach 15.7-15.8		
	1998	2002	2007	1998	2002	2007
Upland watershed is not contributing to riparian-wetland degradation (5)	Yes	Yes	^Yes	Yes	Yes	Yes
Floodplain and channel characteristics (i.e. rocks, overflow channels, coarse and/or large woody debris) are adequate to dissipate energy (13)	No	No	No	No	No	Yes
Point bars are re-vegetating with riparian-wetland vegetation (14)	N/A	No	N/A	N/A	No	N/A
Lateral stream movement is associated with natural sinuosity (15)	No	No	Yes	No	No	Yes
System is vertically stable (16)	Yes	Yes	Yes	Yes	Yes	Yes
Stream in in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion and deposition) (17)	No	No	No	No	No	No

*Condition assessment reach is from stream mile 15.7-16.7 but only stream mile 15.7-15.8 are in the allotment.
^Indicators were marked as "yes" on the data form; should have been "no" based on comment provided.

The condition assessment determined the floodplain is not inundated in relatively frequent events due to the altered streamflow which do not allow for streambanks to be rebuilt during high flow events. Down-cutting and over widening of the stream channel has made the historic floodplain no longer accessible during high flows. The width/depth ratio and sinuosity of this stream reach are not in balance with the landscape. There were high amounts of fine sediment in the stream channel, and the channel was over widened and was less sinuous that would be expected for the landscape setting. Essentially, the stream channel has down-cut and is re-establishing a new floodplain elevation within the down-cut channel. This recovery process is being hampered by the combined effects of the altered streamflow and current livestock grazing. The locations of the fences within the riparian area are not being effective in confining livestock to the designated watering areas. Re-configuration of the existing fences would improve riparian conditions by reducing grazing impacts from the two allotments adjacent to the reach. This would reduce streambank alteration within the reach and allow stabilizing vegetation to increase over time. This would reduce erosion that is occurring and address the reason for the FAR rating (i.e., lack of balance between the water and sediment being supplied by the watershed).

Stream Reach 15.7-15.8

In 2007, stream reach 15.7-15.8 was determined to be in proper functioning condition (Table 13). The Hydrology and Erosion/Deposition condition ratings from the condition assessments are summarized in Table 15. The only item related to hydrology or erosion/deposition on the 2007 condition assessment form marked "no", was item 17. It was marked "no" because cut banks and deposition were apparent in the reach. It is unclear if these conditions were observed in the reach within the allotment (stream mile 15.7-15.8) or was predominant across the entire assessment reach (stream mile 15.7 to 16.7). All other items related to the hydrology and erosion/deposition

DRAFT

were marked “yes”, indicating the processes or attributes are appropriate for the reach given altered flows.

Evaluation Finding – West Pasture is:

___ Meeting the Standard
___ Not meeting the Standard, but making significant progress towards meeting
_X_ Not meeting the Standard

Rationale for Evaluation Finding

Stream reach 15.2-15.7 was determined to be Functional-At-Risk during the most recent assessment. The floodplain is not inundated in relatively frequent events due to the altered streamflow which do not allow for streambanks to be rebuilt during high flow events. Down-cutting of the stream channel has made the historic floodplain no longer accessible during high flows. The width/depth ratio and sinuosity of this stream reach are not in balance with the landscape. There were high amounts of fine sediment in the stream channel, and the channel was over widened and was less sinuous that would be expected for the landscape setting. Livestock have access to the stream reach and are altering streambanks and reducing the occurrence of hydric vegetation. The location of the fences within the riparian area is not being effective in confining livestock to the designated watering areas. Therefore, stream reach 15.2-15.7 is not meeting Standard 3.

Stream reach 15.7-15.8 was determined to be properly functioning during the most recent assessment. Stream attributes, such as sinuosity, width/depth ratio, pool/riffle/run frequency, are appropriate for the landscape. Streambank stability is appropriate, although cut banks and deposition were noted within the reach. Therefore, stream reach 15.7-15.8 is meeting Standard 3.

Standard 4 (Native Plant Communities)

Healthy, productive, and diverse native animal habitat and populations of native plants are maintained or promoted as appropriate to soil type, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.

_X_ Standard Doesn’t Apply

Nearly all of the allotment was sprayed with herbicide and seeded to crested wheatgrass in 1967 to increase livestock forage as part of the Diversion Seeding. Although vegetation cover data collected in 2006 and 2010 clearly indicates a number of native species are present and widely distributed, the JFO IDT determined that the allotment should be assessed as a seeded plant community because the historic treatment and some areas still supporting substantial amounts of crested wheatgrass. The chemical treatment reduced sagebrush and likely altered the native forb composition and abundance.

Standard 5 (Seedings)

Rangelands seeded with mixtures, including predominately non-native plants, are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

Rangeland Health Assessment
As indicated by cover data (Table 16), crested wheatgrass is present across the allotment. Production data indicate the deep-rooted perennial grasses are dominant in the East Pasture and co-dominant in the West Pasture (see Table 7). During the 2013 field assessment four native perennial grass species were documented along with 22 perennial native forbs species (see project record and Appendix A).

No noxious weed species were noted within the allotment during data collection (2006, 2010, and 2013). The 2006 ESI data indicates cheatgrass is present in the East Pasture. Curveseed butterwort, an invasive species, was recorded as cover in the East Pasture and noted to be present in the West Pasture.

Cover data was collected at both sites in 2010 and has been summarized below in Table 16. Sandberg bluegrass comprises the highest average percent of cover at the sites. Crested wheatgrass was the most abundant deep-rooted bunchgrass in the allotment.

Table 16. Cover (All Layers) by Species at HAF (2010) Sites and ESI Sites (2006).

Vegetation Class	Species	% Cover			
		East Pasture		West Pasture	
		HAF (2010)	ESI (2006)	HAF (2010)	ESI (2006)
Perennial Grasses	Crested wheatgrass	6	3	7	18
	Sandberg bluegrass	17	23	20	32
	squirreltail	0	2	3	5
	Idaho fescue	0	5	0	0
	Thickspike wheatgrass	0	0	6	0
	Bluebunch wheatgrass	0	1	0	0
	Thurber's needlegrass	0	0	3	3
Non-native Annual Grasses	Cheatgrass	0	6	0	0
Perennial Forbs	Spiny phlox	1	0	1	0
	Geyer's Twinpod	1	0	0	0
	Sagebrush fleabane	0	0	1	0
	Sagebrush phlox	1	1	1	1
	Milkvetch	1	0	0	0
Native Annual Forbs	Gayophytum	1	0	0	0
Non-native Annual Forbs	Curveseed butterwort	4	0	0	0
Shrubs	Wyoming big sagebrush	19	14	8	16
	Rubber rabbitbrush	0	3	0	0
Other Cover					
	Biological soil crust	45	8	51	20
	Litter Ground	12	50	19	49
	Litter Standing	0	0	1	26
	Rock or Gravel	0	4	0	0
Bare Ground		20	27	14	16

* See Appendix A for other plant species not recorded during cover transects but observed at the 2013 sites.

Although the amount of litter was higher than the reference condition in some areas the JFO interdisciplinary team determined that the amount was appropriate for site stability and ecological processes as shown by adequate soil moisture and annual plant growth/production being in the range expected for the range sites.

East Pasture Site. Loamy 10-13"

IIRH Site 1

IIRH Site 1 is located in a seeded vegetation community where Sandberg bluegrass (17% cover) is the dominant grass species and Wyoming big sagebrush (19% cover) is the dominant shrub species (Table 16). Crested wheatgrass is the dominant deep-rooted perennial bunchgrass at the site, comprising 6 percent of ground cover. Biological soil crusts comprised 45 percent of cover at the site and are widespread. Meanwhile, perennial native forbs contributed to just 3 percent of ground cover, although field notes indicate that 13 species of native perennial forbs are present in the pasture. Overall, the amount of forb cover was less than expected within the pasture.

The indicator for functional structural groups was rated as a slight to moderate departure from the reference condition due to the reduced abundance and relative dominance of deep-rooted perennial bunchgrasses at the site.

Curveseed butterwort, an invasive annual, comprised 4 percent of cover (Table 16) and was noted in the 2013 IIRH field notes to be common throughout the site. Therefore, the indicator for invasive plants was rated as a moderate to extreme departure from the reference condition.

All other indicators related to the Biotic Integrity attribute were rated none to slight. The Biotic Integrity attribute was rated a slight to moderate departure from the reference condition due to the reduced abundance and relative dominance of deep-rooted perennial grasses at the site.

2006 ESI Site

Data collected at the 2006 ESI site indicates Sandberg bluegrass (23 percent) was the dominant grass species and sagebrush (14 percent) was the dominant shrub (Table 16). Meanwhile, perennial forbs represented just 1.5 percent of ground cover and biological soil crusts were recorded at 8 percent of cover at the site. Cheatgrass comprised 6 percent of groundcover. The 2006 ESI site had slightly more litter than compared to the reference sheet (20 – 40 percent). Precipitation in 2005 was 75 percent above normal resulting in greater plant growth, which may have in turn became litter in 2006.

West Pasture Site. Loamy 8-12"

IIRH Site 2

IIRH Site 2 is located in a seeded vegetation community where Sandberg bluegrass (20% cover) is the dominant grass species and Wyoming big sagebrush (8% cover) is the dominant shrub species (Table 16). Crested wheatgrass is the dominant deep-rooted perennial bunchgrass at the site, comprising 7 percent of ground cover. Thurber's needlegrass is also present at the site and comprised 3 percent of total ground cover. 2013 field notes estimated sagebrush cover in the area to be approximately 15 percent, which would be slightly higher than what was recorded in the

2010 cover transect. Biological soil crusts comprised 51 percent of cover at the site and are widespread. Forb cover at the 2010 HAF site was 3 percent (Table 16). 2010 HAF field notes show there were 17 species of native perennial forbs found in the West Pasture.

Curveseed butterwort, an invasive annual, was noted in some disturbed areas of the site but was not recorded in the vegetative cover transect. Field notes indicated that curveseed butterwort was found in a cattle trail (disturbed area) and some adjacent interspaces within the pasture. The indicator for invasive plants was rated Slight to Moderate.

All other indicators related to the Biotic Integrity attribute were rated none to slight. The Biotic Integrity attribute was rated none to slight departure from the reference condition because invasive species were limited to curveseed butterwort, which is largely limited to disturbed areas (cattle trail).

2006 ESI Site

Data collected at the 2006 ESI site indicates Sandberg bluegrass (32 percent) and crested wheatgrass (18 percent) were co-dominant grass species and sagebrush (16 percent) was the dominant shrub (Table 16). Meanwhile, perennial forbs represented just 1 percent of ground cover. In contrast, biological soil crusts were recorded at 20 percent of ground cover at the site. The 2006 ESI site had slightly more litter on the ground (49 percent) than compared to the reference sheet (20 – 40 percent). Precipitation in 2005 was 75 percent above normal resulting in greater plant growth, which may have in turn became litter in 2006.

Allotment Summary for Standard 5 (Seedings):

The biotic integrity attribute rating was rated none to slight for the West Pasture and slight to moderate for the East Pasture (Table 11).

The functional/structural group indicator was rated slight to moderate in the East Pasture due to the reduced abundance and relative dominance of deep-rooted perennial bunchgrasses at the site. The functional structural group indicator was rated none to slight for the West Pasture.

The East Pasture was rated moderate to extreme for invasive plants due to curveseed butterwort being common throughout the site. The West Pasture was rated slight to moderate for invasive plants due to curveseed butterwort. Curveseed butterwort was mostly limited to disturbed areas such as cattle trails in the West Pasture, but was also found at low levels in plant interspaces.

Although slightly elevated amounts of litter were present at both ESI sites within the allotment in 2006, the indicator for litter amount was rated none to slight for both pastures. Approximately 75 percent higher precipitation in 2005 may have contributed to higher plant growth and subsequent litter in 2006. Litter amounts were recorded at 12 and 19 percent cover in 2010. The JFO interdisciplinary team determined that the litter amounts were appropriate for site stability and ecological processes as shown by adequate soil moisture, as well as plant growth/annual production matching what is expected at each site.

DRAFT

Evaluation of Standard 5

The 2013 IIRH field notes and cover data indicate perennial forb species are diverse and somewhat abundant. Native deep-rooted perennial bunchgrasses are limited but the seeded non-native crested wheatgrass augments the reduced native species, improving structure. Sandberg bluegrass was widespread and abundant. Shrub cover has increased allotment wide since the herbicide treatment in 1967, and is adequate to fulfill the structural and functional role. Invasive plants such as cheatgrass and curveseed butterwort are elevated in the East Pasture (Table 16), but are less in the West Pasture. The biotic integrity attribute rating was rated none to slight for the West Pasture and slight to moderate for the East Pasture (Table 11).

Evaluation Finding – Allotment (East and West Pastures) is:

_X_ Meeting the Standard
__ Not meeting the Standard, but making significant progress towards meeting
__ Not meeting the Standard

Rationale for Evaluation Finding

Diversity of perennial species within the Cedar Creek Canyon is as expected for areas that have been seeded. Deep-rooted perennial bunchgrasses are present in adequate amounts within most areas of the seeded plant communities (Table 16). Perennial species are productive and capable of reproduction and recruitment of new seedlings. The 2013 IIRH field notes, as well as cover data, indicate that abundance and diversity of perennial forb species varies across the allotment. Cover of perennial forbs ranged from 1 to 4 percent across the four cover transects recorded within the allotment but field notes indicate overall forb diversity was comparatively high. Perennial bunch grasses, shrubs, and perennial forbs are maintaining diversity.

No noxious weeds were noted to be present in the uplands of the Cedar Creek Canyon Allotment. However, curveseed butterwort, an invasive annual, comprised 4 percent of cover (Table 16) at the IIRH site in the East Pasture and was noted in the 2013 IIRH field notes to be common throughout the site. Curveseed butterwort was not recorded in the cover transects in the West Pasture but was noted in the 2013 IIRH field notes to occur primarily within disturbed areas; but was also noted to occur in some plant interspaces. In addition, cheatgrass comprised 6 percent (Table 16) of ground cover at the 2006 ESI site. Cheatgrass was not noted to occur at the other three sites within the allotment. Invasive species such as cheatgrass and curveseed butterwort can become a threat to biotic integrity following large scale disturbances such as wildfire; however, adequate desirable perennial species and biological soil crusts are present within the seeded plant communities to hinder further spread or establishment of invasive or noxious plant species. Seeded plant communities within the allotment have a high abundance of desirable perennial vegetation and biological soil crusts (Table16) that are providing soil cover and competition to invasive species.

The seeded vegetation communities within the Cedar Creek Canyon Allotment are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle. Therefore, the pasture is meeting Standard 5.

DRAFT

Standard 6 (Exotic Plant Communities, Other than Seedings)
Exotic plant communities, other than seedings, will meet minimum requirements of soil stability and maintenance of existing native and seeded plants. These communities will be rehabilitated to perennial communities when feasible cost effective methods are developed.

__X__Standard Doesn't Apply

The plant communities with the Cedar Creek Canyon Allotment are dominated by native and seeded non-native perennial species. There are no sizeable areas within the allotment dominated by invasive annual species such as cheatgrass. Areas where non-native annuals are abundant are small in size and generally restricted to more frequently disturbed sites. Standard 6 does not apply to the allotment.

Standard 7 (Water Quality)
Surface and ground water on public lands comply with the Idaho Water Quality Standards.

Rangeland Health Assessment

Allotment Summary for Standard 7 (Water Quality):
Cedar Creek is the only stream that occurs within the Cedar Creek Canyon Allotment and forms the eastern boundary of the East and West pastures. In the West Pasture, all of the streamflow in Cedar Creek is diverted into the Cedar Mesa Canal for irrigation on private land. The result of this diversion is that surface flows are not present in the East Pasture of the allotment. There is a wetland in the West Pasture that occurs at a man-made reservoir just upstream of the diversion on Cedar Creek that was constructed to provide water for livestock. Additional information on the water resources within the allotment can be found under Standard 2. It is important to note the IDEQ assessment units (AU) are delineated by the State of Idaho and are not the same as riparian reaches identified in Standard 2.

Evaluation of Standard 7
Cedar Creek within the allotment is in two assessment units. Idaho Department of Environmental Quality (IDEQ) Assessment Units (AU) ID17040213SK000_03 (East Pasture) is entirely within the East Pasture, whereas AU ID17040213SK004_04 is in the East and West pastures (IDEQ 2014). Therefore, Standard 7 applies to both pastures of the allotment.

The IDEQ 2012 Integrated Report identifies AU ID17040213SK000_03 as unclassified waters for which designated beneficial uses (e.g., cold water aquatic life, primary and secondary contact recreation) have been identified but not assessed. The AU is listed as a Category 3 stream (i.e., waters with insufficient data (or no data) to determine if beneficial uses are being attained). Until IDEQ assesses the water quality within the AU, no further evaluation of water quality can be completed for this segment in the East Pasture of the allotment.

IDEQ AU ID17040213SK004_04 includes 0.1 mile and 1.1 mile in the East and West Pastures, respectively. The designated beneficial uses for IDEQ AU ID17040213SK004_04 are cold-water aquatic life, primary contact recreation, and secondary contact recreation (IDEQ 2014). The IDEQ identifies the AU as not supporting the cold-water aquatic life beneficial use due to flow regime alterations, sedimentation/siltation, and elevated water temperature (IDEQ 2014). The

AU has not been assessed by IDEQ to determine if it is supporting the beneficial uses of primary and secondary contact recreation. The AU was removed from the list of Category 5 steams (i.e., waters do not meet water quality standards for one or more beneficial uses) for water temperature and sediment after the Environmental Protection Agency's (EPA) approval of the Salmon Falls Sub-basin Assessment and Total Maximum Daily Loads (IDEQ 2008). For these water quality indicators, Cedar Creek within the AU is listed as a Category 4a stream (i.e., waters with a TMDL completed and approved by EPA). For flow regime alterations, this reach of Cedar Creek is listed as a Category 4c stream (i.e., waters failing to meet water quality standards due to pollution (e.g., flow alteration), not a pollutant).

Evaluation Finding – Allotment (East and West Pastures) is:

___ Meeting the Standard
___ Not meeting the Standard, but making significant progress towards meeting
_X_ Not meeting the Standard

Rationale for Evaluation Finding

Standard 7 is not being met in the East and West Pastures of the Cedar Creek Canyon Allotment based on IDEQ beneficial use support status and water quality impairment information (IDEQ 2014). The AU within these pastures (i.e., ID17040213SK004_04) is listed by IDEQ as not supporting the designated beneficial use of cold water aquatic life due to flow regime alterations, sedimentation/siltation, and elevated water temperature (IDEQ 2014). Therefore, the Cedar Creek Canyon Allotment is not meeting Standard 7.

Standard 8 (Threatened, Endangered and BLM Sensitive Plants and Animals)

Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species.

Rangeland Health Assessment

Plants:

There are no known BLM sensitive plants within the allotment. However, systematic inventories for special status plants have not been conducted in the allotment. In the Jarbidge Field Office special status plants are generally associated with distinct soil types that occur on scattered portions of the field office. None of these soil types occur within the allotment based on SSURGO soil data (NRCS, 2012). Potential habitat occurs for one sensitive plant species, slickspot peppergrass (*Lepidium papilliferum*; Proposed Endangered, BLM sensitive species). Slickspot peppergrass was not found in limited areas checked during site visits in 2006, 2010, or 2013.

Slickspot peppergrass grows in the semiarid sagebrush-steppe ecosystem of southwestern Idaho. Interspersed within this habitat type, slickspot peppergrass can be found in visually distinct microsites known as slickspots (mini playas or natric sites) that act as small water basins and where the sodium and clay content is higher than adjacent, unoccupied habitat (Moseley, 1994). The Cedar Creek Canyon Allotment contains 2,280 acres (91% of allotment) of potential slickspot peppergrass habitat (Map 6, Table 17). A GIS model was developed to help focus inventory and clearance efforts to areas that would have a higher probability of finding slickspot

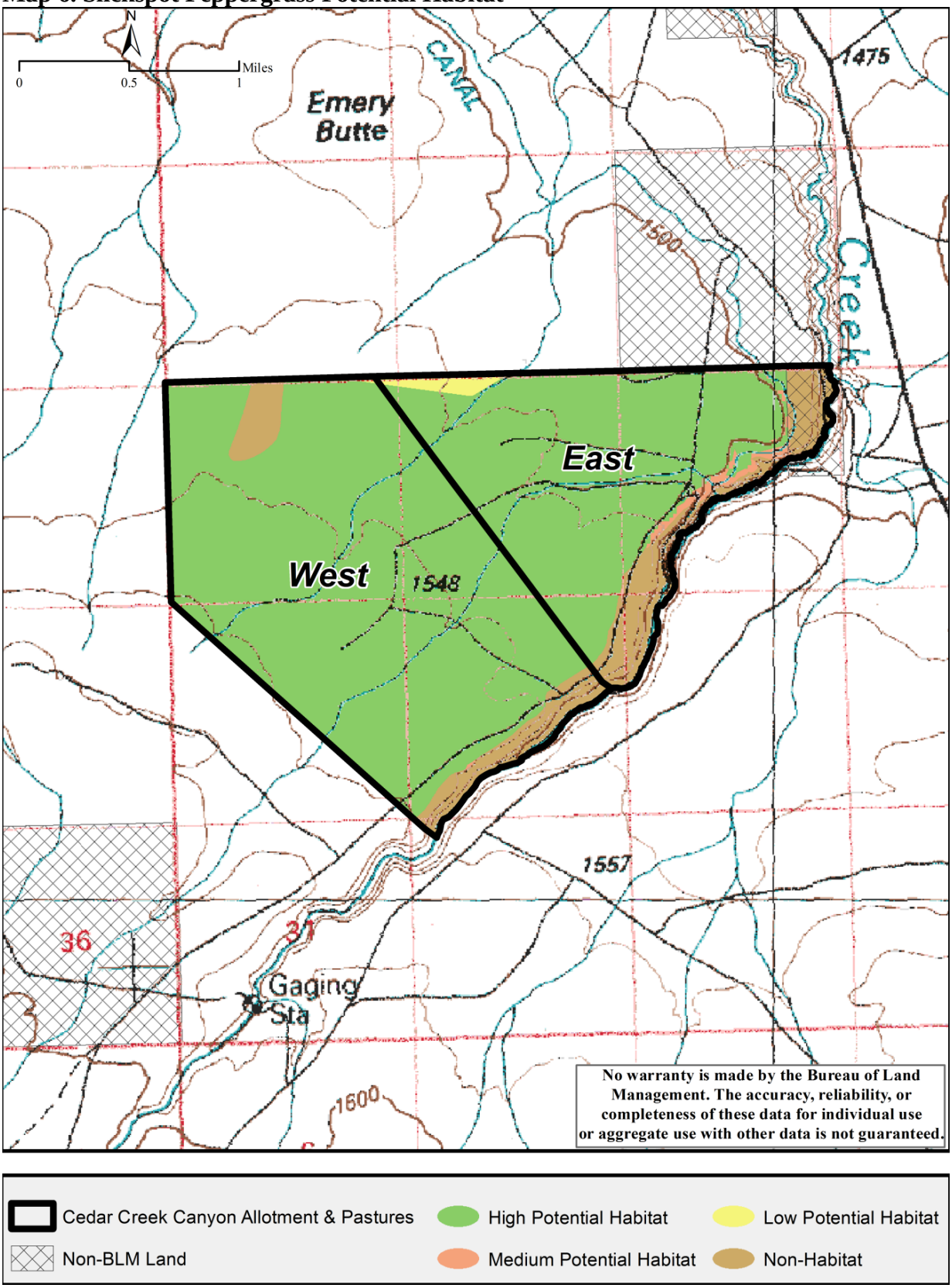
peppergrass plants (BLM, 2012). This model used updated soils data, vegetation community data, fire frequency, slope, and elevation to further refine habitat and to categorize it into groups (high, medium, and low) that identify the potential for finding the species. The allotment contains 2,238 acres of high potential, 18 acres of medium potential, 25 acres of low potential, and 236 acres of non-habitat for slickspot peppergrass. The nearest known occupied habitat for slickspot peppergrass is 19 miles to the west, on the west side of Clover Creek.

Table 17. Slickspot Peppergrass Potential Habitat (Acres).

Pasture	High	Medium	Low	Non-habitat
East	779	17	23	116
West	1,458	0	2	120

DRAFT

Map 6. Slickspot Peppergrass Potential Habitat



Animals:
Presence of various sensitive wildlife species are based upon primarily incidental observations by BLM personnel and data entered into the Idaho Natural Heritage Center database by other individuals. Species found on the Cedar Creek Canyon Allotment are discussed below.

There are no BLM sensitive or federally listed fish or aquatic invertebrates or their habitat within the allotment.

Greater Sage-Grouse (Centrocercus urophasianus; BLM sensitive species)
Sage-grouse require sagebrush and other shrub habitat to fulfill seasonal habitat needs (Connelly et al., 2000; Holloran et al., 2005). Sage-grouse are dependent on sagebrush ecosystems and require extensive stands of sagebrush with a diverse and vigorous herbaceous understory.

Sage-grouse display and breed on leks (i.e., display grounds with sparse vegetation cover) between March and May. After breeding hens disperse into nesting areas around the leks. Approximately 75 percent of sage-grouse hens nest within 4 miles of a lek (Holloran and Anderson, 2005; Holloran et al., 2007). Sage-grouse typically return to the same lek and nest areas year after year. Hens seek out nest sites that are concealed from predators, especially avian predators (Conover et al., 2010) by a combination of sagebrush and grass cover. When chicks hatch the hen and her chicks feed on insects and forbs and slowly move towards wetter areas like wet meadows or streams and springs where forbs are still green and growing. A diverse forb component and an abundance of forbs are necessary to support a variety of insects which are critical to the growth of young sage-grouse (Knick and Connelly, 2011). In the fall as forbs dry up sage-grouse switch from eating forbs to sagebrush through the winter. Sage-grouse may either migrate to different seasonal habitats or may remain in a single general area throughout the year.

In 2010, BLM developed the Sage-Grouse HAF to assess seasonal sage-grouse habitats at multiple scales (Stiver et al., 2010). Habitat suitability requirements were based on the following guidelines which were published in 2000 and describe desired conditions for sage-grouse habitats during nesting and early brood rearing, late brood rearing, and winter:

- Nesting and early brood rearing habitat should support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover should average at least 7” in height with at least 10 percent canopy cover for grasses and at least 5 percent for forbs and a diversity of forb species during spring (Connelly et al. 2000).

- Late brood rearing habitat should support 10-25 percent canopy cover of sagebrush. Riparian areas or wet meadows in the general area improve habitat for sage-grouse (Connelly et al. 2000).

- Winter habitat should have 10-30 percent canopy cover of sagebrush with at least 10-14” exposed above the snow (Connelly et al. 2000).

Based on vegetation mapping from 2013, the Cedar Creek Canyon Allotment contains 2,407 acres mapped as sagebrush (96% of the allotment, Map 3). Sagebrush occurs in the East Pasture (863 acres, 92% of pasture) and West Pasture (1,544 acres, 98% of pasture). Sage-grouse have

been observed in the adjoining allotments year round. Sage-grouse habitat occurs within and around the entire allotment (Map 7).

The Cedar Creek Canyon Allotment contains 2 undetermined (due to a lack of recent surveys) sage-grouse leks. Within five miles there are 7 occupied, 11 undetermined, and 1 unoccupied sage-grouse leks (Map 7). Sage-grouse attendance at occupied leks within 5 miles of the allotment are shown in Table 19. Lek 2T-147 was not known to occur until 2009, at which time data collection started to occur. Leks are considered occupied if there has been documented sage-grouse activity within the past five years.

Table 18: Sage-grouse Attendance at Occupied Leks within Five Miles of the Cedar Creek Canyon Allotment, 2000-2014.

Lek	Location	Survey Year[1]														
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
2T-164	0.2 mile S	4	--	4	--	0	3	4	1	0	0	2	0	0	0	0
2T-168	0.3 mile W	16	--	--	--	--	--	--	--	--	--	--	--	--	--	4
2T-150	0.7 mile S	13	13	10	3	0	3	8	3	4	5	6	4	15	7	6
2T-101	1.9 miles NE	17	7	8	8	0	13	18	30	18	17	0	15	8	11	10
2T-147	2.3 miles NE										12	--	--	7	5	--
2T-021	2.4 miles S	--	--	9	13	15	22	16	12	8	8	7	13	10	15	11
2T-156	4.6 miles NE	19	21	10	11	0	22	40	10	25	23	10	22	25	22	27

[1]Where the table is blank the lek had not yet been identified; in years marked by dashes (--) the lek was not surveyed. An asterisk indicates area around lek burned in a wildfire that year (*).

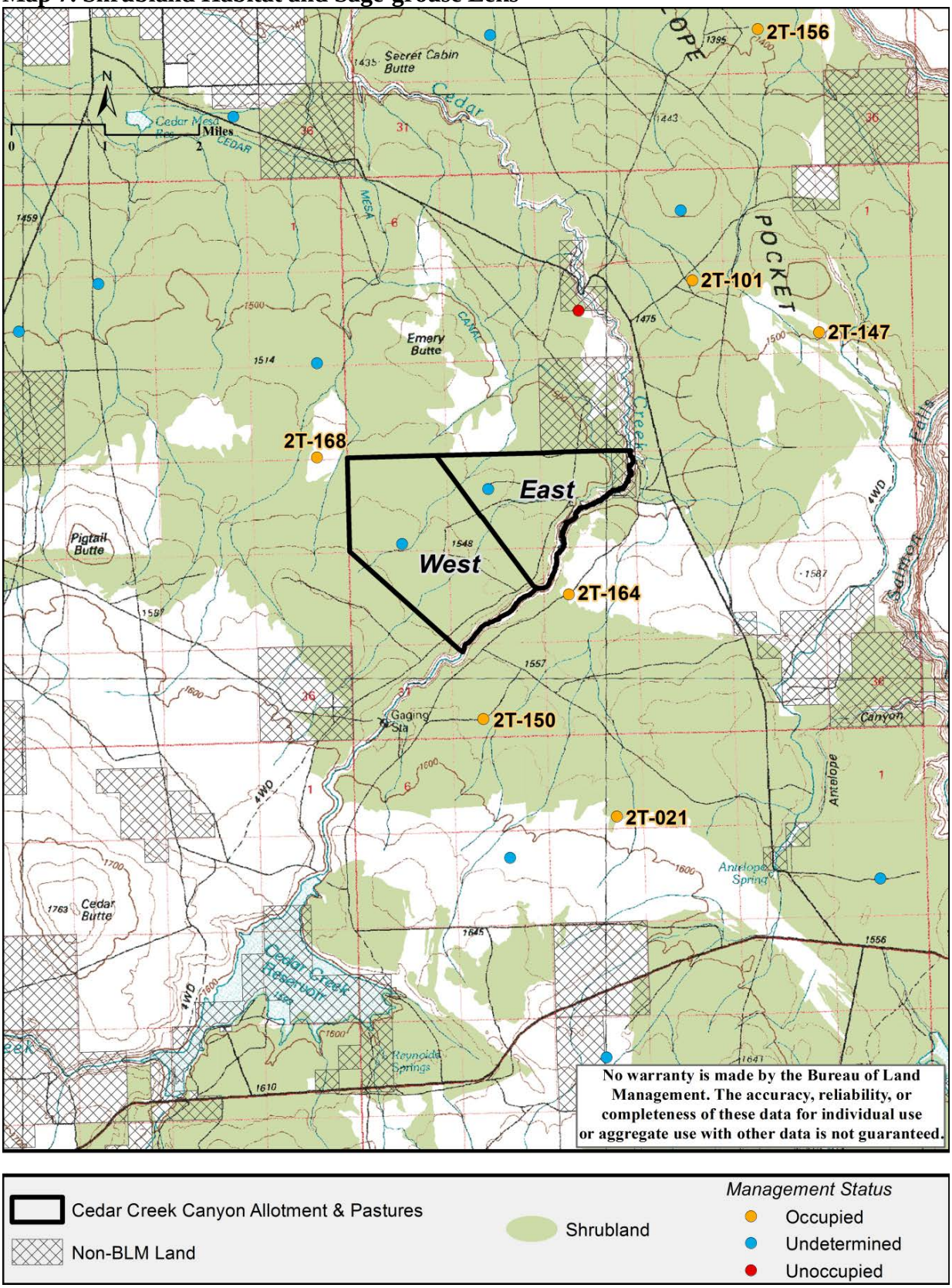
Nesting and Early Brood Rearing Habitat

The current conditions of sage-grouse seasonal habitats were assessed following protocols outlined in the Sage-grouse Habitat Assessment Framework (Stiver et al., 2010). Sage-grouse habitat suitability assessments were conducted in 2012 at HAF sites **E -** East Pasture, and **W-** West Pasture.

Sage-grouse droppings were observed during the assessments in both pastures. Sage-grouse habitat suitability assessments are not necessarily an indication of rangeland health; they are merely indicators of habitat suitability. However, vegetation data collected as part of the habitat suitability assessments may be used to inform and interpret other rangeland health information and observations. Sage-grouse habitat suitability assessments are shown in Table 19.

DRAFT

Map 7. Shrubland Habitat and Sage-grouse Leks



Cedar Creek Canyon Allotment & Pastures

Non-BLM Land

Shrubland

Management Status

- Occupied
- Undetermined
- Unoccupied

Table 19. Sage-grouse Habitat Assessment Worksheet for Nesting and Early Brood Rearing Habitat (Arid Site).

Habitat Indicator	Suitable Habitat	Marginal Habitat	Unsuitable Habitat
Average Sagebrush Canopy Cover	**15 – 25%**	**10 - < 15% or > 25%**	**< 10%**
	E (19%)	W (9%)	
Average Sagebrush Height	**12 - 30”**	**10 -11” or >30”**	**< 10”**
	E (17”), W (20”)		
Sagebrush Growth Form	**Spreading**	**Mix of spreading and columnar**	**Columnar**
	E, W		
Average Grass Height	**≥ 7”**	**5 - < 7”**	**< 5”**
	E (9”), W (11”)		
Average Perennial Grass Canopy Cover	**≥ 10%**	**5 - < 10%**	**< 5%**
	E (22%), W (30%)		
Average Forb Canopy Cover	**≥ 5%**	**3 - < 5%**	**< 3%**
		E (3%), W (3%)	
Preferred Forb Abundance and Diversity	**Forbs common with at least a few preferred species common**	**Forbs common, but only 1 or 2 preferred species present**	**Forbs rare to sparsely present**
	E, W		
Overall Site Evaluation	**E, W**		
Pasture Evaluation	**East, West**		

One HAF site is in the East Pasture (HAF site E). The site is located in an area mapped as a Wyoming sagebrush/ Sandberg bluegrass vegetation community. The site was rated suitable for all habitat indicators except for average forb canopy cover (unsuitable). Although average forb canopy cover was unsuitable, the site was rated suitable for preferred forb abundance and diversity with 13 species of forbs observed. The most common species included sagebrush phlox (*Phlox aculeata*), low pussy-toes (*Antennaria dimorpha*), and spiny phlox all sage-grouse preferred forbs. The East Pasture provides suitable habitat for sage-grouse.

The West Pasture contains one HAF site (HAF site W). The site is located in an area mapped as a Wyoming sagebrush/ Sandberg bluegrass vegetation community. The site was rated suitable for all habitat indicators except for sagebrush canopy cover (marginal) and average forb canopy cover (marginal). Although average forb canopy cover was marginal, the site was rated suitable for preferred forb abundance and diversity with 17 species of forbs observed. The most common species included sagebrush phlox, spiny phlox, and low pussy-toes all sage-grouse preferred forbs. The West Pasture provides suitable habitat for sage-grouse.

A list of plants species observed at each site, including preferred sage-grouse forbs is included in Appendix A.

Late Brood Rearing Habitat

The Cedar Mesa Canal runs through the East Pasture and is approximately 0.9 mile in length. Water is present in the canal from April into October annually. The canal provides water to wildlife in the East Pasture. The canal is also provides some late brood rearing habitat for sage-grouse since seep areas along the canal contain a higher abundance of preferred forbs such as dandelion (*Taraxacum offiniale*), prostrate knotweed (*Polygon aviculare*), and willowherb

(*Epilobium* spp.). These forbs remain succulent through the summer compared to forbs in the surrounding uplands. Other plant species associated with the canal include Baltic rush (*Juncus balticus*), coyote willow (*Salix exigua*), and Kentucky bluegrass. One drawback is that junipers and Russian olives along the canal provide nesting habitat for common ravens (*Corvus corax*) and black-billed magpies (*Pica hudsonia*) which prey on sage-grouse eggs and recently hatched chicks (Autenrieth, 1981; Coates, 2007). The presence and abundance of these trees along the canal may limit sage-grouse use along the canal.

The West Pasture does not contain late brood rearing habitat for sage-grouse. The pasture does not contain areas where moisture collects to maintain forbs throughout the summer. Cedar Creek in the pasture occurs in the bottom of a steep rocky canyon. Riparian areas associated with steep drainages or canyons are not used by sage-grouse (Stiver et al., 2010).

Winter Habitat
Shrub height (17 to 20") and cover (9-19%) are suitable for wintering sage-grouse in all pastures. During winter snow depths are usually less than 12" leaving most sagebrush above the snow and available for wintering sage-grouse.

Ferruginous Hawk (Buteo regalis; BLM sensitive species)
Ferruginous hawks typically inhabit flat and rolling terrain in grasslands and shrub-steppe regions (Bechard and Schmutz, 1995). They primarily nest in trees or less frequently on cliffs, rock outcrops or on the ground at the crest of ridges. Although ferruginous hawks exhibit flexibility in nest site selection, they prefer elevated nest sites and rarely nest on level ground (Bechard and Schmutz, 1995). Ferruginous hawks may have more than one nest site within their nesting territory that they may use in different years (Bechard and Schmutz, 1995). Locally, ferruginous hawks that nest on the ground are rarely successful. Both the male and female share in the nest selection, egg incubation and young rearing, though the male does most of the hunting. One clutch of 2-4 eggs is laid in spring and parents care for the young until several weeks after fledging (Bechard and Schmutz, 1995).

Ferruginous hawk prey primarily on smaller mammals. Prey species include ground squirrel (*Urocitellus* spp.), black-tailed jackrabbit (*Lepus californicus*), mountain cottontail (*Sylvilagus nuttalli*), and pocket gopher (*Thomomys talpoides*). Fledgling birds, reptiles and insects constitute a small percent of the diet (Bechard and Schmutz, 1995).

Management of shrub-steppe and grassland habitats that provide healthy native shrub and bunchgrass communities and a natural range of habitat variation would be expected to provide suitable habitat for ferruginous hawks.

There are no ferruginous hawk nests in the allotment. However, there is a nest 1.5 mile to the southeast and another nest 2.2 miles to the north. Ferruginous hawks from these nesting territories likely hunt in the Cedar Creek Canyon Allotment. Juniper and Russian olive trees along the Cedar Mesa Canal were surveyed for raptor nest in the mid-1990s but no raptor nests were identified. No surveys have been conducted since, but it's probable that raptors are nesting in trees along the canal.

At this time a few nest trees are available for use by ferruginous hawks for nesting in the East Pasture (approximately 30 trees mostly concentrated near the canal). The West Pasture has no junipers in the uplands, but approximately 10 junipers occur in the canyon along Cedar Creek. The entire allotment is dominated by sagebrush steppe which provides habitat suitable for mammalian prey (black-tailed jackrabbit, mountain cottontail, ground squirrels, etc.) favored by ferruginous hawks.

Brewer's Sparrow (Spizella breweri; BLM sensitive species)
Brewer's sparrows are typically associated with sagebrush steppe. Brewer's sparrow place nests primarily in shrubs, but occasionally on the ground. The nest shrub is typically taller and denser than in the surrounding habitat (Rotenberry et al., 1999). Shrubs used for nesting by Brewer's sparrows include primarily big sagebrush (81%), with spiny hopsage (*Grayia spinosa*) (10%), antelope bitterbrush (*Purshia tridentata*) (6%), and rabbitbrush (3%) (Rotenberry et al., 1999). Brewer's sparrows construct their nest in the canopy of sagebrush which averaged 27 inches tall (Rotenberry et al., 1999). In Idaho, Brewer's sparrow nests ranged from 7.8 to 19.6 inches above the ground, averaged 9 inches from the top of the sagebrush and averaged 7 inches from the edge of the shrub canopy (Rotenberry et al., 1999). These sparrows feed on small insects and seeds (Rotenberry et al., 1999).

Management and conservation of habitat to provide suitable sage-grouse habitat would also benefit Brewer's sparrow (Rowland et al., 2006). Brewer's sparrows have been observed and are expected to be common in sagebrush habitats within the Cedar Creek Canyon Allotment. At this time shrub height and density are suitable for Brewer's sparrow nesting in this allotment.

Loggerhead shrike (Lanius ludovicianus; BLM sensitive species)
Loggerhead shrikes are associated with open grasslands and shrub-steppe habitats. In southern Idaho loggerhead shrikes place nests in big sagebrush, antelope bitterbrush and greasewood (Woods and Cade, 1996). Nest shrubs ranged from 35 to 117 inches tall (Woods and Cade, 1996). The average height of the nest was 31 inches and ranged from 13 to 63 inches above ground (Woods and Cade, 1996). Although big sagebrush was shorter than greasewood or bitterbrush nest height was similar for all shrubs (Woods and Cade, 1996). In the Jarbidge Field Office a few loggerhead shrike nests have been found in western juniper.

Loggerhead shrikes feed on arthropods, amphibians, reptiles, small mammals and birds (Yosef, 1996). They use thorny bushes or barbed wire fences to impale their prey to facilitate feeding and to store future meals.

Management of shrub-steppe habitat that provides healthy native shrub and bunchgrass communities and a natural range of habitat variation would be expected to provide suitable habitat for loggerhead shrikes.

Loggerhead shrikes have been observed on the allotment and would be expected to forage and nest on the allotment. Shrubs in the allotment are shorter in height (average shrub height ranged from 17-20", tallest sagebrush on transects was 27") than those preferred by loggerhead shrikes for nesting. However, the East Pasture is suitable for nesting loggerhead shrikes since junipers

along the canal provide some nesting habitat. The West Pasture was rated marginal for nesting since junipers are not found in the uplands and sagebrush is generally short.

Sagebrush sparrow (*Artemisioispiza nevadensis*; BLM sensitive species)
Sagebrush sparrows are sagebrush obligates that are typically common in shrub-steppe habitats (Martin and Carlson, 1998). Sagebrush sparrow place nests in shrubs, bunchgrasses or occasionally on the ground at the base of a shrub (Martin and Carlson, 1998). The nest shrub is usually taller than the surrounding vegetation (Martin and Carlson, 1998). In Idaho sagebrush sparrows nest in big sagebrush, however, in Oregon they may also use antelope bitterbrush, rabbitbrush, greasewood (*Sarcobatus vermiculatus*) and bunchgrasses (Martin and Carlson, 1998). In general sagebrush sparrow nests are placed closer to the main stem than the edge of the shrub. In shrubs the nest can range from 9 to 11 inches above the ground. Sagebrush sparrows feed on seeds, insects, spiders, fruits, and succulent vegetation (Martin and Carlson, 1998).

Management and conservation that provides suitable sage-grouse habitat would also benefit sagebrush sparrow (Rowland et al., 2006). Sagebrush sparrows have been observed and are expected to be common within the allotment. At this time all pastures have suitable shrub height and density for nesting sagebrush sparrows.

Pygmy rabbit (*Brachylagus idahoensis*; BLM sensitive species)
Pygmy rabbits are sagebrush obligates that are usually found in areas with tall dense stands of big sagebrush and deep soils (Green and Flinders, 1980; Heady and Laundré, 2005). Pygmy rabbits usually excavate burrow systems with multiple entrances. Burrow entrances are often at the base of sagebrush (Green and Flinders, 1980). Pygmy rabbits spend most of their time (68%) in a generally small area (less than 200 feet radius [3 acres]) from the burrow within a larger (90 acres to 170 acres) home range. The primary food of pygmy rabbits is sagebrush which comprises 99 percent of its winter diet (Green and Flinders, 1980). Grasses and forbs make up more of the diet in the late spring into early summer.

Management and conservation of habitat to provide suitable sage-grouse habitat would also benefit pygmy rabbit (Rowland et al., 2006).

No surveys for pygmy rabbits have been conducted in the allotment. However, pygmy rabbits potentially occur in the allotment since sagebrush habitat dominates in both pastures. Pygmy rabbits have been observed in the past approximately 4 miles west of the Cedar Creek Canyon Allotment. Due to past vegetation treatments, portions of each pasture within the allotment lack the sagebrush density preferred by pygmy rabbits. Overall, East and West Pastures are marginal for pygmy rabbits.

Piute ground squirrel (*Urocitellus mollis*; BLM sensitive species)
Piute ground squirrels are associated with shrub-steppe habitats in southwestern Idaho. They emerge from hibernation in late February into March depending on the year and begin hibernation by late June (Yensen and Sherman, 2003). The diet of Piute ground squirrels is dominated by herbaceous vegetation including grasses and forbs, seeds, and animal matter (Rickart, 1987; Yensen and Sherman, 2003). Piute ground squirrels excavate deep and shallow burrow systems (Reynolds and Wakkinen, 1987).

Piute ground squirrels are an important prey item to many predators in shrub-steppe habitats including other sensitive species like ferruginous hawks and prairie falcons.

Management of shrub-steppe habitat that provides healthy native shrub and bunchgrass communities and a natural range of habitat variation would be expected to provide suitable habitat for Piute ground squirrels.

Although Piute ground squirrels have been observed in the allotment, the BLM does not have distribution data on ground squirrels within the allotment. Sagebrush habitat in each pasture is suitable to maintain a relatively stable Piute ground squirrel population (Steenhof et al., 2006).

Spotted bat (*Euderma maculatum*; BLM sensitive species)
Spotted bats are typically found in arid portions of the western United States where it forages primarily on moths (Adams, 2003). It roosts in rock crevices in tall cliffs. Little is known about the behavior and population size of spotted bats.

Roosting habitat for spotted bats is present in the canyon cliffs along Cedar Creek in the East and West Pastures. Spotted bats may forage over the allotment and drink and forage along the canal and Cedar Creek. Spotted bats have been observed approximately 2.6 miles east of the allotment.

Evaluation of Standard 8
There is no known BLM sensitive or federally listed plants within the Cedar Creek Canyon Allotment. However, systematic inventories for special status plants have not been conducted in the allotment. GIS modeling predicts that the allotment contains 2,238 acres of high potential, 18 acres of medium potential, and 25 acres of low potential habitat for slickspot peppergrass. However, nearly the entire allotment was sprayed with herbicide to kill sagebrush and seeded to crested wheatgrass in 1967. These treatments may have changed the potential for slickspot peppergrass to be present. The nearest known occupied habitat for slickspot peppergrass is 19 miles away, on the west side of Clover Creek. To date, slickspot peppergrass has not been found east of Clover Creek in the JFO.

There is no BLM sensitive or federally listed fish or aquatic invertebrates or their habitat within the allotment.

Habitat for BLM sensitive wildlife species occurs within the allotment. Overall habitat ratings for each species by pasture are shown in Table 20.

Table 20. Overall Habitat Suitability for BLM Sensitive Wildlife Species by Pasture.

Species Name and Type of Habitat	East	West
Sage-grouse (nesting & early brood rearing)	S	S
(Late brood rearing)	S	U
(Winter)	S	S
Ferruginous hawk (nesting)	S	S
(foraging)	S	S
Brewer's sparrow (nesting)	S	S
Sagebrush sparrow (nesting)	S	S
Loggerhead shrike (nesting)	S	M

Species Name and Type of Habitat	East	West
Pygmy rabbit (year round)	M	M
Piute ground squirrel (year round)	S	S
Spotted bat (roosting)	S	S
(foraging)	S	S

S = Suitable (combination of components make the habitat suitable), M = Marginal (some habitat components are missing), U = Unsuitable (one or more critical habitat components are missing).

Overall, sage-grouse nesting and early brood rearing habitat is suitable in both pastures due to favorable shrub height, shrub cover, shrub growth form, residual herbaceous height and cover, and forb abundance and diversity of sage-grouse preferred forbs. The Cedar Mesa Canal offers some late brood rearing habitat for sage-grouse in the East Pasture. The West Pasture does not contain late brood rearing habitat. Sage-grouse seen in this pasture during the late brood period likely forage near the canal in the adjacent pasture. Both pastures contain sagebrush of sufficient height and cover to provide suitable winter habitat for sage-grouse.

More than an adequate number of potential nest trees are present for ferruginous hawk nesting primarily in the East Pasture near the Cedar Mesa Canal. Both pastures contain habitat that supports prey species such as mountain cottontail, black-tailed jackrabbit and ground squirrels usually hunted by ferruginous hawk.

Shrub height and cover is suitable for Brewer's sparrow and sagebrush sparrow nesting in both pastures. Shrub height is lower than preferred by loggerhead shrikes in the allotment. However, junipers along the canal in the East Pasture provide some suitable nesting habitat. The West Pasture was rated marginal for nesting loggerhead shrikes since junipers are not found in the uplands.

Pygmy rabbit habitat was rated marginal in both pastures. Although sagebrush has increased in the areas treated in the 1967, shrub density is not adequate in most of the treated area to support pygmy rabbits.

All pastures contain suitable habitat to maintain a stable population of Piute ground squirrels due to adequate shrub and grass cover. Steenhof et al. (2006) reported ground squirrel abundance was greater in areas with sagebrush compared to grassland. They additionally reported Piute ground squirrels in areas with sagebrush and Sandberg bluegrass had heavier body weight compared to ground squirrels in grassland which may improve over winter survival.

Spotted bat roosting habitat was rated suitable in the East and West Pastures due to cliffs being present in Cedar Creek Canyon along the eastern edge of both pastures. The sagebrush habitat provides adequate insect diversity and abundance for spotted bat foraging. The canal and Cedar Creek provide a water source for spotted bats from late spring through summer.

Evaluation Finding – Allotment (East and West Pastures) is:

X Meeting the Standard
__ Not meeting the Standard, but making significant progress towards meeting
__ Not meeting the Standard

Rationale for Evaluation Finding

The East and West Pastures contain suitable habitat for special status species. Sage-grouse nesting and early brood rearing habitat is suitable in both pastures due to favorable shrub height, shrub cover, shrub growth form, residual herbaceous height and cover, and forb abundance and diversity of sage-grouse preferred forbs. Therefore, the Cedar Creek Canyon Allotment is meeting Standard 8.

DRAFT

LITERATURE CITED

Adams, R. A. (2003). Bats of the Rocky Mountain West. Bolder, CO: University Press of Colorado.

Autenrieth, R. E. (1981). Sage Grouse Management in Idaho. Wildlife Bulletin 9, Boise, ID: Idaho Department of Fish and Game.

Belnap, J., D. Eldridge. 2001. Biological Soil Crust: structure, function, and management. Edited by Belnap and Lange.

Bechard, M. J., and J. K. Schmutz. (1995). Ferruginous Hawk (*Buteo regalis*), No. 172. In A. Poole (Ed.), The Birds of North America Online. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: http://bna.birds.cornell.edu/bna/species/172.

BLM. (2015). Jarbidge Resource Management Plan. Boise, ID: USDI, Bureau of Land Management.

BLM. (1996). Sampling Vegetation Attributes. Interagency Technical Reference 1734-4.

BLM. (1998). A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. BLM Technical Reference 1737-15.

BLM. (2012). Slickspot Peppergrass Occurrence Potential Model (GIS). Twin Falls, ID: USDI, Bureau of Land Management, Jarbidge Field Office.

Brewer, T. K., J. C. Mosley, D. E. Lucas, and L. R. Schmidt. (2007). Bluebunch Wheatgrass Repsonse to Spring Defoliation on Foothill Rangeland. Rangeland Ecology and Management 60:498–507.

Coates, P. S. (2007). Greater Sage-grouse (*Centrocercus urophasianus*) Nest Predation and Incubation Behavior. Ph.D. dissertation, Idaho State University, Pocatello, ID.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. (2000). Guidelines to Manage Sage Grouse Populations and their Habitats. Wildlife Society Bulletin 28(4): 967–985.

Conover, M. R., J. S. Borgo, R. E. Dritz, J. B. Dinkins, and D. K. Dahlgren. (2010). Greater Sage-grouse Select Nest Sites to Avoid Visual Predators but not Olfactory Predators. Condor 112:331–336.

Cooperative Extension Service, USDA, and NRCS. (1999). Utilization Studies and Residual Measurements. Interagency Technical Reference 1734-3.

Daubenmire, R. F. (1940). Plant Succession Due to Overgrazing in the Agropyron Bunchgrass Prairie of Southeastern Washington. Ecology 21:55–64.

DRAFT

Green, J. S., and Flinders, J. T. (1980). *Brachylagus idahoensis*, No. 125. Washington, DC: American Society of Mammalogists.

Hall, D.B., V.J. Anderson, and S.B. Monsen. (1999). Competitive effects of bluebunch wheatgrass, crested wheatgrass, and cheatgrass on antelope bitterbrush seedling emergence and survival. USDA FS, Ogden, UT, RMRS-RP-16, 12 p.

Heady, L. T., and J. W. Laundré. (2005). Habitat Use Patterns Within the Home Range of Pygmy Rabbits (*Brachylagus idahoensis*) in Southeastern Idaho. Western North American Naturalist 65(4):490–500.

Holloran, M. J., and S. H. Anderson. (2005). Spatial Distribution of Greater Sage-grouse Nests in Relatively Contiguous Sagebrush Habitats. Condor 107:742–752.

Holloran, M. J., B. J. Heath, A. G. Lyon, S. J. Slater, J. L. Kuipers, and S. H. Anderson. (2005). Greater Sage-grouse Nesting Habitat Selection and Success in Wyoming. Journal of Wildlife Management 69:638–649.

Holloran, M. J., R. C. Kaiser, and W. A. Hubert. (2007). Population Response of Yearling Greater Sage-grouse to the Infrastructure of Natural Gas Fields in Southwestern Wyoming. Laramie, WY: USDI, Geological Survey.

IDEQ. (2007). Salmon Falls Creek Sub-basin Assessment and Total Maximum Daily Loads. Twin Falls, Idaho: Idaho Department of Environmental Quality.

IDEQ. (2014). Idaho Department of Environmental Quality Final 2012 Integrated Report. Boise, ID: Idaho Department of Environmental Quality.

Johansen, J. R. 1993. Cryptogamic crusts of semiarid and arid lands of North America. Journal of Phycology. 29(2):140-147.

Knick, S. T., and J. W. Connelly. (2011). Greater Sage-grouse and Sagebrush: an Introduction to the Landscape. In S. T. Knick and J.W. Connelly (Eds.), Greater Sage-grouse Ecology and Conservation of a Landscape Species and Its Habitats (pp. 1-9). Berkeley, CA: University of California Press.

Martin, J. W., and B. A. Carlson. (1998). Sage Sparrow (*Artemisiospiza belli*), No 326. In A. Poole (Ed.), The Birds of North America Online. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: http://bna.birds.cornell.edu/bna/species/326.

Miller, R.F., J.C. Chambers, D.A. Pyke, F.B. Pierson, and C.J. Williams. (2013). A review of fire effects on vegetation and soils in the Great Basin Region: response and ecological site characteristics. USDA, For. Serv. RMRS-GTR-308. 136 p.

Moseley, R.K. (1994). Report on the Conservation Status of Lepidium Papilliferum. Boise, ID: Idaho Conservation Data Center and Idaho Department of Fish and Game.

DRAFT

Norton, J.B., T.A. Monaco, J.M. Norton, D.A. Johnson, and T.A. Jones. 2004. Cheatgrass invasion alters soil morphology and organic matter dynamics in big sagebrush-steppe rangelands. USDA FS Proceedings RMPS-P-31. 7 p.

Pellant, M., P. Shaver, D. A. Pyke, and J. E. Herrick. (2005). Interpreting Indicators of Rangeland Health, Version 4. Technical Reference 1734-6.

Pellant, M. (1996). Cheatgrass: the invader that won the West. Interior Columbia Basin Ecosystem Management Project, BLM ID State Office, white paper. 23 p.

Pyke, D., J.E. Herrick, P. Shaver, and M. Pellant. 2002. Rangeland Health Attributes and Indicators for Qualitative Assessment. Journal of Range Management. Vol. 55, No. 6 (Nov., 2002), pp. 584-597.

Reisner, M. 2010. Drivers of Pant Community Dynamics in Sagebrush Steppe Ecosystems: Cattle Grazing, Heat and Water Stress. PhD Dissertation. Corvallis, OR, Oregon State University, p. 270.

Reisner, M.D., J.B. Grace, D.A. Pyke, and P.S. Doescher. 2013. Conditions Favouring *Bromus tectorum* Dominance of Endangered Sagebrush Steppe Ecosystems. J. of Appl. Ecol. 50(4):1039-1049doi: 10.1111/1365-2664.12097, 11 p.

Reynolds, T. D., and W. L. Wakkinen. (1987). Characteristics of the Burrows of Four Species of Rodents in Undisturbed Soils in Southeastern Idaho. American Midland Naturalist 118 (2): 245–250.

Rickart, E. A. (1987). *Spermophilus townsendii*, Mammalian Species No. 268. Washington, DC: American Society of Mammalogists.

Rotenberry, J. T., M. A. Patten, and K. L. Preston. (1999). Brewer's Sparrow (*Spizella breweri*), No. 390. In A. Poole (Ed.), The Birds of North America Online. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: http://bna.birds.cornell.edu/bna/species/390.

Rowland, M. M., M. J. Wisdom, L. H. Suring, and C. W. Meinke. (2006). Greater Sage-grouse as an Umbrella Species for Sagebrush-associated Vertebrates. Biological Conservation 129: 323–335.

Soil and Water Conservation Society (SWCS). 1999. Soil Quality and Soil Erosion. CRC Press LLC, Boca Raton, Florida. p. 554.

Spaeth, K.E., F. B. Pierson, M.A. Weltz, J. B. Awang. 1996. Gradient Analysis of Infiltration and Environmental Variables as related to Rangeland Vegetation. Transactions of the American Society of Agricultural Engineers. Vol. 39(1):67-77.

DRAFT

Steenhof, K., E. Yensen, M. N. Kochert, and K. L. Gage. (2006). Populations and Habitat Relationships of Piute Ground Squirrels in Southwestern Idaho. Western North American Naturalist 66(4):482–491.

Stiver, S. J., E. T. Rinkes, and D. E. Naugle. (2010). Sage-grouse Habitat Assessment Framework. Boise, ID: USDI, Bureau of Land Management, Idaho State Office.

USDA and NRCS. (2012). Soil Survey Geographic (SSURGO) Database for Elmore, Owyhee, and Twin Falls Counties, Idaho. Boise, ID: USDA, Natural Resources Conservation Service, Soil Survey Staff, Retrieved in August, 2012 from: http://soildatamart.nrcs.usda.gov.

USDA and NRCS. (2013a). Draft Ecological Site Description R025XY019ID, Loamy 10-13" Wyoming Big Sagebrush/Bluebunch wheatgrass ecological site. Boise, ID: State Office.

USDA and NRCS. (2013b). Draft Ecological Site Description R011XY001ID, Loamy 8-12" Wyoming Big Sagebrush/Bluebunch wheatgrass-Thurber's needlegrass ecological site. Boise, ID: State Office.

USDA and NRCS. (2013c). The PLANTS Database. Retrieved December 14, 2013, from http://plants.usda.gov.

Wisdom, M. J., R. S. Holthausen, B. C. Wales, C. D. Hargis, V. A. Saab, D. C. Lee, et al. (2000). Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications, Volume 2: Group Level Results (General Technical Report No. PNW-GTR-485). Portland, OR: USDA, Forest Service, Pacific Northwest Research Station.

Woods, C. P., and T. J. Cade. (1996). Nesting Habits of the Loggerhead Shrike in Sagebrush. Condor 98 (1):75–81.

Yensen, E., and P. W. Sherman. (2003). Ground Dwelling Squirrels of the Pacific Northwest. Boise, ID and Portland, OR: US Fish and Wildlife Service and USDI, Bureau of Land Management.

Yosef, R. (1996). Loggerhead Shrike (*Lanius ludovicianus*), No. 231. In A. Poole (Ed.), The Birds of North America Online. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: http://bna.birds.cornell.edu/bna/species/231.

Young, J. A., E. Martens, and N. E. West. 1992. Germination of bur buttercup seeds. Journal of Range Management 45(4):358-362.

USGS. 2006. Canyonlands Research Station, Southwest Biological Science Center. Moab, UT. http://www.soilcrust.org. [Accessed May 12, 2015].

U.S. Geological Survey. 2014. National Hydrography Data for the United States. http://nhd.usgs.gov/index.html.

DRAFT

APPENDIX A: SPECIES LIST ACCUMULATED DURING UPLAND ASSESSMENTS

Scientific Name	Common Name	Species Status	Site(s) where species occurred
Perennial Grasses			
Achnatherum thurberianum	Thurber's needlegrass	Native	W
Agropyron cristatum	Crested wheatgrass	Exotic, Seeded	E, W
Agropyron dasystachyum	Thickspike wheatgrass	Native	W
Elymus elymoides	squirreltail	Native	W
Poa secunda	Sandberg bluegrass	Native	E, W
Annual Grasses			
Bromus tectorum	Cheatgrass	Exotic, Invasive	E, W
Perennial Forbs			
Allium nevadense	Nevada onion	Native	E, W
Antennaria dimorpha	Low pussy-toes	Native, Sage-grouse Preferred	E, W
Arabis spp.	Rockcress	Native	E, W
Astragalus atratus	Mourning milkvetch	Native	E, W
Astragalus lentiginosus	Freckled milkvetch	Native	W
Astragalus purshii	Woollypod milkvetch	Native	E, W
Ionactis alpina	Lava aster	Native, Sage-grouse preferred	E
Castilleja angustifolia	Northwestern Indian paintbrush	Native	E, W
Crepis spp.	Hawksbeard	Native, Sage-grouse Preferred	E
Crepis acuminata	Tapertip hawksbeard	Native, Sage-grouse Preferred	W
Crepis occidentalis	Western hawksbeard	Native, Sage-grouse Preferred	W
Delphinium andersonii	Anderson's larkspur	Native	W
Erigeron austiniae	Sagebrush fleabane	Native, Sage-grouse Preferred	E, W
Erigeron pumilus	Shaggy fleabane	Native, Sage-grouse Preferred	E
Eriogonum spp.	Buckwheat	Native	W
Lomatium foeniculaceum	Desert biscuitroot	Native, Sage-grouse Preferred	E, W
Penstemon spp.	Penstemon	Native	W
Phlox aculeata	Sagebrush phlox	Native, Sage-grouse Preferred	E, W
Phlox hoodii	Spiny phlox	Native, Sage-grouse Preferred	E, W
Phlox longifolia	Longleaf phlox	Native, Sage-grouse Preferred	W
Physaria geyeri	Geyer's twinpod	Native	E
Zigadenus venenosus	Meadow deathcamas	Native	W

DRAFT

Scientific Name	Common Name	Species Status	Site(s) where species occurred
Annual Forbs			
Alyssum desertorum	Desert madwort	Exotic	E
Ceratocephala testiculata	Curveseed butterwort	Exotic	E, W
Collinsia parviflora	Maiden blue-eyed Mary	Native	E
Descurainia pinata	Western tansymustard	Native	E
Lappula occidentalis	Flatspine stickseed	Native	E, W
Lepidium perfoliatum	Clasping pepperweed	Exotic	E
Microsteris gracilis	Pink microsteris	Native, Sage-grouse Preferred	E
Townsendia florifera	Townsend's daisy	Native, Sage-grouse Preferred	W
Shrubs			
Artemisia tridentata ssp. *wyomingensis*	Wyoming big sagebrush	Native	E, W

This list does not include all plants that can be found in the Cedar Creek Canyon Allotment and is not exhaustive. Scientific and common names were derived from the USDA NRSC Plant Database (USDA and NRCS, 2013c).

DRAFT

APPENDIX B: PROCESS FOR GENERATING SAGE-GROUSE HABITAT ASSESSMENT FRAMEWORK SAMPLE SITES

Sage-grouse Habitat Assessment Framework sites were randomly generated in the following manner. In GIS the vegetation layer was broken into the following habitat categories: shrub-lands, native perennial grass, non-native perennial grass, and annual grassland. The pasture layer was then incorporated and six random points were generated for each habitat category in the pasture.

Using National Agriculture Imagery Program imagery, any points that fell in non-habitat (maintained roads, ponds, gravel pits, cliffs) were removed. To ensure sampling transects did not cross allotment or pasture boundaries, randomly selected points within 100 meters of fences were removed. Random points were also evaluated for ease of access and to maximize sampling efficiency; random points that were more than one mile from a road, jeep trail, or fence were generally dropped. In cases where the amount of BLM land in a pasture was small and state or private land dominated the pasture, the pasture was generally dropped from sampling. Also if the habitat category was minimally present such as 30 acres of annual grassland out of a 1,200 acres pasture, no sampling would be done in the annual area. For shrub-lands to be evaluated they had to be at least 20 acres in size to accommodate sampling transects.

Ultimately, only two random sites in each habitat category were retained. Two points were retained to provide an alternate sampling site if the first point was not in the appropriate habitat category due to mapping errors. If both points were not in the appropriate habitat category, field crews were instructed to travel to the nearest appropriate habitat in the pasture, select a random bearing leading into the habitat category and pace a randomly selected distance prior to sampling.

Due to limited field crew and time when forbs are easily discernable, the following was the priority order for sampling: (1) shrubland habitats; (2) perennial native grassland, (3) non-native perennial grass; and (4) annual grass communities. When randomly generated points in shrubland habitats were in the same general area as randomly generated points in grassland habitats, field crews would often sample both sites on the same day regardless of their priority order. This was to increase sampling efficiency by reducing the amount of time spent traveling between points.

DRAFT