

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

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**RANGELAND HEALTH ASSESSMENT AND EVALUATION REPORT**

**CEDAR CROSSING ALLOTMENT #01022**

January 27, 2016

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## ALLOTMENT INFORMATION

**Field Office:** Jarbidge Field Office (JFO)  
**Name of Permittee:** Koch Land & Livestock, LLC  
**Allotment Name/Number:** Cedar Crossing (01022)  
**Date of Field Assessment:** May 7, 8, and 10, 2013  
**Stream Miles on Public Land (miles):** 0

**Table 1. Cedar Crossing Allotment Acres**

Total Acres	BLM Acres	State Acres	Private Acres	Other Acres
4,976	4,963	0	12	0

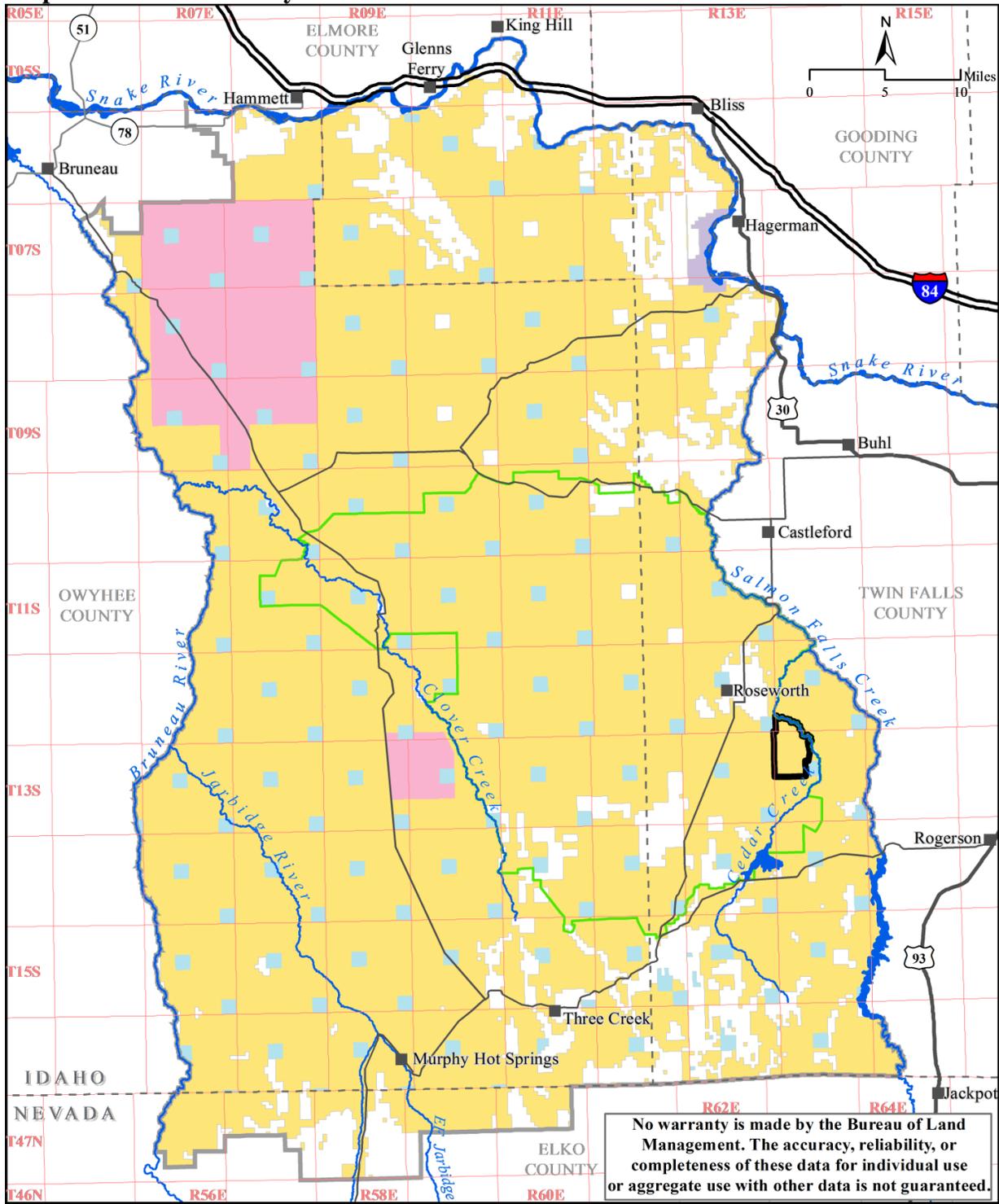
**Table 2: Assessment Participants**

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

## CURRENT PERMITTED LIVESTOCK GRAZING USE

**Total Active Use:** 740 Animal Unit Months (AUMs)  
**Livestock Type:** Cattle  
**Livestock Numbers and Seasons of Use:** 40 Cattle 4/10 to 04/30, 129 Cattle 05/01 to 10/15  
**Current Land Use Plan:** 2015 Jarbidge Resource Management Plan (RMP)  
**Current Stocking Level:** 6.7 Acres/AUM

**Map 1: Allotment Vicinity**



Cedar Crossing Allotment	Bureau of Land Management	Private; other
Devil Creek Sub-region	Military, Department of Defense	State
	National Park Service	

Map projection:  
UTM zone 11  
NAD 1983

## ALLOTMENT PROFILE

The Cedar Crossing Allotment is located approximately 12 miles south of Castleford, Idaho (Map 1). The elevation ranges from approximately 4,600 feet to 5,050 feet.

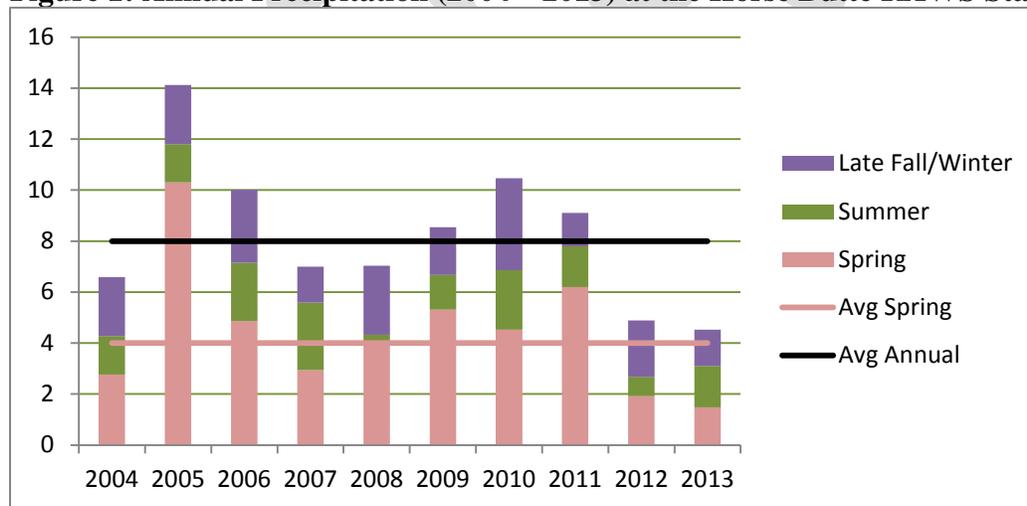
### Climate

Climatic conditions in south central Idaho 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 Crossing Allotment ranges from 10 to 13 inches. The bulk of the moisture typically falls as rain and snow from late-fall through late-spring.

Weather data collected at the Horse Butte RAWS station is used to assess precipitation and temperature trends from 2004 to 2013. The RAWS station is located in an 8 to 12 inch precipitation zone approximately 19 miles west of the Cedar Crossing Allotment. This area is a little drier than the Cedar Crossing 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.

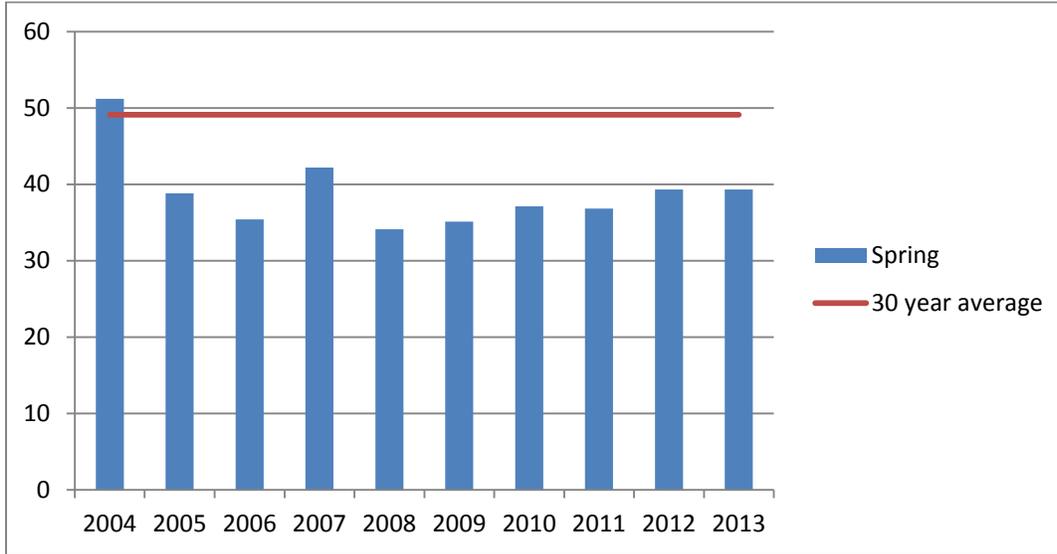
The thirty-year annual average precipitation at the Horse Butte RAWS station is 8.1". Annual precipitation at the station was below the thirty-year average during five of the ten years, especially in 2012 and 2013 (Figure 1). Total rainfall in 2012 was 4.89" and in 2013 it was 4.52". Rainfall was above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

**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". Growing season precipitation was below the thirty-year average during four of the ten years (2004, 2007, 2012, and 2013). Rainfall was especially low in 2012 (1.92") and 2013 (1.48"). Plant growth was likely enhanced in 2005 and 2011 due to higher amounts of spring rainfall (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: Monthly Average Temperature (Fahrenheit) from 2004 – 2013 at the Horse Butte RAWs Station**



**Grazing Management**

The Cedar Crossing Allotment is divided into three pastures (Table 3). The west, south, and east boundaries of the allotment are completely fenced. Natural barriers (i.e. rim rocks, etc.) are used as pasture/allotment boundaries along the north/northeast border adjacent to Cedar Creek. Water flow is diverted into a man-made canal from Cedar Creek approximately 5.5 miles upstream from the Cedar Crossing Allotment. The canal is part of the Cedar Mesa Canal system which provides irrigation water to private lands in the Roseworth area. About 3.7 miles of the canal flows through the allotment (1.2 miles in the Northwest, 1.8 in the South, and 0.7 in the Northeast pastures, respectively). The canal is the source of livestock water for the allotment. Cattle are permitted to graze the allotment from April 10 to October 15 with a permitted active use of 740 AUMs.

**Table 3: Acreage by Pasture and Ownership in the Cedar Crossing Allotment**

Pasture Name	Public	State	Private	Total*
Northeast	1,202	0	12	1,214
Northwest	1,523	0	0	1,523
South	2,238	0	0	2,238
<b>Allotment Total</b>	4,963	0	12	4,976

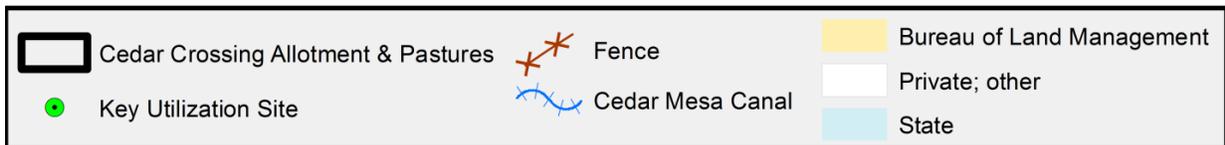
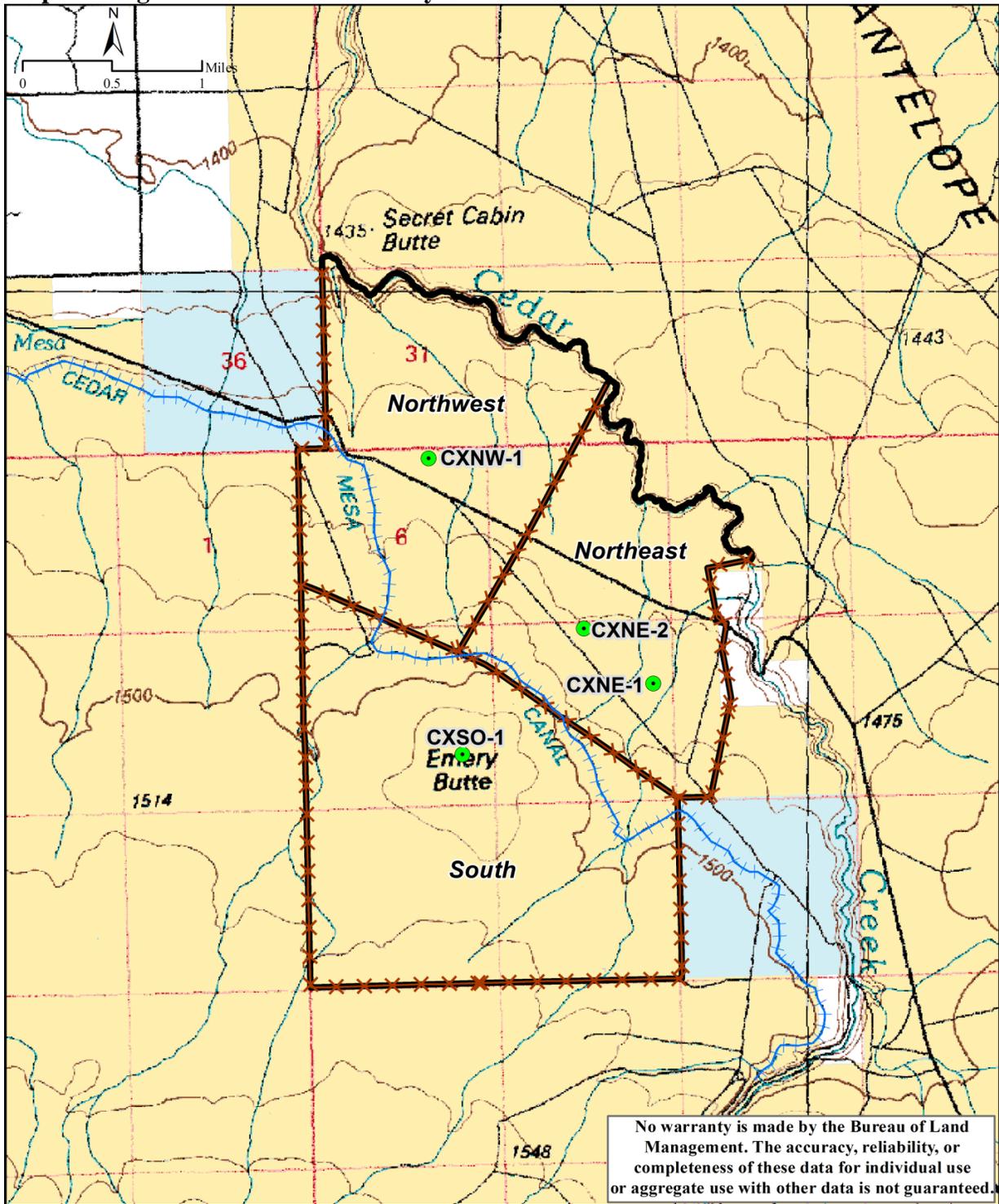
\*Total acres may not match the sum of individual ownership acres due to rounding numbers.

Prior to 1990, both sheep and cattle used the Cedar Crossing Allotment. Sheep use typically occurred in the spring while cattle use occurred from April through October. Temporary Non-Renewable (TNR) grazing was authorized for cattle in November and December; however TNR has not been authorized in the past 10 years. After 1990 only cattle have grazed the allotment. Cattle have been grazed annually from April through October, using each pasture continuously through the grazing season.

The Cedar Crossing Allotment is now subject to Chief U. S. District Judge B. Lynn Winmill's Decision and Order of February 26, 2009. Under the Order, the Bureau of Land Management (BLM) is directed to adjust livestock grazing to maintain and enhance sage-grouse, pygmy rabbit, and slickspot peppergrass habitat. A deferred rotation system was initiated in 2009 in response to the Court Order. Within the deferred rotation, an emphasis has been placed on pastures or areas containing key sage-grouse nesting habitat. Under the deferred rotation system each pasture is grazed during the spring one out of three years. The livestock grazing schedule and rotation is outlined each year in an Annual Grazing Agreement.

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**Map 2: Range Infrastructures and Key Utilization Sites**



A summary of actual use and percent utilization for each pasture within the Cedar Crossing Allotment from 2004 to 2013 can be seen in Tables 4 and 5. Utilization data or actual grazing use by pasture is not available prior to 2009. Subsequent to the 2009 Court Order, actual use in the allotment has closely followed the grazing schedule outlined in the Annual Grazing Agreements. Utilization has been measured on Sandberg bluegrass (*Poa secunda*), crested wheatgrass (*Agropyron cristatum*), Thurber's needlegrass (*Achnatherum thurberianum*), bluebunch wheatgrass (*Pseudoroegneria spicata*) and squirreltail (*Elymus elymoides*). Utilization data was collected by the height-weight method (Cooperative Extension Service et al., 1999). Locations of key utilization sites are shown on Map 2.

**Table 4: Actual Use and Utilization Prior to 2009**

Actual Use by pasture is not available these years.	Year	Actual Use (AUMS)	Percent Utilization				
			Sandberg bluegrass	Crested wheatgrass	Thurber's needlegrass	Bluebunch wheatgrass	Squirreltail
	2004	601	--	--	--	--	--
	2005	741	--	--	--	--	--
	2006	681	--	28%	1%	11%	6%
	2007	741	17%	--	--	--	--
	2008	655	17%	39%	41%	--	--

-- Utilization data not recorded, or species is not present or is not a key species for utilization monitoring.

**Table 5: Actual Grazing Use and Percent Utilization Since 2009**

Pasture	Year	Actual Use		Percent Utilization			
		Season of Use*	AUMs	Sandberg blue grass	Crested wheat grass	Thurber's needle grass	Blue bunch wheat grass
Northwest	2009	Spring/Early Summer	172	9%	--	--	--
	2010	Late Summer/Fall	262	--	--	--	--
	2011	Summer	252	--	--	--	--
	2012	Spring/Early Summer	128	1%	--	--	--
	2013	Late Summer/Fall	293	--	--	--	--
Northeast	2009	Summer	259	21%	51%	61%	--
	2010	Spring/Early Summer	150	--	47%	--	--
	2011	Late Summer/Fall	385	--	11%	--	--
	2012	Summer	292	--	23%	--	--
	2013	Spring/Early Summer	139	--	15%	--	--
South	2009	Late Summer/Fall	290	--	--	--	--
	2010	Summer	321	--	--	--	--
	2011	Spring/Early Summer	131	--	--	--	21%
	2012	Late Summer/Fall	318	--	33%	--	--
	2013	Summer	301	--	37%	--	--

\*Spring/Early Summer (4/10 – 6/20); Summer (6/21 – 8/10); Late Summer/Fall (8/11 – 10/15)

-- Utilization data not recorded, or species is not present or is not a key species for utilization monitoring.

A summary of actual use and average utilization for the Cedar Crossing Allotment from 2004 to 2013 is shown in Table 6. Since 2004, actual use within the Allotment has averaged 707 AUMs.

**Table 6: Actual Use and Utilization Summary for the Cedar Crossing Allotment**

Year	Actual Use (AUMs)	Average Percent Utilization				
		Sandberg bluegrass	Crested wheatgrass	Thurber's needlegrass	Bluebunch wheatgrass	Squirreltail
2004	601	--	--	--	--	--
2005	741	--	--	--	--	--
2006	681	--	28%	1%	11%	6%
2007	741	17%	--	--	--	--
2008	655	17%	39%	41%	--	--
2009	721	15%	51%	61%	--	--
2010	733	--	47%	--	--	--
2011	768	--	11%	--	--	--
2012	738	1%	28%	--	--	--
2013	733	--	26%	--	--	--

--Utilization data not recorded, or species is not present or is not a key species for utilization monitoring.

There are no permitted livestock trailing authorizations within the Cedar Crossing Allotment.

### **Vegetation**

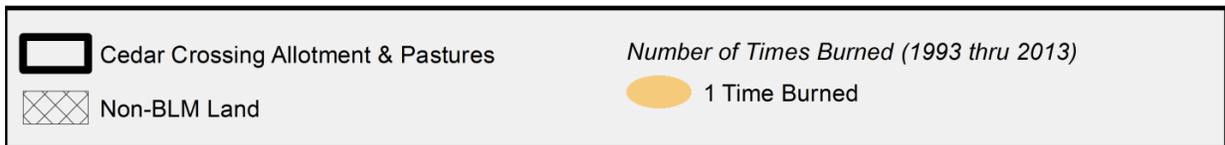
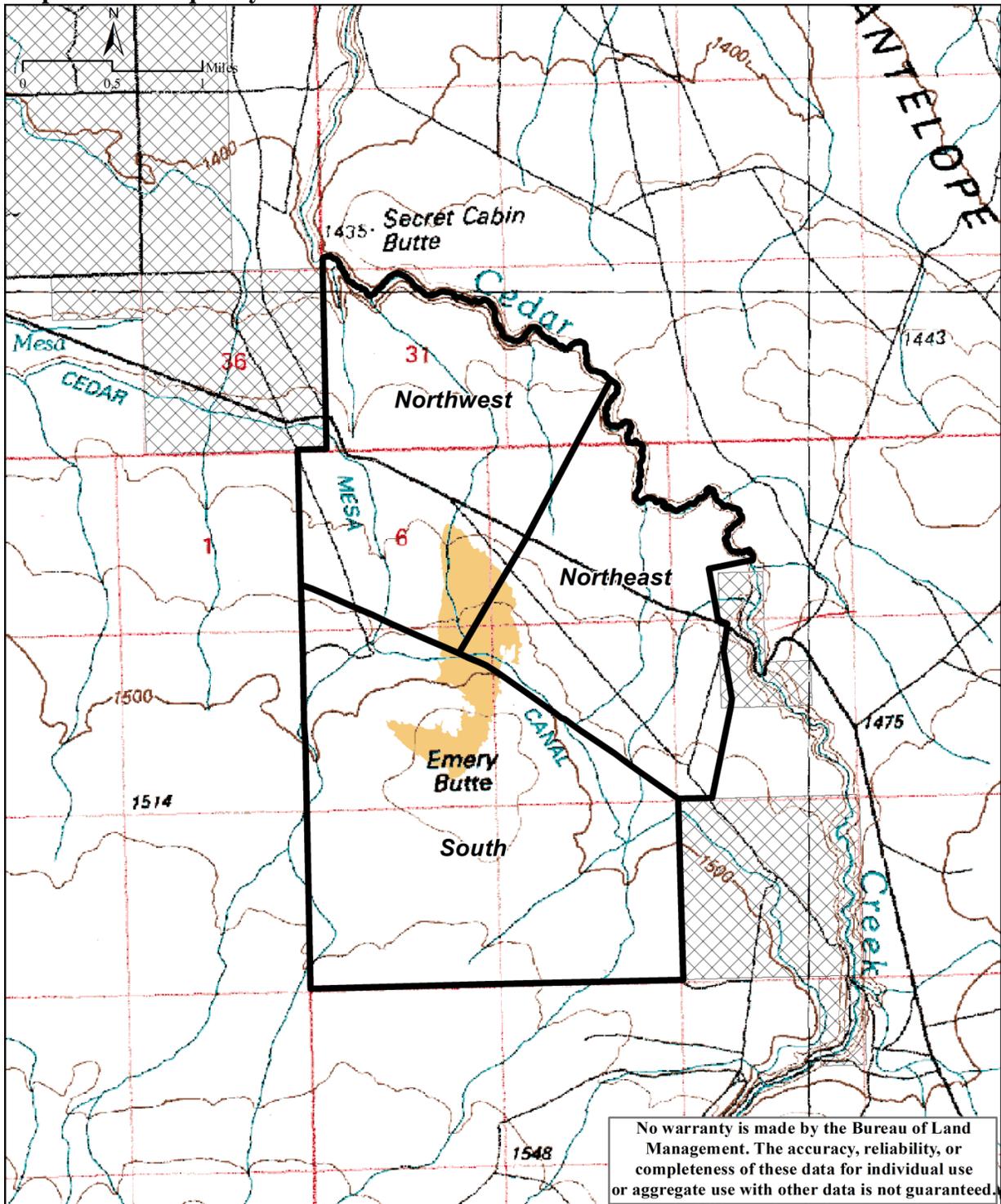
Vegetation in the Cedar Crossing Allotment was initially mapped in 2006 using field observations, field cover data, and 2004 National Agriculture Imagery Program (NAIP) imagery. The vegetation map was updated in 2013 using field observations and NAIP imagery (Map 3). Vegetation communities were classified 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).

Plant communities in the Cedar Crossing Allotment have changed over time. In the late 1950's, a large area of the allotment was plowed and subsequently drill seeded with crested wheatgrass to reduce the potential of weed infestations and provide forage for livestock. Since then, sagebrush has reestablished and vegetation in most of the allotment now resembles a shrub steppe plant community. Most of the allotment has not burned in more than 50 years. However, 272 acres (6% of the allotment) burned in the 2007 Roseworth Fire (Map 3). About 261 acres of the burned area was subsequently seeded with 'Anatone' bluebunch wheatgrass (*Pseudoregneria spicata*) and Sherman big bluegrass (*Poa ampla*). As a result of past seeding treatments, plant communities in the allotment include both native and non-native perennial grass species (Table 7; Map 4).

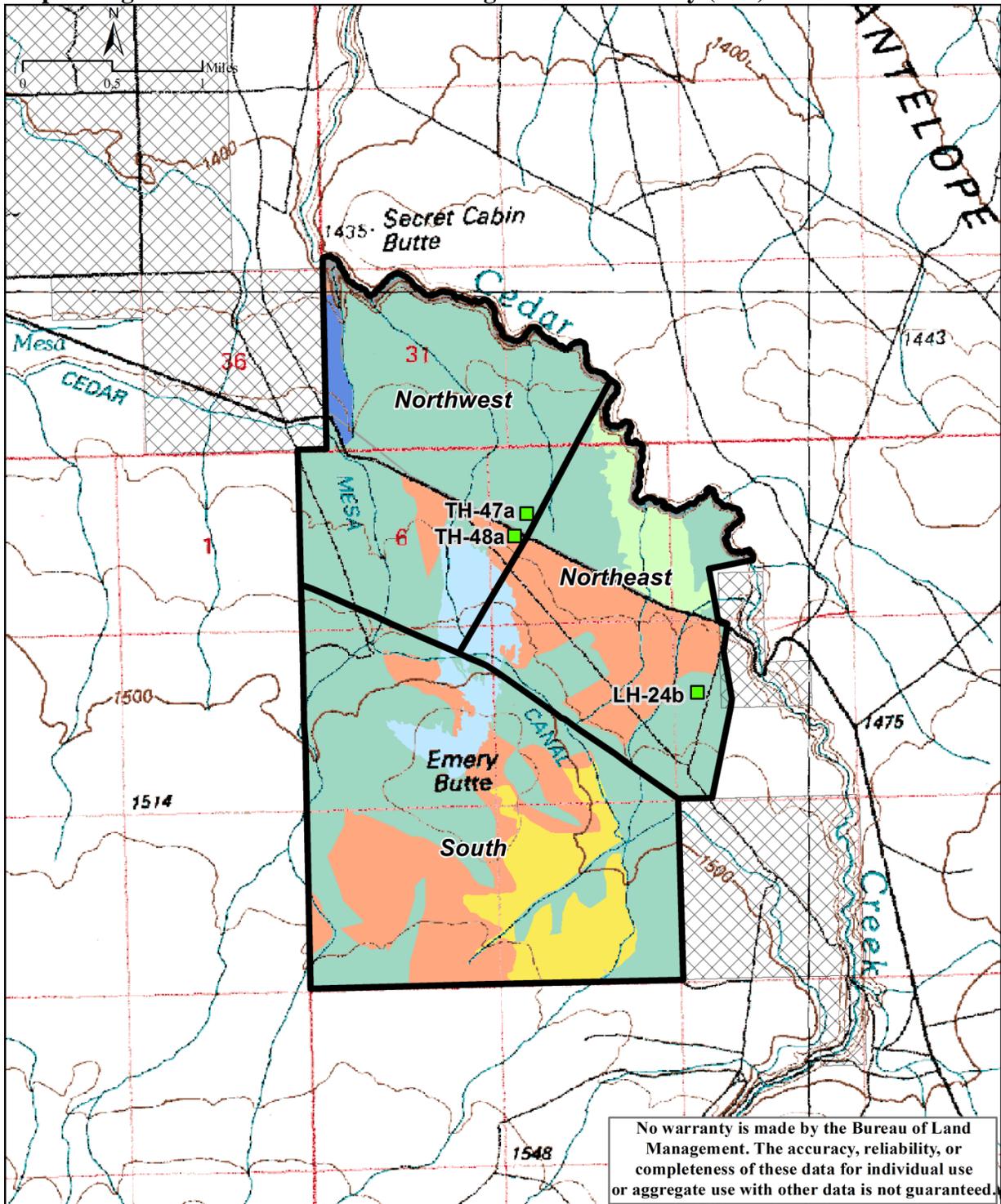
**Table 7: Cedar Crossing Vegetation Communities in Acres and Percentage by Pasture**

<b>Vegetation Community</b>	<b>NW Pasture 1522 acres</b>	<b>NE Pasture 1201 acres</b>	<b>South Pasture 2238 acres</b>
Wyoming big sagebrush /Sandberg bluegrass	1,208 (79%)	499 (42%)	1,189 (53%)
Wyoming big sagebrush/Crested wheatgrass	89 (6%)	426 (35%)	580 (26%)
Wyoming big sagebrush/Thurber's needlegrass	54 (4%)	0 (0%)	0 (0%)
Rubber Rabbitbrush/Sandberg bluegrass	0 (0%)	170 (14%)	0 (0%)
Crested wheatgrass	0 (0%)	0 (0%)	362 (16%)
Anatone bluebunch wheatgrass	99 (7%)	55 (5%)	107 (5%)
Unvegetated Breaks along Cedar Creek Canyon	64 (4%)	45 (4%)	0 (0%)
Barren	8 (<1%)	6 (<1%)	0 (0%)

**Map 3: Fire Frequency**



**Map 4: Vegetation Communities and Ecological Site Inventory (ESI) Plots**



Three Ecological Site Inventory (ESI) sites are found in the Cedar Crossing Allotment (Map 4). Two are in the Northwest Pasture (TH-47a, TH-48a) and one is in the Northeast Pasture (LH-24b). Plant production measured in 2006 (Table 8) show grasses to be within the expected range of production on the 10 – 13” Wyoming big sagebrush/bluebunch site in the Northeast Pasture and on the seeded portion of the Northwest Pasture (USDA NRCS, 2013a). However, production was lower than expected in the native range of the Northwest Pasture. Total production was within the range described on the Ecological Site Description reference sheet (USDA NRCS, 2013a).

**Table 8: Summary of 2006 Ecological Site Inventory Production Data (Total Dry Weight, in Pounds per Acre)**

Vegetation Class	Species	Site ID			
		Loamy 10-13 ARTRW8/PSSPS ESD	Northwest Pasture		Northeast Pasture
			2006-TH-47a	2006-TH-48a	2006-LH-24b
Perennial Grasses	Squirreltail	12 – 33	25.4	-	111.3
	Crested wheatgrass	-	-	481.9	-
	Sandberg bluegrass	12 – 33	137.3	89.2	142.6
	Thurber’s needlegrass ( <i>Achnatherum thurberianum</i> )	6 – 17	1.3	-	13.9
	Bluebunch wheatgrass	160 – 440	-	-	-
	Western wheatgrass ( <i>Pascopyrum smithii</i> )	-	4.7	-	-
	Total Perennial Grass	220 – 600	168.7	571.1	267.8
Perennial Forbs	Spiny phlox ( <i>Phlox hoodia</i> )	8 – 22	44.8	-	135.1
	Longleaf phlox ( <i>Phlox longifolia</i> )	8 – 22	8.5	-	2.2
	Daisy ( <i>Erigeron spp.</i> )	6 – 17	0.7	-	-
	Milkvetch ( <i>Astragalus spp.</i> )	1 – 11	-	5	0.8
	Total Perennial Forb	55 – 170	53.3	5	138.1
Shrubs	Yellow rabbitbrush ( <i>Chrysothamnus viscidiflorus</i> )	10 – 28	15.8	-	-
	Rubber rabbitbrush ( <i>Ericameria nauseosa</i> )	10 – 28	-	0.6	-
	Wyoming big sagebrush	100 – 275	335.8	239.9	555.9
Total Shrub	125 – 330	351.6	240.5	555.9	
Total Production	400 – 1100	573.6	816.6	961.8	

\*Only those native plants found in both the Ecological Site Description (ESD) and production plots are listed in the Table. Therefore, totals for the differing plant types are not a sum of those listed in the Table, but of all plants expected to occur in the ESD.

Due to differences in sampling locations and methodology (e.g. number of transects per site and number of points per transect) among the 2006 ESI data, 2010 and 2012 Habitat Assessment Framework (HAF) data and the 2013 (Step Point Method, BLM, 1996) data, statistical tests cannot be used to analyze vegetative cover across years. However, the data can be used to describe general similarities or differences in vegetation between years or locations within the allotment.

No upland trend monitoring sites have been established within this allotment.

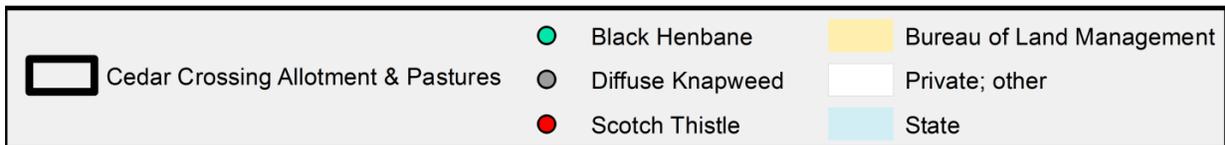
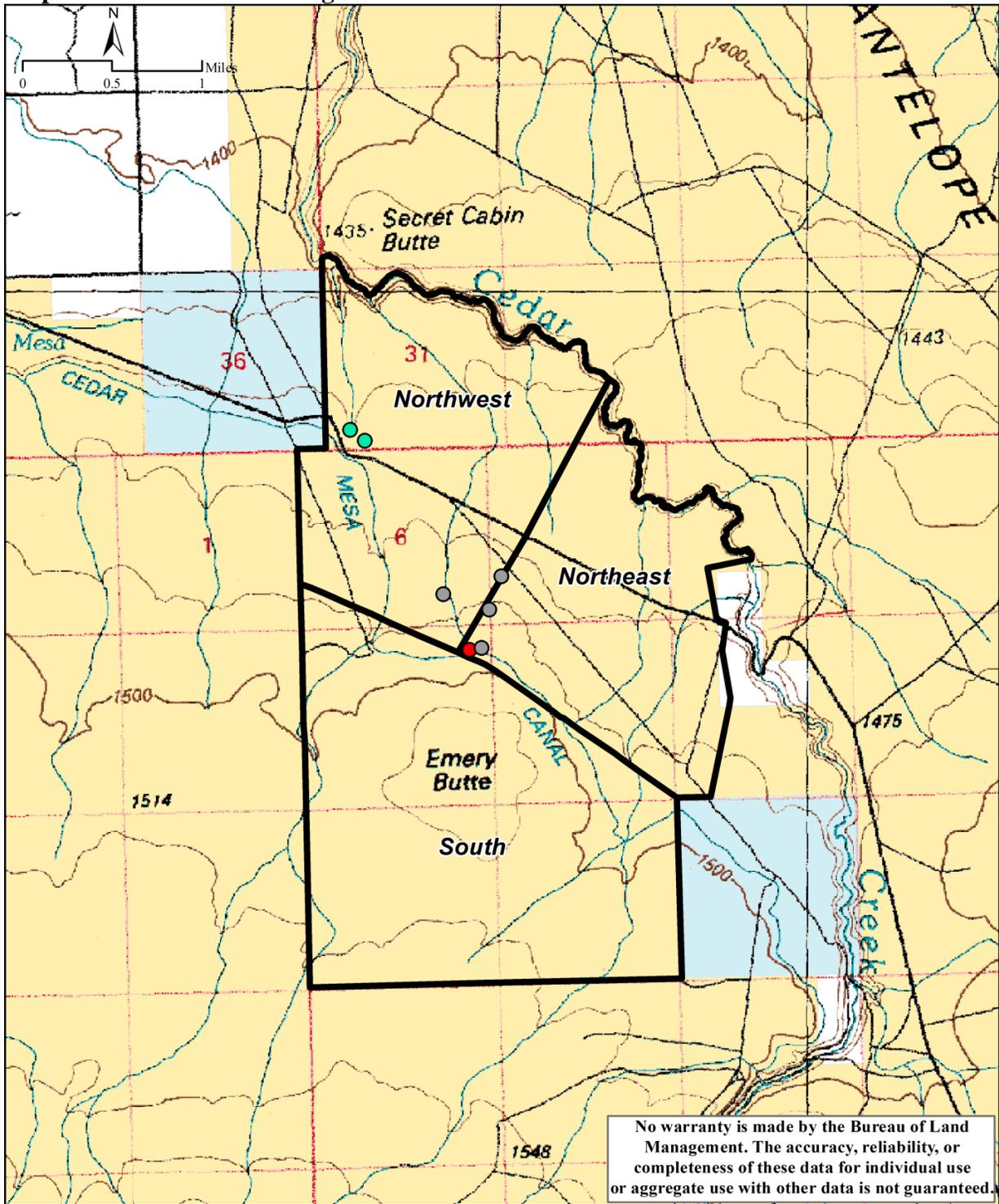
### **Noxious Weeds**

The State of Idaho has listed 65 plant species as noxious weeds; three are known to occur in the Cedar Crossing Allotment (Map 5): diffuse knapweed (*Centaurea diffusa*), scotch thistle (*Onopordum acanthium*), and black henbane (*Hyoscyamus niger*). There are four known diffuse knapweed occurrences in the allotment. Diffuse knapweed occurs in the Northeast and Northwest pastures. There is one occurrence of Scotch thistle in the Northeast Pasture. Black henbane has four occurrences in the Northwest Pasture. The black henbane was chemically treated in 2004, and all other weed occurrences were chemically treated in 2008. No noxious weeds were noted at any of the monitoring/study sites evaluated in this analysis.

Treatment goals are to reduce noxious weeds to where they will not have a significant economic or environmental impact and/or to eradicate them completely. The BLM also works to prevent the establishment of new 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 the 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 5: Noxious Weed Management**



## IDAHO RANGELAND HEALTH STANDARDS ASSESSMENT

There are eight standards for rangeland health that apply to BLM lands in the State of Idaho. Not all of the Standards apply to the Cedar Crossing Allotment due to variances in the land type and geographical area. Of the eight Idaho Standards for Rangeland Health, the following standards are applicable to the Cedar Crossing 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 4** – 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.
- **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 2, 3, and 6 do not apply to the Cedar Crossing Allotment*

**Table 9: Standards Applicable to the Cedar Crossing Allotment by Pasture.**

Standard	Pastures
1	Northwest, Northeast, South
2	Not Applicable
3	Not Applicable
4	Northwest
5	Northeast, South
6	Not Applicable
7	Northwest, Northeast
8	Northwest, Northeast, South

An interdisciplinary (ID) team conducted IIRH field evaluations at five sites representative of the Cedar Crossing Allotment during May of 2013. Map 6 shows the location of the 2013 IIRH evaluation sites. One evaluation was done in the Northwest Pasture and two evaluations were completed in each of the Northeast and South Pastures. Three of these field evaluations were done at HAF sites (IIRH Sites NW, NE\_1, S\_1), one at a key utilization site (NE\_2), and the other site was selected by the ID team (S\_2A). The sites were chosen based on vegetation that was representative of the pasture.

HAF sites were randomly generated through a GIS process (Appendix A). 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.

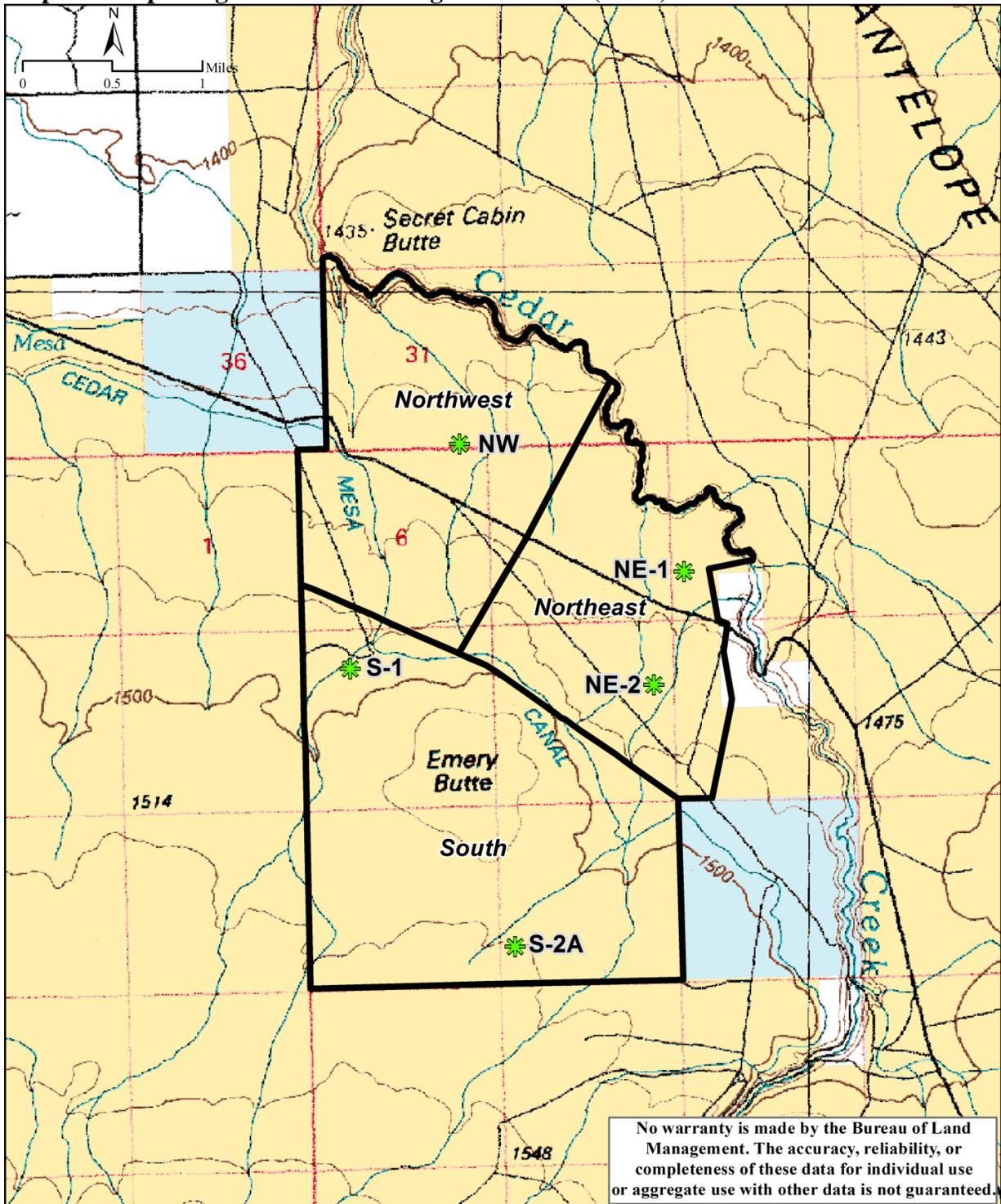
Indicators of rangeland health (Table 10) were used to evaluate three rangeland health attributes (Table 11): Soil and Site Stability, Hydrologic Function, and Biotic Integrity (Pellant et al., 2005). The IIRH evaluation sheet was completed at each site, photographs were taken, and a list of plant species 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 three of the 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. Vegetative cover was recorded at IIRH Site S\_2A using the Step Point Method (BLM, 1996) while 2006 cover data (ESI Site TH-48a) was used to evaluate IIRH Site NE\_2.

In addition to evaluating rangeland health indicators at each of the five IIRH sites, the ID Team also examined other areas to ensure evaluation sites were representative of the vegetation communities throughout the allotment. Data collected at the evaluation sites were compared to the Natural Resource Conservation Service's ESD reference sheet (USDA NRCS 2013a) for soil types and potential vegetation communities in the Cedar Crossing Allotment. All five evaluation sites occurred in the Loamy 10 to 13 ARTRW8/PSSP (Wyoming big sagebrush /bluebunch wheatgrass) ecological site. The ESD reference sheet (R025XY019ID) describes the expected condition/reference state in the description of State 1, Phase A.

The Loamy 10-13" Wyoming big sagebrush /bluebunch wheatgrass (R025XY019ID) reference phase plant community is expected to have Wyoming big sagebrush as the dominant plant species in the overstory with bluebunch wheatgrass dominating the understory. Thurber's needlegrass, Sandberg bluegrass, squirreltail and arrowleaf balsamroot (*Balsamorhiza sagittata*) are sub-dominant species in the understory. Other species in the plant community can include Indian ricegrass (*Achnatherum hymenoides*), foxtail wheatgrass (*Pseudelymus* spp.), Idaho fescue (*Festuca idahoensis*), longleaf and spiny phlox, yellow rabbitbrush. A large variety of other grasses, forbs, and shrubs occur in minor amounts. Natural fire frequency should be 50-70 years.

**Map 6: Interpreting Indicators of Rangeland Health (IIRH) Sites**



Indicator ratings for each IIRH site in the Cedar Crossing 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 ESD Reference Sheet				
	S = Soil & Site Stability H=Hydrologic Function B = Biotic Integrity	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills	S, H					NE_1, NE_2, NW, S_1, S_2A
2. Water-flow Patterns	S, H					NE_1, NE_2, NW, S_1, S_2A
3. Pedestals and/or terracettes	S, H					NE_1, NE_2, NW, S_1, S_2A
4. Bare ground	S, H					NE_1, NE_2, NW, S_1, S_2A
5. Gullies	S, H					NE_1, NE_2, NW, S_1, S_2A
6. Wind-scoured, blowouts, and/or deposition areas	S					NE_1, NE_2, NW, S_1, S_2A
7. Litter movement	S					NE_1, NE_2, NW, S_1, S_2A
8. Soil surface resistance to erosion	S, H, B					NE_1, NE_2, NW, S_1, S_2A
9. Soil surface loss or degradation	S, H, B					NE_1, NE_2, NW, S_1, S_2A
Plant community composition and distribution relative to infiltration	H					NE_1, NE_2, NW, S_1, S_2A
11. Compaction layer	S, H, B					NE_1, NE_2, NW, S_1, S_2A
12. Functional/structural groups	B				NE_1, NE_2	NW, S_1, S_2A
13. Plant mortality/decadence	B					NE_1, NE_2, NW, S_1, S_2A
14. Litter amount	H, B			S_1	NE_1, NE_2	NW, S_2A
15. Annual production	B					NE_1, NE_2, NW, S_1, S_2A

Indicators	Attributes	Degree of Departure from ESD Reference Sheet				
	S = Soil & Site Stability H=Hydrologic Function B = Biotic Integrity	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
16. Invasive plants	B		NW	NE_1, NE_2, S_1, S_2A		
17. Reproductive capability of perennial plants	B					NE_1, NE_2, NW, S_1, S_2A

IIRH Evaluation Sites: NE\_1- Northeast Pasture Site 1, NE\_2- Northeast Pasture Site 2, NW- Northwest Pasture Site 1, S\_1- South Pasture Site 1, and S\_2A- South Pasture Site 2.

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 10 identifies which indicators are related to each of the three attributes. The 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 for Standard 1 in the Cedar Crossing Allotment**

Rangeland Health Attribute	Degree of Departure				
	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil and Site Stability					NE_1, NE_2, NW, S_1, S_2A
Hydrologic Function					NE_1, NE_2, NW, S_1, S_2A
Biotic Integrity				NE_1, NE_2, NW	S_1, S_2A

IIRH Evaluation Sites: NE\_1- Northeast Pasture Site 1, NE\_2- Northeast Pasture Site 2, NW- Northwest Pasture Site 1, S\_1- South Pasture Site 1, and S\_2A- South Pasture Site 2.

### **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**

All five IIRH evaluation sites were evaluated using the ESD reference sheet (R025XY019ID) for the Loamy 10-13" Wyoming big sagebrush/bluebunch wheatgrass ecological site (USDA NRCS 2013a). The reference sheet for the ESD indicates bare ground should range from 30 to 40

percent cover (top layer), litter should range from 5 to 10 percent (cover for all layers), and the soil stability test value should range from 4 to 6. Litter percentage calculations used for rating indicator 14 include all litter, detached and standing. While the ESD indicates that litter cover should range from 5 to 10 percent, cover data collected within the allotment show that litter values actually range from 22 to 54 percent cover for all layers. With this, even though the litter indicator may have been rated as a departure from the reference condition, this departure may not be reflected in the overall attribute rating. Average percent bare ground recorded in the 2006 ESI data, as well as the 2010 and 2012 HAF data (Tables 12 – 16) and 2013 cover data ranges from 9 to 17 percent cover (top layer). In addition, a soil stability test (Pellant et al., 2005) was completed within the Northeast Pasture and resulted in an average soil stability value of 5.5, indicating adequate soil surface resistance to erosion. The soil profile within the Northeast Pasture is shown in Photo 1.

**Photo 1: Soil Profile in the Northeast Pasture at IIRH site NE\_1**



Multiple soil series exist in the Cedar Crossing Allotment and are typically silt loams. The majority of the allotment is relatively flat, except for Cedar Creek Canyon located along the north/northeast border of the allotment. The Soil Survey Geographic (SSURGO) Database (NRCS 2012) shows that 81 percent (4,024 acres) of the allotment has a moderate wind erosion hazard, 16 percent (815 acres) has a non-erosion factor, and the remaining 3 percent (125 acres), has no data on wind erosion. The database also shows 79 percent (3,931 acres) of the allotment has a high water erosion hazard and 18 percent (907 acres) has a medium water erosion hazard, the remaining 3 percent (125 acres) has no data on water erosion.

Although the soil survey shows potential for both wind and water erosion, no indications of soil loss or accelerated erosion were observed during the 2013 IIRH field evaluation. Adequate soil cover is present within the allotment to reduce potential erosion. Abundant perennial vegetation, as well as some biological soil crusts, is present to provide protection for site stability throughout the majority of the allotment (Tables 12 – 16).

**Table 12: Percent Ground Cover (Top Layer) at IIRH Sites**

Ground Cover	IIRH Site NW	IIRH Site NE_1	IIRH Site NE_2 (ESI Site TH-48a)	IIRH Site S_1	IIRH Site S_2A
	NW Pasture	NE Pasture	NE Pasture	South Pasture	South Pasture
Perennial Grasses	24.0%	29.0%	54.0%	29.0%	24.0%
Annual Grasses	0.0%	12.0%	0.0%	2.5%	0.0%
Perennial Forbs	2.0%	0.0%	1.0%	2.0%	6.0%
Annual Forbs	12.0%	11.0%	0.0%	0.0%	8.0%
Shrubs	20.0%	13.0%	14.0%	20.5%	18.0%
Biological Soil Crust	22.0%	9.0%	3.0%	10.5%	18.0%
Bare Ground	14.0%	15.0%	17.0%	13.0%	16.0%
Litter	6.0%	10.0%	11.0%	19.5%	10.0%
Rock	0.0%	1.0%	0.0%	3.0%	0.0%

**Northwest Pasture**

***IIRH Site NW, Loamy 10-13”***

IIRH Site NW is located in a Wyoming big sagebrush/Sandberg bluegrass vegetation community. This vegetation type comprises 79 percent of the pasture. Ground cover for this site is described in Table 12. The amount of bare ground (14%) is below the expected range described in the ESD. Further, there are no visible signs of soil movement on or near the evaluation site (i.e. rills, pedestals, gullies, etc.). Biological soil crusts and litter provide 28 percent of cover, herbaceous plants 38 percent, and shrubs 20 percent (top layer). All indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the reference condition (Table 10). Therefore, the Soil and Site Stability and Hydrologic Function attributes were each rated none to slight departure.

**Northeast Pasture**

***IIRH Site NE\_1, Loamy 10-13”***

IIRH Site NE\_1 is located in a rabbitbrush/Sandberg bluegrass vegetation community that comprises about 14 percent of the Northeast Pasture; and is not representative of the pasture. The amount of bare ground (15%) is below the expected range described in the ESD. Biological soil crusts comprise 9 percent of cover, herbaceous plants 29 percent, annual grasses 12 percent, and shrubs 13 percent (Table 12). Further, there are no visible signs of soil movement on or near the evaluation site (i.e. rills, pedestals, gullies, etc.).

The indicator for litter amount was rated as a slight to moderate departure from the reference condition due to the increase in the amount of litter (27% cover for all layers) found at the site.

However, litter is adequate to provide necessary soil protection. A soil stability test was completed at the site and the soil stability value averaged 5.5, indicating adequate soil surface resistance to erosion.

All other indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the reference condition. Therefore, the Soil and Site Stability and Hydrologic Function attributes were each rated as none to slight departure.

#### ***IIRH Site NE\_2, Loamy 10-13”***

Site NE\_2 is located in a Wyoming big sagebrush/crested wheatgrass vegetation community and comprises about 35 percent of the Northeast Pasture. Cover data collected at ESI Site TH-48a in 2006 was used to evaluate IIRH Site NE\_2. Although the ESI site and IIRH site are not in the same exact location, the ID team determined that they were similar enough to use in evaluating Standard 1. Ground cover data was collected at ESI Site TH-48a, which is located in a seeded vegetation community (Table 12). The amount of bare ground (17%) is below the expected range described in the ESD. In addition, biological soil crusts comprise 3 percent of the ground cover. Further, there are no visible signs of soil movement on or near the evaluation site (i.e. rills, pedestals, gullies, etc.).

Except for the indicator assessing litter amount, all other indicators related to Soil and Site Stability and Hydrologic Function attributes were rate none to slight (Table 10). Litter (24% cover for all layers) amount exceeded the ESD but is considered adequate to protect soils on this site. The indicator measuring litter amounts was rated a slight to moderate departure.

Except for litter amounts, all other indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the EDS reference sheet. Therefore, the Soil and Site Stability and Hydrologic Function attributes were each rated as a none to slight departure.

#### **South Pasture**

##### ***IIRH Site S\_1, Loamy 10-13”***

Site S\_1 is located in the Wyoming big sagebrush/Sandberg bluegrass and comprises about 53 percent of the South Pasture. Ground cover for this site is described in Table 12. The amount of bare ground (13%) is below the expected range described in the ESD reference sheet. Biological soil crusts comprise 10.5 percent of cover, herbaceous perennial plants 31 percent, annual grasses 2.5 percent, and shrubs 20.5 percent. Further, there are no visible signs of soil movement on or near the evaluation site (i.e. rills, pedestals, gullies, etc.).

The amount of litter was higher than expected for the site (37% cover for all layers) and this indicator was rated slight to moderate. However, litter is not affecting infiltration, retention, and release of water at this site.

Except for litter amount, all other indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the EDS reference sheet. Therefore,

the Soil and Site Stability and Hydrologic Function attributes were each rated none to slight departure.

***IIRH Site S\_2A, Loamy 10-13”***

IIRH Site NE\_2A is located in the Wyoming big sagebrush/crested wheatgrass vegetation community and comprises about 26 percent of the South Pasture. All of the indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight (Table 10).

Ground cover for this site is described in Table 12. The amount of bare ground (16%) is below the expected range described in the ESD reference sheet. Biological soil crusts comprise 18 percent of cover, herbaceous perennial plants 38 percent, and shrubs 18 percent. There are no visible signs of soil movement on or near the evaluation site (i.e. rills, pedestals, gullies, etc.).

**Allotment Summary for Standard 1 (Watersheds):**

The attributes of rangeland health related to Standard 1 are Soil and Site Stability and Hydrologic Function. Both attributes were rated none to slight at all five IIRH sites within the allotment.

The indicator for litter amount showed a slight to moderate departure at two evaluation sites (NE\_1, NE\_2) and moderate departure at site S\_1. All other indicators related to the Soil and Site Stability and Hydrologic Function attributes were rated none to slight at all five IIRH sites within the allotment. In addition, a soil stability test was completed at site NE\_1 and the soil stability value averaged 5.5, indicating adequate soil surface resistance to erosion.

**Evaluation of Standard 1**

Although the abundance of deep-rooted perennial bunchgrasses is lower than expected in most of the native plant communities, the ID Team noted that there are adequate amounts of deep-rooted perennial grasses (crested wheatgrass, Thurber’s needlegrass, bluebunch wheatgrass, etc.) and shrubs to distribute water deep into the soil profile as well as hold the soil in place.

The amount of litter found at three of the five IIRH sites is higher than what is described in the ESD reference sheet. However, the ID Team determined that the amount of litter was appropriate for site stability and ecological processes as shown by adequate soil moisture, as well as total plant production matching what is expected for the site. Litter was similar to the ESD for all the other sites.

Due to the abundance of perennial vegetation, biological soil crusts, and litter, and high soil stability with no signs of active soil loss or erosion, the Soil and Site Stability and Hydrologic attributes were rated none to slight departure for all five sites in the Cedar Crossing Allotment.

***Evaluation Finding –Allotment (Northwest, Northeast, and South Pastures) is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

### ***Rationale for Evaluation Finding***

Perennial vegetation, biological soil crusts, and litter amounts are adequate to provide protection for site stability. Bare ground is lower than described in the ESD reference sheet and topography is relatively flat, further reducing the potential for accelerated soil erosion on the Cedar Crossing Allotment.

Observations made by the ID Team during the 2013 Rangeland Health Assessment (RHA), as well as cover data (described above) indicate that ground cover (vegetation, biological soil crusts, litter, etc.) is sufficient for soil stability throughout most of the allotment. Biological soil crusts are generally absent in the 2007 burned area; however, adequate vegetation and litter are present to protect the soil surface from erosion. Deep-rooted perennial bunchgrasses are not as common as expected in the native plant communities. Deep-rooted perennial bunchgrasses are important in promoting infiltration and retention of soil moisture. While not abundant, deep-rooted perennial bunchgrasses, as well as shrubs (Table 12), are present to carry soil moisture deeper into the soil profile. Evidence of accelerated erosion, such as active rills, water flow patterns, pedestals, or other indications of soil erosion were not observed in the allotment. Infiltration, retention, and release of water processes relative to soil, vegetation, climate, and landform appear to be providing for appropriate nutrient and hydrologic cycling and energy flow.

The litter amount indicator ratings deviated from the reference condition found in the ESD at three of the five sites. However, the ID Team determined that the litter amount was 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. The Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure at all IIRH sites in the allotment.

### **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.*

  X   Standard Doesn't Apply

Springs or wetlands are not present within the allotment. Riparian Proper Functioning Condition (PFC) assessments (BLM 1998) were not conducted within the allotment as no riparian vegetation is present due to the ephemeral hydrology of streams within the allotment. Cedar Creek forms the north/northeast boundary of the allotment. The stream reach bordering this allotment is downstream of Cedar Creek Reservoir (Roseworth Reservoir) and a diversion and siphon which remove the entirety of the flow released from the reservoir. Due to the nearly year-round dewatering of Cedar Creek below the diversion, obligate wetland vegetation species do not occur along the stream reach. Vegetation along the stream reach is primarily composed of upland species.

The only water body supporting riparian vegetation within the allotment is the Cedar Mesa Canal which winds through the southern part of the Northeast and Northwest pastures and the northwestern part of the South Pasture. Native wetland plants present along the canal include

Baltic rush (*Juncus baliticus*), spikerush (*Eleocharis* spp.) and willow (*Salix* spp.). Invasive species such as Canada thistle (*Cirsium arvense*) and Russian olive (*Elaeagnus angustifolia*) are scattered along the canal.

Since the natural stream channel is dewatered and the Cedar Mesa Canal is artificially maintained, Standard 2 does not apply to the allotment.

**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.*

X Standard Doesn't Apply

See Standard 2 for rationale.

**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*

**Rangeland Health Assessment**

**Northwest Pasture**

***IIRH Site NW, Loamy 10-13"***

The Northwest Pasture of the Cedar Crossing Allotment is evaluated under Standard 4. The vast majority (83%) of the pasture is dominated by native plant communities, specifically Wyoming big sagebrush/Sandberg bluegrass. Field notes recorded during the 2013 IIRH visit document the presence of native shrubs, grasses, and forbs (Photo 6. IIRH Site NW). Noxious weed species were not observed during the evaluation.

Vegetative cover data was collected at IIRH Site NW in 2010. The vegetative cover data has been summarized below in Table 13. Cover data was collected at multiple layers; however, Table 13 displays only the top layer.

**Table 13: Percent Ground Cover (Top Layer) at IIRH site NW.**

<b>Vegetation Class</b>	<b>Species/Cover Type</b>	<b>Percent Cover IIRH site NW (2010)</b>
Perennial Grasses	Squirreltail	2
	Sandberg bluegrass	22
Perennial Forbs	Sagebrush phlox ( <i>Phlox aculeata</i> )	1
	Spiny Phlox ( <i>Phlox hoodii</i> )	1
Annual Forbs	Curveseed butterwort	11
	Spring draba ( <i>Draba verna</i> )	1
Shrubs	Rubber rabbitbrush	1
	Wyoming big sagebrush	19

Vegetation Class	Species/Cover Type	Percent Cover IIRH site NW (2010)
<b>Vegetation Total</b>		<b>58</b>
Other Cover	Bare Ground	14
	Biological soil crust	22
	Litter in Contact with Soil	6
	Litter Standing	0
	Persistent Litter	0
	Rock or Gravel	0
<b>Grand Total</b>		<b>100</b>

\*Other plant species not recorded during cover transects but observed at the evaluation site are listed in Appendix B.

Sandberg bluegrass is the dominant grass species (22% cover) and Wyoming big sagebrush is the dominant shrub species (19% cover). Biological soil crusts comprise 22 percent of the cover. Curveseed butterwort (*Ceratocephala testiculata*) was recorded at 11 percent of cover and was noted in the IIRH field notes as being common throughout the site. Curveseed butterwort (burr buttercup) is an invasive non-native annual that typically increases on disturbed sites. Cheatgrass was not recorded along the cover transect but was noted to occur in nearby disturbed areas. With the combination of curveseed butterwort being common and cheatgrass found in nearby disturbed areas, the indicator for invasive plants was rated moderate to extreme.

**Photo 2: IIRH Site NW (Northwest Pasture)**



All other indicators related to the Biotic Integrity attribute were rated none to slight. Although Sandberg bluegrass is the dominant grass, other perennial bunchgrasses are present. They include squirreltail, Thurber's needlegrass, intermediate wheatgrass, and crested wheatgrass. The ID team determined that although not dominant, deep-rooted perennial bunchgrasses contribute to diversity and structure and promote ecological processes. Further, these bunchgrasses help to fill

the niche left by the absence of bluebunch wheatgrass. Based on the invasive plants indicator rating, the Biotic Integrity attribute was rated as a “slight to moderate” departure from the ESD reference sheet.

Vegetative cover data were also recorded in other areas of the Northwest Pasture in 2006 (ESI) and 2010 (HAF). The 2006 ESI data and the 2010 HAF data are summarized below in Table 14. Vegetative cover data was collected at multiple layers; however, Table 14 displays only the top layer.

**Table 14: Percent Ground Cover (Top Layer) recorded in 2006 and 2010 in Other Areas of the Northwest Pasture.**

Vegetation Class	Species	Percent Cover	
		2010 HAF Site NW_2	2006 ESI Site TH-47a
Perennial Grasses	Squirreltail	6%	3%
	Sandberg bluegrass	30%	39%
	‘Anatone’ bluebunch wheatgrass	14%	0%
	Sherman big bluegrass	20%	0%
Annual Grasses	Cheatgrass	0%	1%
Perennial Forbs	Longleaf phlox	0%	2%
Annual Forbs	Curveseed butterwort	6%	0%
	Tumblemustard ( <i>Sisymbrium altissimum</i> )	0%	1%
Shrubs	Wyoming Big Sagebrush	0%	24%
	Fourwing saltbrush ( <i>Atriplex canescens</i> )	0%	1%
<b>Vegetation Total</b>		<b>76%</b>	<b>71%</b>
Other Cover	Bare Ground	14%	9%
	Biological soil crust	0%	6%
	Litter in Contact with Soil	10%	3%
	Litter Standing	0%	10%
	Persistent Litter	0%	0%
	Rock or Gravel	0%	1%
<b>Grand Total</b>		<b>100%</b>	<b>100%</b>

Due to differences in sampling locations and methodology (e.g. number of transects per site and number of points per transect) among the 2006 ESI data and the 2010 HAF data, statistical tests cannot be used to analyze vegetative cover across years. However, the data can be used to describe general similarities or differences in vegetation between years or locations within the allotment.

Sandberg bluegrass is the dominant grass species at cover sites applicable to the Northwest Pasture. Wyoming big sagebrush is the dominant shrub species at the ESI site but was not recorded at the HAF site. Biological soil crusts were not recorded at the HAF site and are relatively low at the ESI site. Other than within the small area seeded with ‘Anatone’ bluebunch wheatgrass, the abundance of deep-rooted perennial bunchgrasses is lower than expected within the pasture, as documented in the field notes and vegetative cover data. Curveseed butterwort comprises 6 percent cover at HAF site NW\_2.

**Allotment Summary for Standard 4 (Native Plant Communities):**

The Biotic Integrity Attribute was rated slight to moderate for site NW in the Northwest Pasture of the Cedar Crossing Allotment.

Although not recorded in the cover transect, the 2013 IIRH field notes indicate that Thurber's needlegrass and crested wheatgrass are present at the site. For that reason, the ID Team rated the functional/structural group indicator as a none to slight departure from the ESD reference sheet.

The invasive plant indicator was rated moderate to extreme at IIRH Site NW due to curvseed butterwort being common throughout the site, and cheatgrass being present in some disturbed areas. No other invasive species were observed at the site.

**Evaluation of Standard 4**

IIRH Site NW (Northwest Pasture) was used to evaluate Standard 4. Deep-rooted perennial bunchgrasses, such as bluebunch wheatgrass and Thurber's needlegrass were not recorded in the cover transect. Bluebunch wheatgrass was not observed at the site. The 2013 IIRH field notes, as notes included with the HAF cover data, indicate that Thurber's needlegrass and crested wheatgrass are present at the site, as well as squirreltail and Sandberg bluegrass. Because of this, the ID Team rated the functional/structural group indicator a none to slight departure from the ESD reference sheet based on the presence and observed amounts of Thurber's needlegrass and crested wheatgrass. The native plant community has a high abundance of Sandberg bluegrass and biological soil crusts that are providing soil cover and competition to other vegetation. The native plant communities within the Northwest Pasture are creating litter, minimizing erosion, and protecting the soil. Perennial species that are present within the pasture are productive and capable of reproduction and recruitment of new seedlings. Curvseed butterwort is common throughout the site, and cheatgrass is found in some disturbed areas. No other invasive species were observed. Overall, adequate desirable perennial species and biological soil crusts are present within the native plant community to hinder the spread or establishment of cheatgrass or other invasive or noxious plants.

Data collected in other areas of the pasture showed similar characteristics to the IIRH site such as reduced amounts of deep-rooted perennial bunchgrasses and increased amounts of Sandberg bluegrass. Occurrences of invasive plants such as curvseed butterwort were lower at these sites compared to the IIRH site. Meanwhile, cheatgrass is generally low, or not recorded within the cover transects within the pasture.

***Evaluation Finding – Northwest Pasture is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

Deep-rooted perennial bunchgrasses within the native plant communities of the Northwest Pasture are not the dominant functional/structural group, as described in the ESD reference state. Rather, the native plant communities are dominated by Sandberg bluegrass. This is indicative of a shift in the relative dominance of vegetation functional/structural groups. Declines in deep-

rooted perennial bunchgrasses can result in a modification of nutrient cycling and energy flow due to changes in above and below ground structure. Shallow-rooted perennial grasses generally have a shorter active growth period, smaller root systems, and relatively lower potential to capture and store carbon below ground.

The native plant communities have a high abundance of Sandberg bluegrass and biological soil crusts that are providing soil cover and competition to other vegetation, as documented in the 2006 ESI data and the 2010 HAF cover data. Perennial species that are present within the allotment are productive and capable of reproduction and recruitment of new seedlings. While perennial forbs average only a low percentage of the cover, HAF data (all vegetation layers) indicate an abundant and diverse population of forbs at IIRH site NW.

Curvseed butterwort is common within the native plant community, and cheatgrass is found in some disturbed areas. Invasive species such as curvseed butterwort and cheatgrass 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 native plant communities to hinder further spread or establishment of invasive plants.

Since the 2009 Court Order, the allotment has been grazed in a deferred rotation system outlined each year in an Annual Grazing Agreement. Under the deferred rotation system, each pasture receives spring rest (April through May) from livestock grazing two out of three years. This is a change in management from what was a season-long grazing period beginning April 1 and extending to October, where no rotation occurred and plants were repeatedly grazed during critical growing seasons. Although the relative dominance of deep-rooted perennial bunchgrasses is a departure from the ESD reference sheet, field notes indicate they are present and diverse (2013 IIRH Field Notes, Appendix B) within the native plant communities. Changes in management following the 2009 Court Order are expected to provide for improvement of native vegetation, native animal habitat, and ecological processes (nutrient cycling, hydrologic cycling, and energy flow) in the Northwest Pasture, as well as in the other two pastures of the Cedar Crossing Allotment.

#### **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**

Approximately 1,800 acres in the Cedar Crossing Allotment have been seeded with either non-native grass species or native cultivars. In the late 1950's, a large area of the allotment was seeded with crested wheatgrass to reduce the hazard of weed infestation and provide forage for livestock ( $\approx$ 1,529 acres). In addition, a small area of the allotment burned in the 2007 Roseworth wildfire (272 acres) and approximately 261 acres were subsequently seeded with Anatone bluebunch wheatgrass, Sherman big bluegrass, Munro's Globemallow (*Sphaeralcea munroana*), Utah sweetvetch (*Hedysarum boreale*), and Wyoming big sagebrush.

The Northeast and South pastures are evaluated under Standard 5. While less than 50 percent of the Northeast and South pastures are mapped as seeding, more acres in these two pastures have been seeded than shown on the existing Jarbidge Field Office vegetation map (Map 3). Some of the seeded areas were mapped as a native vegetation community (Wyoming big sagebrush/Sandberg bluegrass) because Sandberg bluegrass is the dominant grass by cover.

Two of the four IIRH evaluation sites (NE\_2 and S\_2A) within the Northeast and South Pastures are located in seeded plant communities that are representative of the majority of the pastures. The two remaining IIRH sites (NE\_1 and S\_1) are located in native vegetation communities that are not representative of the majority of the pastures. Vegetative cover data were recorded in 2010 and 2012 following the Line Point Intercept method, as described in the Sage-grouse Habitat Assessment Framework (Stiver et al., 2010) protocol (HAF) at two (NE\_1 and S\_1) of the four IIRH sites within the pastures. Cover data was recorded in 2006 following the Line Point Intercept method as part of Ecological Site Inventories and used to assess site NE\_2. Finally, vegetative cover data was recorded at the remaining IIRH site (S\_2A) in 2013 using the Step Point Method (BLM, 1996). This cover data is summarized below in Table 15. Vegetative cover data was collected at multiple layers; however, Table 15 displays only the top layer. Sandberg bluegrass comprises the highest percent cover across the seeded plant communities, followed by Wyoming big sagebrush, crested wheatgrass, biological soil crusts, and perennial forbs.

**Table 15: Percent Ground Cover (Top Layer) at IIRH Sites**

Vegetation Class	Species	% Cover			
		IIRH Site NE_2 2006 (ESI TH-48a)	IIRH Site S_2A 2013 (Step)	IIRH Site NE_1 2010 (HAF)	IIRH Site S_1 2012 (HAF)
		Seeded Plant Community		Native Plant Community	
Perennial Grasses	Basin wildrye	0%	0%	0%	0.5%
	Bottlebrush squirreltail	0%	0%	1%	3%
	Crested wheatgrass	21%	8%	0%	0%
	Intermediate wheatgrass	0%	0%	1%	0%
	Sandberg bluegrass	33%	16%	20%	25%
	Western wheatgrass	0%	0%	7%	0.5%
Annual Grasses	Cheatgrass	0%	0%	12%	2.5%
Perennial Forbs	Sagebrush phlox	0%	4%	0%	0%
	Granite prickly phlox	0%	0%	0%	0.5%
	Indian paintbrush	0%	2%	0%	0%
	Prickly-leaved phlox	0%	0%	0%	1%
	Meadow deathcamas	0%	0%	0%	0.5%
	Utah sweetvetch	1%	0%	0%	0%
Annual Forbs	Curveseed butterwort	0%	8%	9%	0%
	Groundsmoke	0%	0%	1%	0%
	Slender phlox	0%	0%	1%	0%
Shrubs	Rubber rabbitbrush	0%	0%	8%	0.5%
	Wyoming big sagebrush	14%	18%	5%	20%

Vegetation Class	Species	% Cover			
		IIRH Site NE_2 2006 (ESI TH-48a)	IIRH Site S_2A 2013 (Step)	IIRH Site NE_1 2010 (HAF)	IIRH Site S_1 2012 (HAF)
		Seeded Plant Community		Native Plant Community	
Vegetation Total		70%	56%	65%	54%
Other Cover	Bare Ground	17%	16%	15%	13%
	Biological soil crust	3%	18%	9%	10.5%
	Litter in Contact with Soil	4%	6%	10%	16.5%
	Litter Standing	7%	4%	0%	1%
	Persistent Litter	0%	0%	0%	2%
	Rock or Gravel	0%	0%	1%	3%
Grand Total		100%	100%	100%	100%

\*Other plant species not recorded during cover transects but observed at the evaluation site are listed in Appendix B.

### Northeast Pasture

#### ***IIRH Site NE\_1 (Loamy 10-13")***

IIRH Site NE\_1 is located in a rabbitbrush/Sandberg bluegrass vegetation community that comprises about 14 percent of the Northeast Pasture; and is not representative of the Northeast Pasture. The amount of bare ground (15%) is below the expected range described in the ESD. Biological soil crusts comprise 9 percent of cover, perennial grasses 29 percent, annual grasses 12 percent, and shrubs 13 percent (Table 15).

The indicator for litter amount was rated as a slight to moderate departure from the reference condition due to a slight increase in the amount of litter (27%) found at the site. A soil stability test (TR 1734-6) was completed at the site and the soil stability value averaged 5.5 indicating adequate soil surface resistance to erosion.

The abundance of deep-rooted perennial bunchgrasses was lower than expected as documented in the field notes and HAF cover data; therefore the functional/structural group indicator was rated at slight to moderate departure from reference condition.

Curveseed butterwort was recorded at 9 percent of total cover and was noted as being scattered throughout the site. Cheatgrass was recorded at 12 percent of foliar cover along the 2010 HAF transect. The 2013 IIRH field notes indicated that cheatgrass occurred in disturbed areas. With the combination of Curveseed butterwort being common and cheatgrass found in some disturbed areas, the indicator for invasive plants was rated a moderate departure from the reference condition.

All indicators related to the Biotic Integrity attribute other than Functional/Structural Groups, Litter Amount, and Invasive Plants were rated none to slight. With this, the Biotic Integrity attribute was rated slight to moderate departure from the reference condition.

**Photo 3: May 2013 Overview of IIRH Site NE\_1 (Northeast Pasture)**



***IIRH Site NE\_2 (Loamy 10-13”)***

IIRH Site NE\_2 is located in a seeded vegetation community and is representative of the majority of the Northeast Pasture. Crested wheatgrass is the dominant deep-rooted grass species, Sandberg’s bluegrass is the dominant shallow-rooted grass species, and Wyoming big sagebrush is the dominant shrub species (Photo 4). Though the shallow rooted Sandberg’s bluegrass is dominant over the deeper rooted Crested wheatgrass by cover, 2006 production data demonstrates an inverse relationship. In 2006, Sandberg’s bluegrass produced 89 pounds of biomass, and Crested wheatgrass produced 482 pounds. With this, grass production is above what is expected for this ecological site. Biological soil crusts are also present on the site but of low abundance. Forb density and diversity is also low.

The 2013 IIRH field notes indicate that perennial forb species were present, although they are of low abundance and diversity. Because the abundance of perennial forb species was lower than expected as documented in the field notes and ESI cover data, the functional/structural group indicator was rated at slight to moderate departure from reference condition.

The indicator for litter amount was rated as a slight to moderate departure from the reference condition due to a slight increase in the amount of litter (24%) found at the site.

Curvseed butterwort was not recorded in the top layer cover but was noted during the IIRH as being scattered throughout the site. Cheatgrass or other invasive plants were not found in the top layer cover and were not observed during the 2013 IIRH field visit. The indicator for invasive plants was rated moderate because curvseed butterwort was scattered throughout the site.

All indicators related to the Biotic Integrity attribute other than Functional/Structural Groups, Litter Amount, and Invasive Plants were rated none to slight. With this, the Biotic Integrity attribute was rated slight to moderate departure from the reference condition.

**Photo 4: May 2013 Overview of IIRH Site NE\_2 (Northeast Pasture)**



### **South Pasture**

#### ***IIRH Site S\_1 (Loamy 10-13")***

Site S\_1 is located in a native vegetation community that is not representative of the majority of the South Pasture. Sandberg bluegrass is the dominant grass cover (25% top layer) at the site, and Wyoming big sagebrush is the dominant shrub species (20% top layer). In addition, biological soil crusts comprise 10.5 percent of top layer cover (Table 15). The site is of relatively flat topography with a south aspect and has not burned by wildfire in over 50 years.

The indicator for litter amount was rated as a moderate departure from the reference condition due to a moderate increase in the amount of litter (37%) found at the site.

Curvedseed butterwort was not recorded along the 2012 cover transect but was noted in 2013 as being scattered throughout the site. Cheatgrass was found to be 2.5 percent of cover along the 2012 HAF transect but was not observed at the site in 2013 during the IIRH field visit. The indicator for invasive plants was rated moderate departure from the reference condition due to curvedseed butterwort being scattered throughout the site.

All indicators other than litter amount and invasive plants were rated none to slight departure from the reference condition. Therefore, the Biotic Integrity attribute was rated none to slight departure.

**Photo 5: May 2013 Overview of IIRH Site S\_2 (South Pasture)**



***IIRH Site S\_2A (Loamy 10-13”)***

IIRH Site S\_2A is located in a seeded vegetation community and is representative of the majority of the South Pasture. Crested wheatgrass is the dominant deep-rooted grass species (8% cover), Sandberg bluegrass is the dominant shallow-rooted grass species (16% cover), and Wyoming big sagebrush is the dominant shrub species at 18 percent cover (Photo 6, Table 15). In addition, biological soil crusts comprise 18 percent of the cover.

Curvseed butterwort comprised 8 percent of the cover along the 2012 cover transect and was noted during 2013 IIRH as being scattered throughout the site. Cheatgrass or other invasive plants were not recorded in the 2012 cover transect and were not observed during the 2013 IIRH visit. The indicator for invasive plants was rated a moderate departure from the ESD reference sheet due to curvseed butterwort being scattered throughout the site.

All indicators other than invasive plants were rated none to slight departure from the ESD reference sheet. Therefore, the Biotic Integrity attribute was rated none to slight departure.

**Photo 6: May 2013 Overview of IIRH Site S\_2A (South Pasture)**



**Allotment Summary for Standard 5 (Seedings):**

IIRH sites NE\_2 and S\_2A are representative of the majority of the Northeast and South Pastures. The Biotic Integrity attribute was rated none to slight at sites S\_1 and S\_2A and slight to moderate at sites NE\_1 and NE\_2 (Table 11).

The ID Team rated the functional/structural group indicator as none to slight departure from reference condition at sites S\_1 and S\_2A. However, the functional/structural group indicator was rated a slight to moderate departure at site NE\_1 due to the reduced relative dominance of deep-rooted perennial grasses, and site NE\_2 due to a low abundance and diversity of perennial forbs, as documented in the IIRH field notes and ESI cover data.

The litter amount indicator was rated none to slight at site S\_2A, slight to moderate departure at site NE\_1 and NE\_2, and moderate at site S\_1. Percentages of litter used to evaluate the litter indicator included not only detached litter in contact with soil but also standing litter.

Invasive plants were rated at a moderate departure from the reference condition at all four sites due to bur buttercup being scattered throughout each site. Cheatgrass was noted to occur in disturbed areas at site NE\_1. Cheatgrass or other invasive plants were not observed during the 2013 IIRH field visits at the other three sites.

In 2010, vegetative cover data was also collected on seeded areas at the HAF Study Site (HAF S-2) in the South Pasture. HAF Site S-2 is located in a crested wheatgrass seeding. Vegetative cover measured at this site is shown in Table 16. The data shows the seeded grass species as being the dominant grass. Cheatgrass was not measured at the site.

**Table 16: Percent Ground Cover (Top Layer) at HAF Site S-2 in the South Pasture**

Vegetation Class	Species/Cover Type	% Cover
		South Pasture 2013 HAF S-2 (4686173 N 676902 E)
Perennial Grasses	Bluebunch wheatgrass	0%
	Bottlebrush squirreltail	2%
	Crested wheatgrass	32%
	Sandberg bluegrass	24%
	Sherman big bluegrass	0%
Annual Grasses	Cheatgrass	0%
Perennial Forbs	Longleaf phlox	2%
Annual Forbs	Curveseed butterwort	2%
	Slender phlox	1%
	Yellow salsify	1%
Shrubs	Wyoming Big Sagebrush	1%
Vegetation Total		65%
Other Cover	Bare Ground	16%
	Biological soil crust	0%
	Litter in Contact with Soil	12%
	Litter Standing	2%
	Persistent Litter	5%
	Rock or Gravel	0%
Grand Total		100%

**Evaluation of Standard 5**

Most seeded plant communities within the Northeast and South Pastures have a high abundance of deep-rooted perennial bunchgrass (crested wheatgrass) and shallow-rooted perennial bunchgrass (Sandberg bluegrass), as well as other desirable vegetation that are providing soil protection and resistance to erosion, as shown in the cover data (Tables 15 and 16). The 2013 IIRH field notes, as well as cover data, indicate that the seeded plant communities in these pastures have sufficient plant cover to provide competition to invasive species. Perennial plant species are appropriately productive and capable of reproduction and recruitment of new seedlings. Curveseed butterwort is scattered throughout each site but IIRH field notes do not indicate that any other invasive species and/or noxious weeds were present. Overall, adequate desirable perennial species are present to hinder the spread or establishment of cheatgrass or other invasive or noxious plant species.

**Evaluation Finding – Northeast and South Pastures are:**

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

**Rationale for Evaluation Finding**

The overall diversity of perennial species within the seeded areas of the Cedar Crossing Allotment appears to be maintaining over time. This is demonstrated by the continued presence

and high vigor (2013 IIRH field notes) of both seeded and native plant species in these areas. The 2013 IIRH field notes indicate that several perennial forb species are present within the pastures. However, perennial forbs were of low abundance and diversity in some areas. Cover of perennial forbs ranged from 0 to 6 percent (top layer) across the cover transects conducted in the seeded areas. The ID Team rated the functional/structural group indicator based on both field observations and cover data documenting the presence of deep-rooted perennial bunchgrasses, shrubs, shallow rooted grasses, and perennial forbs. The seeded plant communities have a high amount of Sandberg bluegrass, as well as more desirable deep-rooted species and biological soil crusts that provide both soil cover and competition to invasive species. Perennial species present within the seeded areas are productive and capable of reproduction and recruitment of new seedlings.

The presence of seeded species, such as crested wheatgrass, can result in higher biomass production, resulting in more litter than is described in the ESD reference sheet. Although litter amounts were high in most of the seeded areas, litter is providing cover for site protection and replenishment of nutrients and does not appear to be negatively affecting ecological processes, as shown by adequate soil moisture, as well as plant growth/annual production matching what is expected at each site.

Curveseed butterwort is scattered throughout the seeded plant communities. Cheatgrass was noted to occur within disturbed areas in the small native plant community (site NE\_1) in the Northeast Pasture; however, this area is not representative of the pasture. No other invasive plants or noxious weed species were noted in the Northeast or South Pastures. Invasive species such as curveseed butterwort and cheatgrass can become a threat to biotic integrity following large scale disturbances such as wildfire. However, adequate desirable perennial species and ground cover are present in the seeded plant communities to hinder the spread or establishment of invasive or noxious plant species.

The seeded vegetation communities within the Northeast and South pastures of the Cedar Crossing Allotment are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle. Current management is expected to provide for maintenance of seeded vegetation, native animal habitat, and ecological processes (nutrient cycling, hydrologic cycling, and energy flow) within the seeded plant communities.

**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 Crossing Allotment are dominated by native and seeded non-native species. 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.*

**South Pasture:**

X Standard Doesn't Apply

No water quality assessments have been completed within the pasture, and beneficial uses have not been designated (IDEQ 2014). No intermittent or perennial water bodies are present within the pasture. Standard 7 does not apply to the pasture.

**Northwest and Northeast Pastures:**

**Rangeland Health Assessment**

Cedar Creek forms the north/northeast boundary of the Cedar Crossing Allotment (Northwest and Northeast Pastures). The stream reach bordering this allotment is downstream of Cedar Creek Reservoir (also known as Roseworth Reservoir) and a diversion and siphon which remove the entirety of the flow released from the reservoir. Due to the nearly year-round dewatering of Cedar Creek below the diversion, obligate wetland vegetation species do not occur along the stream reach. Vegetation along the stream is primarily composed of upland species. Cedar Creek within the allotment does not contain streamflows capable of supporting aquatic life.

The only water body supporting riparian vegetation within the allotment is the Cedar Mesa Canal which winds through the southern part of the Northeast and Northwest pastures and the northwestern part of the South Pasture. The Cedar Mesa Canal is artificially maintained.

**Evaluation of Standard 7**

Intermittent streams, perennial streams, springs or wetlands are not present within the Cedar Crossing Allotment. The only water body within the allotment is the Cedar Mesa Canal.

Cedar Creek borders the Northwest and Northeast pastures of the allotment and is within Idaho Department of Environmental Quality (IDEQ) water quality Assessment Unit (AU) ID17040213SK000\_04 (IDEQ 2014). Therefore, Standard 7 applies to these two pastures of the allotment. Designated beneficial uses for this AU are cold water aquatic life, primary contact recreation, and secondary contact recreation (IDEQ 2014). This AU is listed as not supporting the cold water aquatic life beneficial use due to sedimentation/siltation, elevated water temperature, and flow regime alterations (IDEQ 2014). The AU has not been assessed to determine if it is supporting the beneficial uses of primary and secondary contact recreation.

The AU was removed from the 303(d) list (Category 5) of water quality impaired streams for water temperature and sedimentation/siltation after the Environmental Protection Agency's (EPA) approval of the Salmon Falls Sub-basin Assessment and Total Maximum Daily Loads (TMDL) (IDEQ 2008). The AU is included in the IDEQ 2012 Integrated Report (IDEQ 2014) as a Category 4a stream (i.e., stream with an EPA approved TMDL). Cedar Creek, where it borders the Cedar Crossing Allotment, is in the same AU as Cedar Creek upstream of the siphon. Upstream of the siphon, Cedar Creek only contains water when it is released from Cedar Creek Reservoir. The reach of Cedar Creek that borders the allotment is functioning as an ephemeral stream as it is downstream of the siphon which removes the entire flow released from Cedar Creek Reservoir.

***Evaluation Finding – Northwest and Northeast Pastures are:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

Standard 7 is not being met in the Northwest and Northeast Pastures, where Cedar Creek borders the allotment. The IDEQ identifies this reach of Cedar Creek as not supporting the designated beneficial use of cold water aquatic life due to sedimentation/siltation, water temperature, and flow regime alterations (IDEQ 2014). Therefore, Cedar Creek is not meeting Standard 7 in this area even though it is dewatered at the siphon upstream of the allotment for use on private lands. Due to this dewatering, Cedar Creek is not capable of supporting the designated beneficial use of cold water aquatic life.

**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.*

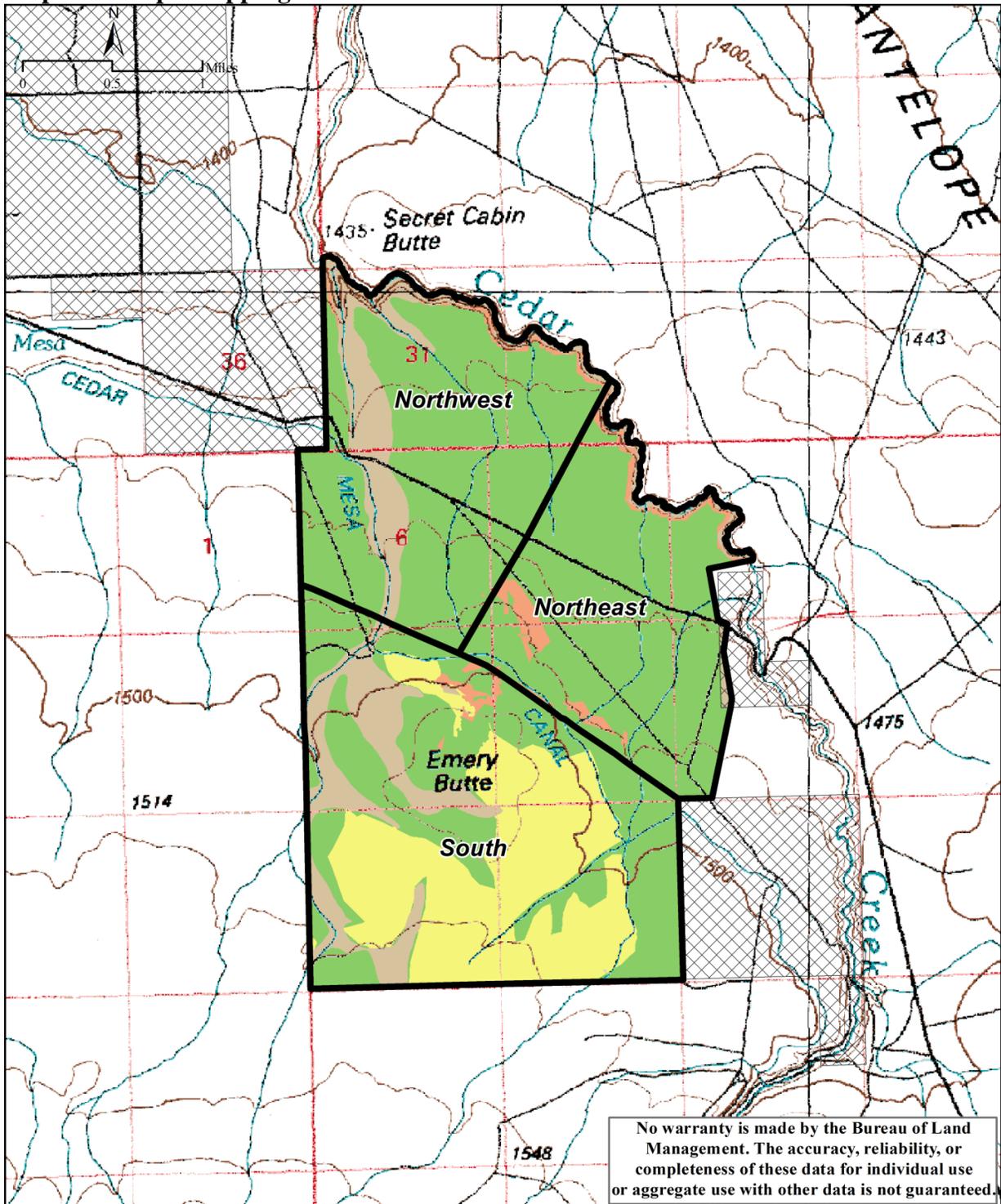
**Rangeland Health Assessment**

**Plants**

There are no known BLM sensitive plants in 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 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 Crossing Allotment contains 4,279 acres (86% of allotment) of potential slickspot peppergrass habitat (Map 7). 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 3,213 acres of high potential, 109 acres of medium potential, 956 acres of low potential, and 685 acres of non-habitat for slickspot peppergrass (Table 17). The nearest known occupied habitat for slickspot peppergrass is 19 miles to the west, on the west side of Clover Creek.

**Map 7: Slickspot Peppergrass Potential Habitat**



**Table 17: Slickspot Peppergrass Potential Habitat (Acres)**

<b>Pasture</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Non-habitat</b>
Northeast	1,084	70	0	48
Northwest	1,204	19	0	301
South	926	21	956	336

### **Animals**

The presence of sensitive wildlife species is primarily based on incidental observations by BLM personnel and data entered into the Idaho Natural Heritage Center database by other individuals. Species found on the Cedar Crossing Allotment are discussed below.

BLM sensitive or federally listed fish or aquatic invertebrates or their habitats do not occur in 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 such as 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 the 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 Crossing Allotment contains 4,045 acres mapped as sagebrush (82% of the allotment, (Map 8). Sagebrush occurs in the Northeast Pasture (925 acres, 77% of pasture), Northwest Pasture (1,351 acres, 88% of pasture), and the South Pasture (1,769 acres, 79% of pasture). Sage-grouse have been observed in the adjoining allotments year round. Sage-grouse habitat extends from the Cedar Crossing Allotment into the Antelope Springs and Cedar Canyon Field Allotments to the East, the Cedar Butte Eastside Allotment to the North, and the Cedar Creek Canyon and Conover Allotments to the South (Map 8).

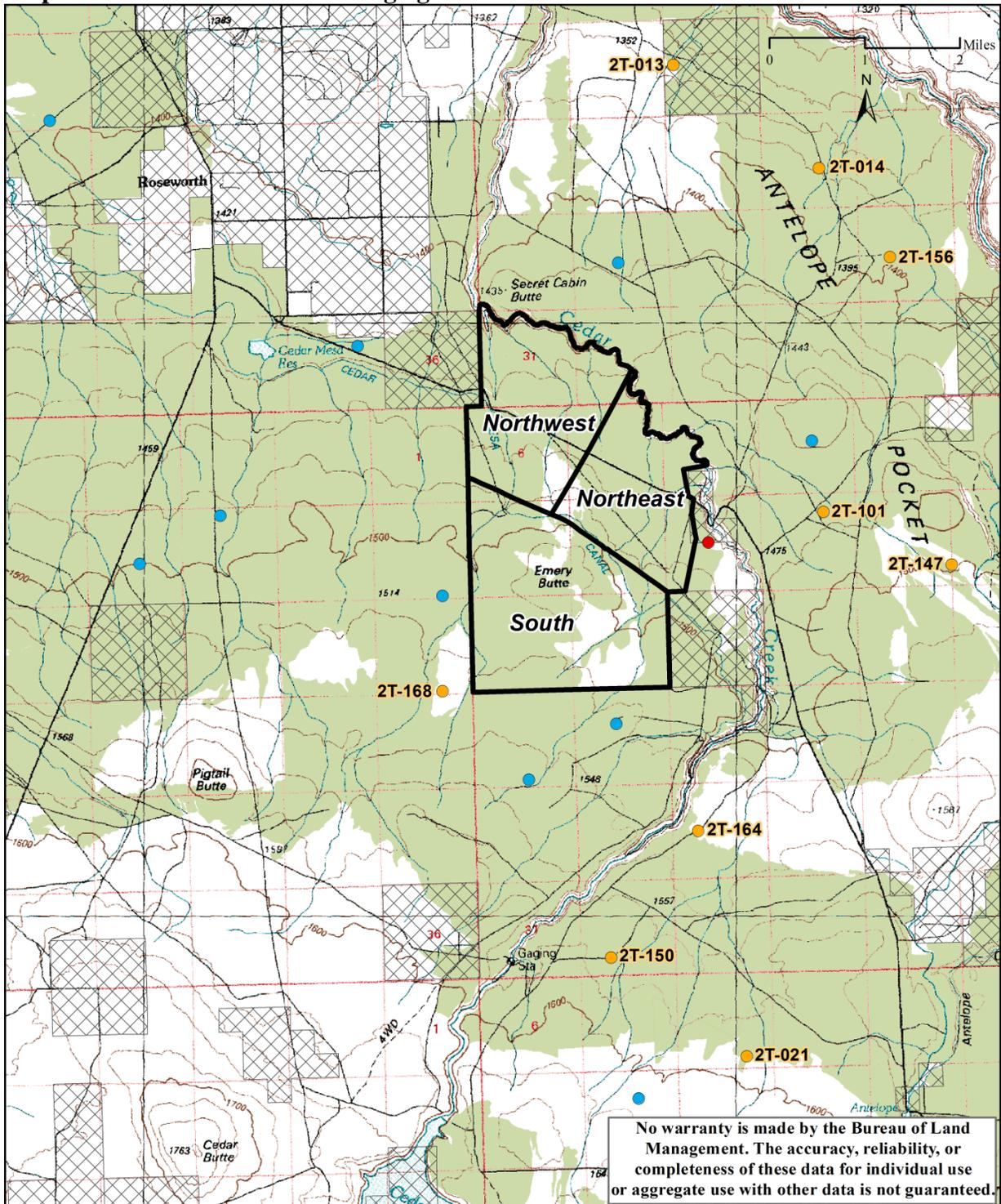
No sage-grouse leks occur in the allotment; however, sage-grouse hens from leks outside the allotment use the area for nesting. Within five miles of the allotment there are 9 occupied, 10 undetermined (due to a lack of recent surveys), and 1 unoccupied sage-grouse leks (Map 8). Lek 2T-147 was not known to occur until 2009, at which time data collection started to occur. Sage-grouse attendance at occupied leks within 5 miles of the allotment is shown in Table 18. 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 Crossing Allotment, 2000-2014.**

Lek	Location	Survey Year <sup>1</sup>														
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
2T-168	0.3 mile W	16	--	--	--	--	--	--	--	--	--	--	--	--	--	4
2T-101	1.1 mile E	17	7	8	8	0	13	18	30	18	17	0	15	8	11	10
2T-164	1.5 miles S	4	--	4	--	0	3	4	1	0	0	2	0	0	0	0
2T-147	2.1 miles E										12	--	--	7	5	--
2T-150	2.8 miles S	13	13	10	3	0	3	8	3	4	5	6	4	15	7	6
2T-014	2.9 miles NE	--	--	--	--	--	--	--	--	0	--	--	--	2	--	--
2T-013	3.0 miles N	--	--	--	--	--	--	0	--	0	--	--	--	0	--	14
2T-156	3.0 miles NE	19	21	10	11	0	22	40	10	25	23	10	22	25	22	27
2T-021	3.9 miles S	--	--	9	13	15	22	16	12	8	8	7	13	10	15	11

<sup>1</sup>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 (\*).

**Map 8: Shrubland Habitat and Sage-grouse Leks**



*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 2010 at HAF Sites NE\_1- Northeast Pasture, NW and NW\_2- Northwest Pasture. Assessments were conducted in 2012 at HAF Site S\_1- South Pasture and in 2013 at HAF Site S\_2- South Pasture. Locations of HAF sites are shown in Map 9.

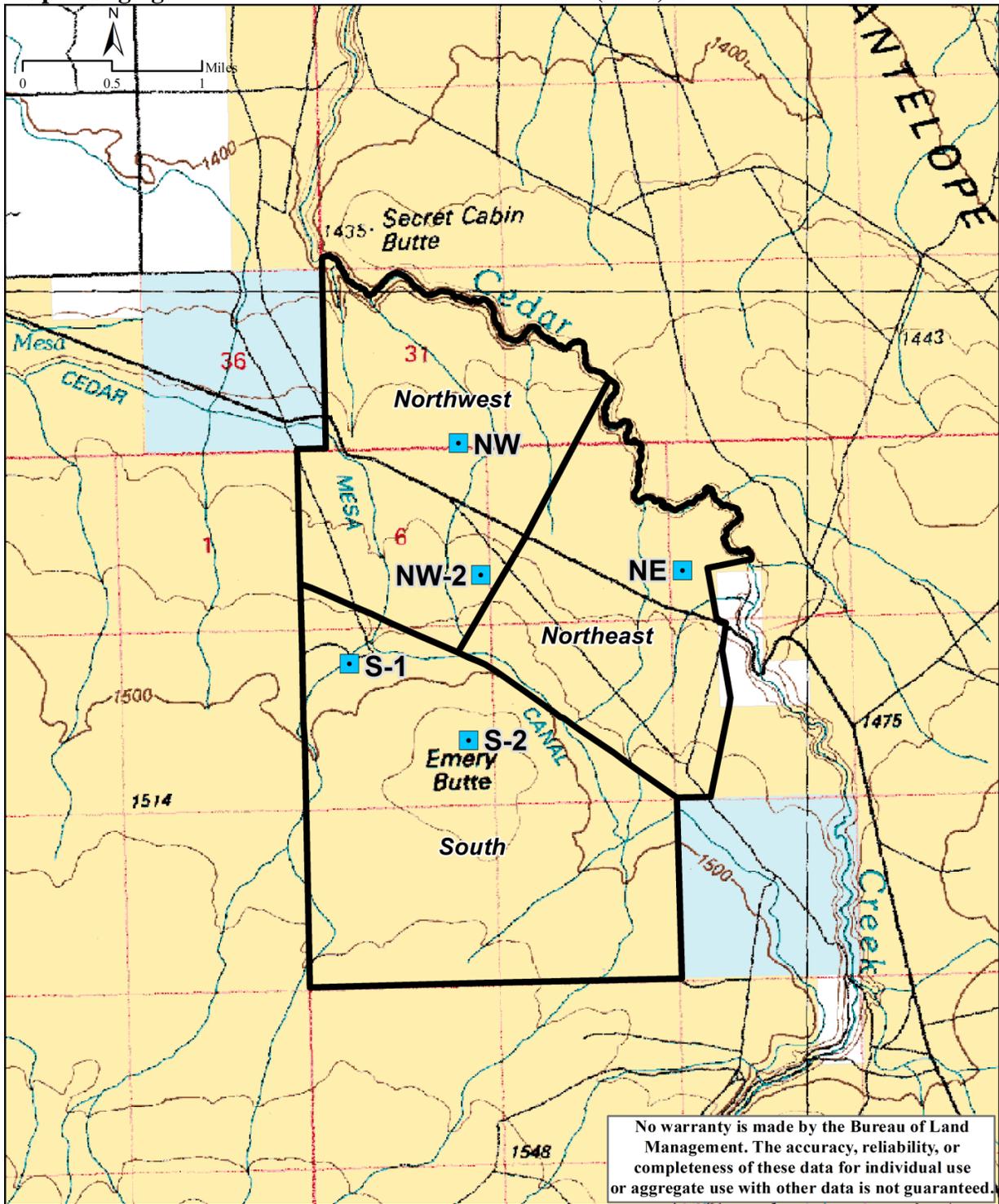
HAF Sites NW\_2 and S\_2 are within the area that burned in the Roseworth Fire of 2007 (272 acres burned). The area has been reseeded to sagebrush. Sagebrush seedlings were observed at low densities during the assessments. The low density and small size of sagebrush makes the burned area currently unsuitable for sage-grouse. However, sagebrush is increasing in the area.

Sage-grouse droppings were observed during the assessments at HAF sites NW and S\_2; however, no sign of sage-grouse was observed at HAF Sites NE, NW\_2, and S\_1. Sage-grouse habitat suitability assessments are not necessarily an indication of rangeland health; but are 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.

**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	<b>15 – 25%</b>	<b>10 - &lt; 15% or &gt; 25%</b>	<b>&lt; 10%</b>
	NW (20%), S_1 (20%)	NE_1 (5% sagebrush and 7% rubber rabbitbrush)	NW_2 (0%), S_2 (1%)
Average Sagebrush Height	<b>12 - 30"</b>	<b>10 -11" or &gt;30"</b>	<b>&lt; 10"</b>
	NE_1 (24"), NW (19"), S_1 (24"), S_2 (13")		NW_2 (0%)
Sagebrush Growth Form	<b>Spreading</b>	<b>Mix of spreading and columnar</b>	<b>Columnar</b>
	S_2	NE_1, NW	NW_2, S_1
Average Grass Height	<b>≥ 7"</b>	<b>5 - &lt; 7"</b>	<b>&lt; 5"</b>
	NE_1 (8"), NW (10"), NW_2 (13"), S_2 (11")		S_1 (3.1")
Average Perennial Grass Canopy Cover	<b>≥ 10%</b>	<b>5 - &lt; 10%</b>	<b>&lt; 5%</b>
	NE_1 (30%), NW (35%), NW_2 (34%), S_1 (44%), S_2 (78%)		
Average Forb Canopy Cover	<b>≥ 5%</b>	<b>3 - &lt; 5%</b>	<b>&lt; 3%</b>
	S_2 (8%)	NE_1 (3%), S_1 (4%)	NW (2%), NW_2 (0%)
Preferred Forb Diversity and Abundance	<b>Forbs common with at least a few preferred species common</b>	<b>Forbs common, but only 1 or 2 preferred species present</b>	<b>Forbs rare to sparsely present</b>
	NW, S_1, S_2	NE_1	NW_2
<b>Overall Site Evaluation Rating</b>	<b>NW</b>	<b>NE_1, S_1</b>	<b>NW_2, S_2</b>
<b>Pasture Evaluation Rating</b>	<b>Northwest</b>	<b>Northeast, South</b>	

**Map 9: Sage-grouse Habitat Assessment Framework (HAF) Sites**



Two HAF sites are located in the Northwest Pasture. HAF Site NW is in the Wyoming sagebrush/Sandberg bluegrass vegetation community. The other site, HAF Site NW\_2 is located on a 2007 burned area that was seeded to native cultivars. Attributes at HAF Site NW were rated suitable for all habitat indicators except for sagebrush growth form (marginal) and average forb canopy cover (unsuitable). Although average forb canopy cover was unsuitable, the site was rated suitable for preferred forb abundance and diversity with 19 species of forbs observed. The most common species included spiny phlox, sagebrush phlox, and shaggy fleabane (*Erigeron pumilus*) all sage-grouse preferred forbs. Indicators at HAF Site NW\_2 were all rated as unsuitable except for grass height and cover (suitable). Forbs were rare to sparsely present at the site, with only 10 forb species being noted. The absence of adequate sagebrush was expected since the area recently burned and shrubs have yet to fully reestablish. The Northwest Pasture provides suitable habitat for sage-grouse across the vast majority of the pasture.

One HAF site is in the Northeast Pasture (HAF Site NE). This site is located on the rabbitbrush/Sandberg bluegrass vegetation community. Grass indicators are suitable at the site. The indicators for sagebrush and forbs were rated marginal, except for average sagebrush height (suitable). Sixteen forb species were noted with the most common forbs being sagebrush phlox, spiny phlox, and longleaf phlox. The Northeast Pasture provides marginal habitat for sage-grouse largely due to sagebrush and forb indicators being marginal.

The South Pasture contains two HAF sites. HAF Site S\_1 is in the Wyoming sagebrush/Sandberg bluegrass vegetation community and S\_2 is in a crested wheatgrass seeding. Average shrub canopy cover and height are suitable at HAF Site S\_1. Sagebrush growth form and grass height were rated as unsuitable. Forb canopy cover and abundance is marginal. There were 9 species of forbs observed, including longleaf phlox and Nevada onion (*Allium nevadense*). At HAF Site S\_2 all of the indicators except for sagebrush canopy cover are rated as suitable. Sagebrush canopy is unsuitable providing only 1 percent of the canopy cover. Since sage-grouse rely heavily on sagebrush during their life history, this site was rated unsuitable. The native vegetation is marginal for sage-grouse habitat in the South Pasture.

A list of plants species observed at each site, including preferred sage-grouse forbs is included in Appendix A. A photo of HAF Site S\_1 is shown in Photo 11.

The photo shows suitable sagebrush cover and height with junipers in the background along the Cedar Mesa Canal. Average grass height was 3.1” which is below the  $\geq 7$ ” recommendation. The photo was taken after the peak of forbs had flowered.

**Photo 7: June 2012 Overview of HAF Site S\_1.**



#### *Late Brood Rearing Habitat*

The Cedar Mesa Canal runs through all three of the pastures (1.2 miles in the Northwest, 1.8 in the South, and 0.7 in the Northeast pastures, respectively). Water is present in the canal from April into October annually. The canal provides water to wildlife in the allotment. The canal also provides some late brood rearing habitat for sage-grouse. Seep areas along the canal contain a higher abundance of preferred sage-grouse forbs such as dandelion (*Taraxacum officinale*), prostrate knotweed (*Polygonum 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 (*Poa pratensis*). 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 majority of the Russian olives and junipers are in the Northwest Pasture. The presence and abundance of these trees along the canal may limit sage-grouse use along the canal.

#### *Winter Habitat*

Shrub height (13-24") and cover (near 20%) 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.

Ferruginous hawks prey primarily on mammals. Prey species include ground squirrel (*Urocitellus* spp.), black-tailed jackrabbit (*Lepus californicus*), mountain cottontail (*Sylvilagus nuttalli*), and 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 is a ferruginous hawk nest in a juniper that is <0.1 mile from the allotment (Table 20). Juniper and Russian olive trees along the Cedar Mesa Canal were surveyed for raptor nests in the mid-1990s but none were identified. No surveys have been conducted since, but it's probable that raptors are nesting in trees along the canal.

**Table 20: Ferruginous Hawk Nest Data.**

Nest	Survey Year <sup>1</sup>																		
	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13
F15	I	--	--	--	--	--	I	1	--	--	--	--	I	--	I	--	I	I	--

<sup>1</sup>Surveys were not conducted in years indicated by dashes (--). If the nest was active with young, the number of young was recorded, if the nest was inactive (I) or active (A) with no young that was also recorded.

At this time few nest trees are available for use by ferruginous hawks for nesting in the Northeast and South pastures (approximately 20 trees in each pasture mostly concentrated near the canal). The Northwest Pasture has numerous junipers concentrated along a 1.9 mile draw near the west side of the pasture. Large areas in all pastures of the allotment are 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 sparrows nest 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 (*Chrysothamnus viscidiflorus*) (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 in the Cedar Crossing 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 nest 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 (*Juniperus occidentalis*).

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. At this time shrub heights as well as scattered juniper in all pastures are suitable for loggerhead shrike nesting.

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 sparrows nest in shrubs, in 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 sagebrush portions of 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). Approximately 100 acres of the allotment has been surveyed for pygmy rabbits. Surveys have been conducted in the northwestern portion of the Northwest Pasture but no pygmy rabbit sign was observed. Pygmy rabbits are potentially present in the allotment. Pygmy rabbits have been observed in the past approximately 4 miles west of the Cedar Crossing Allotment. Due to past vegetation treatments, portions of each pasture within the allotment lack the sagebrush density preferred by pygmy rabbits. However, areas of suitable habitat remain. The vegetation map does not reflect habitat suitability or some of the historic seedings. The area in the Northeast, Northwest and South pastures that burned in the Roseworth Fire of 2007 are currently unsuitable for pygmy rabbit.

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 Northeast and Northwest pastures. No cliff habitat is present in the South Pasture. Spotted bats may forage over the allotment and drink and forage along the canal. Spotted bats have been observed approximately 2.6 miles east of the allotment.

**Evaluation of Standard 8 (Threatened, Endangered and BLM Sensitive Plants and Animals):**

**Plants**

There is no known BLM Sensitive or Federally listed plants within the Cedar Crossing Allotment. However, systematic inventories for special status plants have not been conducted in the allotment. GIS modeling predicts that the allotment contains 3,213 acres of high potential, 109 acres of medium potential, and 956 acres of low potential habitat for slickspot peppergrass. The nearest known occupied habitat for slickspot peppergrass is 19 miles away, on the west side of Clover Creek.

**Animals**

BLM sensitive or federally listed fish or aquatic invertebrates or their habitats do not occur in the Cedar Crossing Allotment.

Habitat for BLM sensitive wildlife species occurs in the allotment. Overall habitat ratings for each species by pasture are shown in Table 21.

**Table 21: Overall Habitat Suitability Summary for BLM Sensitive Wildlife Species by Pasture**

<b>Species Name and Type of Habitat</b>	<b>Northeast</b>	<b>Northwest</b>	<b>South</b>
Sage-grouse (nesting & early brood rearing)	M	S	M
(late brood rearing)	S	S	S
(winter)	S	S	S
Ferruginous hawk (nesting)	S	S	S
(foraging)	S	S	S
Brewer’s sparrow (nesting)	S	S	S
Sagebrush sparrow (nesting)	S	S	S
Loggerhead shrike (nesting)	S	S	S
Pygmy rabbit (year round)	M	M	M
Piute ground squirrel (year round)	S	S	S
Spotted bat (roosting)	S	S	U
(foraging)	S	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 to marginal in all pastures due to favorable shrub height, shrub cover, shrub growth form, residual herbaceous height and cover, and abundance and diversity of sage-grouse preferred forbs. The riparian vegetation along the Cedar Mesa Canal offers some late brood habitat for sage-grouse. Sagebrush heights and cover provide suitable winter habitat for sage-grouse. There are some areas within the allotment such as the area burned in the 2007 Roseworth Fire, where sagebrush cover is unsuitable, but sagebrush is established and increasing.

More than an adequate number of potential nest trees are present for ferruginous hawk nesting in all pastures. All pastures contain habitat that supports prey species such as mountain cottontail, black-tailed jackrabbit and ground squirrels usually hunted by ferruginous hawk. Cliffs are

lacking in the South Pasture which resulted in it being rated unsuitable for prairie falcon nesting. All pastures were rated suitable for prairie falcon foraging.

Shrub height and cover is suitable for Brewer's sparrow, sagebrush sparrow, and loggerhead shrike nesting in all pastures. However, the area burned in all pastures in the 2007 Roseworth Fire generally lacks suitable shrub height and density at this time. The burned area is only a small part of each pasture.

Pygmy rabbit habitat was rated as marginal in all pastures. Grassland areas lack both shrub cover and height favored by pygmy rabbit burrow areas. Although sagebrush has increased in the areas treated in the 1960s, shrub density is not adequate in most of the treated area to support pygmy rabbit. Relic native sagebrush steppe has both the density and height for pygmy rabbit burrows. However, the relic areas are generally less than half the pastures.

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 Northeast and Northwest pastures due to cliffs being present at the northern edge of both pastures. The South Pasture was rated unsuitable because it lacks cliffs for roosting. The sagebrush habitat provides adequate insect diversity and abundance for spotted bat foraging. The canal provides a water source for spotted bats in all pastures.

***Evaluation Finding –Allotment (Northwest, Northeast, and South Pastures) is:***

- Meeting the Standard
- Not meeting the Standard, but making significant progress towards meeting
- Not meeting the Standard

***Rationale for Evaluation Finding***

The Northeast, Northwest, and South Pastures are almost entirely vegetated by sagebrush that provides habitat for sage-grouse and other sagebrush dependent species. Sage-grouse nesting and early brood rearing habitat is suitable to marginal in all pastures due to favorable shrub height, shrub cover, shrub growth form, residual herbaceous height and cover, and abundance and diversity of sage-grouse preferred forbs. There are some areas within the allotment such as the area burned in the 2007 Roseworth Fire, where sagebrush cover is unsuitable, but sagebrush is established and increasing.

Overall, pastures in the Cedar Crossing Allotment provide suitable to marginal habitat for special status species. Therefore, the Northeast, Northwest, and South Pastures are meeting Standard 8.

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**APPENDIX A: PLANT LIST (ACCUMULATED DURING UPLAND ASSESSMENTS)**

Scientific Name	Common Name	Species Type	Site(s) where species occurred
<b>Perennial Grasses</b>			
<i>Achnatherum thurberianum</i>	Thurber's needlegrass	Native	NE_1, NW, S_1
<i>Agropyron cristatum</i>	Crested wheatgrass	Exotic, Seeded	NE_1, NW, NW_2, S_2
<i>Elymus elymoides</i>	Squirreltail	Native	NE_1, NW, NW_2, S_1, S_2
<i>Leymus cinereus</i>	Basin wildrye	Native	S_1
<i>Pascopyrum smithii</i>	Western wheatgrass	Native	NE_1
<i>Poa ampla</i>	Sherman big bluegrass	Native	NW_2
<i>Poa secunda</i>	Sandberg bluegrass	Native	NE_1, NW, NW_2, S_1, S_2
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Native, Seeded	NE_1, NW_2
<i>Thinopyrum intermedium</i>	Intermediate wheatgrass	Exotic, Seeded	NE_1, NW
<b>Annual Grasses</b>			
<i>Bromus tectorum</i>	Cheatgrass	Exotic, Invasive	NE_1, NW, NW_2, S_1
<b>Perennial Forbs</b>			
<i>Allium acuminatum</i>	Tapertip onion	Native	NE_1
<i>Allium nevadense</i>	Nevada onion	Native	NE_1, NW, S_2
<i>Antennaria dimorpha</i>	Low pussytoes	Native, Sage-grouse Preferred	NE_1, NW
<i>Antennaria rosea</i>	Rosy pussytoes	Native, Sage-grouse Preferred	S_2
<i>Astragalus agrestis</i>	Purple milkvetch	Native	S_2
<i>Astragalus atratus</i>	Mourning milkvetch	Native	S_1, S_2
<i>Astragalus lentiginosus</i>	Freckled milkvetch	Native	NW, NW_2, S_1
<i>Astragalus purshii</i>	Woollypod milkvetch	Native	NE_1, NW, NW_2
<i>Balsamorhiza hookeri</i>	Hooker's balsamroot	Native	NE_1, NW_2
<i>Castilleja angustifolia</i>	Northwestern Indian paintbrush	Native	NW, S_1, S_2
<i>Crepis acuminata</i>	Tapertip hawksbeard	Native, Sage-grouse Preferred	NW, S_2
<i>Crepis atribarba</i>	Slender hawksbeard	Native, Sage-grouse Preferred	NW_2
<i>Cryptantha interrupta</i>	Elko cryptantha	Native	NW
<i>Delphinium andersonii</i>	Anderson's larkspur	Native	NE_1
<i>Erigeron pumilus</i>	Shaggy fleabane	Native, Sage-grouse Preferred	NE, NW, NW_2, S_1, S_2
<i>Linathus pungens</i>	Granite prickly phlox	Native	S_1
<i>Linum lewisii</i>	Lewis flax	Native	NW_2
<i>Lomatium foeniculaceum</i>	Desert biscuitroot	Native, Sage-grouse Preferred	NE_1, NW, NW_2, S_2
<i>Medicago sativa</i>	Alfalfa	Exotic, Sage-grouse Preferred	NW_2
<i>Onobrychis viciifolia</i>	Sainfoin	Exotic, Sage-grouse Preferred	NW_2

Scientific Name	Common Name	Species Type	Site(s) where species occurred
<i>Penstemon</i> spp.	Penstemon	Native	NW, NW_2
<i>Phlox aculeata</i>	Sagebrush phlox	Native, Sage-grouse Preferred	NE_1, NW, NW_2, S_1, S_2
<i>Phlox hoodii</i>	Spiny phlox	Native, Sage-grouse Preferred	NE_1, NW, NW_2, S_1, S_2
<i>Phlox longifolia</i>	Longleaf phlox	Native, Sage-grouse Preferred	NE_1, NW, S_1, S_2
<i>Physaria geyeri</i>	Geyer's twinpod	Native	NW, NW_2
<i>Ranunculus glaberrimus</i>	Sagebrush buttercup	Native	NE_1
<i>Sphaeralcea</i> spp.	Globemallow	Native	NW_2
<i>Taraxacum officinale</i>	Common dandelion	Exotic, Sage-grouse Preferred	NE_1, NW, NW_2
<i>Tragopogon dubius</i>	Yellow salsify	Exotic, Sage-grouse Preferred	NE_1, S_2
<i>Zigadenus</i> spp.	Meadow deathcamas	Native	NE_1, NW, S_1
Annual Forbs			
<i>Agoseris glauca</i>	Pale agoseris	Native, Sage-grouse Preferred	NW, NW_2
<i>Ceratocephala testiculata</i>	Curveseed butterwort	Exotic	NE_1, NW, NW_2, S_1, S_2
<i>Collinsia parviflora</i>	Maiden blue eyed Mary	Native	NE_1, S_2
<i>Descurainia pinnata</i>	Western tansymustard	Native	NW_2
<i>Descurainia incana</i>	Mountain tansymustard	Native	NE_1, NW, NW_2
<i>Draba verna</i>	Spring draba	Exotic	NE_1, NW
<i>Gayophytum</i> spp.	Groundsmoke	Native	NE_1
<i>Lepidium perfoliatum</i>	Clasping pepperweed	Exotic	NE_1, NW_2
<i>Microsteris gracilis</i>	Slender phlox	Native, Sage-grouse Preferred	NE_1, NW, S_2
<i>Townsendia florifera</i>	Showy townsend daisy	Native, Sage-grouse Preferred	NW
Shrubs			
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming big sagebrush	Native	NE_1, NW, NW_2, S_1, S_2
<i>Chrysothamnus viscidiflorus</i>	Yellow rabbitbrush	Native	NW
<i>Ericameria nauseosa</i>	Rubber rabbitbrush	Native	NE_1, NW, S_1

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

## **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: shrublands, 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 shrublands 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.