

United States Department of the Interior  
Bureau of Land Management

---

**RANGELAND HEALTH ASSESSMENT AND EVALUATION REPORT**

**CLOVER CROSSING ALLOTMENT #01136  
ECHO CLOVER ALLOTMENT #00341**

October 16, 2015

---

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



DRAFT

This page intentionally left blank.

## TABLE OF CONTENTS

<b>Allotment Information</b> .....	<b>1</b>
<b>Current Permitted Livestock Grazing Use</b> .....	<b>1</b>
<b>Allotment Profile</b> .....	<b>3</b>
Climate.....	3
Grazing Management.....	4
Vegetation.....	11
Noxious Weeds.....	17
<b>Idaho Rangeland Health Standards Assessment</b> .....	<b>19</b>
Standard 1 (Watersheds).....	26
Rangeland Health Assessment.....	26
Evaluation of Standard 1.....	31
Standard 2 (Riparian Areas & Wetlands).....	32
Evaluation of Standard 2.....	34
Standard 3 (Stream Channel/Floodplain).....	36
Evaluation of Standard 3.....	37
Standard 4 (Native Plant Communities).....	40
Rangeland Health Assessment.....	40
Evaluation of Standard 4.....	44
Standard 5 (Seedings).....	46
Rangeland Health Assessment.....	46
Evaluation of Standard 5.....	56
Standard 6 (Exotic Plant Communities, Other than Seedings).....	58
Standard 7 (Water Quality).....	59
Evaluation of Standard 7.....	59
Standard 8 (Threatened, Endangered and BLM Sensitive Plants and Animals).....	60
Rangeland Health Assessment.....	60
Evaluation of Standard 8.....	75
<b>Literature Cited</b> .....	<b>79</b>
<b>Appendix A: Process for Generating Sage-grouse Habitat Assessment Framework Sample Sites</b> .....	<b>83</b>
<b>Appendix B: Species List Accumulated During Upland Assessments</b> .....	<b>84</b>

## LIST OF TABLES

Table 1: Allotment acres .....	1
Table 2: Assessment participants.....	1
Table 3: Acreage by pasture and ownership in the Clover Crossing Allotment.....	4
Table 4: Acreage by pasture and ownership in the Echo Clover Allotment.....	4
Table 5. Actual Grazing Use and Percent Utilization by Pasture Since 2005. ....	6
Table 6: Actual Use and Utilization Summary for 2005 through 2013 .....	8
Table 7. Fire Frequency by Pasture from 1993 to 2012. ....	13
Table 8. Vegetation Communities in Acres and Percentage by Pasture.....	15
Table 9. Summary of 2002 and 2003 Production Data.....	16
Table 10. Applicable Standards by Pasture. ....	19
Table 11: Summary of 17 Rangeland Health Indicators.....	23
Table 12: Rangeland Health Attribute Rating by Site .....	25
Table 13: Percent ground cover (top layer) at IIRH sites .....	27
Table 14. PFC Assessment Ratings by Stream Reach and Year. ....	33
Table 15. Livestock Use Indicator Data Collected at DMAs .....	33
Table 16. Vegetation Items from PFC Assessments in the Clover Crossing, School Section and West Side Pastures.....	34
Table 17. Vegetation Items Ratings from the South Bridge Field Pasture.....	35
Table 18. Hydrology and Erosion/Deposition Item Ratings from the Clover Crossing, School Section and West Side Pastures. ....	37
Table 19. Hydrology and Erosion/Deposition Item Ratings from the South Bridge Field Pasture. ....	38
Table 20. Percent Cover (Top Layer) at IIRH sites .....	40
Table 21. Percent Cover (Top Layer) at Additional Site.....	41
Table 22: Percent Cover (Top Layer) at IIRH sites.....	49
Table 23. Percent ground cover (top layer) recorded in 2002, 2012, and 2013 in other areas of the Echo Clover Allotment and the Clover and North Bridge Field Pastures. ....	50
Table 24. Slickspot Peppergrass Potential Habitat (Acres) in the Clover Crossing Allotment....	61
Table 25. Sage-grouse Attendance at Occupied Leks within Five Miles of the Clover Crossing and Echo Clover Allotments, 2000-2014.....	66
Table 26. Sage-grouse Habitat Assessment Worksheet for Nesting and Early Brood Rearing Habitat (Arid Site).....	68
Table 27. Ferruginous Hawk Nest Data.....	71

Table 28. Overall Habitat Suitability for BLM Sensitive Wildlife Species by Pasture..... 76

**LIST OF FIGURES**

Figure 1: Annual Precipitation (2004 – 2013) at the Horse Butte RAWS Station ..... 3  
 Figure 2: Annual Spring Temperatures (2004 – 2013) at the Horse Butte RAWS Station..... 4

**LIST OF MAPS**

Map 1. Allotment Vicinity ..... 2  
 Map 2. Range Infrastructures and Key Utilization Sites ..... 10  
 Map 3. Vegetation Communities and Production and/or Cover Plots..... 12  
 Map 4. Fire Frequency ..... 14  
 Map 5. Noxious Weed Management ..... 18  
 Map 6. Interpreting Indicators of Rangeland Health (IIRH) Sites..... 21  
 Map 7. Slickspot Peppergrass Potential Habitat and Area Surveyed ..... 62  
 Map 8. Shrubland Habitat and Sage-grouse Leks..... 65  
 Map 9. Sage-grouse Habitat Assessment Framework (HAF) Sites ..... 67

DRAFT

This page intentionally left blank.

## ALLOTMENT INFORMATION

**Field Office:** Jarbidge Field Office (JFO)

**Name of Permittee:** Camas Creek Cattle Association, LLC

**Allotment Name/Number:** Clover Crossing (01136), Echo Clover (00341)

**Date of Field Assessment:** May 18 and 24, 2012; and May 29, 2013

**Table 1: Allotment acres**

Allotment	Total Acres	BLM Acres	State Acres	Private Acres	Other Acres	Stream Miles on Public Land
Clover Crossing	28,327	25,997	1,890	439	0	9
Echo Clover	2,512	2,511	1	0	0	0

**Table 2: Assessment participants**

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

## CURRENT PERMITTED LIVESTOCK GRAZING USE

### **Clover Crossing Allotment (01136):**

**Total Active Use:**

Permit: 8,034 Animal Unit Months (AUMs)

IGMP: 6,500 AUMs (Interim Grazing Management Plan (IGMP))

**Livestock Type:** Cattle, Horses

**Livestock Numbers:** 1,600 Cattle, 25 Horses

**Season of Use:** 03/01 to 02/28

**Current Land Use Plan:** 1987 Jarbidge Resource Management Plan (RMP)

**Current Stocking Level:** 4.0 Acres/AUM (IGMP)

### **Echo Clover Allotment (00341):**

**Total Active Use:**

Permit: 1,992 AUMs

SSA: 1,492 AUMs (Stipulated Settlement Agreement (SSA))

**Livestock Type:** Cattle, Horses

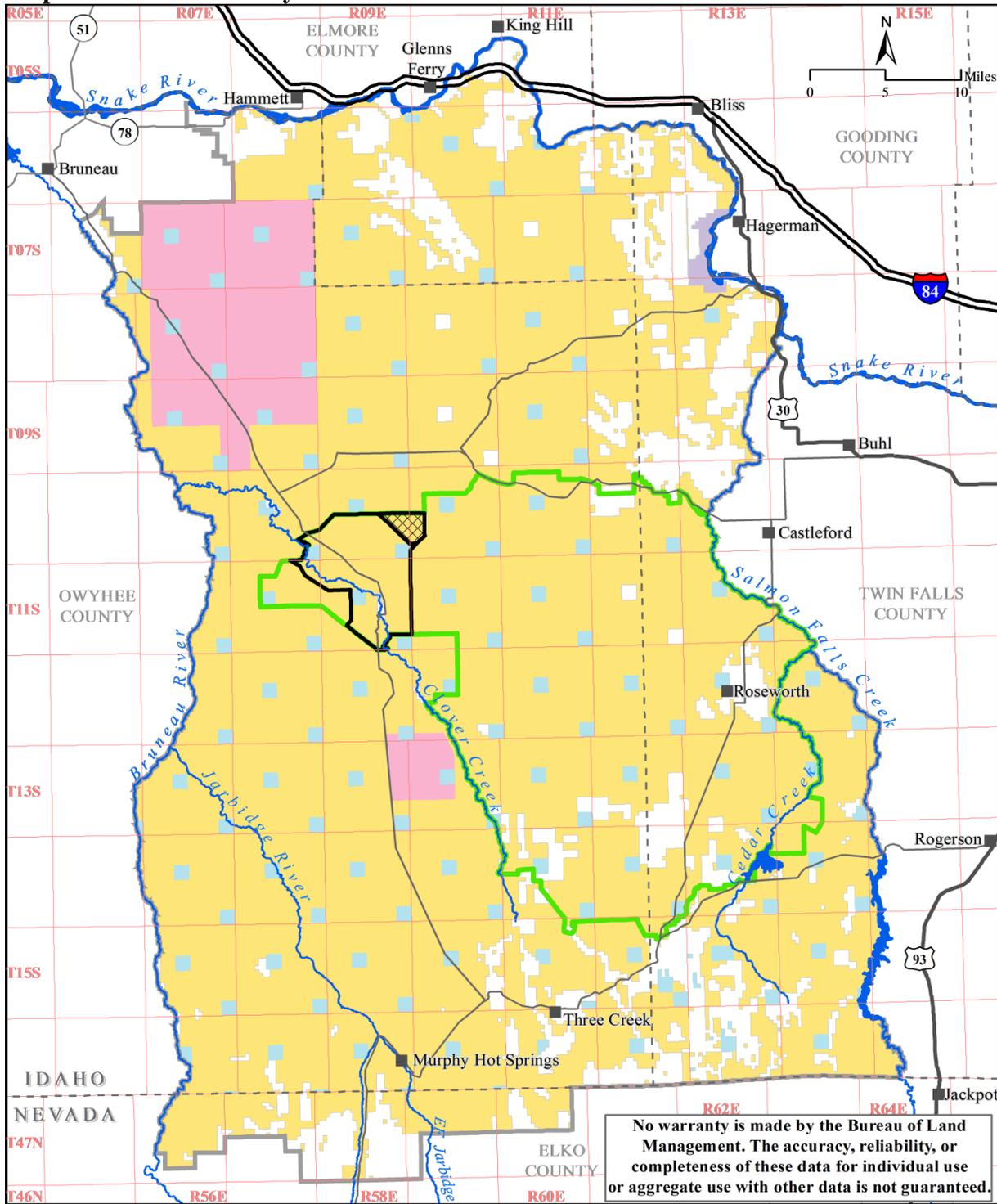
**Livestock Numbers:** 1,600 Cattle, 25 Horses

**Season of Use:** 03/01 to 02/28

**Current Land Use Plan:** 1987 Jarbidge Resource Management Plan (RMP)

**Current Stocking Level:** 1.7 Acres/AUM (SSA)

**Map 1. Allotment Vicinity**



	Clover Crossing Allotment		Bureau of Land Management		Private; other
	Echo Clover Allotment		Military, Department of Defense		State
	Devil Creek Sub-region		National Park Service	Map projection: UTM zone 11 NAD 1983	

## ALLOTMENT PROFILE

The Clover Crossing and Echo Clover Allotments are located approximately 23 miles west of Castleford, Idaho (Map 1). The elevation within the allotments ranges from approximately 4,000 feet to 4,600 feet.

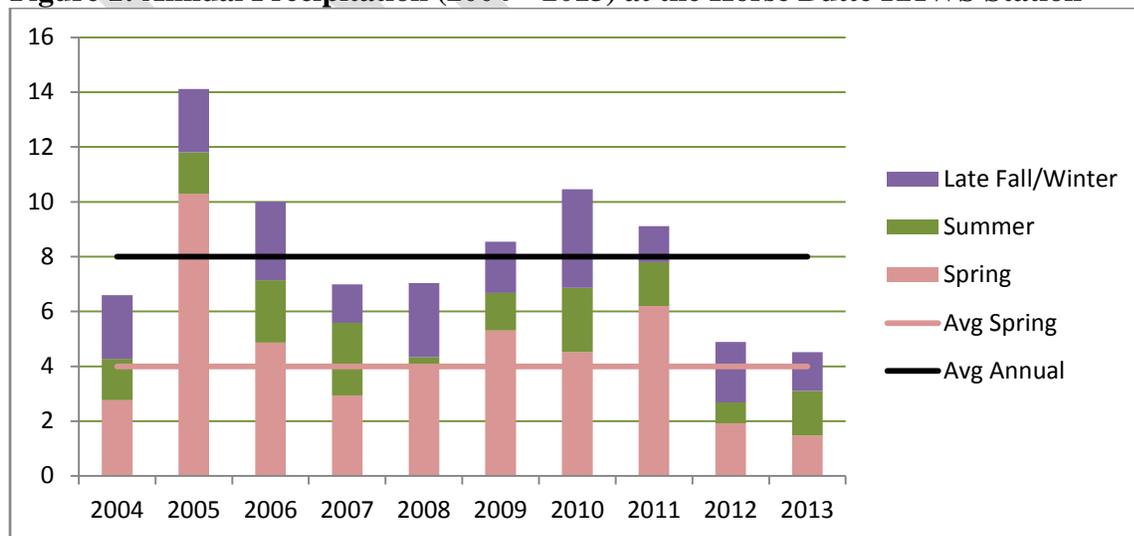
### Climate

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 Clover Crossing and Echo Clover Allotments ranges from 8 to 12 inches. The bulk of the moisture typically falls as rain and snow from late fall through late spring.

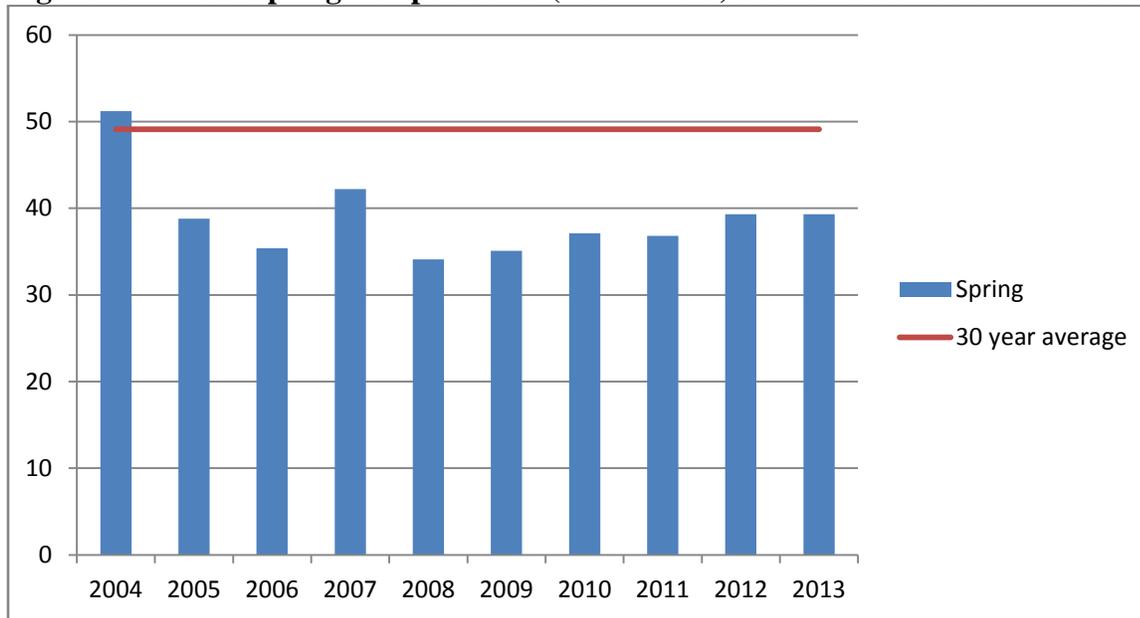
Weather data collected at the Horse Butte RAWS station is used to assess precipitation and temperature trends from 2004 to 2013. The RAWS station is located in an 8 to 12 inch precipitation zone approximately six miles east of the Clover Crossing and Echo Clover Allotments. The thirty-year annual average 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).

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



**Figure 2: Annual Spring Temperatures (2004 – 2013) at the Horse Butte RAWs Station**



### **Grazing Management**

The Clover Crossing Allotment is divided into five pastures (Table 3). The majority of the allotment and pastures are completely fenced; however, some natural barriers (i.e. rim rocks, etc.) are used as pasture/allotment boundaries adjacent to Clover Creek. Meanwhile, the Echo Clover Allotment is not divided into pastures and essentially functions as an additional pasture of the Clover Crossing Allotment (Table 4). The Echo Clover Allotment is fenced on all sides.

**Table 3: Acreage by pasture and ownership in the Clover Crossing Allotment**

Pasture Name	Public	State	Private	Total*
Clover	16,637	644	0	17,281
West Side	1,586	29	0	1,615
School Section	849	601	18	1,468
North Bridge Field	3,488	0	89	3,577
South Bridge Field	2,834	0	47	2,821
Exclosures^	603	617	286	1,506
<b>Allotment Total^</b>	<b>25,997</b>	<b>1,891</b>	<b>440</b>	<b>28,328</b>

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

^This includes various exclosures that are inaccessible to livestock within the allotment boundaries.

**Table 4: Acreage by pasture and ownership in the Echo Clover Allotment**

Pasture Name	Public	State	Private	Total*
Echo Clover	2,511	1	0	2,512
<b>Allotment Total^</b>	<b>2,511</b>	<b>1</b>	<b>0</b>	<b>2,512</b>

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

Clover Creek flows through, or is adjacent to, each pasture of the Clover Crossing Allotment. With the exception of designated water gaps within the West Side, School Section, and South

Bridge Field Pastures, the reaches of Clover Creek located on public lands within the allotment are currently inaccessible to livestock. These reaches of Clover Creek are completely dewatered during the summer months of some years for the irrigation of private lands upstream of the allotment. Water is pumped out of Clover Creek into an underground pipeline and water trough system that provides livestock water to the uplands of the pastures (Map 2).

Clover Crossing is a natural area where crossing the canyon surrounding Clover Creek is possible. Because of this, the Clover Crossing area was historically a main trailing route for livestock moving back and forth from areas near Bruneau and the Snake River to the higher elevation foothills in the south. Due to the close proximity to Clover Creek, and the lack of water in other areas, it is also likely that the Clover Crossing area was a place to rest trailing livestock before moving on. Because of the Clover Crossing Allotments close proximity to Clover Crossing, Clover Creek, and private land, it is suspected that this area received high amounts of repeated spring livestock use by both sheep and cattle for many years.

Through the early 1980's, the portion of the Clover Crossing Allotment north and east of Clover Creek (Clover and North Bridge Field Pastures), and all of the Echo Clover Allotment, were part of the Sailor Creek Unit which encompassed the entire northeastern portion of the Jarbidge Field Office. Meanwhile, the portion of the Clover Crossing Allotment (West Side, School Section, and South Bridge Field Pastures) south of Clover Creek was part of the Three Creek and Three Creek-Clover Allotments. In 1985, the Sailor Creek Unit was divided into smaller units and individual allotments. At that time, the portion of the Clover Crossing Allotment north and east of Clover Creek, and all of the Echo Clover Allotment, became part of the new Echo Group Allotment. The Echo Group Allotment consisted of nine grazing permittees who used the allotment in common with a permitted season of use from April 1 through November 30 each year. Throughout the 1980's and early 1990's, the active permitted use within the areas currently known as the Clover Crossing and Echo Clover Allotments was 2,378 AUMs and 300 AUMs, respectively. In most years, the season of use was extended through Temporary Non-Renewable grazing authorizations when additional forage was available for livestock use.

In 1994, portions of the Echo Group, Three Creek, and Three Creek-Clover Allotments were combined to formally create the Clover Crossing Allotment with a total active permitted use of 2,378 AUMs. Meanwhile, the Echo Clover Allotment was formally split from the Echo Group Allotment in 2002 with a total active permitted use of 300 AUMs. Temporary Non-Renewable grazing authorizations continued throughout the 1990's within the allotments in years when additional forage was available for livestock use. Prior to the year 2000, the West Side Pasture was part of what is currently the Antelope Butte North Allotment. During that time, the only available livestock water for this area was Clover Creek where it flows adjacent to the West Side Pasture. The Antelope Butte North Allotment was split from the Clover Crossing Allotment mid-year in 2000, and the West Side Pasture was fenced and retained as part of the Clover Crossing Allotment.

The term grazing permit for the Clover Crossing and Echo Clover Allotments was fully processed in early 2005. However, as a result of appeal and subsequent litigation, the allotments were subject to the interim grazing measures in the Stipulated Settlement Agreement ordered by Chief Judge B. Lynn Winmill on October 20, 2005 (SSA). The allotments were managed per the

terms of the SSA through the 2010 grazing season. As a result of an additional Memorandum Decision and Order by Chief Judge B. Lynn Winmill dated July 22, 2011, the Clover Crossing Allotment is currently managed under an Interim Grazing Management Plan (IGMP) (dated August 2011) until the grazing permit renewal decision is final. The IGMP provides that the Active Use be limited to 6,500 Animal Unit Months (AUMs) in the Clover Crossing Allotment. Meanwhile, the Echo Clover Allotment remains subject to the 2005 SSA, as modified on January 20, 2011. The SSA provides that the Active Use shall be limited to 1,492 AUMs for the Echo Clover Allotment. Livestock grazing within each of the allotments is managed pursuant to an Annual Grazing Plan (AGP) implemented at the beginning of each grazing year (March 1).

Since the 2005 SSA, management of the allotments has been outlined each year in an AGP. Actual use and percent utilization for each pasture within allotments from 2005 to 2013 can be seen in Table 5. Utilization has been measured on crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*), Sandberg bluegrass (*Poa secunda*), western wheatgrass (*Pascopyrum smithii*), 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 3.

**Table 5: Actual Grazing Use and Percent Utilization by Pasture Since 2005.**

Pasture	Year	Actual Use		Percent Utilization					
		Season of Use*	AUMs	Crested wheatgrass	Bluebunch wheatgrass	Thurber's Needlegrass	Sandberg bluegrass	Western wheatgrass	Squirreltail
Echo Clover	2005	Spring/Summer	860	20%	-	-	-	-	-
	2006	Spring/Summer	628	38%	-	-	-	-	-
	2007	Fall/Winter	510	28%	-	-	-	-	-
	2008	Fall/Winter	929	23%	-	-	-	-	-
	2009	Fall/Winter	1,110	22%	-	-	-	-	-
	2010	Fall/Winter/Spring	1,066	19%	-	-	-	-	-
	2011	Fall/Winter	0	3%	-	-	-	-	-
	2012	Fall/Winter	746	-	-	-	-	-	-
	2013	Spring	1,019	44%	-	-	-	-	-
Clover	2005	Summer	3,756	16%	-	24%	7%	-	-
	2006	Spring/Summer/Fall	3,399	19%	-	6%	14%	-	-
	2007	Fall/Winter	5,110	29%	-	20%	37%	-	-
	2008	Fall/Winter/Spring	4,524	33%	-	30%	-	-	-
	2009	Fall/Winter/Spring	4,820	29%	-	40%	-	-	-
	2010	Fall/Winter/Spring	4,371	32%	-	-	-	-	-
	2011	Fall/Winter	4,849	10%	-	5%	-	-	-
	2012	Fall/Winter/Spring	3,355	9%	-	-	-	-	-
	2013	Fall/Winter/Spring	1,901	12%	-	-	-	-	-
West Side	2005	Summer	0	-	10%	-	-	-	-
	2006	Summer/Fall	0	-	-	-	-	-	-
	2007	Winter/Spring	0	-	20%	-	-	-	-
	2008	Spring	230	-	14%	-	-	-	-
	2009	Spring	256	-	11%	-	-	-	-
	2010	Fall/Winter/Spring	0	-	-	-	-	-	-
	2011	Rest	0	-	-	-	-	-	-
	2012	Fall/Winter/Spring	0	-	-	-	-	-	-
	2013	Fall/Winter	0	-	-	-	-	-	-
School Section	2005	Fall	187	-	-	-	13%	-	-
	2006	Spring/Summer	0	-	-	-	32%	-	21%

Pasture	Year	Actual Use		Percent Utilization					
		Season of Use*	AUMs	Crested wheatgrass	Bluebunch wheatgrass	Thurber's Needlegrass	Sandberg bluegrass	Western wheatgrass	Squirreltail
	2007	Winter/Spring	0	-	-	-	-	-	-
	2008	Spring	151	-	-	-	9%	-	-
	2009	Spring	145	-	-	-	34%	-	-
	2010	Fall/Winter/Spring	0	-	-	-	-	-	-
	2011	Rest	0	-	-	-	-	-	-
	2012	Fall/Winter/Spring	0	-	-	-	-	-	-
	2013	Fall/Winter	0	-	-	-	-	-	-
<b>North Bridge Field</b>	2005	Summer	307	-	15%	29%	7%	-	-
	2006	Fall	598	-	28%	-	-	-	17%
	2007	Winter/Spring	0	-	42%	31%	-	-	-
	2008	Spring	452	-	15%	33%	-	-	-
	2009	Fall/Winter/Spring	385	-	12%	30%	-	-	-
	2010	Rest	0	-	-	-	-	-	-
	2011	Fall/Winter/Spring	0	-	0%	-	-	-	-
	2012	Rest	0	-	-	-	-	-	-
<b>South Bridge Field<sup>^</sup></b>	2005	Rest	0	-	-	-	17%	-	-
	2006	Rest	0	-	-	6%	-	-	11%
	2007	Rest	0	-	-	-	-	-	-
	2008	Rest	0	-	0%	-	-	14%	-
	2009	Rest	0	-	-	-	-	-	-
	2010	Rest	0	-	-	-	-	-	-
	2011	Fall/Winter	813	-	-	31%	-	-	-
	2012	Fall/Winter	640	-	-	25%	-	-	-
2013	Rest	0	-	-	-	-	-	-	

\*Winter Use (1/1 – 3/31); Spring Use (4/1 – 5/31); Summer Use (6/1 – 9/30); Fall Use (10/1 – 12/31).

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

<sup>^</sup>There was no livestock grazing within the South Bridge Field Pasture from 2005 through 2010 per the 2005 Stipulated Settlement Agreement. Compliance inspections from 2005 through 2010 support that livestock did not graze within the South Bridge Field Pasture during those years.

A summary of actual use and average utilization in the Clover Crossing and Echo Clover Allotments from 2005 to 2013 can be seen in Table 6. Since 2005, actual use data has averaged 4,535 AUMs within the Clover Crossing Allotment and 763 AUMs within the Echo Clover Allotment. Utilization was measured on crested wheatgrass, bluebunch wheatgrass, Thurber's needlegrass, Sandberg bluegrass, western wheatgrass, and squirreltail. Utilization measurements on Sandberg bluegrass during winter months can result in inconsistent measurements due to high amount of biomass loss to natural disarticulation from mechanical damage from wind, snow, and decomposition. The JFO ceased monitoring use of Sandberg bluegrass during winter use periods. 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 6: Actual Use and Utilization Summary for 2005 through 2013**

Allotment	Year	Actual Use (AUMs)	Utilization					
			Crested wheatgrass	Bluebunch wheatgrass	Thurber's needlegrass	Sandberg bluegrass	Western wheatgrass	Squirreltail
Echo Clover	2005	860	20%	-	-	-	-	-
	2006	628	38%	-	-	-	-	-
	2007	510	28%	-	-	-	-	-
	2008	929	23%	-	-	-	-	-
	2009	1,110	22%	-	-	-	-	-
	2010	1,066	19%	-	-	-	-	-
	2011	0	3%	-	-	-	-	-
	2012	746	-	-	-	-	-	-
	2013	1,019	44%	-	-	-	-	-
Clover Crossing	2005	4,250	16% (CL)	10% (WS) 15% (NBF)	24% (CP) 29% (NBF)	7% (CP) 13% (SS) 7% (NBF) 17% (SBF)	-	-
	2006	3,997	19% (CL)	28% (NBF)	6% (CP) 6% (SBF)	14% (CP) 32% (SS)	-	21% (SS) 17% (NBF) 11% (SBF)
	2007	5,110	29% (CL)	20% (WS) 42% (NBF)	20% (CP) 31% (NBF)	37% (CP)	-	-
	2008	5,357	33% (CL)	14% (WS) 15% (NBF) 0% (SBF)	30% (CP) 33% (NBF)	9% (SS)	14% (SBF)	-
	2009	5,606	29% (CL)	11% (WS) 12% (NBF)	40% (CP) 30% (NBF)	34% (SS)	-	-
	2010	4,371	32% (CL)	-	-	-	-	-
	2011	5,662	10% (CL)	0% (NBF)	5% (CP) 31% (SBF)	-	-	-
	2012	3,995	9% (CL)	-	25% (SBF)	-	-	-
	2013	2,467	12% (CL)	-	7% (NBF)	-	-	-

CP=Clover Pasture, WS=West Side Pasture, SS=School Section Pasture, NBF=North Bridge Field Pasture, SBF=South Bridge Field Pasture.

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

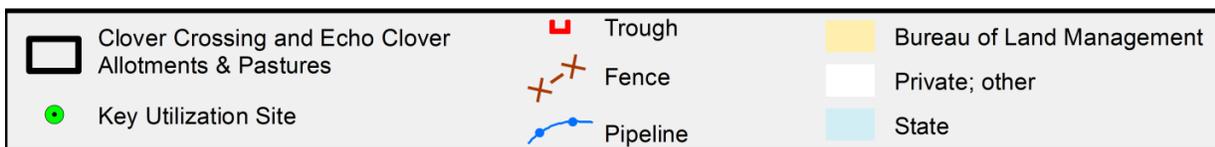
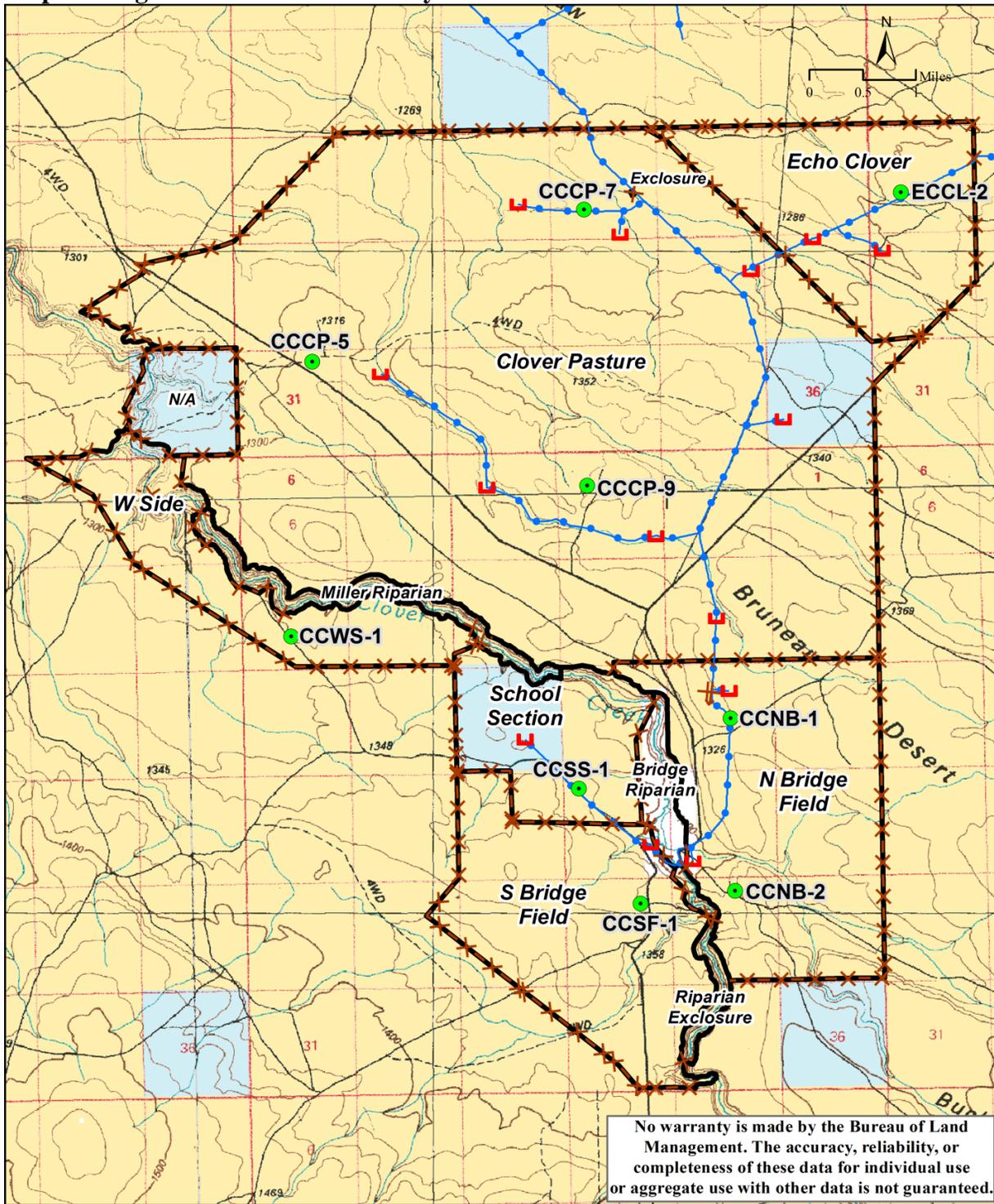
\*There was no livestock grazing within the South Bridge Field Pasture from 2005 through 2010 per the 2005 Stipulated Settlement Agreement. Compliance inspections from 2005 through 2010 support that livestock did not graze within the South Bridge Field Pasture during those years.

In addition to permitted livestock use described above, livestock trailing is authorized within the Clover Crossing and Echo Clover Allotments. The JFO livestock trailing EA (EA# DOI-BLM-ID-T010-2012-0004-EA) analyzed trailing that can be authorized for the Three Creek Ranch Company to trail up to 750 cattle through the Clover and North Bridge Field Pastures each spring and fall along the main road. There are no overnight stays associated with this trail, and it typically takes less than 6 hours to trail through the allotment. The EA also analyzed a trailing application from Wells Juniper Ranch Grazing Association to trail up to 400 cattle through both the Clover Crossing and Echo Clover Allotments. However, Wells Juniper Ranch Grazing Association does not intend to trail livestock through the Clover Crossing and Echo Clover

Allotments at this time, but may in the future depending on transportation costs, or if fall weather inhibits trucking of livestock from the Juniper Ranch AMP Allotment.

DRAFT

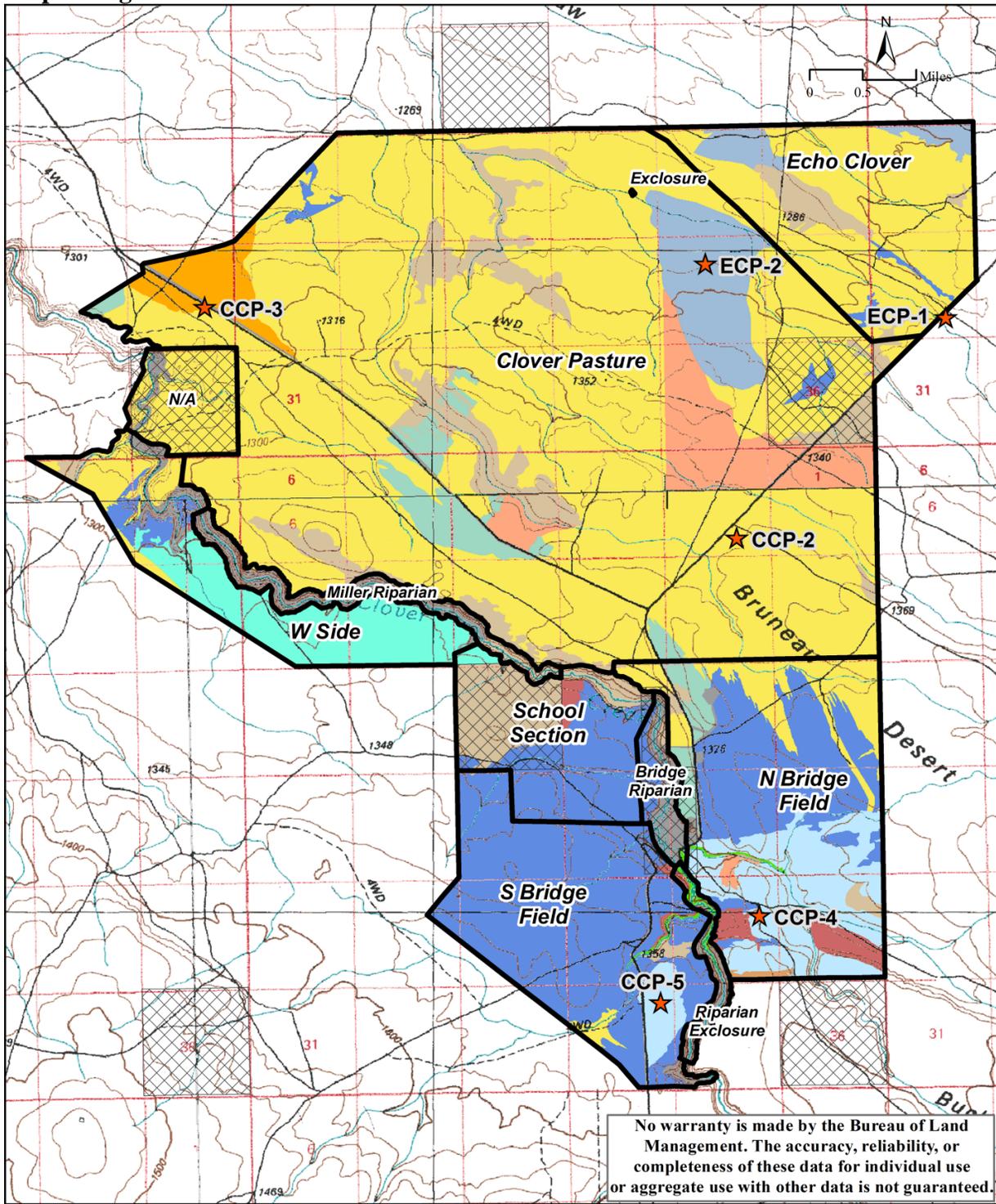
**Map 2. Range Infrastructures and Key Utilization Sites**



## **Vegetation**

Vegetation in the Clover Crossing and Echo Clover Allotments 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).

**Map 3. Vegetation Communities and Production and/or Cover Plots**



	Clover Crossing and Echo Clover Allotments & Pastures		Annual		Crested		Needlegrass		WY Sage/Crested
	Non-BLM Land		Bluebunch		Fourwing/Crested		Rabbitbrush/Crested		WY Sage/Thurbers
	Production and/or Cover Plot		Bluegrass		Juniper		Thurbers		Breaks; Barren
									WY Sage/Bluegrass

The allotments were historically a shrub steppe plant community; however, the allotments have been greatly affected by wildfires since 1981. Almost the entire Echo Clover Allotment has burned at least once over the past 20 years and approximately 76 percent of the Allotment has burned more than once in that same time period (Table 7). Meanwhile, approximately 68 percent of the Clover Crossing Allotment has also burned within the past 20 years, and approximately 5 percent of the Allotment has burned twice in that same time period (Table 7, Map 4).

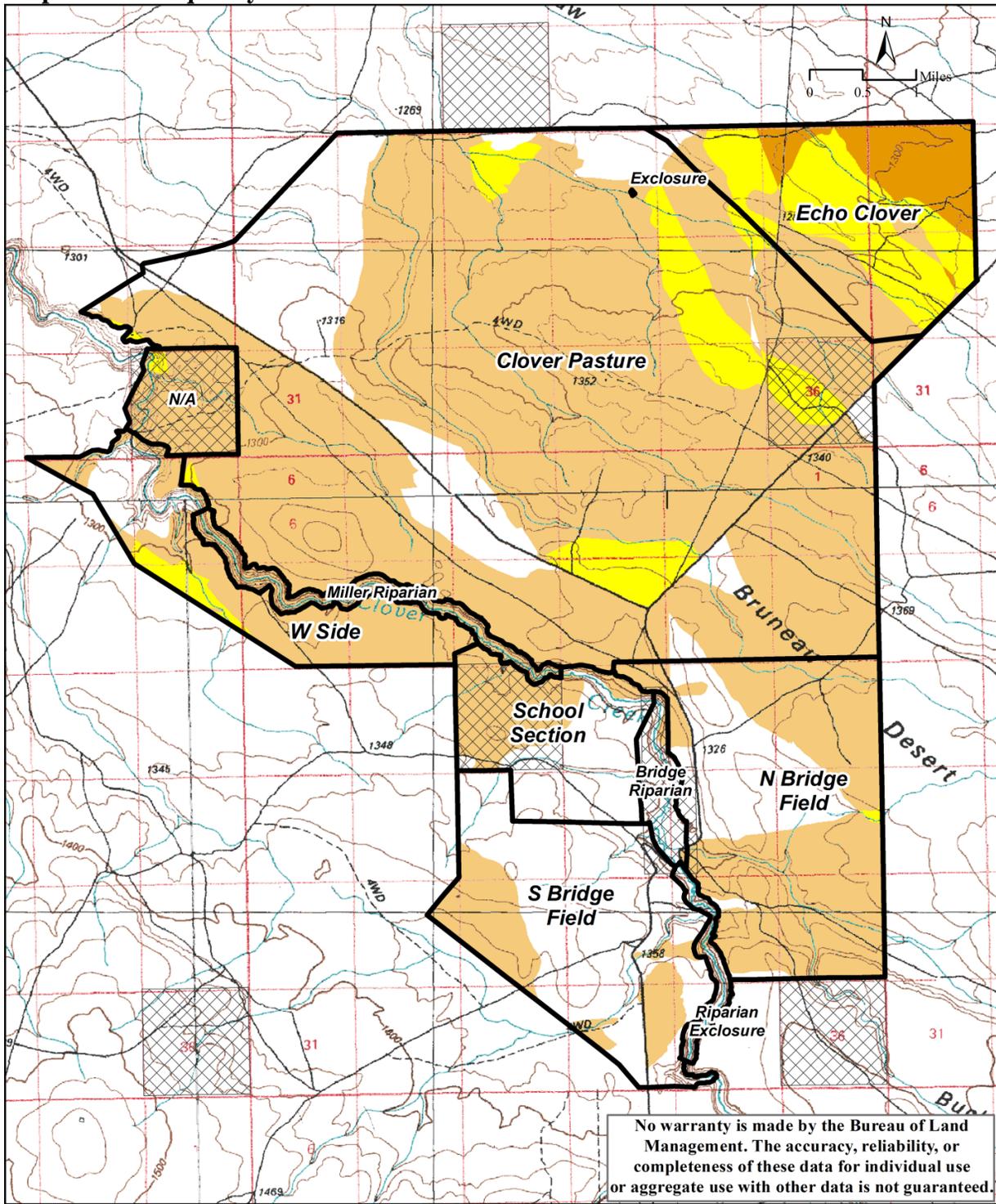
**Table 7: Fire Frequency by Pasture from 1993 to 2012.**

Pasture	Number of Times Burned 1993 to 2012	Acres Of Pasture	Percentage of Pasture
Echo Clover Allotment (2,511 acres)	0	34	1%
	1	582	23%
	2	1,205	48%
	3	691	28%
Clover (16,637 acres)	0	2,629	16%
	1	12,915	78%
	2	1,093	6%
West Side (1,586 acres)	0	321	20%
	1	1,120	71%
	2	144	9%
School Section (849 acres)	0	710	84%
	1	139	16%
North Bridge Field (3,488 acres)	0	1,016	29%
	1	2,459	70%
	2	13	<1%
South Bridge Field (2,834 acres)	0	2,085	74%
	1	749	26%

An additional 603 acres administered by the BLM occur within the Clover Crossing Allotment; however, these acres are within exclosures or are areas inaccessible to livestock.

Plant communities within the Echo Clover and Clover Crossing Allotments have been modified. Fourteen different wildfires have occurred within the allotments since 1981, and various drill and aerial seeding efforts have been undertaken to rehabilitate burned areas. Records indicate that the allotments have been drill seeded and aerially seeded with a variety of native and non-native species. Nearly the entire Echo Clover, Clover, and West Side Pastures were seeded following wildfires that occurred between 1981 and 2002, and approximately half of the North Bridge Field Pasture was seeded following the 1999 Doe (Buck N Doe) Fire. As a result of these treatments, the allotments are currently vegetated by both native and non-native perennial grass species (Table 8, Map 3). Meanwhile, the vast majority of the School Section and South Bridge Field Pastures remain unseeded native plant communities (Table 8, Map 3). A detailed discussion of past wildfire rehabilitation efforts within the Clover Crossing and Echo Clover Allotments can be found under Standard 5.

**Map 4. Fire Frequency**



**Table 8: Vegetation Communities in Acres and Percentage by Pasture**

<b>Vegetation Community</b>	<b>Echo Clover</b>	<b>Clover</b>	<b>West Side</b>	<b>School Section</b>	<b>North Bridge Field</b>	<b>South Bridge Field</b>
Crested wheatgrass	1,980 (79%)	12,584 (76%)	313 (20%)	0 (0%)	583 (17%)	51 (2%)
Wyoming big sagebrush/Crested wheatgrass	0 (0%)	997 (6%)	0 (0%)	0 (0%)	33 (1%)	0 (0%)
Fourwing saltbrush/Crested wheatgrass	0 (0%)	0 (0%)	985 (62%)	36 (4%)	0 (0%)	0 (0%)
Rabbitbrush/Crested wheatgrass	0 (0%)	415 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Bluegrass	261 (10%)	829 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Wyoming big sagebrush/Bluegrass	0 (0%)	544 (3%)	0 (0%)	0 (0%)	147 (4%)	0 (0%)
Wyoming big sagebrush/Thurber's needlegrass	46 (2%)	46 (<1%)	138 (9%)	670 (79%)	1,273 (36%)	2,489 (88%)
Thurber's needlegrass	0 (0%)	0 (0%)	0 (0%)	43 (5%)	221 (6%)	13 (<1%)
Bluebunch wheatgrass	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1,115 (32%)	188 (7%)
Annual	220 (9%)	1,176 (7%)	40 (2%)	100 (12%)	68 (2%)	35 (1%)
Juniper	0 (0%)	0 (0%)	0 (0%)	0 (0%)	14 (<1%)	15 (<1%)
Barren	0 (0%)	39 (<1%)	0 (0%)	0 (0%)	20 (<1%)	11 (<1%)
Breaks	4 (<1%)	7 (<1%)	111 (7%)	0 (0%)	1 (<1%)	33 (1%)
N/A	0 (0%)	0 (0%)	0 (0%)	0 (0%)	12 (<1%)	0 (0%)

An additional 603 acres administered by the BLM occur within the Clover Crossing Allotment; however, these acres are within exclosures or are areas inaccessible to livestock.

Vegetative production and cover data were recorded in 2002 and 2003 at one site within the Echo Clover Allotment and five sites within the Clover Crossing Allotment. Vegetative production data recorded at the sites is summarized in Table 9 and the cover (top layer) data from the sites is shown in Tables 21 and 23. Site ECP-1 within the Echo Clover Allotment burned in the 2010 Long Butte Fire. In addition, site CCP-1 within the Clover Crossing Allotment burned in the 2006 Big Draw Fire and site CCP-5 burned in the 2011 Clover Butte Fire. The vegetation communities at these sites were modified by the wildfires after the data was collected in 2002 and 2003.

No trend sites have been established within the Echo Clover or Clover Crossing Allotments. Due to differences in sampling locations and methodology (e.g. number of transects per site and number of points per transect) among the 2002 and 2003 production and cover data, the 2012, 2013, and 2014 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.

**Table 9: Summary of 2002 and 2003 Production Data**

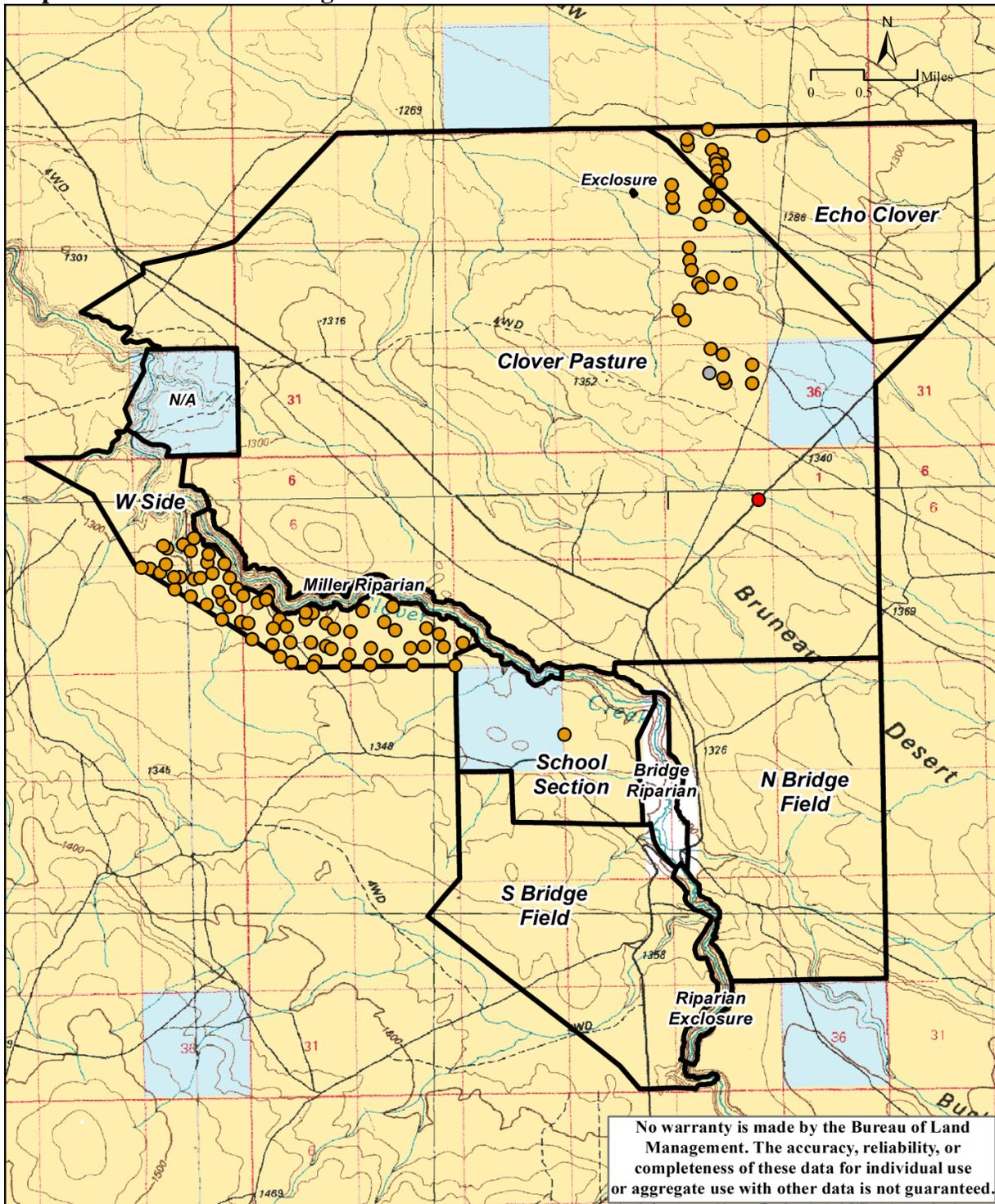
Vegetation Class	Species	Production (Total Dry Weight in Pounds per Acre)						
		Loamy 8-12" ESD Reference Sheet	ECP-1 August 2003	CCP-1 July 2003	CCP-2 August 2003	CCP-3 August 2003	CCP-4 August 2002	CCP-5 August 2003
			Echo Clover	Clover	Clover	Clover	North Bridge Field	South Bridge Field
Perennial Grasses	Squirreltail	20 - 45	-	-	45	21	102	70
	Crested wheatgrass	-	734	572	520	440	-	-
	Sandberg bluegrass	20 - 45	81	25	72	77	8	109
	Thurber's needlegrass	80 - 180	-	-	74	-	-	91
	Bluebunch wheagrass	100 - 225	-	-	-	-	118	-
	Thickspike wheatgrass ( <i>Elymus lanceolatus</i> )	0 - 45	-	-	-	-	254	-
	Indian ricegrass ( <i>Achnatherum hymenoides</i> )	0 - 22	-	-	-	-	-	5
Annual Grasses	Cheatgrass ( <i>Bromus tectorum</i> )	-	0	-	0	13	3	6
Perennial Forbs	Arrowleaf balsamroot ( <i>Balsamorhiza sagittata</i> )	12 - 27	-	-	-	-	-	-
	Tapertip hawksbeard ( <i>Crepis acuminata</i> )	1 - 27	-	-	-	-	-	-
	Carpet phlox ( <i>Phlox hoodii</i> )	0 - 5	-	-	-	-	14	-
	Longleaf phlox ( <i>Phlox longifolia</i> )	0 - 5	2	8	37	12	-	40
	Larkspur ( <i>Delphinium bicolor</i> )	0 - 5	-	-	-	-	-	1
Annual Forbs	Curveseed butterwort ( <i>Ceratocephala testiculata</i> )	-	0	-	0	0	0	0
	Maiden blue eyed mary ( <i>Collinsia parviflora</i> )	-	0	-	0	-	-	0
	Clasping pepperweed ( <i>Lepidium perfoliatum</i> )	0 - 5	8	-	-	-	3	-
	Tumblemustard ( <i>Sisymbrium altissimum</i> )	0 - 5	-	-	-	-	11	-
	Yellow salsify ( <i>Tragopogon dubius</i> )	-	-	-	-	-	-	3
Shrubs	Yellow rabbitbrush ( <i>Chrysothamnus viscidiflorus</i> )	0 - 14	-	-	-	46	-	-
	Wyoming big sagebrush ( <i>Artemisia tridentata wyomingensis</i> )	100 - 225	-	-	-	10	-	78
<b>TOTAL</b>		<b>400 - 900</b>	<b>825</b>	<b>605</b>	<b>748</b>	<b>619</b>	<b>513</b>	<b>403</b>

## **Noxious Weeds**

The State of Idaho has listed 65 plant species as noxious weeds. Diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), and scotch thistle (*Onopordum acanthium*) are known to occur within the Clover Crossing and Echo Clover Allotments (Map 5). There are 23 known rush skeletonweed occurrences, one diffuse knapweed occurrence and one scotch thistle occurrence within the Clover Pasture. The rush skeletonweed and diffuse knapweed occurrences were chemically treated in 2007. The scotch thistle occurrence was chemically treated in 2008. There is one known occurrence of rush skeletonweed in the School Section Pasture that was chemically treated in 2005. There are 68 known occurrences of rush skeletonweed occurrences within the West Side Pasture that were chemically treated in 2005. Within the Echo Clover Allotment there are 13 known occurrences of rush skeletonweed that were chemically treated in 2005. 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 Echo Clover or Clover Crossing Allotments 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 Echo Clover or Clover Crossing Allotments:

- **Standard 1** – Watersheds provide for the proper infiltration, retention, and release of water appropriate to soil type, vegetation, climate, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow.
- **Standard 2** – Riparian-wetland areas are in properly functioning condition appropriate to soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow
- **Standard 3** – Stream channels and floodplains are properly functioning relative to the geomorphology (e.g. gradient, size, shape, roughness, confinement, and sinuosity) and climate to provide for proper nutrient cycling, hydrologic cycling, and energy flow.
- **Standard 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.

*\*Standard 6 does not apply to the Echo Clover or Clover Crossing Allotments*

**Table 10: Applicable Standards by Pasture.**

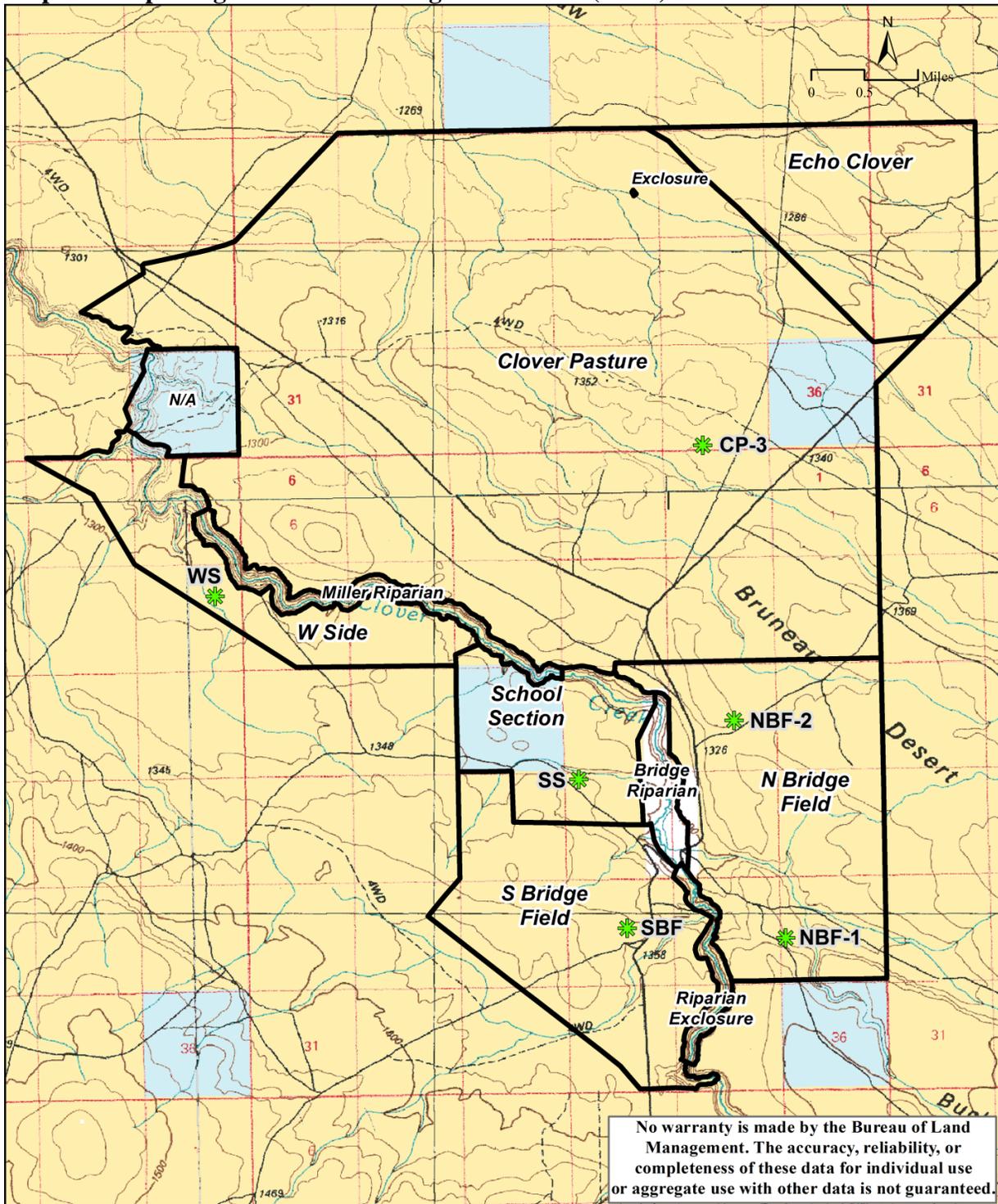
Standard	Pastures
1	All Pastures in Echo Clover Allotment and Clover Crossing Allotment
2	Clover , West Side, School Section, and South Bridge Field Pastures
3	Clover, West Side, School Section, and South Bridge Field Pastures
4	School Section and South Bridge Field Pastures
5	Echo Clover Allotment, Clover Pasture, West Side Pasture, North Bridge Field Pasture
6	Not Applicable to the Echo Clover or Clover Crossing Allotments
7	Clover, West Side, School Section, and South Bridge Field Pastures

Standard	Pastures
8	All Pastures in Echo Clover Allotment and Clover Crossing Allotment

An interdisciplinary (ID) team conducted IIRH field evaluations at six sites representative of plant communities within the Echo Clover and Clover Crossing Allotments during May of 2012 and 2013. The Clover, West Side, School Section, and South Bridge Field Pastures each contained one site while the North Bridge Field Pasture contained two sites. Three of the six sites were located in areas of seeded non-native plant communities. The three sites located in areas of native plant communities were located within the School Section, North Bridge Field, and South Bridge Field Pastures. Of the six sites at which IIRH evaluations were conducted, five were HAF sites and one site was a key utilization site identified by the ID Team as being representative of the vegetation community within the northern portion of the North Bridge Field Pasture (Map 6).

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.

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



Seventeen indicators of rangeland health (Table 6) were used to evaluate three rangeland health attributes (Table 7): Soil and Site Stability, Hydrologic Function, and Biotic Integrity (Pellant et al., 2005). An IIRH 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 was recorded at five 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. Cover data was recorded at the remaining site (key utilization site) in the North Bridge Field Pasture using the Step Point Method (BLM, 1996).

In addition to evaluating rangeland health indicators at each of the six IIRH sites, the ID Team also examined other areas to ensure evaluation sites were representative of the vegetation communities throughout the allotments. Data collected at the evaluation sites were compared to the Natural Resource Conservation Service's (NRCS) Ecological Site Description (ESD) reference sheet for the soil types and potential vegetation communities in the Echo Clover and Clover Crossing Allotments. All IIRH sites occurred in the Loamy 8-12" Wyoming Big Sagebrush/Bluebunch wheatgrass/Thurber's needlegrass ecological site. The ESD reference sheet describes the expected condition of the ecological site in state 1, phase A of the reference state. The Loamy 8-12" Wyoming big sagebrush/bluebunch wheatgrass/Thurber's needlegrass (R011XY001ID) plant community is expected to have Wyoming big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Thurber's needlegrass should be the subdominant grass. Other significant species should include Sandberg bluegrass, squirreltail, and arrowleaf balsamroot. There can be a variety of other grasses, forbs, and shrubs in minor amounts. The natural fire frequency should be 50-70 years.

Indicator ratings for each IIRH site are shown in Table 11. Rangeland health attributes ratings are shown in Table 12.

**Table 11: Summary of 17 Rangeland Health Indicators**

Indicators	Attributes	Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)				
	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					CP_3, NBF_1, NBF_2, SBF, SS, WS
2. Water-flow Patterns	S, H					CP_3, NBF_1, NBF_2, SBF, SS, WS
3. Pedestals and/or terracettes	S, H					CP_3, NBF_1, NBF_2, SBF, SS, WS
4. Bare ground	S, H					CP_3, NBF_1, NBF_2, SBF, SS, WS
5. Gullies	S, H					CP_3, NBF_1, NBF_2, SBF, SS, WS
6. Wind-scoured, blowouts, and/or deposition areas	S					CP_3, NBF_1, NBF_2, SBF, SS, WS
7. Litter movement	S					CP_3, NBF_1, NBF_2, SBF, SS, WS

Indicators	Attributes	Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)				
	S = Soil & Site Stability H=Hydrologic Function B = Biotic Integrity	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
8. Soil surface resistance to erosion	S, H, B					CP_3, NBF_1, NBF_2, SBF, SS, WS
9. Soil surface loss or degradation	S, H, B					CP_3, NBF_1, NBF_2, SBF, SS, WS
10. Plant community composition and distribution relative to infiltration	H				CP_3, NBF_1	NBF_2, SBF, SS, WS
11. Compaction layer	S, H, B					CP_3, NBF_1, NBF_2, SBF, SS, WS
12. Functional/structural groups	B			CP_3, SS, WS	NBF_1	NBF_2, SBF
13. Plant mortality/decadence	B					CP_3, NBF_1, NBF_2, SBF, SS, WS
14. Litter amount	H, B			CP_3, SS, WS	NBF_1, SBF	NBF_2
15. Annual production	B					CP_3, NBF_1, NBF_2, SBF, SS, WS
16. Invasive plants	B		NBF_2, SS, WS	CP_3, NBF_1	SBF	

Indicators	Attributes	Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)				
	S = Soil & Site Stability H=Hydrologic Function B = Biotic Integrity	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17. Reproductive capability of perennial plants	B					CP_3, NBF_1, NBF_2, SBF, SS, WS

CP\_3=Clover Pasture site 3, WS=West Side Pasture Site 2, SS=School Section Pasture Site 2, NBF\_1=North Bridge Field Pasture Site 1, NBF\_2=North Bridge Field Pasture site 2, SBF=South Bridge Field Pasture

The ratings of the 17 indicators do not result in a single rating of rangeland health for a site. The 17 indicators are related to three components of rangeland health known as attributes (soil and site stability, hydrologic function, and biotic integrity). The second column of Table 11 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 12.

**Table 12: Rangeland Health Attribute Rating by Site**

Rangeland Health Attribute	Degree of Departure				
	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil and Site Stability					CP_3, NBF_1, NBF_2, SBF, SS, WS
Hydrologic Function					CP_3, NBF_1, NBF_2, SBF, SS, WS
Biotic Integrity			WS	CP_3, NBF_1, NBF_2, SBF, SS	

CP\_3=Clover Pasture site 3, WS=West Side Pasture Site 2, SS=School Section Pasture Site 2, NBF\_1=North Bridge Field Pasture Site 1, NBF\_2=North Bridge Field Pasture site 2, SBF=South Bridge Field Pasture

## **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 six IIRH sites (CP\_3, NBF\_1, NBF\_2, SBF, SS, and WS) were evaluated using the ESD (R011XY001ID) reference sheet for the Loamy 8-12” Wyoming big sagebrush/bluebunch wheatgrass/Thurber’s needlegrass ecological site (USDA and NRCS, 2013a). The reference sheet indicates bare ground should range from 30 to 40 percent cover (top layer) and litter should range from 5 to 10 percent (cover for all layers). The soil stability test value should range from 4 to 6 (Scale of 1 to 6; Pellant et al., 2005) for this ecological site. Litter percentage calculations used for rating indicator 14 include all litter, detached and persistent. While the ESDs indicate that litter cover should range from 5 to 10 percent, cover and HAF data collected within the allotment show that litter values actually range from 27 percent to 45 percent cover for all layers. Average percent bare ground recorded in the 2002 and 2003 cover data, as well as the 2012, 2013, and 2014 HAF data (Tables 13 and 20 – 23) ranges from 5 percent to 30 percent of cover (top layer). In addition, soil stability tests (Pellant et al., 2005) were completed within the Clover, West Side, School Section, and North Bridge Field Pastures and resulted in an average soil stability value of 4.6, indicating adequate soil surface resistance to erosion.

Multiple soil series exist within the Echo Clover and Clover Crossing Allotments and are typically silt loams. The majority of the area is relatively flat, except for Clover Creek and the associated canyon within the Clover Crossing Allotment. The Soil Survey Geographic (SSURGO) Database (NRCS 2012) shows that 100 percent of the Echo Clover Allotment has a moderate wind erosion hazard. Within the Clover Crossing Allotment, 9 percent has a severe wind erosion hazard, 53 percent has a moderate wind erosion hazard, 34 percent has a slight wind erosion hazard, and 4 percent has no data for wind erosion hazard. In addition, the soil survey shows that 61 percent of the Echo Clover Allotment has a high water erosion hazard and 38 percent has a medium water erosion hazard. Meanwhile, 18 percent of the Clover Crossing Allotment has a high water erosion hazard, 77 percent has a medium water erosion hazard, and 4 percent has no data for water erosion hazard.

Although the soil survey shows potential for both wind and water erosion in this area, no indications of active erosion or soil loss were noted during the 2012 or 2013 IIRH field visits. Adequate soil cover is present within the allotment to reduce potential erosion. Bare ground is generally low, with an abundance of vegetation and biological soil crusts throughout the majority of the allotments (Tables 13 and 20 – 23).

While the amount of litter deviated from the reference condition in most areas, 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 annual plant growth/production matching what is expected. Percentages of litter used to evaluate the litter indicator included not only detached litter in contact with soil but also persistent litter.

**Table 13: Percent ground cover (top layer) at IIRH sites**

Ground Cover	IIRH Site CP_3	IIRH Site WS	IIRH Site SS	IIRH Site NBF_1	IIRH Site NBF_2	IIRH Site SBF
	Clover Pasture	West Side Pasture	School Section Pasture	North Bridge Field Pasture		South Bridge Field Pasture
Perennial Grasses	33%	30%	33%	24%	10%	17%
Annual Grasses	7%	6%	20.5%	5%	20%	3%
Perennial Forbs	0%	0%	0.5%	2%	0%	1.5%
Annual Forbs	5%	0%	0%	3%	4%	0%
Shrubs	0%	3%	14.5%	0%	10%	22.5%
Biological Soil Crust	6%	21%	6%	6%	20%	14.5%
Bare Ground	11%	5%	9.5%	28%	24%	24.5%
Litter	37%	32%	15.5%	31%	12%	17%
Rock	1%	3%	0.5%	1%	0%	0%

Clover Pasture (includes Echo Clover Allotment)

*IIRH Site CP\_3. Loamy 8-12”*

Site CP\_3 is located in the Clover Pasture within a seeded vegetation community where Sandberg bluegrass comprises 24 percent of cover and crested wheatgrass comprises 9 percent of cover. No shrubs were present at the site. Meanwhile, biological soil crusts comprise 6 percent of cover (Table 13). The site is of relatively flat topography and has burned by wildfire twice since 1985. A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 4.7, indicating adequate soil surface resistance to erosion (Photo 1). The ID Team determined that site CP\_3 was representative of the Clover Pasture of Clover Crossing, as well as of the Echo Clover Allotment.

The indicator for plant community composition and distribution relative to infiltration was rated a slight to moderate departure from the reference condition due to the lack of shrubs at the site.

The indicator for litter amount was rated a moderate departure from the reference condition due to an increased amount of litter (42% cover for all layers) found at the site.

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

**Photo 1: Soil Profile at IIRH site CP\_3 within the Clover Pasture**



West Side Pasture

*IIRH Site WS. Loamy 8-12"*

Site WS is located in the West Side Pasture within a seeded vegetation community where Sandberg bluegrass comprises 23 percent of cover. Yellow rabbitbrush is the dominant shrub species (3% cover) at the site. In addition, biological soil crusts comprise 21 percent of cover (Table 13). The site is of relatively flat topography and has burned by wildfire three times since 1985. A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 5.3, indicating adequate soil surface resistance to erosion.

The indicator for litter amount was rated a moderate departure from the reference condition due to an increased amount of litter (50% cover for all layers) found at the site.

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.

School Section Pasture

*IIRH Site SS. Loamy 8-12"*

Site SS is located in the School Section Pasture within a native vegetation community where Sandberg bluegrass comprises 29.5 percent of cover and cheatgrass comprises 19 percent of cover. Meanwhile, Wyoming big sagebrush is the dominant shrub species (14.5% cover) at the site. In addition, biological soil crusts comprise 6 percent of cover (Table 13). The site is of

relatively flat topography and has not burned by wildfire in over 50 years. A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 4.6, indicating adequate soil surface resistance to erosion.

The indicator for litter amount was rated a moderate departure from the reference condition due to an increased amount of litter (38% cover for all layers) found at the site.

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.

#### North Bridge Field Pasture

##### *IIRH Site NBF\_1. Loamy 8-12"*

Site NBF\_1 is located in the North Bridge Field Pasture within a seeded vegetation community where Sandberg bluegrass comprises 16 percent of cover and bluebunch wheatgrass comprises 6 percent of cover. No shrubs were present at the site while biological soil crusts comprise 6 percent of cover (Table 13). The site is of relatively flat topography that burned in the 1999 Doe Fire. A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 3.8, indicating that soil surface resistance to erosion is slightly less than expected (Photo 2).

The indicator for plant community composition and distribution relative to infiltration was rated a slight to moderate departure from the reference condition due to the lack of shrubs at the site.

The indicator for litter amount was rated a slight to moderate departure from the reference condition due to an increased amount of litter (35% cover for all layers) found at the site.

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

**Photo 2: Soil Profile at IIRH site NBF\_1 within the North Bridge Field Pasture**



*IIRH Site NBF\_2. Loamy 8-12”*

Site NBF\_2 is located in the North Bridge Field Pasture within a vegetation community where cheatgrass comprises 20 percent of cover and Sandberg bluegrass comprises 8 percent of cover. Wyoming big sagebrush is the dominant shrub species (8% cover) at the site. In addition, biological soil crusts comprise 20 percent of cover (Table 13). The site is of relatively flat topography and has not burned by wildfire in over 50 years.

All 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.

South Bridge Field Pasture

*IIRH Site SBF. Loamy 8-12”*

Site SBF is located in the South Bridge Field Pasture within a native vegetation community where Sandberg bluegrass comprises 12.5 percent of cover and squirreltail comprises 4.5 percent of cover. Wyoming big sagebrush is the dominant shrub species (22.5% cover) at the site. In addition, biological soil crusts comprise 14.5 percent of cover (Table 13). The site is of relatively flat topography and has not burned by wildfire in over 50 years.

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

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.

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

The attributes of rangeland health related to Standard 1 are Soil and Site Stability and Hydrologic Function. The Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure for all six sites (Table 11) within the allotments.

The indicator for plant community composition and distribution relative to infiltration was rated a slight to moderate departure from the reference condition at sites CP\_3 and NBF\_1 due to the lack of shrubs at each of the sites. Meanwhile, the litter amount indicator was rated none to slight at site NBF\_2, slight to moderate departure at sites NBF\_1 and SBF, and moderate at sites CP\_3, SS, and WS. Soil stability tests (Pellant et al., 2005) were completed at evaluation sites CP\_3, WS, SS, and NBF\_2 with an average stability value of 4.6 across the sites.

**Evaluation of Standard 1**

Two of the six sites within the allotments were rated slight to moderate departure for plant community composition and distribution relative to infiltration and runoff due to the lack of shrubs.

The amount of litter found within the allotments is higher than what is described in the ESD. 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 annual plant production matching what is expected.

The Soil and Site Stability and Hydrologic Function attributes were rated none to slight departure from the reference condition for all six sites (Table 12) within the allotments.

***Evaluation Finding – Echo Clover and Clover Crossing (all pastures) Allotments are:***

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

***Rationale for Evaluation Finding***

Abundant vegetation, as well as biological soil crusts, is present within the Echo Clover and Clover Crossing Allotments to provide protection for site stability (Tables 13 and 20 – 23). Additionally, bare ground is lower than expected throughout the allotments and the topography is relatively flat.

Observations made by the ID Team during 2012 and 2013 IIRH evaluations, as well as cover data (Tables 13 and 20 – 23) collected within each pasture of the Echo Clover and Clover Crossing Allotments indicate that ground cover (vegetation, biological soil crusts, litter, etc.) is sufficient for soil stability. Within the more recently burned areas, biological soil crusts are generally of lower abundance; however, adequate vegetation and litter are present within these areas to protect the soil surface from erosion. While some evidence of past pedestal formation

was observed within the School Section and West Side Pastures, pedestals were not widespread and were noted to be inactive. Additionally, no signs of past or present pedestal formation were noted in any other areas of the allotments. No other signs of accelerated erosion, such as active rills, water flow patterns, gullies, or other indications of soil erosion were present within the allotments; therefore, the infiltration, retention, and release of water processes relative to soil, vegetation, climate and landform appear to be providing for adequate nutrient and hydrologic cycling and energy flow in most areas.

Due to wildfires and vegetation treatments, shrubs are lacking within some plant communities of the allotments. Wildfire has essentially eliminated shrubs in these areas. Shrubs trap snow and have a taproot that penetrates deep into the soil profile; therefore, the lack of shrubs has the potential to affect infiltration and retention of soil moisture. However, some shrub species, as well as abundant deep-rooted perennial bunchgrasses, are present in most areas to carry soil moisture deep into the soil profile. In addition, perennial grasses appeared vigorous and were producing seedheads at all sites, suggesting that the reduction of shrub cover is not negatively affecting infiltration to the point of reducing plant vigor or reproductive capability.

A low abundance of deep-rooted perennial bunchgrasses were noted within some areas of the School Section Pasture. A reduced abundance of deep-rooted perennial bunchgrasses has the potential to affect infiltration and retention of soil moisture. However, shrubs are present within these areas, which help to capture and store precipitation, and facilitate the infiltration of moisture deeper into the soil profile. Moreover, deep-rooted perennial bunchgrasses are abundant throughout most areas of the allotments.

The litter amount indicator ratings deviated from the reference condition found in the ESD at five of the six sites. However, litter is providing cover for site protection, replenishing nutrients, and does not appear to be negatively affecting ecological processes.

**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.*

***Allotment Summary for Standard 2 (Riparian Areas and Wetlands):***

**Echo Clover Allotment**

  X Standard Doesn't Apply

No perennial streams, springs, wetlands, or riparian vegetation are present in the Allotment. Standard 2 does not apply to the Echo Clover Allotment.

**Clover Crossing Allotment**

North Bridge Field Pasture

  X Standard Doesn't Apply

No perennial streams, springs, wetlands, or riparian vegetation are accessible to livestock in the North Bridge Field Pasture. Standard 2 does not apply to the North Bridge Field Pasture of the

Clover Crossing Allotment.

Clover, West Side, School Section, and South Bridge Field Pastures

Clover Creek is the only perennial stream within the Clover Crossing Allotment. A total of 9 miles of Clover Creek occurs on lands administered by BLM with additional miles occurring on state and private lands. No springs or wetlands are present within these pastures. Clover Creek within the Clover Crossing Allotment was completely dewatered during the summer months of 2012 and 2013 for irrigation of private lands upstream of the allotment. Two livestock enclosures (Miller Enclosure and Dam Enclosure) were established in the early 1990s. Both enclosures were functioning in 2013. Proper Functioning Condition (PFC) assessments to assess riparian condition were not conducted within the allotment during 2013, but stream reaches were visited. PFC assessments were conducted on Clover Creek within these pastures using the approved BLM Technical Reference 1737-15 (BLM 1998) in 1996, 1999, 2004, and 2006 (Table 14).

**Table 14: PFC Assessment Ratings by Stream Reach and Year.**

Clover Creek Reach (miles)	Pasture	1996 Rating	1999 Rating	2004 Rating	2006 Rating
17.4-18.3	West Side/Clover	-	FAR-UP	-	FAR-UP
18.3-18.5	West side	-	FAR-UP	-	FAR-UP
18.5-21.9	Miller Enclosure	-	FAR-UP	-	FAR-DN
21.9-22.5	West Side	-	FAR-UP	-	FAR-DN
23.0-23.8	School Section	-	FAR-UP	-	FAR-UP
26.8-27.6	South Bridge Field	FAR-UP	FAR-UP	FAR-UP	FAR-UP
27.6-29.2	Dam Enclosure	FAR-UP	*	FAR-UP	FAR-UP
29.2-29.9	South Bridge Field	-	*	FAR-NA	FAR-NA

FAR-NA= Functional-At-Risk-No Apparent Trend, FAR-UP=Functional-At-Risk with Upward Trend, FAR-DN= Functional-At-Risk with Downward Trend. \*These reaches are mentioned in the previous rangeland health assessment as being FAR-UP, but the data sheets cannot be located.

Riparian designated monitoring areas (DMAs) were established at three locations (stream miles 17.5, 22.2, and 29.4) on Clover Creek within the Clover Crossing Allotment in 2011. Livestock use indicators (stubble height, streambank alteration and woody species use) were read at the three DMAs in 2012 (Table 15). Average greenline to greenline width (GGW) was measured when DMAs were established in 2011.

**Table 15: Livestock Use Indicator Data Collected at DMAs**

DMA	Date	Average GGW in 2011 (m)	Median Stubble Height of Key Species (in)	Streambank Alteration (%)	Woody Species Use (%)
17.5	6/27/2012	14.5	10.0	0%	10.0%
22.2	6/26/2012	6.7	9.5	0%	9.9%
29.4	6/26/2012	6.3	10.0	0%	7.5%

The DMAs at 17.5 and 22.2 are accessible to livestock from the West Side Pasture. The 17.5 DMA is also accessible from the Clover Pasture. These DMAs were visited in 2013, but no measurements of stubble height, streambank alteration, or woody species use were taken as livestock use had not occurred within the DMAs. Photos were taken at the DMAs. The West

Side Pasture was not grazed during the winter of 2013. DMA 29.4 is accessible to livestock from the South Bridge Field Pasture and was visited in 2013. No livestock use had occurred, so no measurements were taken. Photos were taken of the DMA. Livestock access to Clover Creek from the South Bridge Field Pasture is difficult due to steep terrain between the uplands of the pasture and the riparian area along Clover Creek.

**Evaluation of Standard 2**

Clover Creek reaches 17.4-18.3, 18.3-18.5, 23.0-23.8, and 26.8-27.6 were determined to be functional-at-risk with an upward trend during the most recent PFC assessment. Vegetation items from the most recent PFC assessments in these reaches were all marked “yes” except item 11 (Table 16).

**Table 16: Vegetation Items from PFC Assessments in the Clover Crossing, School Section and West Side Pastures.**

Vegetation Item from PFC Assessment Form	Reach 17.4-18.3		Reach 18.3-18.5		Reach 18.5-21.9		Reach 21.9-22.5		Reach 23.0-23.8	
	1999	2006	1999	2006	1999	2006	1999	2006	1999	2006
There is a diverse age class distribution of riparian-wetland vegetation (recruitment for maintenance and recovery) (6)	Yes	Yes								
There is a diverse composition of riparian-wetland vegetation (for maintenance/recovery) (7)	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Species present indicate maintenance of riparian-wetland soil moisture characteristics (8)	Yes	Yes								
Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-stream flow events (9)	Yes	Yes								
Riparian plants exhibit high vigor (10)	Yes	Yes								
Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows (11)	No	No	No	No	Yes	No	No	No	No	No
Plant communities in the riparian area are an adequate source of coarse and/or large woody material (for maintenance/recovery) (12)	N/A	N/A								

A “yes” indicates the attribute or process is appropriate for the reach. Item 11 was marked “no” within these reaches due to the presence of exposed streambanks that would be subject to stream energy during high flows. Riparian vegetation within these reaches includes a diverse composition of species and age class structure.

Clover Creek reaches 18.5-21.9 and 21.9-22.5 were determined to be functional-at-risk with a downward trend during the most recent PFC assessment. Vegetation items from the most recent PFC assessments in these reaches were all marked “yes” except item 11 (Table 16). Item 11 was marked “no” within these reaches due to the presence of exposed streambanks that would be subject to erosion during high flows. Riparian vegetation within these reaches includes a diverse composition of species and age class structure.

Clover Creek reach 27.6-29.2 was determined to be functional-at-risk with an upward trend, and reach 29.2-29.9 was determined to be functional-at-risk with no apparent trend during the most recent PFC assessments. All vegetation items from the most recent PFC assessments in these reaches were marked “yes” (Table 17). Riparian vegetation is present within these reaches to protect streambanks during periods of high flows. Riparian vegetation within these reaches includes a diverse composition of species and age class structure.

**Table 17: Vegetation Items Ratings from the South Bridge Field Pasture.**

Vegetation Item from PFC Assessment Form	Reach 26.8-27.6			Reach 27.6-29.2			Reach 29.2-29.9		
	1996	1999	2004	2006	1996	2004	2006	2004	2006
There is a diverse age class distribution of riparian-wetland vegetation (recruitment for maintenance and recovery) (6)	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
There is a diverse composition of riparian-wetland vegetation (for maintenance/recovery) (7)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Species present indicate maintenance of riparian-wetland soil moisture characteristics (8)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-stream flow events (9)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Riparian plants exhibit high vigor (10)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows (11)	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Plant communities in the riparian area are an adequate source of coarse and/or large woody material (for maintenance/recovery) (12)	N/A	N/A	No	N/A	N/A	No	N/A	No	N/A

Three riparian DMAs exist within the Clover Crossing Allotment. Stubble height remaining post-grazing should exceed 6 inches on fish bearing streams that are functional-at-risk with no apparent trend (DMA 29.4) or downward trend (DMA 22.2). Stubble height remaining post-grazing should exceed 4 inches on fish bearing streams that are in properly functioning condition

or function-at-risk with and upward trend (DMA 17.5). Utilization of woody riparian plants should not exceed 50 percent of the current year's growth. Minimum stubble height and woody browse utilization levels at all three of the DMAs in 2012 was within limits designed to result in improvement of riparian conditions (Table 15). No measurements of stubble height or woody browse utilization were taken in 2013 as no livestock use occurred within the DMAs.

***Evaluation Finding – Clover, West Side, School Section, and South Bridge Field Pastures are:***

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

***Rationale for Evaluation Finding***

The stream channel of Clover Creek throughout much of the Clover Crossing Allotment is incised and has down cut as the result of historic land management practices. The down cutting has resulted in Clover Creek being disconnected from its' historic flood plain in some areas. The incision and down cutting are no longer occurring, but has resulted in areas where vertical cut banks exist. Some cut banks exceed six feet in height. These cut banks are the reason item 11 from the PFC assessment forms were marked "no" for many reaches within the Allotment. Due to the height of some cut banks above the water table, riparian vegetation has yet to establish on the top of these banks, but hydric vegetation species are established along the base of the cut banks.

Young willows are common throughout the reaches within the allotment, but mature willow are still lacking in some areas, both inside and outside of the exclosures. All reaches contain multiple age class of willows and a diverse composition of species. Riparian vegetation is stabilizing streambanks during typical peak flows, but some cut banks are still likely susceptible to stream energy during years with abnormally high peak flows.

Along with stabilizing streambanks, riparian vegetation is also filtering sediment and aiding in floodplain development. Shallow rooted species such as Kentucky bluegrass (*Poa pratensis*) are a minor component of riparian vegetation. Noxious weeds within the riparian area do not appear to be increasing, but noxious weeds (primarily Canada thistle) are present.

None of the reaches of Clover Creek within the allotment were determined to be in properly functioning condition during the most recent (2006) PFC assessments. While the stream reaches within the allotment are not in properly function condition, conditions are improving. Clover Creek stream reaches within the Clover Crossing Allotment are making significant progress towards meeting Standard 2.

**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.*

***Allotment Summary for Standard 3 (Stream Channel/Floodplain):***

**Echo Clover Allotment**

X Standard Doesn't Apply

No perennial streams, springs, wetlands, or riparian vegetation are present in the Allotment. Standard 3 does not apply to the Echo Clover Allotment.

**Clover Crossing Allotment**

**North Bridge Field Pasture**

X Standard Doesn't Apply

No perennial streams, springs, wetlands, or riparian vegetation are accessible to livestock in the North Bridge Field Pasture. Standard 3 does not apply to the North Bridge Field Pasture of the Clover Crossing Allotment.

**Evaluation of Standard 3**

**Clover, West Side, School Section, and South Bridge Field Pastures**

Clover Creek reach 17.4-18.3 was rated functional-at-risk with an upward trend during the most recent PFC assessment. Hydrology and erosion/deposition items from the most recent PFC assessment were all marked “yes” except items 3 and 17 (Table 18). A “yes” indicates the attribute or process is appropriate for the reach. Item 3 was marked no due to the stream channel being over widened. Item 17 was marked “no” due to excessive deposition and erosion within the reach.

**Table 18: Hydrology and Erosion/Deposition Item Ratings from the Clover Crossing, School Section and West Side Pastures.**

Hydrology and Erosion/Deposition Item from PFC Assessment Form	Reach 17.4-18.3		Reach 18.3-18.5		Reach 18.5-21.9		Reach 21.9-22.5		Reach 23.0-23.8	
	1999	2006	1999	2006	1999	2006	1999	2006	1999	2006
Floodplain above bankfull inundated in "relatively frequently" events (1-3 years) (1)	Yes	Yes								
Active/stable beaver dams, where present (2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	N/A
Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region) (3)	No	No								
Riparian zone is widening or has achieved potential extent (4)	Yes	Yes								
Upland watershed is not contributing to riparian-wetland degradation (5)	Yes	Yes								
Floodplain and channel characteristics (i.e. rocks, overflow channels, coarse and/or large woody debris) are adequate to dissipate energy (13)	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No

Hydrology and Erosion/Deposition Item from PFC Assessment Form	Reach 17.4-18.3		Reach 18.3-18.5		Reach 18.5-21.9		Reach 21.9-22.5		Reach 23.0-23.8	
	1999	2006	1999	2006	1999	2006	1999	2006	1999	2006
Point bars are revegetating with riparian-wetland vegetation (14)	Yes	Yes								
Lateral stream movement is associated with natural sinuosity (15)	Yes	Yes								
System is vertically stable (16)	Yes	Yes								
Stream in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion and deposition) (17)	No	No								

Clover Creek reaches 18.3-18.5 and 23.0-23.8 were determined to be functional-at-risk with an upward trend during the most recent PFC assessment. Clover Creek reaches 18.5-21.9 and 21.9-22.5 were determined to be functional-at-risk with a downward trend during the most recent PFC assessment. Hydrology and erosion/deposition items 3, 13, and 17 were marked “no” on the forms from the most recent PFC assessment (Table 18). Item 3 was marked “no” due to the stream channel being over widened. Item 13 was marked “no” for these reaches due to lack of rock and overflow channels sufficient to dissipate stream energy. Item 17 was marked “no” due to excessive erosion and deposition occurring within the reaches. All other hydrology or erosion/deposition items applicable to these reaches were marked “yes”.

Clover Creek reach 26.8-27.6 was determined to functional-at-risk with an upward trend during the most recent PFC assessment. All hydrology and erosion/deposition items from the most recent PFC assessment form were marked “yes” except item 17 (Table 19). Item 17 was marked “no” due to excess deposition occurring within the reach.

**Table 19: Hydrology and Erosion/Deposition Item Ratings from the South Bridge Field Pasture.**

Hydrology and Erosion/Deposition Item from PFC Assessment Form	Reach 26.8-27.6				Reach 27.6-29.2			Reach 29.2-29.9	
	1996	1999	2004	2006	1996	2004	2006	2004	2006
Floodplain above bank-full inundated in "relatively frequently" events (1-3 years) (1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Active/stable beaver dams, where present (2)	No	No	Yes	Yes	No	Yes	N/A	No	N/A
Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region) (3)	No	No	Yes	Yes	No	No	No	No	No
Riparian zone is widening or has achieved potential extent (4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Upland watershed is not contributing to riparian-wetland degradation (5)	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Floodplain and channel characteristics (i.e. rocks, overflow channels, coarse and/or large woody debris) are adequate to	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes

Hydrology and Erosion/Deposition Item from PFC Assessment Form	Reach 26.8-27.6				Reach 27.6-29.2			Reach 29.2-29.9	
	1996	1999	2004	2006	1996	2004	2006	2004	2006
dissipate energy (13)									
Point bars are revegetating with riparian-wetland vegetation (14)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes
Lateral stream movement is associated with natural sinuosity (15)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
System is vertically stable (16)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stream in in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion and deposition) (17)	No	No	No	No	No	No	Yes	No	No

Clover Creek reach 27.6-29.2 was determined to be functional-at-risk with an upward trend during the most recent PFC assessment. All hydrology and erosion/deposition items from the most recent PFC assessment form were marked “yes” except items 3 and 15 (Table 19). Items 3 and 15 were marked “no” due to multiple or multi-thread channels being present.

Clover Creek reach 29.2-29.9 was determined to be functional-at-risk with no apparent trend during the most recent PFC assessment. All hydrology and erosion/deposition items from the most recent PFC assessment form were marked “yes” except items 3 and 17 (Table 19). Item 3 was marked “no” due to the stream channel being over widened. Item 17 was marked “no” due to excess deposition occurring within the reach.

Three riparian DMAs exist within the Clover Crossing Allotment. Streambank alteration criteria for fish bearing streams is 10 percent, and is designed to result in improvement of stream conditions. Streambank alteration in 2012 was 0 percent at all three DMAs (Table 15). No measurements of streambank alteration were taken in 2013 as no livestock use occurred within the DMAs.

***Evaluation Finding – Clover, West Side, School Section, and South Bridge Field Pasture are:***

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

***Rationale for Evaluation Finding***

None of the reaches of Clover Creek within the Clover Crossing Allotment were determined to be in properly functioning condition during the most recent (2006) PFC assessments. The stream channel throughout much of the allotment is incised and has down cut resulting from historic land management. Down cutting of the stream channel is no longer occurring.

The historic incision and down cutting of Clover Creek is no longer occurring but has resulted in Clover Creek being disconnected from its flood plain in some areas of the allotment. Due to the incision and down cutting, the width/depth ratio of Clover Creek is not appropriate for the landscape as the stream channel is overly widened. The sinuosity has also been reduced, and the

pool/riffle frequency is not appropriate as pools are lacking. Excessive sediment deposition was also noted in the reaches of Clover Creek within the allotment.

**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*

**Echo Clover Allotment**

X Standard Doesn't Apply

Plant communities within the Echo Clover Allotment have been modified. The allotment has been seeded with crested wheatgrass following past wildfires. Therefore, Standard 4 for Native Plant Communities does not apply and the Echo Clover Allotment is assessed under Standard 5.

**Clover Crossing Allotment**

**Rangeland Health Assessment**

The School Section and South Bridge Field Pastures are evaluated under Standard 4. The vast majority of the School Section and South Bridge Field Pastures are dominated by native plant communities, as shown by the vegetation cover data collected in 2012 (Table 20). Field notes recorded during the 2012 and 2013 IIRH indicate the presence of native shrubs, grasses, and forbs. No noxious weed species were noted at the sites during the evaluation.

Three of the six IIRH evaluation sites (SS, NBF\_2, and SBF) within the Clover Crossing Allotment are located within native plant communities. Vegetative cover data collected within the native plant communities of the School Section and South Bridge Field Pastures are included below in Table 20. Because the North Bridge Field Pasture is assessed under Standard 5, site NBF\_2 is included in Table 22 under seeded plant communities. The remaining three sites (CP\_3, WS, and NBF\_1) are located within seeded plant communities and are also included under Standard 5.

Cover data was collected in 2012 at two IIRH sites within the pastures (School Section and South Bridge Field) assessed under Standard 4. Cover data collected at the sites is summarized below in Table 20. Vegetative cover data was collected at multiple layers; however, Table 20 displays only the top layer. Sandberg bluegrass is the dominant grass species and Wyoming big sagebrush is the dominant shrub species within the native plant communities.

**Table 20: Percent Cover (Top Layer) at IIRH sites**

Vegetation Class	Species	% Cover	
		2012 SS Site	2012 SBF Site
		School Section Pasture	South Bridge Field Pasture
Perennial Grasses	Thurber's needlegrass	2.5%	0.0%
	Squirreltail	1.0%	4.5%

Vegetation Class	Species	% Cover	
		2012 SS Site	2012 SBF Site
		School Section Pasture	South Bridge Field Pasture
Annual Grasses	Sandberg bluegrass	29.5%	12.5%
	Small Fescue	1.5%	0.0%
	Cheatgrass	19.0%	3.0%
Perennial Forbs	Longleaf phlox	0.5%	0.5%
	Larkspur	0.0%	1.0%
Shrubs	Wyoming big sagebrush	14.5%	22.5%
<b>Vegetation Total</b>		<b>68.5%</b>	<b>44%</b>
Other Cover	Bare Ground	9.5%	24.5%
	Biological soil crust	6.0%	14.5%
	Litter in Contact with Soil	8.0%	5.5%
	Litter Standing	7.0%	10.5%
	Persistent Litter	0.5%	1.0%
	Rock or Gravel	0.5%	0.0%
<b>Grand Total</b>		<b>100%</b>	<b>100%</b>

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

Vegetative cover data were also recorded at an additional site within the South Bridge Field Pasture in 2002 (production and cover). The 2002 cover data is summarized below in Table 21. Vegetative cover data was collected at multiple layers; however, Table 21 displays only the top layer.

**Table 21: Percent Cover (Top Layer) at Additional Site**

Vegetation Class	Species	% Cover	
		2002 Cover Site CCC-5	
		South Bridge Field Pasture	
Perennial Grasses	Squirreltail	14%	
	Sandberg bluegrass	11%	
	Thurber's needlegrass	11%	
	Indian ricegrass	1%	
Annual Grasses	Cheatgrass	3%	
Perennial Forbs	Longleaf phlox	3%	
Annual Forbs	Curveseed butterwort	1%	
Shrubs	Wyoming big sagebrush	10%	
<b>Vegetation Total</b>		<b>54%</b>	
Other Cover	Bare Ground	19%	
	Biological soil crust	11%	

Vegetation Class	Species	% Cover	
		2002 Cover Site CCC-5	
		South Bridge Field Pasture	
	Litter in contact with soil	13%	
	Litter Standing	3%	
	Persistent Litter	0%	
	Rock or Gravel	0%	
<b>Grand Total</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 2002 production and cover data and the 2012 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 pastures.

While the amount of litter deviated from the reference condition in most areas, 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 annual plant growth/production matching what is expected.

#### School Section Pasture

##### *IIRH Site SS. Loamy 8-12"*

Site SS is located in the School Section Pasture within a native vegetation community where Sandberg bluegrass comprises 29.5 percent of cover and cheatgrass comprises 19 percent of cover. Wyoming big sagebrush is the dominant shrub species (14.5% cover) at the site. In addition, biological soil crusts comprise 6 percent of cover (Table 20). The site is of relatively flat topography and has not burned by wildfire in over 50 years (Photo 3). A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 4.6, indicating adequate soil surface resistance to erosion.

Deep-rooted perennial bunchgrasses were noted in the 2012 IIRH field notes to be lower in abundance than expected at the site. It was also noted that cheatgrass appeared to be outcompeting native deep-rooted perennial bunchgrasses, as well as perennial forbs. Therefore, the functional/structural group indicator was rated a moderate departure from the reference condition.

The indicator for litter amount was rated a moderate departure from the reference condition due to an increased amount of litter (38% cover for all layers) found at the site.

Cheatgrass comprises 19 percent of cover (Table 20) and was noted in the 2012 IIRH field notes to be common throughout the site and dominant in some localized areas. Therefore, the indicator for invasive plants was rated a moderate to extreme departure from the reference condition due to cheatgrass.

All indicators related to the Biotic Integrity attribute other than Functional/Structural Groups,

Litter Amount, and Invasive Plants were rated none to slight. The Biotic Integrity attribute was rated slight to moderate departure from the reference condition due to the shift in functional/structural groups in combination with cheatgrass being common throughout the site.

### Photo 3. Overview of IIRH Site SS



#### South Bridge Field Pasture *IIRH Site SBF. Loamy 8-12"*

Site SBF is located in the South Bridge Field Pasture within a native vegetation community where Sandberg bluegrass comprises 12.5 percent of cover and squirreltail comprises 4.5 percent of cover. Wyoming big sagebrush is the dominant shrub species (22.5% cover) at the site. In addition, biological soil crusts comprise 14.5 percent of cover (Table 20). The site is of relatively flat topography and has not burned by wildfire in over 50 years.

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

Cheatgrass comprises 3 percent of cover (Table 20) and was noted in the 2012 IIRH field notes to be scattered throughout the site and more prevalent in disturbed areas (along roads, varmint mounds, etc.). Therefore, the indicator for invasive plants was rated as a moderate departure from the reference condition due to cheatgrass.

All other indicators related to the Biotic Integrity attribute were rated none to slight. The Biotic Integrity attribute was rated a slight to moderate departure from the reference condition due to

the invasive cheatgrass scattered throughout the site.

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

The Biotic Integrity attribute was rated slight to moderate at both IIRH sites within the two pastures assessed under standard 4.

The functional/structural group indicator was rated as none to slight departure from reference condition at site SBF but was rated a moderate departure at site SS due to the low abundance of deep-rooted perennial grass species and a high abundance of cheatgrass.

The litter amount indicator was rated slight to moderate departure at site SBF and moderate at site SS. 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 slight to moderate departure from the reference condition at site SBF and moderate to extreme at site SS. Cheatgrass ranged from being scattered at site SBF to being common throughout site SS.

**Evaluation of Standard 4**

The native plant communities of the School Section and South Bridge Field Pastures have a high abundance of Sandberg bluegrass and Wyoming Big Sagebrush, as well as other desirable herbaceous vegetation that are providing soil cover and resistance to erosion, as documented in the 2002 cover data and the 2012 HAF data (Tables 20 and 21). However, the 2012 IIRH field notes indicate a low abundance of deep-rooted perennial grasses within the native plant communities of the School Section Pasture. Perennial species that are present within the native areas of the Clover Crossing Allotment are appropriately productive and are capable of reproduction and recruitment of new seedlings.

Cheatgrass is common in some native plant communities and was noted to be dominant in some localized areas. Moreover, it was noted during the 2012 IIRH field visit that cheatgrass appeared to be outcompeting deep-rooted perennial bunchgrasses and perennial forbs within the School Section Pasture. In addition, cheatgrass is scattered throughout some areas of the South Bridge Field Pasture. IIRH field notes do not indicate any other invasive species were present at the evaluation sites.

***Evaluation Finding – School Section Pasture is:***

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

***Rationale for Evaluation Finding***

The 2012 IIRH field notes indicate that deep-rooted perennial bunchgrasses were of low abundance across the native plant communities of the School Section Pasture and do not comprise the dominant functional/structural group, as described in the ESD for the reference condition. This is indicative of a shift in the relative dominance of vegetation functional/structural groups, with an increase in shallow-rooted perennial bunchgrasses, namely

Sandberg bluegrass, throughout the native plant communities of the pasture. 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 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 within the School Section Pasture have a high abundance of Sandberg bluegrass and biological crusts (Table 20) that provide soil cover. The soil stability test conducted within the pasture indicated adequate soil surface resistance to erosion.

Adequate litter is present within the pasture to provide cover for site protection. The litter amount indicator rating deviated from the reference condition found in the ESD at the site. 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.

Cheatgrass comprises a high percent of cover (Table 20) and is common throughout the pasture and dominant in some localized areas. Cheatgrass appeared to be outcompeting native deep-rooted perennial bunchgrasses, as well as perennial forbs. No noxious weed species were noted within the pasture. Invasive species such as cheatgrass can become a threat to biotic integrity and can influence ecological processes.

The native plant communities of the School Section Pasture are not functioning to maintain or promote native animal habitat or native plant populations. Due to the high abundance of cheatgrass, as well as the reduced relative dominance of deep-rooted perennial bunchgrasses, the diversity of native species has not been maintained or improved within the pasture. Therefore the School Section Pasture of Clover Crossing Allotment is not meeting Standard 4.

***Evaluation Finding – South Bridge Field Pasture is:***

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

***Rationale for Evaluation Finding***

The 2012 IIRH field notes, as well as the HAF cover data, indicate that deep-rooted perennial bunchgrasses were of low abundance at the IIRH site within the South Bridge Field Pasture and do not comprise the dominant functional/structural group in that area, as described in the ESD for the reference condition. This could be indicative of a shift in the relative dominance of vegetation functional/structural groups, with an increase in shallow-rooted perennial bunchgrasses, mostly Sandberg bluegrass. However, most areas of the South Bridge Field Pasture contain an adequate abundance of Thurber's needle grass or other deep-rooted perennial bunchgrass, as shown in the cover data collected at the 2002 site (Table 21). Deep-rooted perennial bunchgrasses can help support nutrient cycling and energy flow due to their above and below ground structure. Deep-rooted grasses generally have a longer active growth period, larger root systems, and relatively higher potential to capture and store carbon below ground.

The native plant communities within the pasture have a high abundance of Sandberg bluegrass and Wyoming big sagebrush, as well as other desirable vegetation and biological crusts (Tables 20 and 21) that are providing soil cover and competition to invasive species. The perennial species present within the pasture are appropriately productive and are capable of reproduction and recruitment of new seedlings.

Adequate litter is present within the pasture to provide cover for site protection. The litter amount indicator rating deviated from the reference condition found in the ESD at the site. 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.

Cheatgrass comprises a low percent of cover (Tables 20 and 21) within the South Bridge Field Pasture and was noted as being scattered at the site and found in disturbed areas (rodent mounds, along roads, etc.). It was also noted that cheatgrass was more prevalent near the main graveled roads adjacent to the IIRH site. No noxious weed species were noted within the South Bridge Field Pasture. Invasive species such as 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 of the South Bridge Field Pasture to hinder further spread or establishment of invasive or noxious plant species.

As ordered in the 2005 SSA, the South Bridge Field Pasture was rested from livestock grazing from 2005 through 2010. The South Bridge Field Pasture was re-opened to livestock grazing following the 2011 Court Order and subsequent IGMP. Actual use within the South Bridge Field Pasture from 2005 to 2013 is included in Table 5.

Since 2011, the South Bridge Field Pasture has been grazed in a deferred rotation system outlined each year in the AGP. The changes in management following the 2011 Court Order are expected to provide for the continued maintenance or improvement of native animal habitat, native plant populations, and ecological processes (nutrient cycling, hydrologic cycling, and energy flow) in the South Bridge Field Pasture. Therefore, the South Bridge Field Pasture is meeting Standard 4.

#### **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**

Plant communities within the Echo Clover Allotment and the Clover, West Side, and North Bridge Field Pastures of the Clover Crossing Allotment have been modified. Therefore, Echo Clover Allotment and the Clover, West Side, and North Bridge Field Pastures of the Clover Crossing Allotment are evaluated under Standard 5. Fourteen different wildfires have occurred within the allotments since 1981, and various drill and aerial seeding efforts have been undertaken to rehabilitate burned areas. Records indicate that the allotments have been drill

seeded and aerially seeded with a variety of native and non-native species. Nearly the entire Echo Clover, Clover, and West Side Pastures were seeded following wildfires that occurred between 1981 and 2002, and approximately half of the North Bridge Field Pasture was seeded following the Buck N Doe Fire of 1999. As a result of these treatments, the Pastures are currently vegetated by both native and non-native perennial grass species (Map 3, Table 8).

While a large area of the North Bridge Field Pasture is currently mapped as native (Sandberg bluegrass, Wyoming big sagebrush/Sandberg bluegrass), the northern portion of the pasture has been seeded to crested wheatgrass and the southern half has been seeded to Secar bluebunch wheatgrass. The western portion of the West Side Pasture has been seeded with crested wheatgrass and fourwing saltbush, while the remainder of the pasture has been seeded with Secar bluebunch wheatgrass. Furthermore, nearly the entire Clover Pasture, as well as the Echo Clover Allotment, has been seeded with crested wheatgrass.

The 1981 Clover Fire burned approximately 775 acres (4.7%) of the Clover Pasture of the Clover Crossing Allotment. No fire rehabilitation information is available for this fire.

The 1982 Crown Nest Fire burned approximately 670 acres (26.7%) of the Echo Clover Allotment and approximately 750 acres (4.5%) of the Clover Pasture of the Clover Crossing Allotment. The fire rehabilitation plan prescribed seeding the burned area with crested wheatgrass.

The 1984 Winter Camp 2 Fire burned approximately 2,700 acres (16.2%) of the Clover Pasture of the Clover Crossing Allotment. The fire rehabilitation plan prescribed seeding 2,000 acres of the burned area with crested wheatgrass and Nomad alfalfa, and seeding another 600 acres with crested wheatgrass, four-wing saltbush, Lewis flax, and Nomad alfalfa.

The 1985 Crow's Nest Fire burned the entire Echo Clover Allotment and approximately 13,000 acres (78.1%) of the Clover Pasture of the Clover Crossing Allotment. The fire also burned a small portion of the North Bridge Field Pasture. The fire rehabilitation plan prescribed seeding 41,950 acres with a mixture of grasses, forbs, and shrubs. Approximately 38,025 acres of the burned area were to be seeded with crested wheatgrass and alfalfa.

The 1985 Winter Camp Fire burned approximately 465 acres (29.3%) of the West Side Pasture of the Clover Crossing Allotment. The burned acres within the West Side Pasture were subsequently seeded with Fairway crested wheatgrass, Rambler alfalfa, and four-wing saltbush.

The 1995 Tuana Fire (Clover Complex) burned approximately 13,000 acres (78.1%) of the Clover Pasture, 1,000 acres (28.7%) of the North Bridge Field Pasture, 300 acres (18.9%) of the West Side Pasture, and 500 acres (17.6%) of the South Bridge Field Pasture. Some of the burned areas within the Clover Crossing Allotment were drill seeded with hycrest crested wheatgrass and four-wing saltbush and some additional acres were aerially seeded with Wyoming big sagebrush, yellow sweetclover, and Ladak alfalfa.

The 1999 Doe Fire (Buck N Doe Fire) burned approximately 1,400 acres (40.1%) of the North Bridge Field Pasture and almost 50 acres (1.8%) of the South Bridge Field Pasture. The fire

rehabilitation plan prescribed drill seeding 5,700 acres of the 8,095 acre fire with a mixture of bluebunch wheatgrass, thickspike, western wheatgrass, basin wildrye, and sainfoin. In addition, 6,300 acres were prescribed to be aerially seeded with a mixture of Lewis flax, small burnette, and Wyoming big sagebrush.

The 2000 Crimson Clover Fire burned approximately 2,375 acres (94.6%) of the Echo Clover Allotment and 470 acres (2.8%) of the Clover Pasture of the Clover Crossing Allotment. Approximately 720 acres of the Echo Clover Allotment were subsequently seeded with Siberian wheatgrass and four-wing saltbush.

The 2001 Clover T Fire burned approximately 360 acres (2.2%) of the Clover Pasture of the Clover Crossing Allotment. No fire rehabilitation information is available for this fire.

The 2002 Clot Fire burned approximately 1,100 acres (69.4%) of the West Side Pasture, 150 acres (0.9%) of the Clover Pasture, and 90 acres (10.6%) of the School Section Pasture of the Clover Crossing Allotment. The fire rehabilitation plan prescribed drill seeding 535 acres of the West Side Pasture with a mixture of Secar bluebunch wheatgrass, Sherman big bluegrass, globemallow, penstemon, Ladak alfalfa, Eski sainfoin, and Wyoming big sagebrush. Additionally in the Clover Crossing Allotment, sagebrush seedlings have been hand planted in approximately 130 acres of the West Side Pasture

The 2006 Big Draw Fire burned approximately 440 acres (17.5%) of the Echo Clover Allotment and 960 acres (5.8%) of the Clover Pasture of the Clover Crossing Allotment. The fire rehabilitation plan did not prescribe seeding the burned areas within these allotments.

The 2006 Sailor Cap Fire burned approximately 730 acres (29.1%) of the Echo Clover Allotment. The fire rehabilitation plan did not prescribe seeding the burned areas within the Allotment.

The 2010 Long Butte Fire burned approximately 1,480 acres (58.9%) of the Echo Clover Allotment. The fire rehabilitation plan did not prescribe seeding the burned areas within the Allotment.

The 2011 Clover Butte Fire burned approximately 190 acres (6.7%) of the South Bridge Field Pasture. The fire rehabilitation plan prescribed drill seeding the burned area with a mixture of Anatone bluebunch wheatgrass, Rattlesnake bottlebrush squirreltail, Ladak alfalfa, and western yarrow.

Three of the six IIRH evaluation sites within the Clover Crossing Allotment are located within seeded plant communities, as shown by vegetation cover data collected in 2013 (Table 22). The remaining IIRH site (NBF\_2) is located within a native plant community in the North Bridge Field Pasture and represents less than half of the pasture. IIRH site CP\_3 is representative of the Clover Pasture of the Clover Crossing Allotment, as well as the Echo Clover Allotment.

Cover data was collected within the allotments in 2002, 2012, 2013, and 2014. The cover data for the pastures assessed under Standard 5 (Echo Clover, Clover, West Side, and North Bridge

Field) is summarized below in Tables 22 and 23. Vegetative cover data was collected at multiple layers; however, tables 22 and 23 display only the top layer.

**Table 22: Percent Cover (Top Layer) at IIRH sites**

Vegetation Class	Species	% Cover			
		2013 CP_3 Site	2014 WS Site	2013 NBF_1 Site	2013 NBF_2 Site
		Clover Pasture	West Side Pasture	North Bridge Field Pasture	
<b>Perennial Grasses</b>	Squirreltail	0%	3%	0%	2%
	Crested wheatgrass	9%	0%	0%	0%
	Bluebunch wheatgrass	0%	3%	6%	0%
	Indian ricegrass	0%	1%	0%	0%
	Sandberg bluegrass	24%	23%	16%	8%
	Basin wildrye	0%	0%	1%	0%
	Western wheatgrass	0%	0%	1%	0%
<b>Annual Grasses</b>	Cheatgrass	7%	6%	5%	20%
<b>Perennial Forbs</b>	Carpet phlox	0%	0%	2%	0%
<b>Annual Forbs</b>	Curveseed butterwort	3%	0%	2%	4%
	Slender phlox	1%	0%	0%	0%
	Tumblemustard	0%	0%	1%	0%
	Maiden blue-eyed Mary	1%	0%	0%	0%
<b>Shrubs</b>	Yellow rabbitbrush	0%	3%	0%	2%
	Wyoming big sagebrush	0%	0%	0%	8%
<b>Vegetation Total</b>		<b>45%</b>	<b>39%</b>	<b>34%</b>	<b>44%</b>
<b>Other Cover</b>	Bare Ground	11%	5%	28%	24%
	Biological soil crust	6%	21%	6%	20%
	Litter in Contact with Soil	15%	28%	15%	6%
	Litter Standing	21%	2%	16%	6%
	Persistent Litter	1%	2%	0%	0%
	Rock or Gravel	1%	3%	1%	0%
<b>Grand Total</b>		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

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

Vegetative cover data were also recorded at additional sites within the Echo Clover Allotment and the Clover and North Bridge Field Pastures in 2002, 2012, and 2013. The cover data is summarized below in Table 23. Vegetative cover data was collected at multiple layers; however, Table 23 displays only the top layer.

**Table 23. Percent ground cover (top layer) recorded in 2002, 2012, and 2013 in other areas of the Echo Clover Allotment and the Clover and North Bridge Field Pastures.**

Vegetation Class	Species	% Cover						
		EC_1 2013	ECC-1 2002	CP_1 2012	CCC-1 2002	CCC-2 2002	CCC-3 2002	CCC-4 2002
		Echo Clover Allotment			Clover Pasture			
<b>Perennial Grasses</b>	Bluebunch wheatgrass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%
	Squirreltail	1.0%	0.0%	2.0%	0.0%	7.0%	3.0%	7.0%
	Crested wheatgrass	12.0%	31.0%	0.5%	21.0%	26.0%	18.0%	0.0%
	Indian ricegrass	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%
	Sandberg bluegrass	11.0%	8.0%	40.0%	11.0%	25.0%	16.0%	7.0%
	Thickspike wheagrass	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	5.0%
	Thurber's needlegrass	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	0.0%
<b>Annual Grasses</b>	Cheatgrass	1.0%	1.0%	11.5%	0.0%	2.0%	8.0%	1.0%
	Sixweeks fescue	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%
<b>Perennial Forbs</b>	Carpet phlox	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
	Longleaf phlox	1.0%	0.0%	0.5%	3.0%	1.0%	3.0%	2.0%
	Sagebrush phlox	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Annual Forbs</b>	Curveseed butterwort	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	21.0%
	Tall tumbled mustard	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%
<b>Shrubs</b>	Antelope bitterbrush	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%
	Wyoming big sagebrush	0.0%	0.0%	11.5%	0.0%	0.0%	8.0%	0.0%
	Yellow rabbitbrush	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%	0.0%
<b>Vegetation Total</b>		<b>27.0%</b>	<b>40.0%</b>	<b>67.5%</b>	<b>36.0%</b>	<b>72.0%</b>	<b>63.0%</b>	<b>46.0%</b>
<b>Other Cover</b>	Bare Ground	12.0%	37.0%	10.5%	15.0%	13.0%	19.0%	37.0%
	Biological soil crust	0.0%	6.0%	8%	15.0%	3.0%	2.0%	1.0%
	Litter in contact with soil	17.0%	9.0%	3%	26.0%	12.0%	16.0%	7.0%

Vegetation Class	Species	% Cover						
		EC_1 2013	ECC-1 2002	CP_1 2012	CCC-1 2002	CCC-2 2002	CCC-3 2002	CCC-4 2002
		Echo Clover Allotment		Clover Pasture				North Bridge Field Pasture
	Litter Standing	44.0%	0.0%	11%	8.0%	0.0%	0.0%	0.0%
	Persistent Litter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Rock or Gravel	0.0%	8.0%	0.0%	0.0%	0.0%	0.0%	9.0%
<b>Grand Total</b>		<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

While the amount of litter deviated from the reference condition in most areas, 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 annual plant growth/production matching what is expected.

Clover Pasture (also represents the Echo Clover Allotment)

*IIRH Site CP\_3. Loamy 8-12”*

Site CP\_3 is located in the Clover Pasture within a seeded vegetation community where Sandberg bluegrass comprises 24 percent of cover and crested wheatgrass comprises 9 percent of cover. No shrubs were present at the site. Meanwhile, biological soil crusts comprise 6 percent of cover (Table 22). The site is of relatively flat topography and has burned by wildfire twice since 1985. A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 4.7, indicating adequate soil surface resistance to erosion. The ID Team determined that site CP\_3 was representative of not only the Clover Pasture of the Clover Crossing Allotment, but also representative of the Echo Clover Allotment as well (Photo 4).

The 2013 IIRH field notes and cover data indicate that shrubs are generally lacking from the site and the number of forb species is reduced; therefore, the functional/structural group indicator was rated a moderate departure from the reference condition.

The indicator for litter amount was rated a moderate departure from the reference condition due to an increased amount of litter (42% cover for all layers) found at the site.

Cheatgrass was recorded at 7 percent and curvseed butterwort was recorded at 3 percent of cover along the 2013 HAF transect. Cheatgrass and curvseed butterwort were noted during IIRH to be scattered throughout the site; however, it was also noted that the species were found mostly in disturbed areas (rodent mounds, pipelines, etc.). The indicator for invasive plants was rated moderate due to the presence of curvseed butterwort and cheatgrass.

All indicators related to the Biotic Integrity attribute other than Functional/Structural Groups, Litter Amount, and Invasive Plants were rated none to slight. The Biotic Integrity attribute was

rated slight to moderate departure from the reference condition due to the lack of shrubs, forbs being reduced, and cheatgrass and curvseed butterwort being scattered throughout the site.

#### **Photo 4. Overview of IIRH Site CP\_3**



#### West Side Pasture

##### *IIRH Site WS. Loamy 8-12"*

Site WS is located in the West Side Pasture within a seeded vegetation community where Sandberg bluegrass comprises 23 percent of cover. Yellow rabbitbrush is the dominant shrub species (3% cover) at the site. In addition, biological soil crusts comprise 21 percent of cover (Table 22). The site is of relatively flat topography and has burned by wildfire three times since 1985 (Photo 5). A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 5.3, indicating adequate soil surface resistance to erosion.

Shrubs were noted to be absent from the site in the 2012 IIRH field notes. It was also noted that forbs were of low diversity and abundance. Moreover, cheatgrass appeared to be outcompeting perennial forbs. Therefore, the functional/structural group indicator was rated a moderate departure from the reference condition.

The indicator for litter amount was rated a moderate departure from the reference condition due to an increased amount of litter (50% cover for all layers) found at the site.

Cheatgrass was recorded at 6 percent of cover along the HAF transect and the IIRH field notes indicated that cheatgrass was common throughout the site; therefore, the indicator for invasive plants was rated moderate to extreme 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. The Biotic Integrity attribute was rated a moderate departure from the reference condition due to the combination of the lack of shrubs, low abundance of forbs, and cheatgrass being common throughout the site.

#### **Photo 5. Overview of IIRH Site WS**



#### North Bridge Field Pasture *IIRH Site NBF\_1. Loamy 8-12"*

The ID Team determined that site NBF\_1 is representative of the majority of the North Bridge Field Pasture. The site is located in a seeded vegetation community where Sandberg bluegrass comprises 16 percent of cover and bluebunch wheatgrass comprises 6 percent of cover. No shrubs were present at the site while biological soil crusts comprise 6 percent of cover (Table 22). The site is of relatively flat topography that burned in the 1999 Doe (Buck N Doe) Fire (Photo 6). A soil stability test (Pellant et al., 2005) was completed at the site during IIRH and the soil stability value averaged 3.8, indicating a slightly reduced soil surface resistance to erosion.

The 2013 HAF data and IIRH field notes indicate that shrubs are lacking from the site; therefore, the functional/structural group indicator was rated at slight to moderate departure from the

reference condition.

The indicator for litter amount was rated a slight to moderate departure from the reference condition due to an increased amount of litter (35% cover for all layers) found at the site.

Cheatgrass was recorded at 5 percent and curvseed butterwort was recorded at 2 percent of cover along the 2013 HAF transect. Cheatgrass was noted during IIRH to be scattered throughout the site; therefore, the indicator for invasive plants was rated moderate.

All indicators related to the Biotic Integrity attribute other than Functional/Structural Groups, Litter Amount, and Invasive Plants were rated none to slight. The Biotic Integrity attribute was rated slight to moderate departure from the reference condition due to the low abundance and diversity of perennial forbs at the site.

**Photo 6. Overview of IIRH Site NBF\_1**



***IIRH Site NBF\_2. Loamy 8-12"***

The ID Team determined that site NBF\_2 does not represent the majority of the North Bridge Field Pasture. The site is located in a vegetation community where cheatgrass is the dominant grass species (20% cover) and Sandberg bluegrass is the sub-dominant grass species (8% cover). Wyoming big sagebrush is the dominant shrub species (8% cover) at the site. In addition, biological soil crusts comprise 20 percent of cover (Table 22). The site is of relatively flat topography and has not burned by wildfire in over 50 years (Photo 7).

Cheatgrass was recorded at 20 percent and curvseed butterwort was recorded at 4 percent of cover along the 2013 cover transect. Cheatgrass was noted during IIRH to be common throughout the site; therefore, the indicator for invasive plants was rated moderate to extreme.

All indicators related to the Biotic Integrity attribute other than Invasive Plants were rated none to slight. The Biotic Integrity attribute was rated slight to moderate departure from the reference condition due to cheatgrass being common throughout the site.

**Photo 7. Overview of IIRH Site NBF\_2**



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

The Biotic Integrity attribute was rated slight to moderate at three of the four IIRH sites evaluated under Standard 5 and moderate at the remaining site (WS) (Table 12).

The functional/structural group indicator was rated as none to slight departure from reference condition at site NBF\_2, slight to moderate at site NBF\_1 due to the lack of shrubs, and moderate at sites CP\_3 and WS due to the lack of shrubs and low abundance and diversity of perennial forb species.

The litter amount indicator was rated none to slight at site NBF\_2, slight to moderate departure at site NBF\_2, and moderate at sites CP\_3 and WS. 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 moderate departure from the reference condition at sites CP\_3 and NBF\_1, and moderate to extreme at sites NBF\_2 and WS. Cheatgrass ranged from being scattered throughout sites NBF\_1 and CP\_3 to being common throughout sites NBF\_2 and WS. Curveseed butterwort was also noted to be scattered throughout site CP\_3.

### **Evaluation of Standard 5**

The 2012 and 2013 IIRH field notes indicate that shrubs are generally absent from the seeded plant communities of the Echo Clover and Clover Crossing Allotments. In addition, some seeded plant communities have a low abundance and diversity of perennial forbs. Most seeded plant communities within the allotments have a high abundance of Sandberg bluegrass, as well as other desirable seeded vegetation that are providing soil cover and competition to invasive species, as shown in the 2002 cover data and the 2012, 2013, and 2014 HAF data (Tables 22 and 23). However, cheatgrass is common in some seeded plant communities, such as the western portion of the West Side Pasture, where it was noted during the 2012 IIRH that cheatgrass appeared to be outcompeting forbs. Cheatgrass was also noted to be dominant in some areas of the northern portion of the North Bridge Field Pasture.

Cheatgrass ranged from being scattered throughout some sites to being common throughout other sites; and was even noted to be dominant in some small areas. Meanwhile, curveseed butterwort was scattered throughout one site, and was shown to comprise 21 percent of cover at a 2002 cover site in the North Bridge Field. IIRH field notes do not indicate any other invasive species were present at the evaluation sites. Overall, adequate desirable perennial species are present in some areas to hinder the further spread or establishment of cheatgrass or other invasive or noxious plant species.

#### ***Evaluation Finding – Echo Clover and Clover Pastures are:***

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

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

Diversity of perennial species within the Echo Clover and Clover Pastures is as expected for areas that have burned by wildfire multiple times and have been drill seeded. Deep-rooted perennial bunchgrasses are the dominant functional/structural group within most areas of the seeded plant communities (Tables 22 and 23). Perennial species are productive and capable of reproduction and recruitment of new seedlings. The 2012 and 2013 IIRH field notes, as well as cover data, indicate that abundance and diversity of perennial forb species varies across the seeded plant communities of the Echo Clover and Clover Crossing Pastures (Tables 22 and 23). Cover of perennial forbs ranged from 0 to 3 percent across all cover transects recorded within the two pastures (Tables 22 and 23). Shrubs were generally absent from the seeded plant communities.

The litter amount indicator rating deviated from the reference condition found in the ESD. The presence of seeded species can result in higher biomass production, resulting in more litter than is described in the ESD reference sheet. However, 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.

Cheatgrass was scattered throughout some of the seeded plant communities within the Echo Clover and Clover Pastures (Tables 22 and 23). Meanwhile, curvseed butterwort was not observed in most areas but was noted to be scattered throughout the IIRH site within the Clover Pasture. Invasive species such as cheatgrass and curvseed butterwort can become a threat to biotic integrity following large scale disturbances such as wildfire; however, adequate desirable perennial species and biological soil crusts are present within the seeded plant communities to hinder further spread or establishment of invasive or noxious plant species. Most seeded plant communities within the Echo Clover and Clover Pastures have a high abundance of crested wheatgrass and Sandberg bluegrass, as well as other desirable vegetation and biological crusts (Tables 22 and 23) that are providing soil cover and competition to invasive species. The perennial species present within the pastures are appropriately productive and are capable of reproduction and recruitment of new seedlings.

The current plant communities within the Echo Clover and Clover Pastures lack vertical structure due to repeated wildfire over the past 30 years, which have removed shrubs and their seed sources. Use by native wildlife dependent on sagebrush for their habitat (i.e. sage thrasher (*Oreoscoptes montanus*), sagebrush vole (*Lemmiscus curtatus*), sagebrush lizard (*Sceloporus graciosus*), least chipmunk (*Neotamius minimus*), and Vesper sparrow (*Pooecetes gramineus*) is limited at this time. As shrubs re-establish and mature these animals should return to the area. In the meantime, the crested wheatgrass plant community provides habitat for grassland [Savannah sparrow (*Passerculus sandwichensis*), grasshopper sparrow (*Ammodramus savannarum*), and montane vole (*Microtus montanus*)] and generalist wildlife species [horned lark (*Eremophila alpestris*), Western meadowlark (*Sternella neglecta*), deer mouse (*Peromyscus maniculatus*), and coyote (*Canis latrans*)]. It also can provide seasonal forage for mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and elk (*Cervus elaphus*).

The seeded vegetation communities within the Echo Clover and Clover Pastures are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle. Therefore, these pastures are meeting Standard 5.

***Evaluation Finding – West Side and North Bridge Field Pastures are:***

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

***Rationale for Evaluation Finding***

The 2012 and 2013 IIRH field notes, as well as cover data (Tables 22 and 23), indicate that invasive annual species range from scattered to common throughout the plant communities of the West Side and North Bridge Field Pastures of the Clover Crossing Allotment. In addition, the relative dominance of deep-rooted perennial bunchgrasses is reduced in some areas. Cover of perennial forbs ranged from 0 percent to 3 percent across all cover transects recorded within the pastures (Tables 22 and 23). Shrubs were generally absent from the seeded plant communities, but are present in some native areas of the North Bridge Field Pasture. The ID Team rated the

functional/structural group indicator based on field observations documenting the high abundance of annual grasses or absence of shrubs at each site.

The seeded plant communities of the West Side Pasture do not have adequate desirable perennial vegetation to provide structural diversity for habitat or nutrient cycling. Declines in deep-rooted perennial bunchgrasses, compounded by the loss of shrubs, can result in a modification of nutrient cycling and energy flow due to changes in the above ground structure. It was also noted that cheatgrass appeared to be outcompeting perennial forbs. Although the increase in litter does not appear to be affecting the seeded communities within the pastures at this time, the potential for these areas to be affected in the future is high as cheatgrass litter continues to increase. While the seeded plant communities of the North Bridge Field Pasture have adequate desirable perennial vegetation to hinder further spread or establishment of invasive annual species, cheatgrass is common throughout the native plant communities of the pasture and is even dominant in some areas. Invasive species such as cheatgrass and curvseed butterwort can become a threat to biotic integrity following large scale disturbances such as wildfire.

The reduced relative dominance of deep-rooted perennial bunchgrasses or lack of shrub cover is apparent in many of the plant communities of the pastures. Shrubs function to catch snow and thereby increase infiltration. Sagebrush roots can redistribute small amounts (less than 0.3 inches) of water in the soil profile up to 1.5 meters in depth (Ryel et al., 2003). The absence of shrubs in combination with a low abundance of deep-rooted perennial bunchgrasses in these areas may be impacting the overall hydrologic cycle. The decline in large statured bunchgrasses and shrubs in combination with the presence of invasive annual plants in these pastures puts the plant communities at an increased risk for loss of diversity following large scale disturbances such as wildfire, and decreases the ability to maintain native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

The plant communities within the West Side and North Bridge Field Pastures of the Clover Crossing Allotment are not functioning to maintain native animal habitat or life form diversity due to the combination of the lack of shrubs, low abundance of deep-rooted perennial bunchgrasses in some areas, and the abundance of invasive annual species such as cheatgrass. The absence of sagebrush and presence of cheatgrass was documented in most seeded plant communities throughout the pastures. Due to the lack of native animal habitat and life form diversity, the West Side and North Bridge Field Pastures are not meeting Standard 5.

**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 within the Echo Clover and Clover Crossing Allotment are either native or are areas that have been drill seeded with native or non-native species; therefore, standard 6 does not apply to the allotments.

**Standard 7 (Water Quality)**

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

***Allotment Summary for Standard 7 (Water Quality):***

See standard 2 for a description of water resources within the allotment.

**Echo Clover Allotment**

Standard Doesn't Apply

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

**Clover Crossing Allotment**

North Bridge Field Pasture

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.

**Clover, School Section, and South Bridge Field Pastures**

**Evaluation of Standard 7**

The reaches of Clover Creek in the Clover, School Section and South Bridge Field pastures of the Clover Crossing Allotment are within Idaho Department of Environmental Quality (IDEQ) Assessment Units (AU) ID17050102SW028\_04 and ID17050102SW028\_05. Therefore, Standard 7 applies to the allotment. The AU ID17050102SW028\_04 begins at the mouth of Buck Flat Draw and extends upstream of the allotment boundary. AU ID17050102SW028\_05 extends from the mouth of Buck Flat Draw downstream through the allotment. The reaches of Clover Creek within these AUs are listed by IDEQ as not supporting the beneficial uses of cold water aquatic life, primary contact recreation, and salmonid spawning (IDEQ 2014). Causes listed for these AUs failing to support designated beneficial uses are *Escherichia coli* and water temperature. Streams within these two AUs were removed from the 303(d) list for *E. coli* after the approval of the Bruneau Subbasin Assessment and Total Maximum Daily Loads (TMDLs) of the 303(d) Water Bodies (IDEQ 2000) by Environmental Protection Agency. They are currently included in the IDEQ 2012 Integrated Report as Category 4a streams (Impaired Waters with Approved TMDLs) for *E.coli*. The reaches of Clover Creek within these AUs, remain on the 303(d) list due to water temperature. IDEQ is currently in the process of developing a TMDL for temperature impairment within the Bruneau Subbasin.

***Evaluation Finding – Clover, West Side, School Section, and South Bridge Field Pasture 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 for Clover Creek in the Clover, School Section, and South Bridge Field Pastures of the Clover Crossing Allotment based on IDEQ beneficial use support status and water quality impairment information (IDEQ 2014). The AUs within the allotment are listed by IDEQ as not supporting the designated beneficial use of cold water aquatic life due to *E. coli* and water temperature. Therefore, the portion of Clover Creek within the Clover Creek Crossing Allotment is not meeting Standard 7. Because livestock have access to Clover Creek and its associated riparian areas and hydric vegetation, livestock grazing cannot be discounted as a contributing factor to the water quality impairment for *E. coli* and water temperature.

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

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

### **Rangeland Health Assessment**

#### **Plants:**

There are no known BLM sensitive plants within the allotments. In the Jarbidge Field Office special status plants are generally associated with distinct soil types that occur in scattered portions of the field office. None of these soil types occur within the allotments based on SSURGO soil data (NRCS, 2012). Potential habitat occurs for one sensitive plant species, slickspot peppergrass (*Lepidium papilliferum*; Proposed Endangered, BLM sensitive species). Approximately 14,934 acres in the Clover Crossing Allotment and the entire Echo Clover Crossing Allotment have been surveyed for slickspot peppergrass; slickspots were noted but slickspot peppergrass plants have not been found in these or previous surveys. Systematic inventories for other special status plants have not been conducted in the allotments. No special status plant species have been recorded during other monitoring efforts (e.g., slickspot peppergrass inventories, IIRH field visits, sage-grouse habitat assessments, fire rehabilitation monitoring, etc.).

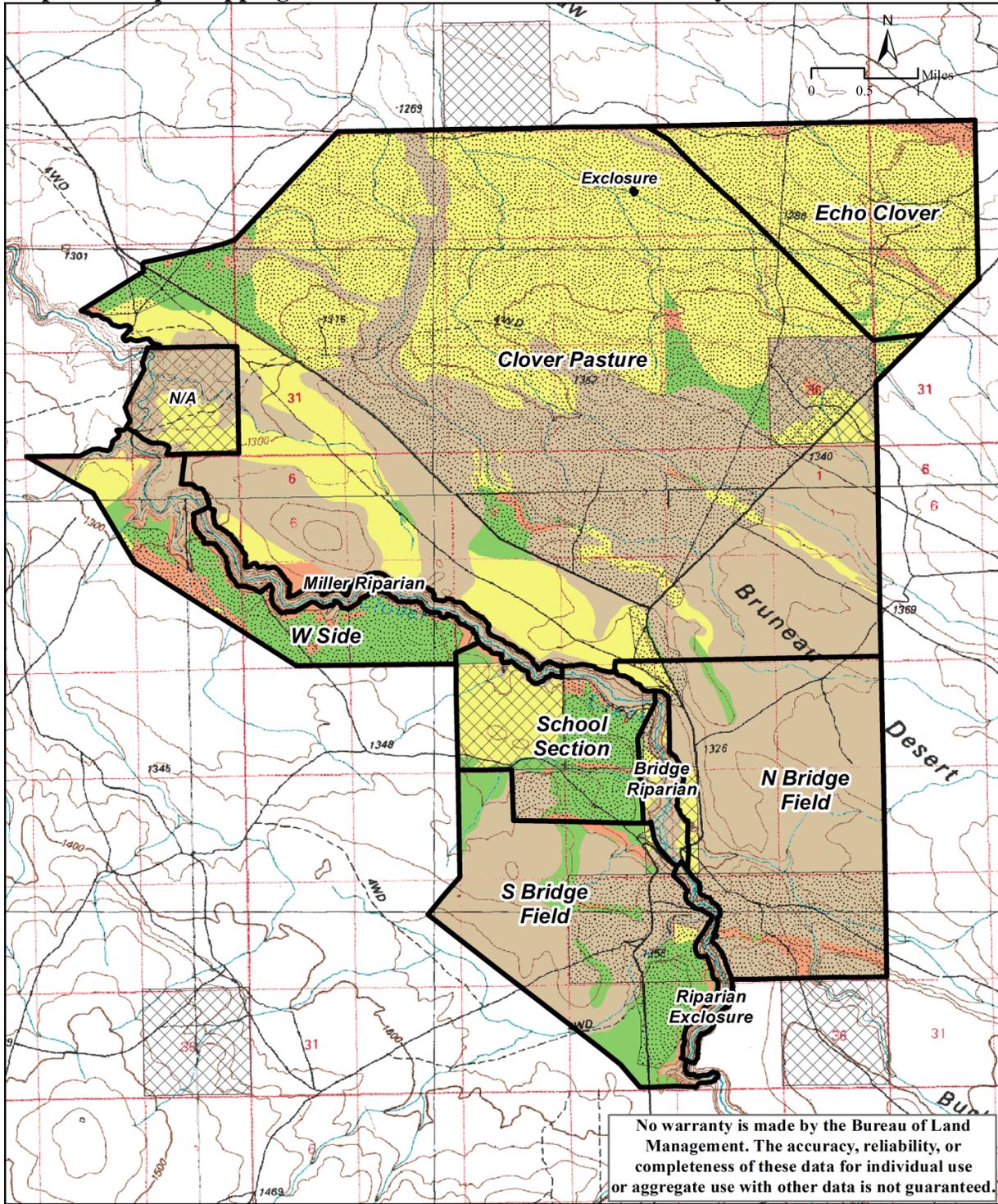
Slickspot peppergrass grows in the semiarid sagebrush-steppe ecosystem of southwestern Idaho. Interspersed within this habitat type, slickspot peppergrass can be found in visually distinct microsites known as slickspots (mini playas or natric sites) that act as small water basins and where the sodium and clay content is higher than adjacent, unoccupied habitat (Moseley, 1994). The Clover Crossing Allotment contains 12,486 acres (48% of allotment) of potential slickspot peppergrass habitat (Map 7). The Echo Clover Allotment contains 2,488 acres (99% of allotment) of potential slickspot peppergrass habitat. 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 potential habitat and to categorize it into groups (high, medium, and low) that identify the potential for finding the species. The Clover Crossing Allotment contains 3,064 acres of high potential, 839 acres of medium potential, 8,583 acres of low potential, and 13,511 acres of non-habitat for slickspot peppergrass (Table 24). The Echo Clover Allotment contains 41 acres of high potential, 147 acres of medium potential, 2,300 acres of low potential, and 23 acres of non-habitat for slickspot peppergrass. The nearest known occupied habitat for slickspot peppergrass is 2.4 miles south of the Clover Crossing Allotment and 9.5 miles south of the Echo Clover Allotment.

**Table 24. Slickspot Peppergrass Potential Habitat (Acres) in the Clover Crossing Allotment.**

<b>Pasture</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Non-habitat</b>
Bridge Riparian	15	1	1	6
Clover	824	188	8,347	7,278
Exclosure	0	0	1	0
Miller Riparian	0	13	0	379
North Bridge Field	47	119	63	3,259
N/A	0	0	0	8
Riparian Exclosure	0	2	0	176
South Bridge Field	856	94	21	1,863
School Section	560	70	3	217
West Side	762	352	147	325

DRAFT

**Map 7. Slickspot Peppergrass Potential Habitat and Area Surveyed**



Clover Crossing and Echo Clover Allotments & Pastures	Area Surveyed
Non-BLM Land	High Potential Habitat
	Medium Potential Habitat
	Low Potential Habitat
	Non-Habitat

### Animals:

Presence of various sensitive wildlife species are based upon primarily incidental observations by BLM personnel and data entered into the Idaho Natural Heritage Center database by other individuals. Species found on the Clover Crossing and Echo Clover Allotments are discussed below.

#### Redband Trout (*Oncorhynchus mykiss gairdnerii*; BLM sensitive species)

Redband trout are known to occur within the Clover Creek drainage in the Clover Crossing Allotment. No recent fisheries surveys or fish habitat surveys have occurred in the allotment, but redband trout likely inhabit Clover Creek within the allotment when water temperatures are suitable (October – June). In some years, Clover Creek is completely dewatered during the summer months for the irrigation of private lands upstream. No other BLM sensitive fish or threatened, endangered, or special status aquatic species are present in the allotments.

#### 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. Sage-grouse typically return to the same lek and nest areas year after year. Hens seek out nest sites that are concealed from predators especially avian predators (Conover et al., 2010) by a combination of sagebrush and grass cover. When chicks hatch the hen and her chicks feed on insects and forbs and slowly move towards wetter areas like wet meadows or streams and springs where forbs are still green and growing. A diverse forb component and an abundance of forbs are necessary to support a variety of insects which are critical to the growth of young sage-grouse (Knick and Connelly, 2011). In the fall as forbs dry up sage-grouse switch from eating forbs to sagebrush through the winter. Sage-grouse may either migrate to different seasonal habitats or may remain in a single general area throughout the year.

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

- Nesting and early brood rearing habitat should support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover should average at least 7” in height with at least 10 percent canopy cover for grasses and at least 5 percent for forbs and a diversity of forb species during spring (Connelly et al., 2000).
- Late brood rearing habitat should support 10-25 percent canopy cover of sagebrush. Riparian areas or wet meadows in the general area improve habitat for sage-grouse (Connelly et al., 2000).

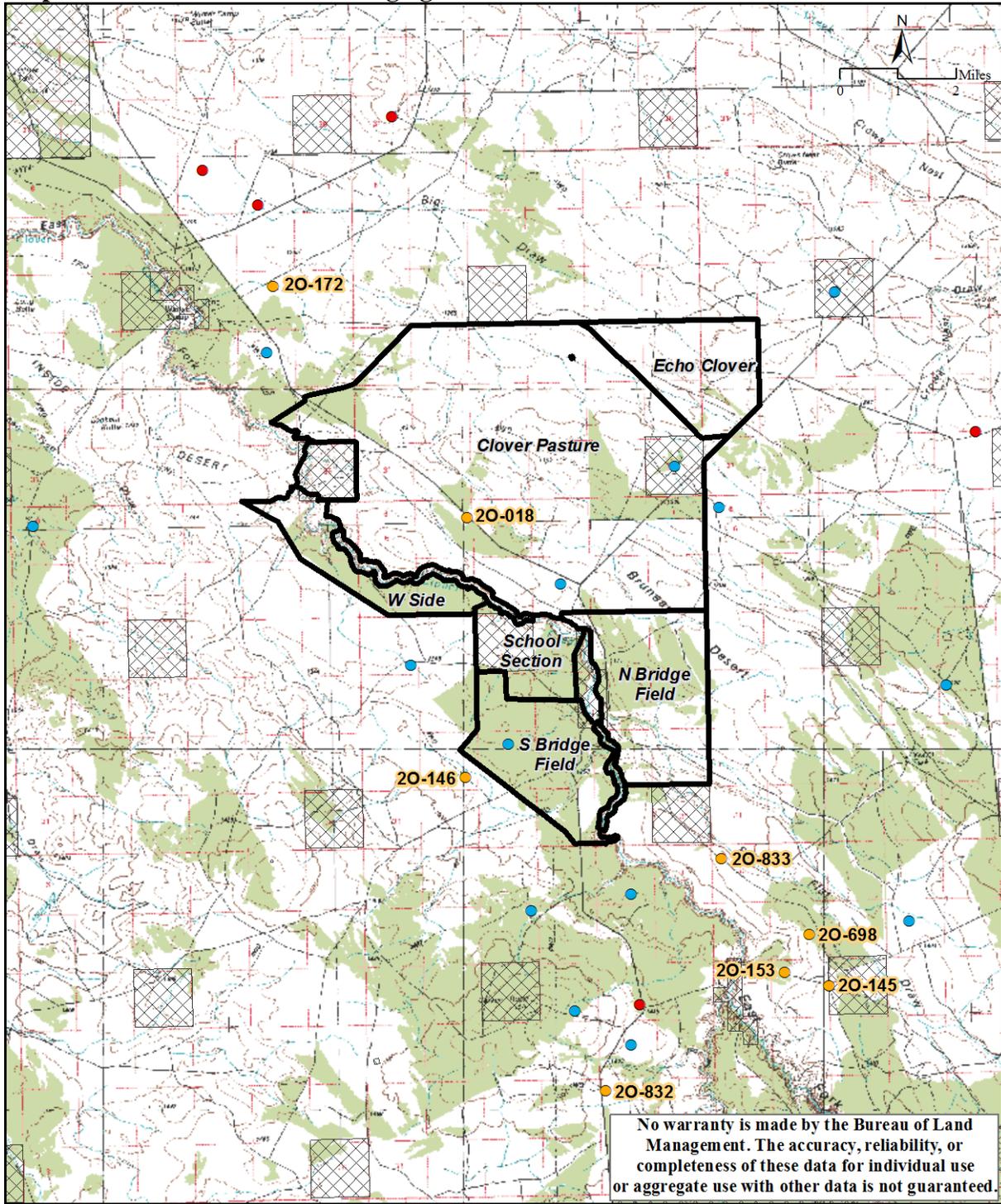
- Winter habitat should have 10-30 percent canopy cover of sagebrush with at least 10-14” exposed above the snow (Connelly et al., 2000).

Based on vegetation mapping from 2013, the Clover Crossing Allotment contains 6,367 acres mapped as sagebrush (24% of the allotment, Map 3). Sagebrush in the Clover Crossing Allotment occurs in the following pastures: Clover (1,587 acres, 10% of pasture), North Bridge Field (1,454 acres, 42% of pasture), South Bridge Field (2,490 acres, 88% of pasture), School Section (670 acres, 79% of pasture) and West Side (138 acres, 9% of pasture) and exclosures: Bridge Riparian (18 acres, 78% of pasture) and Riparian Exclosure (10 acres, 6% of pasture). The Echo Clover Allotment contains 46 acres mapped as sagebrush (2% of the allotment, Map 3).

Fourteen wildfires (as discussed in Standard 5) eliminated the majority of sagebrush in the northern portion of the Clover Crossing Allotment and the entire Echo Clover Allotment. Sagebrush has been aerial seeded in the majority of the Echo Clover Allotment and in the south half of the North Bridge Field Pasture in the Clover Crossing Allotment. Additionally in the Clover Crossing Allotment, sagebrush seedlings have been hand planted in approximately 130 acres of the West Side Pasture. Where sagebrush has been reseeded, recovery of the sagebrush community needed for sage-grouse is expected to take one (Wambolt and Payne, 1986) to several (Baker, 2006; Baker, 2011) decades assuming the absence of additional fire. Where sagebrush seedlings have been hand planted recovery is expected to occur sooner.

Sage-grouse have been observed in the adjoining allotments year round. Sage-grouse habitat extends from the south end of the Clover Crossing Allotment into the Juniper Ranch Allotment. Sage-grouse habitat also occurs to the northwest of the Clover Crossing Allotment in the Winter Camp Allotment (Map 8).

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



Clover Crossing and Echo Clover Allotments & Pastures	Shrubland	<b>Management Status</b>
Non-BLM Land		Occupied
		Undetermined
		Unoccupied

The Clover Crossing Allotment contains 1 occupied and 3 undetermined (due to a lack of recent surveys) sage-grouse leks. The Echo Clover Allotment does not contain any sage-grouse leks. Within five miles of the allotments there are 8 occupied, 14 undetermined, 1 not verified (historic lek in database, no count numbers assigned to the lek), and 5 unoccupied sage-grouse leks (Map 8). Sage-grouse attendance at occupied leks within five miles of the allotment are shown in Table 25. Leks are considered occupied if there has been documented sage-grouse activity within the past five years.

**Table 25. Sage-grouse Attendance at Occupied Leks within Five Miles of the Clover Crossing and Echo Clover Allotments, 2000-2014.**

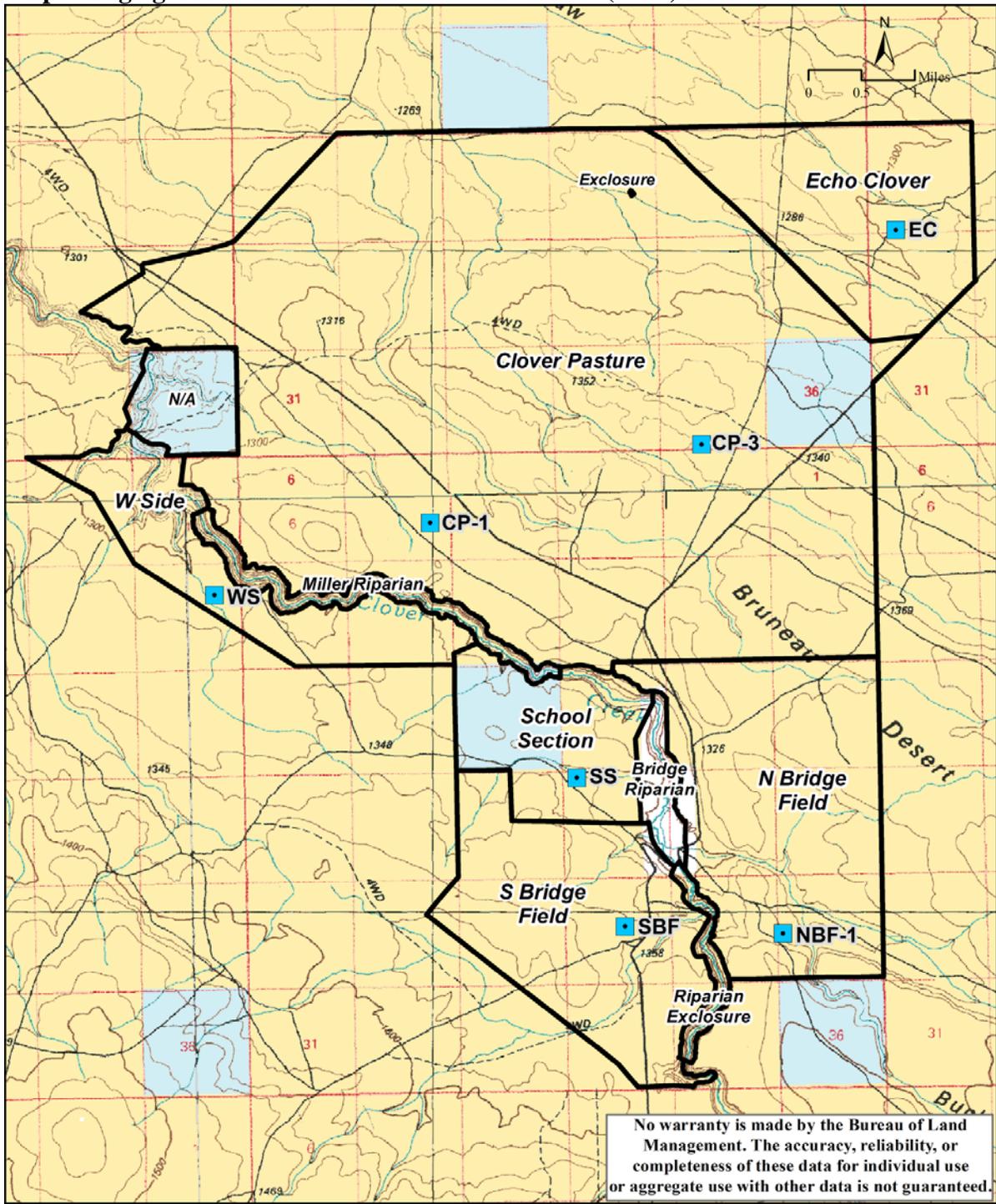
Lek	Location	Survey Year <sup>1</sup>														
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
2O-018	Clover Pasture	1	--	0	--	--	--	20	26	--	--	12	--	--	0	0
2O-146	0.3 mile S	6	7	0	--	0	--	--	16	--	--	0	0	--	--	8
2O-833	1.3 mile													9	--*	19
2O-172	2.0 miles NW	--	--	--	27	20	28	28	41	31	24	22*	--	13	13	21
2O-698	3.1 miles SE								7	--	--	3	0	0	--	--
2O-153	3.5 miles SE										3	12	--	--	0	0
2O-145	4.1 miles SE	22	21	6	--	24	32	10	33	25	19	22	0	22	19	33
2O-832	4.3 miles S											3	7	19	12	25

<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 (\*).

#### *Nesting and Early Brood Rearing Habitat*

The current conditions of sage-grouse seasonal habitats were assessed following protocols outlined in the Sage-grouse Habitat Assessment Framework (Stiver et al., 2010). Sage-grouse habitat suitability assessments were conducted in 2012 at **CP\_1**- Clover Pasture, **SS**- School Section Pasture, and **SBF**- South Bridge Field Pasture. Assessments were conducted in 2013 at **CP\_3**- Clover Pasture, **EC**- Echo Clover Allotment, and **NBF\_1**- North Bridge Field Pasture, and in 2014 at **WS**- West Side Pasture. Locations of sage-grouse habitat suitability assessments (HAF sites) are shown in Map 9.

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



No sage-grouse droppings were observed during the habitat suitability assessments; however, sage-grouse droppings were observed during the IIRH field visits at SB\_2. Sage-grouse habitat suitability assessments are not necessarily an indication of rangeland health; they are merely indicators of habitat suitability. However, vegetation data collected as part of the habitat suitability assessments may be used to inform and interpret other rangeland health information and observations. Sage-grouse habitat suitability assessments are shown in Table 26.

**Table 26. 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>
	SS(15%), SBF(24%)	CP_1(13.5%)	CP_3(0%), EC(0%), NBF_1(0%), WS(0%)
Average Sagebrush Height	<b>12 - 30"</b>	<b>10 -11" or &gt;30"</b>	<b>&lt; 10"</b>
	CP_1(29"), SBF(28")	SS(31")	CP_3(0"), EC(0"), NBF_1(0"), WS (0")
Sagebrush Growth Form	<b>Spreading</b>	<b>Mix of spreading and columnar</b>	<b>Columnar</b>
	CP_1, SBF	SS	CP_3, EC, NBF_1, WS
Average Grass Height	<b>≥ 7"</b>	<b>5 - &lt; 7"</b>	<b>&lt; 5"</b>
	NBF_1(7.4"), WS(8.3")	CP_1(5.5"), SBF(6.8")	CP_3 (4.6"), EC (4.6"), SS(4.3")
Average Perennial Grass Canopy Cover	<b>≥ 10%</b>	<b>5 - &lt; 10%</b>	<b>&lt; 5%</b>
	CP_1(58.5%), CP_3(51%), EC(54%), NBF_1(49%), SS(42.5%), SBF(25%), WS(36%)		
Average Forb Canopy Cover	<b>≥ 5%</b>	<b>3 - &lt; 5%</b>	<b>&lt; 3%</b>
	EC(6%), NBF_1(8%)	CP_3(3%)	CP_1(2%), SS(1%), SBF(2%), WS(0%)
Preferred Forb Abundance and Diversity	<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>
	EC, SS	CP_1, NBF_1, SBF	CP_3, WS
<b>Overall Site Evaluation</b>		<b>CP_1, SS, SBF</b>	<b>CP_3, EC, NBF_1, WS</b>
<b>Pasture Evaluation</b>		<b>School Section, South Bridge Field</b>	<b>Clover, Echo Clover, North Bridge Field, West Side</b>

The Clover Pasture contained two HAF sites. HAF site CP\_1 is located in an area mapped as a Wyoming sagebrush/ Sandberg bluegrass vegetation community. The other HAF site, CP\_3 is in an area mapped as a Wyoming sagebrush/ crested wheatgrass vegetation community. Attributes at HAF site CP\_1 were rated suitable for sagebrush height, growth form, and perennial grass canopy cover. Sagebrush cover, grass height, and preferred forb abundance and diversity were rated marginal and average forb canopy cover was rated unsuitable. Eight species of forbs were

observed and they occurred at moderate density (1.72 forbs per 0.1m<sup>2</sup> plot). The most common species were longleaf phlox (*Phlox longifolia*) and sagebrush phlox (*Phlox aculeata*) both sage-grouse preferred forbs. Attributes at HAF site CP\_3 were rated unsuitable for sagebrush indicators, grass height, and preferred forb abundance and diversity, marginal for forb canopy cover, and suitable for grass canopy cover. Only 4 species of forbs were observed and they occurred at low density (0.20 forbs per 0.1 m<sup>2</sup> plot). The only common forb was sagebrush phlox. Cheatgrass was measured at 12 percent cover at HAF site CP\_1 and 11 percent cover at HAF site CP\_3 (cover values reported are for all layers). Over time cheatgrass can limit native perennial and annual forbs and increase fine fuels making wildfires more likely. Wildfires have eliminated the majority of sagebrush in the Clover Pasture making it unsuitable for sage-grouse. The majority of the pasture is currently mapped as a crested wheatgrass vegetation community.

The Echo Clover Allotment contained one HAF site. HAF site EC is located in an area mapped as a crested wheatgrass vegetation community. Wildfires have eliminated the majority of sagebrush in the Echo Clover Allotment making it unsuitable for sage-grouse. Despite this, all grass and forb indicators were rated suitable at the HAF site except for grass height which was rated unsuitable. Nine species of forbs were observed and they occurred at high density (2.44 forbs per 0.1 m<sup>2</sup> plot). The most common forbs included sagebrush phlox and longleaf phlox. Cheatgrass was recorded at 1 percent cover at the site (all layers).

One HAF site is located in the North Bridge Field Pasture. The pasture is a mixture of areas mapped as sagebrush in the northern portion of the pasture and areas mapped as perennial grasslands in the southern portion. HAF site NBF\_1 is located in the southern portion of the pasture mapped as a bluebunch wheatgrass vegetation community. Sagebrush was absent along the transect at the site. Grass and forb attributes were all rated suitable except for average forb canopy cover (marginal). Fourteen species of forbs were observed and they occurred at moderate density (1.10 forbs per 0.1m<sup>2</sup> plot). The most common species were sagebrush phlox and spiny phlox. Cheatgrass was recorded at 8 percent cover (all layers). Overall, the pasture is unsuitable for sage-grouse.

The School Section Pasture contained one HAF site. HAF site SS is located in the south central portion of the pasture that is mapped as a Wyoming sagebrush/ Thurber's needlegrass vegetation community. Attributes at the site were rated suitable for sagebrush cover, grass cover, and preferred forb abundance and diversity. Sagebrush height and growth form were rated marginal and grass height and average forb canopy cover were rated unsuitable. Although average forb canopy cover was unsuitable, the site was rated suitable for preferred forb abundance and diversity with 11 species of forbs observed. Forbs occurred at moderate density (1.2 forbs per 0.1 m<sup>2</sup> plot). The most common forbs were sagebrush and longleaf phlox. Cheatgrass was recorded at 23 percent cover (all layers). Overall, the pasture is marginal for sage-grouse during nesting and early brood rearing.

The South Bridge Field contained one HAF site. HAF site SBF is located in an area mapped as a Wyoming sagebrush/ Thurber's needlegrass vegetation community. Attributes at the site were rated suitable for all sagebrush indicators, grass cover, and preferred forb abundance and diversity. Grass height was rated marginal and average forb canopy cover was rated unsuitable. Seven species of forbs were observed and they occurred at high density (3.02 forbs per 0.1 m<sup>2</sup>

plot). The most common forbs were longleaf phlox, sagebrush phlox, and Anderson's larkspur (*Delphinium andersonii*). Cheatgrass was recorded at 4 percent cover (all layers). Overall, the pasture is marginal for sage-grouse during nesting and early brood rearing.

One HAF site is located in the West Side Pasture. HAF site WS is located in the central portion of the pasture in an area mapped as a fourwing saltbush/ crested wheatgrass vegetation community. Attributes at the site were rated unsuitable for all attributes except for grass cover and height which were rated suitable. No sagebrush was observed along the transect at the site. Nine species of forbs were observed and they occurred at low density (0.14 forbs per 0.1m<sup>2</sup> plot). The only common forb was sagebrush phlox. Cheatgrass was recorded at 6 percent cover (all layers). Overall, the pasture is unsuitable for sage-grouse during nesting and early brood rearing.

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

#### *Late Brood Rearing Habitat*

No late brood rearing habitat is present in the Echo Clover Allotment. The allotment does not contain areas where moisture collects to maintain forbs throughout the summer. Drainages throughout the Clover Crossing Allotment are generally dry and lack wetland vegetation with the exception of Clover Creek. Clover Creek flows through, or is adjacent to all pastures in the Clover Crossing Allotment occurs predominately in the bottom of a steep canyon. Riparian areas associated with steep drainages or canyons are not used by sage-grouse (Stiver et al., 2010). However, private wet meadows along Clover Creek at Clover Crossing occur in a portion of the canyon that is relatively open. Sage-grouse likely use wet meadows on private land in this area during late brood rearing.

#### *Winter Habitat*

The School Section and South Bridge Field Pastures contain shrub height (28 to 32 inches) and cover (13-24%) that is suitable for wintering sage-grouse. During the winter snow depths are usually less than 12 inches leaving most sagebrush above the snow and available for wintering sage-grouse.

Sagebrush has been removed by wildfire across the majority of the Echo Clover Allotment making it unsuitable as wintering habitat for sage-grouse. Cover of grasses and forbs for wintering habitats generally is irrelevant, because of the complete reliance of sage-grouse upon sagebrush during this period (Homer et al., 1993). The Clover Pasture is predominately a perennial grassland that is largely unsuitable as wintering habitat. However, the Clover Pasture also contains relatively large areas mapped as sagebrush which could provide some wintering habitat. The largest area mapped as sagebrush in the pasture is approximately 875 acres in size and the next largest is approximately 425 acres. The northern half of the North Bridge Field Pasture contains sagebrush of adequate height and cover for wintering sage-grouse while the southern half of the pasture contains only limited areas with sagebrush. Overall, the North Bridge Field Pasture is marginal for wintering sage-grouse. The West Side Pasture is predominately a perennial grassland with a small amount of sagebrush in the northern portion of the pasture (139 acres of sagebrush, 9% of the pasture). For this reason, the West Side Pasture was rated unsuitable as winter habitat.

Ferruginous Hawk (*Buteo regalis*; BLM sensitive species)

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

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

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

Ferruginous hawks sporadically nest in junipers in the Clover Crossing Allotment. At this time 1 nesting territory is present in the North Bridge Field Pasture and nest locations can alternate between nests F23 and F23a (Table 27). Nest F23 is in a standing dead juniper while nest F23a is in a live juniper 0.5 mile to the south along the Buck Flat Draw.

**Table 27. 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
F23	--	3	--	--	--	--	A	--	--	--	--	--	I	I	--	--	--	--	--
F23a															--	3*	2	I	--

<sup>1</sup>Where the table is blank the nest had not yet been identified; in years marked by dashes (--) the nest was not surveyed. 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. An asterisk indicates the young were all found dead in the nest (\*). It is suspected that the young died from exposure following 3 days of cold and wet weather.

Junipers that could be used for nesting by ferruginous hawks occur in the North Bridge Field, South Bridge Field, and West Side Pastures in the Clover Crossing Allotment. The North Bridge Field Pasture contains over 100 junipers, both live and dead along Buck Flat Draw. The South Bridge Field contains over 100 live junipers along an unnamed side draw extending from Clover Creek. The West Side Pasture contains a few dead junipers along a different unnamed side draw extending from Clover Creek. The remaining pastures in the Clover Crossing Allotment and the Echo Clover Allotment do not contain trees for nesting.

The Clover, North Bridge Field, and West Side Pastures of the Clover Crossing Allotment and the Echo Clover Allotment are predominately perennial grasslands. Perennial grasslands provide marginal habitat for mammalian prey (black-tailed jackrabbit, mountain cottontail, ground squirrels, etc.) favored by ferruginous hawks. The School Section and South Bridge Field Pastures of the Clover Crossing Allotment contain both shrub and bunchgrass communities which provide suitable habitat for prey species hunted.

Brewer's Sparrow (*Spizella breweri*; BLM sensitive species)

Brewer's sparrows are typically associated with sagebrush steppe. Brewer's sparrow place nests primarily in shrubs, but occasionally on the ground. The nest shrub is typically taller and denser than in the surrounding habitat (Rotenberry et al., 1999). Shrubs used for nesting by Brewer's sparrows include primarily big sagebrush (81%), with spiny hopsage (*Grayia spinosa*) (10%), antelope bitterbrush (*Purshia tridentata*) (6%), and rabbitbrush (*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 within the Clover Crossing Allotment. At this time shrub height and density are suitable for Brewer's sparrow nesting in the School Section and South Bridge Field Pastures. While the Clover and West Side Pastures contains areas of suitable habitat (areas mapped as sagebrush, approximately 10 percent of the pastures) these pasture as a whole are generally unsuitable. The northern half of the North Bridge Pasture contains sagebrush of suitable height and density for nesting. The southern half of the pasture contains only limited areas with sagebrush and is generally unsuitable. Taking into account both suitable and unsuitable areas, the North Bridge Field Pasture was rated marginal overall. The Echo Clover Allotment was rated unsuitable as nesting habitat since the majority of sagebrush in the allotment has been removed by wildfire.

Loggerhead shrike (*Lanius ludovicianus*; BLM sensitive species)

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

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

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

Loggerhead shrikes have been observed on the Clover Crossing Allotment. Nesting habitat for loggerhead shrikes is limited to areas containing sagebrush, fourwing saltbush, or junipers. While the allotments contain areas of scattered rabbitbrush, plants are generally too short for nesting. Sagebrush of suitable height for nesting occurs in the School Section and South Bridge Field Pastures. The West Side Pasture contains some sagebrush in the northern portion of the pasture and some scattered fourwing saltbush plants that provide marginal nesting habitat. Junipers in the North Bridge Field, South Bridge Field, and in the West Side Pasture also provide nesting habitat for shrikes where they occur. The North Bridge Field Pasture contains sagebrush of suitable size for nesting in the north portion of the pasture and limited sagebrush in the south portion of the pasture. However, the south portion of the pasture contains numerous junipers (>100 junipers) which provide suitable nesting habitat along Buck Flat Draw. Overall, the North Bridge Field Pasture is suitable for loggerhead shrike nesting. The Clover Pasture contains suitable habitat for nesting, however the pasture as a whole is unsuitable since the majority of shrubs have been removed by wildfires. The Echo Clover Allotment is unsuitable for nesting due to the lack of shrubs throughout the allotment.

Sagebrush sparrow (*Artemisioispiza nevadensis*; BLM sensitive species)

Sagebrush sparrows are sagebrush obligates that are typically common in shrub-steppe habitats (Martin and Carlson, 1998). Sagebrush sparrow 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 in areas containing sagebrush. The School Section and South Bridge Field Pastures are suitable for nesting. The Clover and West Side Pastures contain suitable habitat for nesting, however these pastures as a whole are dominated by perennial grasslands that are unsuitable for nesting. The Echo Clover Allotment is also unsuitable for nesting. The North Bridge Field Pasture contains sagebrush in the north portion of the pasture and limited sagebrush in the south portion of the pasture. Overall, the North Bridge Field Pasture was rated as marginal for nesting.

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).

Pygmy rabbits were documented in South Bridge Field Pasture during surveys conducted in 2006 (approximately 230 acres surveyed). This is the only area in the allotments that has been surveyed for pygmy rabbits. Pygmy rabbits are likely present in areas containing tall dense sagebrush in the southern portion of the Clover Crossing Allotment (i.e., North Bridge Field, School Section, and South Bridge Field Pastures). The School Section and South Bridge Field Pastures contain large areas of tall dense sagebrush that are suitable for pygmy rabbits. The North Bridge Field Pasture contains a mixture of both tall dense sagebrush and areas dominated by perennial grasslands. For this reason, the North Bridge Field was rated marginal for pygmy rabbits.

The Clover Pasture contains an area (approximately 400 acres in the southwest portion of the pasture) of tall dense sagebrush that appears suitable for pygmy rabbits. The sagebrush density shown on the 2013 NAIP imagery for the area appears similar to that in the South Bridge Field Pasture where pygmy rabbits were documented. The West Side Pasture also contains an area of tall dense sagebrush (approximately 80 acres in the southwest portion of the pasture) adjacent to the Clover Creek canyon rim. Since the area is adjacent to the canyon rim the soils are generally shallower and are less suitable.

Areas of dense sagebrush in the Clover and West Side Pastures have not been surveyed for pygmy rabbits and are somewhat isolated from other areas containing dense sagebrush. Overall, the Clover and West Side Pastures are unsuitable for pygmy rabbits since sagebrush of suitable height and density is absent across the majority of these pastures. The Echo Clover Allotment is predominately a perennial grassland that does not provide habitat for pygmy rabbits.

#### Piute ground squirrel (*Urocitellus mollis*; BLM sensitive species)

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

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

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

Although Piute ground squirrels have been observed in the allotments, the BLM does not have distribution data on ground squirrels within the allotments. Sagebrush and grassland habitats in North Bridge Field, School Section, and South Bridge Field Pastures are suitable to maintain a relatively stable Piute ground squirrel population (Steenhof et al., 2006). Because shrub habitats provide more favorable environments for ground squirrels than grass habitats (Yensen et al., 1992; Van Horne et al., 1997) the Clover and West Side Pastures and the Echo Clover Allotment were rated marginal for Piute ground squirrels.

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 Clover Creek Canyon which borders all pastures in the Clover Crossing Allotment. The Echo Clover Allotment does not contain cliffs for roosting. Spotted bats may forage over both allotments and drink and forage along Clover Creek. Spotted bats have been observed along Clover Creek Canyon and along the Bruneau River Canyon.

**Evaluation of Standard 8**

There are no known BLM sensitive or federally listed plants within the Clover Crossing or Echo Clover Allotments. Approximately 14,934 acres in the Clover Crossing Allotment and the entire Echo Clover Crossing Allotment have been surveyed for slickspot peppergrass. However, systematic inventories for other special status plants have not been conducted in the allotments. GIS modeling predicts that the Clover Crossing Allotment contains 3,064 acres of high potential, 839 acres of medium potential, and 8,583 acres of low potential habitat for slickspot peppergrass. The Echo Clover Allotment contains 41 acres of high potential, 147 acres of medium potential, and 2,300 acres of low potential habitat for slickspot peppergrass. The nearest known occupied habitat for slickspot peppergrass is 2.4 miles south of the Clover Crossing Allotment and 9.5 miles south of the Echo Clover Allotment.

Redband trout are known to occur within the Clover Creek drainage in the Clover Crossing Allotment. No recent fisheries surveys or fish habitat surveys have occurred in the allotment, but redband trout likely inhabit Clover Creek within the allotment when water temperatures are suitable (October – June). No other BLM Sensitive fish or threatened, endangered, or special status aquatic species are present in the allotments.

Clover Creek within the Clover Crossing Allotment is listed by IDEQ as not supporting the beneficial uses of cold water aquatic life and salmonid spawning due to water temperature. During periods of the year when water temperature in Clover Creek exceed Idaho water temperature criteria for cold water aquatic life, Clover Creek within the allotment is not suitable habitat for redband trout. Riparian conditions within the allotment have improved which will result in increased shading of the stream by riparian vegetation. While improvement in riparian condition results in increased shading of the stream, Clover Creek is still not likely to meet IDEQ water temperature standards due to dewatering occurring upstream of the allotment. In some

years, Clover Creek is completely dewatered during the summer months for the irrigation of private lands upstream.

Excess sediment was observed in all reaches of Clover Creek during the most recent PFC assessments. Excessive amounts of fine sediment can result in reduced spawning success and recruitment of salmonid species due to suffocation of incubating eggs. Appropriately sized substrate for salmonid spawning is present in the portions of the stream reaches in the allotment. Excess sediment may also negatively affect aquatic macroinvertebrates abundance. Aquatic macroinvertebrates are the primary food source of stream-dwelling salmonid species.

The physical habitat parameters (pool/riffle frequency, overhanging vegetation) within the allotment are marginal for adult and juvenile redband trout. Much of Clover Creek within the allotment was determined to be over widened during the most recent PFC assessment. Pool habitat is also lacking in portions of some reaches due to the overly wide stream channel.

Habitat for BLM sensitive wildlife species occurs within the allotments. Overall habitat ratings for each species by allotment and pasture are shown in Table 28.

**Table 28. Overall Habitat Suitability for BLM Sensitive Wildlife Species by Pasture.**

Species Name and Type of Habitat	Clover	Echo Clover	North Bridge Field	School Section	South Bridge Field	West Side
Sage-grouse (nesting & early brood rearing)	U	U	U	M	M	U
(late brood rearing)	U	U	U	U	U	U
(winter)	U	U	M	S	S	U
Ferruginous hawk (nesting)	U	U	S	U	S	S
(foraging)	M	M	M	S	S	S
Brewer's sparrow (nesting)	U	U	M	S	S	S
Sagebrush sparrow (nesting)	U	U	M	S	S	S
Loggerhead shrike (nesting)	U	U	S	S	S	S
Pygmy rabbit (year round)	U	U	M	S	S	U
Piute ground squirrel (year round)	M	M	S	S	S	S
Spotted bat (roosting)	S	U	S	S	S	S
(foraging)	S	S	S	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 marginal in the School Section and South Bridge Field Pastures. The Clover Pasture, Echo Clover Allotment, and North Bridge Field and West Side Pastures were rated unsuitable for nesting and early brood rearing. No late brood rearing habitat is found on these allotments. However, wet meadows on private land along Clover Creek at Clover Crossing provide some late brood rearing habitat for the area. The School Section and South Bridge Field Pastures contain sagebrush of sufficient height and cover to provide suitable winter habitat for sage-grouse. The North Bridge Field Pasture contains a mixture of sagebrush and perennial grasslands and was rated marginal as winter habitat. Wildfires have removed the majority of sagebrush in the Clover and West Side Pastures and Echo Clover Allotment making them unsuitable as wintering habitat. However, some wintering habitat is found in the islands of sagebrush that remain in the Clover and West Side Pastures.

Junipers that could be used for nesting by ferruginous hawks occur in the North Bridge Field, South Bridge Field, and West Side Pastures in the Clover Crossing Allotment. The remaining pastures in the Clover Crossing Allotment and the Echo Clover Allotment do not contain trees for nesting. Habitat that supports prey species such as mountain cottontail, black-tailed jackrabbit and ground squirrels usually hunted by ferruginous hawk was rated suitable in the School Section and South Bridge Field Pastures. The Clover Pasture, Echo Clover Allotment, North Bridge Field and West Side Pastures were rated marginal for ferruginous hawk foraging.

Shrub height and cover is suitable for Brewer's sparrow, loggerhead shrike, and sagebrush sparrow nesting in the School Section and South Bridge Field Pastures. The Clover and West Side Pastures and Echo Clover Allotment are generally unsuitable for nesting by these species since they are predominately perennial grasslands. However, the Clover and West Side Pastures do contain areas of suitable nesting habitat in the islands mapped as sagebrush (approximately 10% of these pastures). The North Bridge Field Pasture was rated marginal for Brewer's sparrow and sagebrush sparrow nesting since the pasture contains a mixture of sagebrush and perennial grasslands. The North Bridge Field Pasture was rated suitable for loggerhead shrike nesting since junipers along Buck Flat Draw provide nesting habitat in the southern portion of the pasture where sagebrush is limited.

Areas containing sagebrush of adequate height and density for pygmy rabbits were found in the School Section and South Bridge Field Pastures. The North Bridge Field Pasture was rated marginal for pygmy rabbits since the pasture contains both suitable areas dominated by tall dense sagebrush and unsuitable areas where sagebrush is limited. Overall, the Clover and West Side Pastures are unsuitable for pygmy rabbits since sagebrush of suitable height and density is absent across the majority of these pastures. The Echo Clover Allotment is predominately a perennial grassland that does not provide habitat for pygmy rabbits.

The North Bridge Field, School Section, and South Bridge Field Pastures contain suitable habitat to maintain a stable population of Piute ground squirrels due to adequate shrub and grass cover. The Clover and West Side Pastures and the Echo Clover Allotment were rated marginal for Piute ground squirrels.

Spotted bat roosting habitat was rated suitable in the all pastures in the Clover Crossing Allotment due to cliffs along Clover Creek. The Echo Clover Allotment does not contain cliffs for roosting. The allotments were rated suitable for spotted bat foraging due to their proximity to roosting habitat and the presence of grassland, sagebrush, and riparian habitats that support insects eaten by spotted bats. Clover Creek provides roosting, foraging, and watering locations for spotted bats within the Clover Crossing Allotment.

***Evaluation Finding – Echo Clover and Clover Crossing Allotments are:***

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

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

Clover Creek which flows through, or is adjacent to all pastures in the Clover Crossing Allotment is listed by IDEQ as not supporting the beneficial uses of cold water aquatic life and salmonid spawning due to elevated water temperatures. Recruitment and spawning success are also likely reduced due to the excessive amount of fine sediment present in Clover Creek. Other adult and juvenile redband trout habitat requirements are likely met outside of the period when water temperatures exceed the preferred thermal range of redband trout. Due to the water temperature and sedimentation limitations, Clover Creek is not supporting a viable population of redband trout. In addition, during some years Clover Creek is completely dewatered during the summer months for the irrigation of private lands upstream.

The School Section and South Bridge Field Pastures contain marginal nesting and early brood rearing habitat for sage-grouse. The North Bridge Field Pasture was rated unsuitable as nesting and early brood rearing habitat. The Clover and West Side Pastures and the Echo Clover Allotment have burned repeatedly in wildfires which eliminated the majority of sagebrush in the pastures and allotment. Without sagebrush, the majority of the Clover and West Side Pastures and the Echo Clover Allotment are unsuitable for sage-grouse and other sagebrush dependent species. No late brood rearing habitat for sage-grouse is present in the allotments. Winter habitat ratings for sage-grouse ranged from suitable to unsuitable.

Of great concern is the amount of cheatgrass throughout the Clover Crossing Allotment. Cheatgrass cover values ranged from 4-23 percent with the majority of sites in the 8-12 percent cover range (cover values reported are for all layers). Over time cheatgrass can limit native perennial and annual forbs and increase fine fuels making wildfires more likely. Therefore, the Echo Clover and Clover Crossing Allotments are not meeting Standard 8.

## LITERATURE CITED

- Adams, R. A. (2003). Bats of the Rocky Mountain West. Bolder, CO: University Press of Colorado.
- Baker, W. L. (2006). Fire and Restoration of Sagebrush Ecosystems. *Wildlife Society Bulletin*, 34(1), 177-185.
- Baker, W. L. (2011). Chapter 11: Pre-Euro-American and Recent Fire in Sagebrush Ecosystems. pp. 185-203. In S. T. Knick and J. W. Connelly (Eds.), *Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats* (pp. 185-203). *Studies in Avian Biology Series* (Vol. 38), Berkeley, CA: University of California Press.
- Bechard, M. J., and J. K. Schmutz. (1995). Ferruginous Hawk (*Buteo regalis*), No. 172. In A. Poole (Ed.), *The Birds of North America Online*. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: <http://bna.birds.cornell.edu/bna/species/172>.
- BLM. (1987). Jarbidge Resource Management Plan. Boise, ID: USDI, Bureau of Land Management.
- BLM. (1996). Sampling Vegetation Attributes. Interagency Technical Reference 1734-4.
- BLM. 1998. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. BLM Technical Reference 1737-15.
- BLM. (2012). Slickspot Peppergrass Occurrence Potential Model (GIS). Twin Falls, ID: USDI, Bureau of Land Management, Jarbidge Field Office.
- Brewer, T. K., J. C. Mosley, D. E. Lucas, and L. R. Schmidt. (2007). Bluebunch Wheatgrass Response to Spring Defoliation on Foothill Rangeland. *Rangeland Ecology and Management* 60:498–507.
- Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. (2000). Guidelines to Manage Sage Grouse Populations and their Habitats. *Wildlife Society Bulletin* 28(4): 967–985.
- Conover, M. R., J. S. Borgo, R. E. Dritz, J. B. Dinkins, and D. K. Dahlgren. (2010). Greater Sage-grouse Select Nest Sites to Avoid Visual Predators but not Olfactory Predators. *Condor* 112:331–336.
- Cooperative Extension Service, USDA, and NRCS. (1999). Utilization Studies and Residual Measurements. Interagency Technical Reference 1734-3.
- Daubenmire, R. F. (1940). Plant Succession Due to Overgrazing in the Agropyron Bunchgrass Prairie of Southeastern Washington. *Ecology* 21:55–64.

- Green, J. S., and Flinders, J. T. (1980). *Brachylagus idahoensis*, No. 125. Washington, DC: American Society of Mammalogists.
- Grossman, D. H., D. Faber-Langendoen, A. S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. D. Patterson, M. Pyne, M. Reid, and L. Sneddon. (1998). International Classification of Ecological Communities: Terrestrial Vegetation of the United States, Volume I. Arlington, VA: The Nature Conservancy.
- Heady, L. T., and J. W. Laundré. (2005). Habitat Use Patterns Within the Home Range of Pygmy Rabbits (*Brachylagus idahoensis*) in Southeastern Idaho. *Western North American Naturalist* 65(4):490–500.
- Holloran, M. J., B. J. Heath, A. G. Lyon, S. J. Slater, J. L. Kuipers, and S. H. Anderson. (2005). Greater Sage-grouse Nesting Habitat Selection and Success in Wyoming. *Journal of Wildlife Management* 69:638–649.
- Homer, C. G., T. C. Edwards, Jr., R. D. Ramsey, and K. P. Price. (1993). Use of Remote Sensing Methods in Modelling Sage Grouse Winter Habitat. *Journal of Wildlife Management* 57:78–84.
- IDEQ. 2000. Bruneau Subbasin Assessment and Total Maximum Daily Loads. Idaho Department of Environmental Quality Twin Falls Regional Office. Twin Falls, Idaho.
- IDEQ. (2014). Idaho Department of Environmental Quality Final 2012 Integrated Report. Boise, ID: Idaho Department of Environmental Quality.
- Knick, S. T., and J. W. Connelly. (2011). Greater Sage-grouse and Sagebrush: an Introduction to the Landscape. In S. T. Knick and J.W. Connelly (Eds.), *Greater Sage-grouse Ecology and Conservation of a Landscape Species and Its Habitats* (pp. 1-9). Berkeley, CA: University of California Press.
- Martin, J. W., and B. A. Carlson. (1998). Sage Sparrow (*Artemisiospiza belli*), No 326. In A. Poole (Ed.), *The Birds of North America Online*. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: <http://bna.birds.cornell.edu/bna/species/326>.
- Moseley, R.K. (1994). Report on the Conservation Status of *Lepidium Papilliferum*. Boise, ID: Idaho Conservation Data Center and Idaho Department of Fish and Game.
- Pellant, M., P. Shaver, D. A. Pyke, and J. E. Herrick. (2005). Interpreting Indicators of Rangeland Health, Version 4. Technical Reference 1734-6.
- Reynolds, T. D., and W. L. Wakkinen. (1987). Characteristics of the Burrows of Four Species of Rodents in Undisturbed Soils in Southeastern Idaho. *American Midland Naturalist* 118 (2): 245–250.

- Rickart, E. A. (1987). *Spermophilus townsendii*, No. 268. Washington, DC: American Society of Mammalogists.
- Rotenberry, J. T., M. A. Patten, and K. L. Preston. (1999). Brewer's Sparrow (*Spizella breweri*), No. 390. In A. Poole (Ed.), *The Birds of North America Online*. Ithaca, NY: Cornell Laboratory of Ornithology, Retrieved in March, 2014 from: <http://bna.birds.cornell.edu/bna/species/390>.
- Rowland, M. M., M. J. Wisdom, L. H. Suring, and C. W. Meinke. (2006). Greater Sage-grouse as an Umbrella Species for Sagebrush-associated Vertebrates. *Biological Conservation* 129: 323–335.
- Steenhof, K., E. Yensen, M. N. Kochert, and K. L. Gage. (2006). Populations and Habitat Relationships of Piute Ground Squirrels in Southwestern Idaho. *Western North American Naturalist* 66(4):482–491.
- Stiver, S. J., E. T. Rinkes, and D. E. Naugle. (2010). Sage-grouse Habitat Assessment Framework. Boise, ID: USDI, Bureau of Land Management, Idaho State Office.
- USDA and NRCS. (2012). Soil Survey Geographic (SSURGO) Database for Elmore, Owyhee, and Twin Falls Counties, Idaho. Boise, ID: USDA, Natural Resources Conservation Service, Soil Survey Staff, Retrieved in August, 2012 from: <http://soildatamart.nrcs.usda.gov>.
- USDA and NRCS. (2013a). Draft Ecological Site Description R011XY001ID, Loamy 8-12" Wyoming Big Sagebrush/Bluebunch wheatgrass-Thurber's needlegrass ecological site. Boise, ID: State Office
- USDA and NRCS. (2013b). The PLANTS Database. Retrieved December 14, 2013, from <http://plants.usda.gov>.
- Van Horne, B., G. S. Olson, R. L. Schooley, J. G. Corn, and K. P. Burnham. (1997). Effects of Drought and Prolonged Winter on Townsend's Ground Squirrel Demography in Shrubsteppe Habitats. *Ecological Monographs* 67:295–315.
- Wambolt, C. L., and G. F. Payne. (1986). An 18-Year Compromise of Control Methods for Wyoming Big Sagebrush in Southwestern Montana. *Journal of Range Management*, 39(4), 314-319.
- Wisdom, M. J., R. S. Holthausen, B. C. Wales, C. D. Hargis, V. A. Saab, D. C. Lee, et al. (2000). Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications, Volume 2: Group Level Results (General Technical Report No. PNW-GTR-485). Portland, OR: USDA, Forest Service, Pacific Northwest Research Station.

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

Yensen, E., D. L. Quinney, K. Johnson, K. Timmerman, and K. Steenhof. (1992). Fire, Vegetation Changes, and Population Fluctuations of Townsend's Ground Squirrels. *American Midland Naturalist* 128:299–312.

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

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

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

DRAFT

## **APPENDIX A: 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.

**APPENDIX B: SPECIES LIST ACCUMULATED DURING UPLAND ASSESSMENTS**

Scientific Name	Common Name	Species Type	Site(s) where species occurred
<b>Perennial Grasses</b>			
<i>Achnatherum hymenoides</i>	Indian ricegrass	Native	SS, SBF, WS
<i>Achnatherum thurberianum</i>	Thurber's needlegrass	Native	CP_1, CP_3, NBF_1, NB_2, SS, WS
<i>Agropyron cristatum</i>	Crested wheatgrass	Exotic, Seeded	CP_1, CP_3, EC, WS
<i>Elymus elymoides</i>	Bottlebrush squirreltail	Native	CP_1, CP_3, EC, NBF_1, NB_2, SS, SBF, WS
<i>Hesperostipa comata</i>	Needle and thread	Native	SS, WS
<i>Leymus cinereus</i>	Basin wildrye	Native	NBF_1, SS
<i>Pascopyrum smithii</i>	Western wheatgrass	Native	NBF_1, SS
<i>Poa secunda</i>	Sandberg bluegrass	Native	CP_1, CP_3, EC, NBF_1, NB_2, SS, SBF, WS
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Native, Seeded	NB, WS
<b>Annual Grasses</b>			
<i>Bromus tectorum</i>	Cheatgrass	Exotic, Invasive	CP_1, CP_3, EC, NBF_1, NB_2, SS, SBF, WS
<i>Vulpia microstachys</i>	Small fescue	Native	SS
<b>Perennial Forbs</b>			
<i>Allium</i> sp.	Onion	Native	CP_3, EC
<i>Allium nevadense</i>	Nevada onion	Native	CP_3
<i>Antennaria dimorpha</i>	Low pussytoes	Native, Sage-grouse Preferred	CP_1, EC, NBF_1, NB_2, SS
<i>Arabis</i> sp.	Rockcress	Native	NBF_1
<i>Astragalus calycosus</i>	Torrey's milkvetch	Native	NBF_1
<i>Astragalus lentiginosus</i>	Freckled milkvetch	Native	NBF_1, NBF_2, SS, SBF, WS
<i>Astragalus malacus</i>	Shaggy milkvetch	Native	SBF
<i>Astragalus purshii</i>	Woollypod milkvetch	Native	EC, NBF_1, NBF_2, SS, SBF, WS
<i>Castilleja angustifolia</i>	Northwestern Indian paintbrush	Native	CP_1, NBF_2, SS, SBF
<i>Crepis acuminata</i>	Tapertip hawksbeard	Native, Sage-grouse Preferred	NBF_1, SS, SBF
<i>Crepis occidentalis</i>	Largeflower hawksbeard	Native, Sage-grouse Preferred	EC, NBF_2, SBF
<i>Cryptantha</i> spp.	Cryptantha	Native	SBF
<i>Cryptantha humilis</i>	Roundspike cryptantha	Native	NBF_1, NBF_2
<i>Cryptantha interrupta</i>	Elko cryptantha	Native	SS
<i>Cryptantha spiculifera</i>	Snake River cryptantha	Native	NBF_1
<i>Delphinium andersonii</i>	Anderson's larkspur	Native	CP_1, EC, NBF_1, SS, SBF, WS
<i>Erigeron pumilus</i>	Shaggy fleabane	Native, Sage-grouse Preferred	NBF_1, SS, WS
<i>Eriogonum ovalifolium</i>	Cushion buckwheat	Native	NBF_2
<i>Grindelia squarrosa</i>	Curlycup gumweed	Native	WS
<i>Linanthus pungens</i>	Granite prickly phlox	Native	SS
<i>Linum lewisii</i>	Lewis flax	Native	NBF_1, SBF
<i>Lomatium cous</i>	Cous biscuitroot	Native, Sage-grouse Preferred	CP_1, NBF_1, SBF

Scientific Name	Common Name	Species Type	Site(s) where species occurred
<i>Lomatium foeniculaceum</i>	Desert biscuitroot	Native, Sage-grouse Preferred	CP_1, NBF_1, SS
<i>Medicago sativa</i>	Alfalfa	Exotic, Sage-grouse Preferred	CP_3, WS
<i>Penstemon</i> spp.	Penstemon	Native	SS
<i>Penstemon cyaneus</i>	Blue penstemon	Native	NBF_1
<i>Phlox aculeata</i>	Sagebrush phlox	Native, Sage-grouse Preferred	CP_1, CP_3, EC, NBF_1, NB_2, SS, SBF, WS
<i>Phlox hoodii</i>	Spiny phlox	Native, Sage-grouse Preferred	CP_1, EC, NBF_1, NB_2, SS, SBF, WS
<i>Phlox longifolia</i>	Longleaf phlox	Native, Sage-grouse Preferred	CP_1, CP_3, EC, NBF_1, SS, SBF
<i>Munro's globemallow</i>	Munro's globemallow	Native	WS
<i>Tragopogon dubius</i>	Yellow salsify	Exotic, Sage-grouse Preferred	CP_3, EC, NBF_1, SS, SBF, WS
<b>Annual Forbs</b>			
<i>Agoseris glauca</i>	Pale agoseris	Native, Sage-grouse Preferred	NBF_1, SS, WS
<i>Agoseris heterophylla</i>	Annual agoseris	Native	SS
<i>Ceratocephala testiculata</i>	Curveseed butterwort	Exotic	CP_1, CP_3, EC, NBF_1, NBF_2, SS, SBF
<i>Collinsia parviflora</i>	Maiden blue eyed Mary	Native	CP_3
<i>Descurainia incana</i>	Mountain tansymustard	Native	CP_3
<i>Descurainia pinnata</i>	Western tansymustard	Native	CP_3, SBF
<i>Epilobium brachycarpum</i>	Tall annual willowherb	Native, Sage-grouse Preferred	SS
<i>Erodium cicutarium</i>	Redstem stork's bill	Exotic	SS, WS
<i>Lactuca serriola</i>	Prickly lettuce	Exotic, Sage-grouse Preferred	WS
<i>Lepidium perfoliatum</i>	Clasping pepperweed	Exotic	CP_1, CP_3, NBF_1, SS, WS
<i>Microsteris gracilis</i>	Slender phlox	Native, Sage-grouse Preferred	CP_3
<i>Salsola kali</i>	Russian thistle	Exotic	WS
<i>Sisymbrium altissimum</i>	Tall tumblemustard	Exotic	NB, CP_3, NBF_1, NBF_2, SS, WS
<i>Townsendia florifer</i>	Showy townsend daisy	Native, Sage-grouse Preferred	NBF_2, SS, WS
<b>Shrubs</b>			
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming big sagebrush	Native	CP_1, NBF_1, NBF_2, SS, SBF, WS, WS
<i>Atriplex canescens</i>	Fourwing saltbrush	Native	WS
<i>Chrysothamnus viscidiflorus</i>	Yellow rabbitbrush	Native	CP_3, NBF_1, NBF_2, WS
<i>Ericameria nauseosa</i>	Rubber rabbitbrush	Native	WS
<i>Grayia spinosa</i>	Spiny hopsage	Native	NBF_2, SS, SBF
<i>Gutierrezia sarothrae</i>	Broom snakeweed	Native	SS, SBF, WS
<i>Purshia tridentata</i>	Antelope bitterbrush	Native	CP_1

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