

BUREAU OF LAND MANAGEMENT

Rangeland Health Assessment and Evaluation Report

**Achieving the Idaho Standards for Rangeland Health
Owyhee Field Office Group 1 Allotments**

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Idaho BLM NEPA Permit Renewal Team

Rangeland Health Assessment and Evaluation Report Achieving the Idaho Standards for Rangeland Health

Field Office: Owyhee Field Office

Allotment Name/Number: Garat Allotment 0584

Name of Permittee(s): Petan Company of Nevada, Inc.

Standards for Rangeland Health

In 1997, the Idaho BLM adopted rangeland health standards (Appendix A - *Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management*), which were developed in coordination with the agency's three Resource Advisory Councils during the previous two years. The Standards outline the Bureau of Land Management's rangeland management goals for the betterment of the environment and sustained productivity of the range. They were developed with the specific intent of providing for the multiple uses of public lands managed by the BLM within Idaho. Application of the standards should involve collaboration between the authorized officer, interested publics, and resource users.

The eight standards for rangeland health are expressions of the level of physical and biological condition or degree of function required for healthy, sustainable rangelands, based on a number of indicators of rangeland health. Rangelands should be meeting or making significant progress toward meeting the standards through proper nutrient and hydrologic cycling and energy flow.

Appropriate to soil type, climate, and landform, indicators are a list of typical physical and biological factors and processes that can be measured and/or observed (e.g., photographic monitoring). They are used in combination to provide information necessary to determine the health and condition of the rangelands. Usually, no single indicator provides sufficient information to determine rangeland health, and only those indicators appropriate to a particular site are to be used. The indicators listed below each standard are not intended to be all-inclusive, and the issue of scale must be considered when evaluating each indicator. In some cases, individual isolated sites within a landscape may not be meeting the standards, but broader areas must be in proper functioning condition. Furthermore, fragmentation of habitat that reduces the effective size of large areas must also be evaluated for its consequences.

Rangeland Health Assessment and Evaluation Report

The Rangeland Health Assessment (RHA) is a compilation and analysis of all data and information available for an allotment or group of allotments that describes the current rangeland health conditions and identifies changes or trends in rangeland health over time. Permittees, interested publics, tribes, and state agencies must be given an

opportunity to provide information and data to be considered in the RHA. Rangeland Health Assessments are used in association with other quantitative monitoring and inventory information as a qualitative evaluation tool to provide early warnings of resource problems in rangeland uplands. The RHA procedure used for assessing the ISRH standards 1, 4, 5, and 6 compares 17 indicators to a reference state or Ecological Site Descriptions (USDA NRCS 2005, 2006 and 2010) and expresses a degree of departure from what is expected.

The Evaluation Report draws on monitoring reports on representative sites to determine rangeland health, condition and trend based on a number of indicators of rangeland health. It answers two major questions:

Is the allotment meeting the Idaho Standards for Rangeland Health (ISRH)?

If the allotment is not meeting the ISRH, is it making significant progress toward meeting the ISRH?

The analysis in the RHA is the basis for completing the Evaluation Report (ER). Some of the factors that might influence the current conditions include livestock grazing management, off-highway vehicles (OHV), wildlife concentration, roads, and trails. Current livestock grazing management and other uses are evaluated to conclude causes of any unsatisfactory conditions. Conclusions reached in the evaluation should describe all the factors and indicators and the scientific basis for each conclusion. The evaluation rationale should contain descriptions of each attribute or indicator that contributes to allotment(s) meeting or not meeting the standards.

Rangeland health field assessments (RHFA) were completed for the Garat allotment in May, June and July of 2003. Protocols used were in accordance with techniques identified in BLM technical reference 1734-6 Interpreting Indicators of Rangeland Health – Version 3 (USDI BLM 2000). Subsequent to completion of the field assessments and the initiation of this rangeland health assessment and evaluation report, Version 3 of the technical reference was updated by Version 4 (USDI BLM 2005). The techniques for qualitatively assessing rangeland health remained similar with indicators unchanged from Version 3. Even though the evaluation process had already begun for the allotment, use of refined description of the process provided in Version 4 was used to complete this report.

Allotment and Livestock Grazing Management

The Garat allotment is located in Owyhee County, Idaho, approximately 15 miles northwest of Owyhee, Nevada. The allotment is bordered by the East Fork Owyhee River on the north, South Fork Owyhee River on the west, the Nevada state line on the south and the Duck Valley Indian Reservation on the east (Appendix I-Map 1). The Garat allotment includes 202,618 acres of public land, 8,836 acres of state land, and 207 acres of private land in six pastures (Table ALLOT-1, Appendix I-Map 2-6).

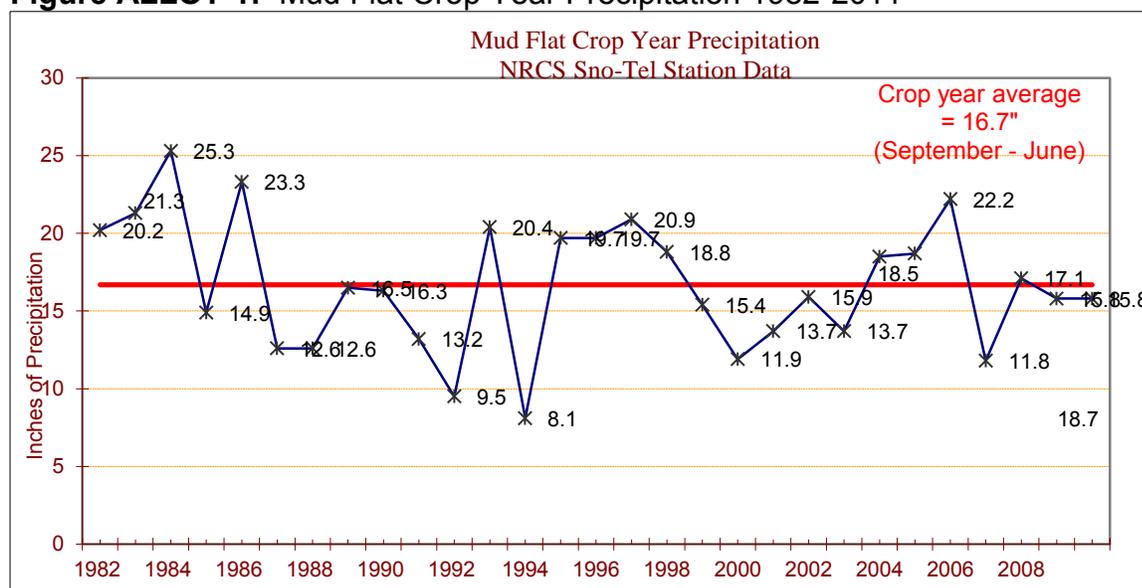
Table ALLOT-1: Total acres by pasture and ownership within the Garat Allotment in 2011

Allotment	Pasture	Pasture Name	Public	State	Private	Total
Garat	1	Dry Lakes	14,551	636	0	15,187
	2	Piute Creek	19,765	635	0	20,400
	3	Forty Five	42,932	1,644	0	44,576
	4	Kimball	38,492	2,519	45	41,056
	5	Big Horse	38,027	922	78	39,023
	6	Juniper Basin	48,854	2,481	85	51,412
Total			202,618	8,836	207	211,654

The allotment is located within the Upper Owyhee and South Fork Owyhee sub-basin and contains elevation ranges from 4,600 feet near the Owyhee River Canyon adjacent to Piute Creek to over 5,500 feet on plateau summits near the Duck Valley Indian Reservation. Terrain across the majority of the allotment consists of undulating plateaus and steep canyon walls. Landforms consist of foothills, structural benches, tablelands and calderas. Tablelands are primarily basalt in origin while most of the other landform features are developed in welded rhyolitic tuffs and some breccia.

The nearest weather station data is from Mud Flat, Natural Resources Conservation Service (NRCS) Sno-Tel Station (20 miles northeast of the Garat allotment). Precipitation data from this station is available from 1982-2009. Average crop year precipitation was 16.7 inches and varied from 8.1 inches in 1994 to 25.3 inches in 1984 (Figure ALLOT-1). Crop year precipitation is the sum of monthly precipitation between September and June and is used as a predictor of forage production during the growing season during the crop year (Sneva and Hyder 1962).

Figure ALLOT-1: Mud Flat Crop Year Precipitation 1982-2011



The allotment includes portions of the Owyhee River Bighorn Sheep Area of Critical Environmental Concern (ACEC), as designated by the Owyhee Resource Management Plan (RMP) (USDI-BLM 1999) and portions of the Owyhee River Wilderness Study Areas (WSA).

The soils in the Garat allotment are diverse due to varying parent materials, slope, aspect, elevation, climate and vegetative communities. The soils may be separated using two major physiographic regions: the Terraces and Bottomlands (the Juniper Basin area), and the structural benches and foothills. The majority of these soils are associated with Loamy 10-13" ecological sites; areas of Shallow-Claypan ecological sites are dispersed through the allotment (USDA NRCS 2005, 2006 and 2110).

The potential natural vegetative community for the Loamy 10-13" ecological sites is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*)/bluebunch wheatgrass (*Pseudroegnaria spicata*). These sites occur where soils are moderately deep and there is a mesic soil temperature regime (generally sites below 5,400 feet elevation).

The potential natural vegetative community for the Shallow Claypan 12-16" ecological site consists of low sagebrush (*Artemisia arbuscula*), Sandberg bluegrass, Idaho fescue and bluebunch wheatgrass. These sites occur where soils are shallow to bedrock or have heavy clay layers in the profile. Relatively shallow soils in these ecological sites tend to be dominated by Sandberg bluegrass (*Poa secunda*), while the deeper soils are dominated by bluebunch wheatgrass and Idaho fescue (*Festuca idahoensis*).

There have been seven wildfires ranging in size from two acres to 24,694 acres in the Garat allotment from 1973-2007. A majority of the fires have occurred in pastures 4 and 6 including portions of adjacent pastures. Pasture 4 recorded the most acreage burned

by one fire (14,165 acres) that included portions of pastures 2 and 3. The most wildfires, four, have occurred in pasture 6. The most active fire year occurred in 1985 with four fires covering 32,988 acres in each of the pastures except pasture 1. In 1985, 9,681 acres were post-fire seeded with crested wheatgrass (*Agropyron cristatum*) and small burnet (*Sanguisorba minor*) in pastures 4 and 6.

Table ALLOT-3: Fire History of the Garat allotment from 1973 – 2007

Pasture Name	Year, Acreage Burned, Number of Wildfires and Acreage Seeded					
	1973	1984	1985	1986	1996	2007
Pasture 1 Dry Lakes						6 (1)
Pasture 2 Piute Creek			7,118 (1)			
Pasture 3 Forty Five			3,935 (3)			
Pasture 4 Kimball			14,165 (1)		258 (1)	
			2,701 seeded			
Pasture 5 Big Horse Basin		858 (1)	3,750 (1)			
			seeding part of Pasture 6			
Pasture 6 Juniper Basin	1,534 (2)	8,637 (3)	4,019 (3)	11,421(1)		
			6,980 seeded			
Total Acreage Burned and Number of Wildfires	1,534 (2)	9495 (4)	32,988 (9)	11,421 (1)	258 (1)	6 (1)

The current total permitted use for livestock grazing in the Garat allotment is 33,646 Animal Unit Months (AUMs) (Table ALLOT-4) and current active use is 22,750 AUMs. The average AUMs is 14,802 and the average stocking rate is 12.0 acres per AUM. Actual use records from 1986 to 2011 can be found in Appendix F.

Table ALLOT-4: Total permitted use for individual permittee in the Garat allotment

Permittee	Active Use	Suspended Use	Total
Petan Company of Nevada, Inc.	22,750	10,896	33,646

Range adjudication and forage allocation on the Garat allotment were completed in 1940. Subsequently, fences were installed to split the allotment into six pastures during the 1940s (Appendix I-Maps 2-6).

Table ALLOT-5: Garat allotment grazing schedule implemented in Allotment Management Plan 1989

Pasture	Pasture Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	Dry Lakes	3/15-6/15	Rest	3/15-6/15 ¹	3/15-6/15	Rest	3/15-6/15 ¹
2	Piute Creek	3/15-6/15	Rest	3/15-6/15	3/15-6/15	Rest	3/15-6/15
3	Forty Five	Rest	3/15-06/15	3/15-6/15	Rest	3/15-6/15	3/15-6/15
4	Kimball	3/15-6/15	3/15-6/15	Rest	3/15-6/15	3/15-6/15	Rest
5	Big Horse	8/1-9/30	8/1-9/30	6/16-9/30	8/1-9/30	8/1-9/30	6/16-9/30
6	Juniper Basin	6/16-9/30	6/16-9/30	6/16-9/30	6/16-9/30	6/16-9/30	6/16-9/30

¹Will be used 3/5-5/30 with 500-1,000 head on old feed (NW Corner).
Flexibility for strays 10/1-10/15

Table ALLOT-6: Garat allotment grazing schedule in accordance with Actual Use Reports 2006-2011

Pasture	Pasture Name	2006	2007	2008	2009	2010	2011
1	Dry Lakes	3/27-7/8	3/15-7/9	Rest	3/16-7/9	3/21-7/7	Rest
2	Piute Creek	3/27-7/8	3/15-7/9	Rest	3/16-7/9	3/21-7/7	Rest
3	Forty Five	Rest	3/19-6/1	3/27-7/14	3/20-7/6	Rest	3/15-7/15
4	Kimball ¹	3/18-7/15	4/17-8/30	5/12-8/23	6/16-10/11	3/24-7/14	6/15-10/15
5	Big Horse ¹	3/15-6/27	Rest	3/22-5/15	Rest	Rest	3/15-7/15
6	Juniper Basin	6/25-10/15	6/18-10/10	6/19-10/15	6/27-10/13	6/22-9/20	6/15-10/15

¹Pasture rotations have been deviated from rotations in the Allotment Management Plan (Table ALLOT-5) since 2006. Rest has been added to the Big Horse pasture due to large amounts of poison in the spring and limited water in the fall, and no rest has occurred in the Kimball pasture in the past 6 years to compensate.

Pasture 1 & 2 Dry Lakes and Piute Creek

Pastures 1 and 2 have been used as a single pasture in a rest-rotation with pastures 3 and 4 (the Forty-Five and Kimball pastures). Pastures 1 and 2 are used for two years, followed by a year of rest. Season of use is generally from mid-March to early July. From 1986 to 2011, reported actual use has ranged from 906 to 4,896 AUMs (Appendix

F). Average actual use has been 3,233 AUMs for the 18 years in which the pastures have been grazed and pasture specific information is available. The average stocking rate has been 11.0 acres per AUM. The pastures have been rested for seven of the past 26 years.

Pasture 3 Forty-Five

Pasture 3, known as the Forty-Five pasture, has generally been grazed from March 15th to July 15th. Since 1986, this pasture has been rested seven of the past 26 years. 1997 was considered a rest year because actual use that year was 169 AUMs for six days and did not have any measureable impact on the land. The actual grazing use for pasture 3 has ranged from 1,159 to 5,343 AUMs (Appendix F). Average actual use for the eighteen years in which this pasture was grazed and pasture specific information is available has been 3,437 AUMs, for an average stocking rate of 13.0 acres per AUM.

Pasture 4 Kimball

Pasture 4 (Kimball) has been grazed on a spring/summer/rest rotation since 1986. In 13 of those years, this pasture has been grazed in the spring (March 15 to July 30), in nine years, it was grazed in the summer (after June 15th), and it was rested in three years (data missing for one year). Average annual actual use in Pasture 4 has been 4,066 AUMs for the 22 years in which pasture specific data is available, with actual use ranging from 1,442 to 7,401 AUMs (Appendix F). The average stocking rate was 10.1 acres per AUM.

Pasture 5 Big Horse

Pasture 5 (Big Horse) was grazed annually during the summer season (July to September) from 1986 to 1991 and again in 1997. Since 1992, this pasture has been rested nine years and, when used, has been grazed from mid-March to the end of June, except in 1997 (Appendix F). Actual use during the period 1986 through 2011 ranged from 646 AUMs in 1991 to 4,615 AUMs in 1999. The average actual use for the 16 years in which the pasture was grazed and pasture specific data is available was 2,569 AUMs, for an average stocking rate of 15.2 acres per AUM.

Pasture 6 Juniper Basin

Grazing use in pasture 6 (Juniper Basin) has occurred primarily from mid-June to mid-October from 1986 through 2011. However, in 1992 and 2003, the pasture was grazed from mid-April through early September. This pasture has not been rested during the time period for which actual use reports are available (Appendix F). Reported actual use for which pasture specific data is available ranged from 1,640 to 8,538 AUMs. Average annual use was 4,969 AUMs, for an average stocking rate of 10.3 acres per AUM.

Monitoring

Standards: 2003/2004 Data Collection and Associated 2006 Assessment and Determinations

In 2003 and 2004, the BLM conducted Rangeland Health Field Assessments (RHFAs) (USDI-BLM 2000) at 63 monitoring sites, and 12 trend plots were updated to provide for existing conditions in the Garat Allotment (Appendix I-Maps 2-6). The assessed areas primarily occur on Loamy 10"-13" and Shallow Claypan 11"-13" ecological sites, although a few Shallow Claypan 12"-16" are represented as well. Findings were compiled in an Assessment (USDI- BLM 2006), followed by a Determination (USDI-BLM 2006).

Petan Data (Western Range Service)

In December 2007, Petan Company of Nevada (Petan) provided the BLM with comments regarding the final Garat allotment Rangeland Health Assessment/Evaluations (USDI-BLM 2006) and Determination (USDI-BLM 2006) for the Garat permit renewal process (Petan 2007). The document includes additional information collected by Western Range Service (WRS), a consulting firm that Petan has used for more than two decades to conduct quantitative studies and review BLM decisions. WRS data is within BLM monitoring protocols as acceptable data and has been considered in the past. Furthermore, BLM policy (IM-2006-100) and WO MOU (The Public Lands Council (PLC) President and the BLM Director signed an MOU on January 30, 2004) encourages BLM & grazing permittees to cooperatively collect monitoring data.

Western Range Service evaluated the 63 RHFAs that were conducted by the BLM in 2003/2004 and provided a detailed revised suite of data, additional quantitative studies, corrected ratings, in-depth methodology, and alternative interpretations of findings and observations for the Garat allotment.

In short, WRS revisited 19 sites on which the BLM rated one or more of the attributes of rangeland health as moderate or greater departure. The BLM did not disclose what served as a reference state for any of the RHFAs, so WRS established reference conditions for their re-assessment by first visiting five RHFA sites that the BLM found to exhibit minimal departure. The consultants also conducted additional quantitative measurements including the Line-Point Intercept, Basal Gap Intercept, Soil Stability Kit, and Belt Transect methods (as outlined in Herrick et al. 2009) to supplement the qualitative decisions of the RHFA (Petan 2007).

Western Range Service concluded that it was necessary to change the BLM ratings of 72 indicators to fall into the slight-to-moderate departure category from reference conditions and ratings for an additional three indicators to fall into the none-to-slight departure category, rather than being classified within a moderate-to-greater departure category. These indicators resulted in a new distribution that was used by WRS to generate overall attribute ratings for each pasture (Table SOIL-3). All overall ratings,

coupled with other findings, fell within the slight-to-moderate departure category and claimed that Standards 1 and 4 were met in every pasture of the Garat allotment (Table SOIL-4). Refer to Petan (2007) for the complete data for summary of results.

In 2009 BLM staff assisted WRS with data collection to observe and document the current ecological status (range condition) and trend in the Garat allotment previously determined in 1997 and 2003. The BLM 2011 Interdisciplinary team concurred with the data and collection methods, but did not agree with overall conclusions of WRS. See the 2011 update below for details.

Ecological status and total production data collection methods used the Dry Weight Rank Method described in the 1996 Interagency Technical Reference. Scores were determined using the method described in Section 305 of the 1976 Soil Conservation Service National Range Handbook (NRH). The ecological status classes used were: Early Seral=0-25 percent of potential species composition based on the historic climax plant community; Mid Seral= 26-50 percent of potential; Late Seral= 51-75 percent of potential; and PNC = 76-100 percent of potential.

2011 Update

Rangeland Health Field Assessment (RHFA) data collected between May of 2003 and 2004, and 2006; WRS data submitted to BLM on behalf of Petan Company of Nevada; and additional BLM monitoring data (current and historical) pertaining to the Garat Allotment (Appendix I-Maps 2-6), has been considered by the BLM NPR (NEPA Permit Renewal) interdisciplinary team (BLM IDT) to reassess and provide a 2011 Rangeland Health Standards and Guidelines update. With this said, one of the 63 RHFA's was missing and was dropped, providing for a total of 62 RHFA's. An updated Version 4 Indicators remained the same from Version 3, so the assessment process is still relevant, even where prior evaluations were made in 2001.

The 2011 Interdisciplinary team reviewed the RHFA data and some conclusions varied from both the Petan data and the 2003-2004 BLM data as described in detail by pasture in this report.

The 2011 Interdisciplinary team reviewed the 1997, 2003 and 2009 WRS trend data and agreed with some of the data provided; however, it did not agree with the overall conclusions of meeting Standards 1 and 4 in every pasture of the Garat allotment. Decreased bunchgrasses and higher than-expected shrub cover and shrub decadence including poor vegetation re-establishment in burned, unseeded areas as compared to the desired condition is apparent across the allotment. Soil degradation is a concern in areas where invasive annuals are increasing, such as in Juniper Basin. In addition, many sites that burned in the mid-1980s have not recovered. The Wyoming sagebrush/bluebunch wheatgrass ecological sites in the Garat allotment have moved away from the historic climax plant community to a more Wyoming sagebrush/Sandberg bluegrass dominated site as described in detail by pasture in this report.

Information Sources

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Sneva F.A., and D.N. Hyder. 1962. Estimating Herbage Production on Semiarid Ranges in the Intermountain Region. Journal of Range Management. Vol. 15. No. 2. pp 88-93.

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USDI Bureau of Land Management. 2006. Final Rangeland Health Assessment for the Garat Allotment. Owyhee Field Office. Marsing, Idaho. 40 p.

USDI Bureau of Land Management. 2006. Evaluation and Determination: Achieving the Idaho Standards for Rangeland Health and Conformance with the Guidelines for Livestock Grazing Management. Owyhee Field Office. Marsing, Idaho. 9 p.

Standards

Standard 1 – Watersheds

___ Standard Doesn't Apply

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.

1. Indicators may include but are not limited to:
2. The amount and distribution of ground cover, including litter, for identified ecological site or soil-plant associations are appropriate for site stability.
3. Evidence of accelerated erosion in the form of rills and/or gullies, erosional pedestals, flow patterns, physical soil crusts/ surface sealing, and compaction layers below the soil surface is minimal for soil type and landform.

Rangeland Health Assessment

Overview

Twelve of the 17 indicators utilized in the Rangeland Health Field Assessment (RHFA) are related to Standard 1 - Watershed Health. The analysis of watershed condition considers both soil stability and hydrologic indicators and displays a natural range of physical and vegetative characteristics. Table SOIL-1 summarizes all indicator ratings and corresponding percentages related to Standard 1 by pasture.

For example, five sites were evaluated in Pasture 1, for a total of 50 indicator ratings per resource related to watersheds. Of these, 15 were rated as having a slight to moderate degree of departure from reference site conditions for soil/site stability. Detailed indicator ratings by site can be found in Appendix H – RHFA Data.

Table SOIL-1: Summary of BLM 2003/2004 watershed-related indicator ratings by pasture (Appendix H)

Pasture Name	Sites Total & Overall Rating	Soil/Site Stability										Hydrologic Function									
		n-s		s-m		m		m-e		e		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Pasture 1 Dry Lakes ¹	5	23	46	15	30	12	24	0	0	0	0	13	26	18	36	19	38	0	0	0	0
Pasture 2 Piute Creek ²	7	32	46	25	36	13	19	0	0	0	0	20	29	30	43	20	29	0	0	0	0
Pasture 3 Forty-Five ³	10	47	47	23	23	19	19	11	11	0	0	29	29	26	26	31	31	14	14	0	0
Pasture 4 Kimball ⁴	11	59	54	34	31	12	11	4	4	1	1	45	41	41	37	18	16	5	5	1	1
Pasture 5 Big Horse ⁵	14	66	47	53	38	19	14	2	1	0	0	46	33	62	44	29	21	3	2	0	0
Pasture 6 Juniper Basin ^{6**}	15	84	56	39	26	23	15	4	3	0	0	60	40	52	35	34	23	4	3	0	0

n-s = none-to-slight; s-m = slight-to-moderate; m = moderate; m-e = moderate-to-extreme; e = extreme

¹ Summarizes ratings for: 4 Loamy 10"-13" sites and 1 Shallow-Claypan 11"-13" site.

² Summarizes ratings for: 5 Loamy 10"-13" sites and 2 Shallow-Claypan 11"-13" sites.

³ Summarizes ratings for: 9 Loamy 10"-13" sites and 1 Shallow-Claypan 11"-13" site.

⁴ Summarizes ratings for: 6 Loamy 10"-13" sites, 2 Shallow Claypan 12"-16" sites, and 3 Shallow-Claypan 11"-13" sites.

⁵ Summarizes ratings for: 14 Loamy 10"-13" sites.

⁶ Summarizes ratings for: 13 Loamy 10"-13" sites, 1 11"-13" Shallow-Claypan site, and 1 12"-16" Shallow-Claypan site.

**One Loamy 10"-13" site was removed due to missing data; numbers therefore differ from USDOJ-BLM 2006.

The interpretation process is the critical link between observations of indicators and determining the degree of departure from a reference condition. A BLM interdisciplinary team used RHFA monitoring sheets, photos, functional group descriptions, cover class percentages, and site documentation for species abundance and dominant life forms to interpret attribute ratings (Table SOIL-2). The team altered the 2003 decisions based on

available information. Ecological Site Descriptions (USDA NRCS 2005, 2006, and 2010) specific to each monitoring site location (Map 4) were used to provide for interpretation of departure from reference conditions because there were no reference sheets available for the 2003 RHFA data.

Table SOIL-2: Summary of 2011 BLM attribute ratings and overall ratings for the Garat allotment (Appendix H)*

Pasture Name	Sites Total & Overall Ratings #	Soil/Site Stability										Hydrologic Function										
		n-s		s-m		m		m-e		e		n-s		s-m		m		m-e		e		
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	
Pasture 1 Dry Lakes	5 m	0	0	2	40	3	60	0	0	0	0	0	0	0	2	40	3	60	0	0	0	0
Pasture 2 Piute Creek	7 s-m	0	0	6	86	1	14	0	0	0	0	0	0	0	6	86	1	14	0	0	0	0
Pasture 3 Forty-Five	10 m	0	0	4	40	5	50	1	10	0	0	0	0	0	4	40	4	40	2	20	0	0
Pasture 4 Kimball	11 s-m	3	27	6	55	1	9	1	9	0	0	2	18	7	64	1	9	1	9	0	0	0
Pasture 5 Big Horse	14 s-m	1	7	11	79	2	14	0	0	0	0	1	7	10	71	2	14	1	7	0	0	0
Pasture 6 Juniper Basin**	15 m	3	20	8	53	4	27	0	0	0	0	3	20	8	53	4	27	0	0	0	0	0

*Final ratings are not exclusively based on the displayed watershed-related indicators and relied on a summary of all available information (Team notes). Compared to Table SOIL-4, the numbers reflect a tally of final attribute ratings per site within each pasture rather than a tally of individual indicator ratings.

**One Loamy 10-13" site was removed due to missing data; numbers therefore differ from 2006 RHA.

#The overall rating also takes into account the adjusted Petan data from Table SOIL-3.

A “preponderance of evidence” approach was used to select the appropriate departure category for each attribute. The decision was not always based on where the majority of indicators for each attribute fell, but also weighed a rating depending on whether an indicator was particularly important for the site (Pellant et al. 2005). Such an approach therefore excluded the use of a numerical indicator tally and heavily relied on a summary of all available information.

Ground cover data collected from twelve nested frequency trend plots were evaluated from 1989 to 2009 in the Garat allotment (Maps 5-9). This information provides quantitative data that reflect long-term and short-term changes for ground cover, which consists of basal and total vegetation, rock, gravel, biologic crust, persistent and non-persistent litter, and canopy cover.

For this assessment, *long-term* represents the full length of time between the first and last reading (e.g. comparing 1989 to 2009) and *short-term* reflects a comparison between 2009 and the immediately previous reading. Data may or may not show statistical significance or reflect a direction change in conditions.

Petan (2007) data that was re-collected and reviewed provided additional valuable information and, in several cases, offered a rectification and re-evaluation of several shortcomings of the data collected in 2003/2004. The BLM ID team incorporated their own ratings (Table SOIL-1), along with much of Petan's more current additional data (Tables SOIL-3 and SOIL-4), to support the final overall BLM ratings (Table SOIL-2).

Table SOIL-3: Summary of Petan (2007) watershed-related indicator ratings by pasture based on adjusted 2003/2004 BLM RHFA data

Pasture Name	Sites Total	Soil/Site Stability										Hydrologic Function									
		n-s		s-m		m		m-e		e		n-s		s-m		m		m-e		e	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Pasture 1 Dry Lakes West ¹	5	23	46	17	34	10	20	0	0	0	0	13	26	21	42	16	32	0	0	0	0
Pasture 2 Piute Creek ²	7	32	46	28	40	10	14	0	0	0	0	20	29	35	50	15	21	0	0	0	0
Pasture 3 Forty-Five ³	10	49	49	37	37	9	9	5	5	0	0	31	31	48	48	15	15	6	6	0	0
Pasture 4 Kimball ⁴	11	59	54	39	35	10	9	1	1	1	1	45	41	50	45	13	12	1	1	1	1
Pasture 5 Big Horse ⁵	14	66	47	58	41	16	11	0	0	0	0	46	33	71	51	23	16	0	0	0	0
Pasture 6 Juniper Basin ⁶	16	90	56	44	28	23	14	3	2	0	0	66	41	61	38	30	19	3	2	0	0

n-s = none-to-slight; s-m = slight-to-moderate; m = moderate; m-e = moderate-to-extreme; e = extreme

¹ Summarizes ratings for: 4 Loamy 10"-13" sites and 1 Shallow-Claypan 11"-13" site.

² Summarizes ratings for: 5 Loamy 10"-13" sites and 2 Shallow-Claypan 11"-13" sites.

³ Summarizes ratings for: 9 Loamy 10"-13" sites and 1 Shallow-Claypan 11"-13" site.

⁴ Summarizes ratings for: 6 Loamy 10"-13" sites, 2 Shallow Claypan 12"-16" sites, and 3 Shallow-Claypan 11"-13" sites.

⁵ Summarizes ratings for: 14 Loamy 10"-13" sites.

⁶ Summarizes ratings for: 14 Loamy 10"-13" sites, 1 11"-13" Shallow-Claypan site, and 1 12"-16" Shallow-Claypan site.

Table SOIL-4: Summary of Petan (2007) indicator tallies and overall ratings by pasture based on adjusted 2003/2004 BLM RHFA data

Standard 1	Indicator Tally (1-11, 14) by Degree of Departure					Overall Rating
	n-s	s-m	m	m-e	e-t	
Pasture 1 Dry Lakes West	23	21	16	0	0	s-m
Pasture 2 Piute Creek	32	37	15	0	0	s-m
Pasture 3 Forty-Five	49	50	15	6	0	s-m
Pasture 4 Kimball	62	55	13	1	1	s-m
Pasture 5 Big Horse	64	78	23	0	0	s-m
Pasture 6 Juniper Basin	95	64	30	3	0	s-m

Pasture 1 - Dry Lakes

There are 41 miles of ephemeral drainage paths and six developed livestock reservoirs in this pasture (Map 5). Classic riparian habitat function and structure does not exist (Standard 2) although mesic habitat features in shallow drainages and reservoir perimeters may persist for periods of time with adequate soil moisture. Pasture 1 is grazed simultaneously with pasture 2 (Piute Creek) in the spring to mid-summer (Table ALLOT-5 and 6).

Rangeland Health 2003: Five rangeland health assessments were completed in pasture 1: four in Loamy 10"-13" and one in Shallow-Claypan 11"-13" ecological sites (Table SOIL-1). As a whole, pasture 1 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-2).

Pedestals are mainly noted on Sandberg bluegrass, appear to be mostly historic, but occasionally display exposed roots that are more recent. At all but one evaluation site in this pasture, water flow patterns are longer, often connect to form a network, and are more numerous than expected. Occasional interspaces often promote ponding. The proportion of bare ground is rated moderate due to a lack of vegetation and weaker structure in the interspaces that makes the soils more susceptible to erosion. Though biotic crusts and gravels are present at several locations, the remaining sites note a lack of stabilizing agents.

Soil loss is mostly historic, while occasional evidence of re-deposition of soil and mechanical degradation from hoof action leaves some areas with impacts. Plant community composition and distribution deviate from reference conditions due to higher-than-expected relative abundance of sagebrush and a reduced occurrence of large perennial bunchgrasses, which is also reflected in a reduction of litter.

Trend: Ground cover trend data was collected from 1989 to 2009 at two sites (Appendix G; Map 5). Bare ground and basal vegetation show a statistically significant long-term and short-term reduction for both sites. Rock, gravels, persistent litter, and biological crust (after this, referred to as biological crust only) showed a statistical decline on one site long-term and an incline for both sites short-term. Non-persistent litter remained static between 2003 and 2009 but is significantly increasing long-term. Trend data for total vegetation and canopy cover is only available for 2003 and 2009 and shows no change for total vegetation and a short-term significant increase of canopy cover at one site.

Petan - Rangeland Health 2007: One of the five RHFA sites evaluated by BLM was re-evaluated and resulted in WSR recommending improved levels of departure for water flow, bare ground, and plant community from moderate to slight-to-moderate (Table SOIL-3; Petan 2007)).

Line-point intercept results show an average of 33 percent canopy cover, 26 percent bare ground, 9 percent basal cover, and 45 percent litter. As a whole, Petan (2007) rated pasture 1 as having a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-4).

Pasture 2 – Piute Creek

There are 64 miles of ephemeral drainage paths and eight developed livestock reservoirs in this pasture (Map 5). Three of the reservoirs are developed natural playas. Classic riparian habitat function and structure does not exist (Standard 2) although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture.

Pasture 2 is grazed simultaneously with pasture 1, generally from mid-March to late June/early July (Table ALLOT-5 and 6).

A wildfire in 1985 burned 7,118 acres (31 percent) of the pasture, largely in the Piute Basin (Table ALLOT-3; Map 3). Grazing continued until the pasture was rested in 1990 and no fire rehabilitation was noted.

Rangeland Health 2003: Seven rangeland health assessments were completed in pasture 2: five in Loamy 10"-13" and two in Shallow-Claypan 11"-13" ecological sites (Table SOIL-1; Map 4). As a whole, pasture 2 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-2).

Pedestals are mainly noted on Sandberg bluegrass, appear to be mostly stabilized, but occasionally display exposed roots that indicate ongoing erosional activity. Water flow patterns are longer, often connect to form a network, and are more numerous than expected, with occasional interspaces that promote ponding. The proportion of bare ground is rated moderate due to a lack of vegetation and weaker soil structure in the interspaces. Though biotic crusts and gravels are present at several locations, the remaining sites note a lack of stabilizing agents.

Soil loss is mostly historic, while occasional evidence of soil re-deposition and mechanical degradation from hoof action were observed in limited areas. Plant community composition and distribution deviate from reference conditions due to higher-than-expected relative abundance of sagebrush and a reduced occurrence of large perennial bunchgrasses, which is also reflected in a reduction of litter in interspaces.

Trend: Ground cover trend data was collected from 1989 to 2009 at two sites (Appendix G; Map 6). Bare ground and basal vegetation show a statistically significant long-term and short-term reduction for both sites. Biological crust shows no long-term change and a non-significant short-term increase, while non-persistent litter is significantly increasing both long-term and short-term. Trend data for total vegetation and canopy

cover, which is only available for 2003 and 2009, shows only a slight, non-significant short-term increase for both cover types.

Petan - Rangeland Health 2007: One RHFA site serves as a reference. Two of seven previously visited RHFA sites that were re-evaluated by WRS (Petan 2007) received improved ratings for water flow, soil surface erosion, and plant community by shifting from moderate to slight-to-moderate degree of departure from the reference conditions (Table SOIL-3). BLM elevated ratings that show a shift from reference conditions for biotic indicators are largely supported by Petan.

Line-point intercept results show an average of 23 percent canopy cover, 22 percent bare ground, 8 percent basal cover, and 62 percent litter. One soil stability test displayed reduced values on bare soils compared to vegetated areas and provides an overall stability rating average of 3.1 (Herrick et al. 2001). As a whole, Petan (2007) rated pasture 2 as having a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-4).

Pasture 3 - Forty-Five Field

There are 172 miles of ephemeral drainage paths and twenty-four developed livestock reservoirs in this pasture (Map 6). Classic riparian habitat function and structure does not exist (Standard 2), although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture. Pasture 3 is grazed from March 15 to July 15 (Table ALLOT-5 and 6).

Three wildfires burned in this pasture in 1985, ranging in size from 41 to 3,411 acres, for a total of 3,935 acres (10 percent of pasture) burned (Table ALLOT-3; Map 3) No fire rehabilitation was noted. Grazing continued until the pasture was rested in 1989.

Rangeland Health 2003: Ten rangeland health assessments were completed in pasture 3: nine in Loamy 10"-13" and one in Shallow-Claypan 11"-13" ecological sites (Table SOIL-1). As a whole, pasture 3 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-2).

Water flow patterns are more numerous than expected at all evaluation sites in this pasture and vary in length, width, and connectedness. Ponding is common, and where flow patterns are longer, cut areas are often observed. More than half of the 14 moderate-to-extreme ratings occur on two sites, while one other site displayed five moderate and three moderate-to-extreme ratings.

Active and historic pedestals are mostly observed in association with Sandberg bluegrass within shrub interspaces and the flow paths. Mosses and biotic soil crusts stabilize some pedestals, while others appear to be more recent and include root exposure. Shrub mounds are noted at several sites. The proportion of bare ground is rated moderate and moderate-to-extreme due to a lack of vegetation and litter in shrub interspaces. Biotic soil crusts are also below potential at these sites.

Soil surface resistance to erosion appears to be compromised at four sites in this pasture due to historic and active soil loss and the lack of soil surface stabilizing agents such as biotic soil crusts, organic matter, and vegetative cover. Plant community composition and distribution are altered throughout the pasture because of a greater-than-expected occurrence of sagebrush and a decline in large perennial bunchgrasses, particularly in shrub interspaces.

Trend: Ground cover trend data were collected from 1989 to 2009 at one site (Appendix G; Map 6). Biological crust and persistent litter, as well as total vegetation and canopy cover, are static. Over the long-term and short-term, bare ground and basal vegetation show a statistically significant decline, while non-persistent litter significantly increased.

Petan - Rangeland Health 2007: One site served as a reference. Five of 10 previously visited RHFA sites that were re-evaluated by WRS (Petan 2007) received improved ratings for water flow, bare ground, soil surface erosion, plant community composition, and litter amount by shifting from moderate or moderate-to-extreme to slight-to-moderate (Table SOIL-3). Compaction ratings were reduced from moderate to none-to-slight, while the Petan data retained BLM ratings of moderate-to-extreme for pedestaling and moderate for soil surface loss and degradation. Most BLM ratings for biotic indicators were not changed by WSR.

Line-point intercept results show an average of 40 percent canopy cover, 28 percent bare ground, 9 percent basal cover, and 52 percent litter. Soil stability tests at four sites display similar variations between bare soils and vegetated areas and result in an overall range of soil stability rating averages from 3.4 to 4.3 (Herrick et al. 2001) for all samples. As a whole, Petan (2007) rated pasture 3 as having a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-4).

Pasture 4 - Kimball

There are 113 miles of ephemeral drainages and twenty-four developed livestock reservoirs in this pasture (Map 7). Classic riparian habitat function and structure does not exist (Standard 2), although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture.

An intermittent portion of Piute Creek occurs in the northern part of this pasture, with subsurface flows from Piute Reservoir supporting discontinuous reaches of heavily grazed (less than 0.5 inches tall) herbaceous vegetation. No riparian shrub component occurs. Pasture 4 is grazed on a spring/summer/rest rotation. Actual grazing periods have been variable from 2006 to 2011 (Table ALLOT-5 and 6).

Wildfire burned 14,165 acres of this pasture in 1985 and 258 acres in 1996 (Map 3). In 1986, 34 percent of the pasture burned, largely in Piute Basin, and was followed up by a

2,701-acre (19 per cent of the burned area) seeding of crested wheatgrass and small burnet. Grazing continued until the pasture was rested in 1989. The 1996 wildfire burned 0.6 percent of the pasture within the 1986 fire perimeter and no fire rehabilitation was noted. The burned area continued to be grazed until rested in 2004.

Rangeland Health 2003: Eleven rangeland health assessments were completed in pasture 4: six in Loamy 10"-13", three in Shallow Claypan 11"-13", and one in Shallow-Claypan 12"-16" ecological sites (Table SOIL-1; Map 4). As a whole, pasture 4 has a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-2)

Pedestals are generally associated with Sandberg bluegrass and appear to be both active and historic. While mosses and biotic soil crusts stabilize many pedestals, cut areas and exposed roots are noted at some sites, suggesting active erosion. Water flow patterns tend to be longer and more numerous than expected and often include ponding and cut areas.

Although bare ground is primarily rated no higher than slight-to-moderate departure, an increase in departure can be attributed to a lack of litter and vegetative cover, resulting in occasional moderate to large bare patches. Abundant rock and gravel, however, provide soil protection when present.

The indicator for plant community composition and distribution relative to infiltration and runoff was rated as showing a moderate departure from reference conditions at three sites. This was based on lower-than-expected relative abundance of bluebunch wheatgrass, Idaho fescue, and a corresponding increase in Sandberg bluegrass and other small perennial bunchgrasses. At the 14S02W22 site (Appendix H), this indicator was rated as showing a moderate-to-extreme departure, due to lack of shrubs and dominance of cheatgrass (*Bromus tectorum*) in patches.

Trend: Ground cover trend data were collected from 1989 to 2009 at two sites (Appendix G; Map 7). Data collection appears to have been inconsistent in this pasture - 2009 basal vegetation data is missing for one of the sites. The available data show an insignificant short-term decline in basal vegetation for the site lacking 2009 data and a significant long-term and short-term decline for the second site covering 1989 to 2009.

Bare ground shows a long-term and short-term decline, with the latter being statistically significant for both sites. Biological crust presence shows no consistent trend. Non-persistent litter increased significantly long-term for both sites and short-term for one. Trend data for total vegetation and canopy cover are only available for 2003 and 2009 and show significant short-term increases for both covers at one site and no change and a non-significant increase for the other site.

Petan - Rangeland Health 2007: Two sites served as a reference. Four out of 11 previously visited RHFA sites that were re-evaluated by WRS (Petan 2007) receive shifted ratings for water flow, bare ground, soil surface erosion, plant community

composition, and litter amount from moderate or moderate-to-extreme to slight-to-moderate (Table SOIL-3). The previous BLM ratings of moderate-to-extreme for pedestaling and moderate ratings for soils surface loss and degradation were not changed.

Line-point intercept results show an average of 27 percent canopy cover, 18 percent bare ground, 5 percent basal cover, and 64 percent litter. A soil stability test at two sites displays reduced values on bare soils compared to vegetated areas and results in an overall range of soil stability rating averages from 2.7 to 3.4 (Herrick et al. 2001) for both samples. As a whole, Petan (2007) rated pasture 4 as having a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-4).

Pasture 5 - Big Horse

There are 105 miles of ephemeral drainages and 10 developed livestock reservoirs in this pasture (Map 8). Classic riparian habitat function and structure does not exist (Standard 2), although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture. There are also five springs identified in this pasture, but the functional and structural status of them is unknown.

Pasture 5 was grazed during the summer season from July to September, from 1986 to 1991, and again in 1997. Since 1992, this pasture has been rested for a total of nine non-consecutive years (except in 2009-2010) and, when it is used, current grazing occurs from mid-March to the end of June (Table ALLOT-5 and 6).

Fires burned 858 acres in this pasture in 1984 and 3,750 acres in 1985 and were followed up with seedings of crested wheatgrass (Table ALLOT-3; Map 3). The pasture was never rested after the fires and was grazed for the following 6 years.

Rangeland Health 2003: Fourteen rangeland health assessments were completed in pasture 5, all in Loamy 10"-13" ecological sites (Table SOIL-1; Map 4). As a whole, pasture 5 has a slight to slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-2).

Most pedestals are associated with Sandberg bluegrass and smaller short-lived bunchgrasses and appear to be both historic and active. Water flow patterns are mostly short and wide but more numerous than expected, while several sites contain connected flows with distinct cut areas.

Bare ground displays a moderate departure at more than half of the sites, due to larger-than-expected unvegetated patches associated with water ponding areas. Soil surface resistance to erosion is within the expected range of conditions at most sites but is occasionally compromised when patches of soils are bare and reductions in herbaceous cover and litter amounts are present.

Plant community composition and distribution relative to infiltration received numerous ratings of departure from reference conditions. This was attributed to a higher-than-expected relative abundance of sagebrush, a reduction in large and mid-size perennial bunchgrasses, and a corresponding increase in small, shallow-rooted bunchgrasses. Several of the sites with greatest departure from reference conditions are located near roads on the northern half of the pasture.

Trend: Ground cover trend data were collected from 1989 to 2009 at two sites (Appendix G; Map 8). Bare ground shows statistically significant long-term decreases for both sites and for one site over the short-term. Basal vegetation displays no major long-term change but a significant short-term decrease. Biological crust, total vegetation, and canopy cover on both sites appear to have changed very little over time.

Petan - Rangeland Health 2007: One site serves as a reference. Four of the 14 previously visited RHFA sites that were re-evaluated by WRS (Petan 2007) receive altered ratings for water flow, bare ground, soil surface erosion, litter amount, and plant community composition by shifting from moderate or moderate-to-extreme to slight-to-moderate degrees of departure from reference conditions (Table SOIL-3). The Petan data confirm some of the BLMs moderate rankings for pedestaling and a moderate rating for soil surface loss and degradation.

Bureau of Land Management ratings for biotic indicators are largely supported by WSR and shifted one score for invasive species from none-to-slight to slight-to-moderate. Line-point intercept results show an average of 26 percent canopy cover, 22 percent bare ground, 4 percent basal cover, and 60 percent litter. A soil stability test at one site displays similar variations between bare soils and vegetated areas and results in an overall soil stability rating of 3.6 (Herrick et al. 2001). As a whole, Petan (2007) rated pasture 5 as having a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-4).

Pasture 6 - Juniper Basin

There are 158 miles of ephemeral drainages and twelve developed livestock reservoirs in this pasture (Map 9). Classic riparian habitat function and structure do not exist (Standard 2), although mesic habitat features on shallow slopes, in low gradient drainages, and along reservoir perimeters may persist for periods of time with adequate soil moisture. Juniper Reservoir is heavily impacted by livestock concentration and lacks any functional and structural riparian habitat.

Fires in this pasture burned 1,534 acres in 1973, 8,637 acres in 1984, 4,019 acres in 1985, and 11,400 acres in 1986 (Table ALLOT-3). After the 1985 fire, 6,980 acres were drilled and seeded with crested wheatgrass. Native species appear to be re-colonizing significant portions of the seeded area. The pasture was never rested after the fire (Table ALLOT-5 and 6).

Rangeland Health 2003: Fifteen rangeland health assessments were completed in pasture 6: thirteen in Loamy 10"-13", one in Shallow Claypan 11"-13", and one in Shallow-Claypan 12"-16" ecological sites (Table SOIL-1). As a whole, pasture 6 has a moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-2).

Pedestals are mostly associated with Sandberg bluegrass and short-lived bunchgrasses and appear to be both historic and active. Commonly noted departures from expected conditions are for water flow patterns, bare ground and soil surface erosion. Water flow patterns are mostly short and wide but more numerous than expected, while several sites contain connected flows with distinct cut areas.

Bare ground displays a moderate departure at half of the sites, due to larger-than-expected unvegetated patches associated with water ponding in shrub interspaces. Soil surface resistance to erosion is within the expected range of conditions at most sites but is occasionally compromised when patches of soils are bare and reductions in herbaceous cover and litter amounts are present.

Plant community composition and distribution relative to infiltration received some ratings of departure from reference conditions. This was attributed to a higher-than-expected relative abundance of sagebrush, a lack of biotic crust, a reduction in large perennial bunchgrasses, and a corresponding increase in small, shallow-rooted bunchgrasses. Several of the sites with the greatest departure from reference conditions are located in the northwest and near the southern boundary of the pasture.

Trend: Ground cover trend data were collected from 1989 to 2009 at three sites, although basal vegetation was not read at one of the trend locations in 2009 (Appendix G; Map 9). Bare ground was variable, with one statistically significant and one non-significant long-term increase at two sites and one significant decline at another. Over the short-term, two sites decreased bare ground significantly while one displayed a non-significant increase. Basal vegetation declined significantly over the long- and short term while biologic crusts were static or showed a non-significant long-term and short-term decline, with only one site increasing significantly short-term.

Non-persistent litter is significantly declining long-term and short-term on two sites and increasing on one other. Trend data for total vegetation and canopy cover are only available for 2003 and 2009 and show non-significant short-term decreases for both covers at two sites, while the third displays a significant decline in total vegetation and a minor non-significant increase for canopy cover.

Petan - Rangeland Health 2007: One site serves as a reference. Two previously visited RHFA sites that were re-evaluated by WRS (Petan 2007) receive altered ratings for water flow, bare ground, compaction, litter amount, and plant community composition by shifting moderate or moderate-to-extreme ratings toward slight-to-moderate (Table SOIL-3). The Petan data confirm some of the BLMs moderate rankings for soil surface loss and degradation.

The data also support elevated ratings that show a shift from reference conditions for biotic indicators. Line-point intercept results show an average of 34 percent canopy cover, 25 percent bare ground, 7 percent basal cover, and 58 percent litter. As a whole, Petan (2007) rated pasture 6 as having a slight-to-moderate degree of departure from reference conditions for soil/site stability and hydrologic function (Table SOIL-4).

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

Meeting the Standard

Not meeting the Standard, but making significant progress towards meeting

Not meeting the Standard

Desired Conditions:

1999 Owyhee Resource Management Plan:

Livestock Grazing Management

- LVST 1: Provide for sustained level of livestock use compatible with meeting other resource objectives.
- MGMT ACTIONS: The livestock allocation is the current active permitted use for livestock in the Owyhee Resource Area. In order to meet resource objectives, the forage allocation will be adjusted based upon monitoring and assessment. Evaluation of monitoring data will determine future stocking levels.
- Limit upland forage use to 50 percent unless a higher or lower level of use is appropriate to meet standards for healthy rangelands.

Soil Resources

- SOIL 1: Improve unsatisfactory and maintain satisfactory watershed health/condition on all areas.
- SOIL 2: Achieve stabilization of current, and prevent the potential for future, localized accelerated soil erosion problems (particularly on stream banks, roads, and trails).
- MGMT ACTIONS: Implement grazing practices that during and at the end of the grazing season provide adequate amounts of ground cover (determined on an ecological site basis) to support proper infiltration, maintain soil moisture, stabilize soils, and maintain site productivity.

1989 Garat Grazing Agreement:

- Achieve a distribution pattern of livestock in each field to obtain a uniform pattern of utilization and reduce areas of heavy livestock concentration.
- Range readiness is defined as that point in time when the soils have firmed after the spring thaw, when Squirrel-tail (SIBY) has 2-4" new growth, and bluebunch wheatgrass (AGSP) has 4-6" new growth.

Rationale for Evaluation Finding

Rangeland Health: Watershed standards are not being met in Pastures 1, 3, and 6, as well as in other localized areas of the Garat allotment due to effects on soil and hydrologic function associated with departures from expected conditions in the plant community. Particularly in Wyoming big sagebrush sites, shrub cover is greater than expected and the plant community composition and distribution are altered due to a decrease in relative abundance of large, deep-rooted native perennial bunchgrasses. Where fire has been present and the pasture has seen little to no rest (pastures 4 and 6), localized areas are degraded. Soil and hydrologic function are compromised due to inadequate plant community composition and distribution, lack of shrub re-establishment, and dominance of annual and small perennial grasses.

Water flow patterns show departures from reference conditions in areas of each pasture when associated with Loamy 10"-13" sites (Appendix H). Changes in the plant community appear to influence a decrease in relative abundance of large perennial bunchgrasses and a reduction in the small-scale variations of height and roughness of the ground surface. Sediment movement may be relatively short to non-existent on flat terrain but is of greater significance where slopes promote transport over longer distances that are not disrupted by vegetation, gravels, or biotic crusts.

Some pedestaling, bare ground, and water flow patterns at Shallow Claypan sites are inherent and expected but should be rare on Loamy (10"-13") ecological sites, especially across the relatively flat landscape (USDI BLM 2005, 2006 to 2010). Since the majority of monitoring is associated with loamy sites, the increased presence of pedestals found at many locations is a concern.

Soil degradation is a concern in areas where invasive annuals are increasing, such as in pasture 6, as shallow root structure provides reduced protection, especially in the latter part of the season as plants die. Based on soil stability ratings (Petan 2007) that consistently fall at or below expected values (4 to 6 for Loamy 10"-13" and Shallow Claypan 11"-13"), these sites could be vulnerable to degradation from raindrop impact and overland flow.

Rangeland Health Changes: Trends in ground cover (Appendix G) are not apparent at a majority of monitoring sites on the Garat allotment. Bare ground has shown to be either static, mixed, or decreasing across the allotment and falls generally below the expected ranges of 30 to 40 percent on loamy and 40 to 50 percent on shallow claypan sites. This suggests improvement, although the decline of basal vegetation, coupled with an increase in canopy cover and non-persistent litter across the allotment, warrants more consideration.

When litter is increasing, as can be expected with the abundant presence of sagebrush and numerous annuals, bare soils often decline and are masked by abundant material. However, bare ground may increase again over time with plant mortality and decadence.

Many sites that burned in the mid-1980s have not recovered. See Standard 4 for further discussion of rangeland health changes relative to the native plant communities on the Garat Allotment.

Livestock Management Effects: Some alteration of soils occur due to livestock trampling and hoof action when soils are wet in the spring, particularly near roads and fence lines in pastures 1, 2, 3, and 4. Heavy livestock use surrounding reservoirs, such as Juniper Reservoir, Piute Reservoir, and other water developments, results in localized compaction, increased bare ground, and heavily impacted vegetation. However, on a landscape basis, effects of livestock trampling and hoof action on watershed functionality are minimal, especially with distance away from water developments.

Several of the RHFA site locations for the pasture 4 assessments were located away from main livestock movement corridors (based on field trip observations on 10/14/2011) and do not necessarily represent current watershed conditions. Livestock in pasture 4 are concentrated in the northwestern part and along one of the main roads crossing the pasture where salt lick placement was observed to be very dense and impacts were common.

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Standard 2 – Riparian Areas and Wetlands ___ Standard Doesn't Apply

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

Indicators may include but are not limited to:

1. The riparian/wetland vegetation is controlling erosion, stabilizing streambanks, shading water areas to reduce water temperature, stabilizing shorelines, filtering sediment, aiding in floodplain development, dissipating energy, delaying floodwater, and increasing recharge of groundwater appropriate to site potential.
2. Riparian/wetland vegetation with deep strong binding roots is sufficient to stabilize streambanks and shorelines. Invader and shallow rooted species are a minor component of the floodplain.
3. Age class and structural diversity of riparian/wetland vegetation is appropriate for the site.
4. Noxious weeds are not increasing.

Overview

The 1999 Owyhee Resource Management Plan (ORMP) identified perennial and fish-bearing streams that occur on public lands along with an assessment of the mileage present and the condition at the time. The ORMP identified 7.38 miles of the Owyhee River in unsatisfactory condition and 6.86 miles in satisfactory condition.

Based on the National Hydrologic Dataset (NHD), riparian and water resources within the allotment include more than 500 miles of intermittent and ephemeral¹ streams (2.5 miles support riparian vegetation; NAIP 2009), and numerous man-made reservoirs (Table RIPN 1). The NHD does not differentiate between intermittent and ephemeral streams. An ephemeral stream is one that flows only in direct response to precipitation during normal water years. In normal years, an ephemeral stream receives no water from springs and no extended supply from melting snow or other surface source. Ephemeral streams are not in contact with groundwater and normally do not flow

¹ Perennial: Contains water throughout the year, except for infrequent periods of severe drought
Intermittent: Contains water for only part of the year, but more than just after rainstorms and at snowmelt.
Ephemeral: A stream or stretch of stream that flows in normal water years only in direct response to precipitation and whose channel is above the water table at all times.

continuously for up to one month. Not all ephemeral streams support riparian plant communities. Most of the streams within the Garat allotment are ephemeral and do not support riparian-wetland areas. The major drainages that do support intermittent flow and riparian vegetation include Piute Creek and the Owyhee River.

The current BLM range improvement database identifies 84 reservoirs that fall within the allotment. There is no information available regarding the presence of riparian-wetland vegetation, nor is there available information regarding whether any of the reservoirs are protected from livestock.

Table RIPN 1: Total Miles of Perennial and Intermittent Stream, and Number of Springs within Pasture

Pasture	Perennial Miles	Intermittent/Ephemeral Miles	# Reservoirs	# Springs
1	0	40.75	6	0
2	0	63.6	8	0
3	0	171.8	24	0
4	0	112.9	24	0
5	0	104.8	10	5
6	0	157.8	12	0

Previous Assessment Summary

The Garat (0584) Grazing Allotment Rangeland Health Assessment dated December 2006 primarily discussed the results of the lotic and lentic (stream and spring) Proper Functioning Condition (PFC) Assessments². The assessment concluded that the reaches of Piute Creek that traverse pastures 2, 3, and 4 are functioning-at-risk (FAR), the reaches of the South Fork of the Owyhee River that border the western edge of the allotment and are inaccessible to livestock are functioning properly, and the reaches of the Owyhee River that form the northern and eastern boundaries are FAR due to sedimentation.

Current Assessment

Pasture 1 - Dry Lakes

According to the NHD, pasture 1 of the allotment contains approximately 40.75 miles of intermittent streams and six range improvements (reservoirs). The streams in pasture 1 are ephemeral and do not support riparian-wetland area. None of the streams or reservoirs in pasture 1 have been assessed.

² PFC Assessments are based on Interagency Technical Reference 1737-15, *A User Guide to Assessing Proper Functioning Condition and Supporting Science for Lotic Areas* and 1737-16, *A User Guide to Assessing Proper Functioning Condition and Supporting Science for Lentic Areas*

Pasture 2 – Piute Creek

According to the NHD, pasture 2 of the allotment contains 63.6 miles of intermittent streams and eight range improvements (reservoirs). The streams in pasture 2 are ephemeral and do not support riparian-wetland areas. None of the streams or reservoirs in pasture 2 have been assessed.

Western Range Service conducted a stream classification analysis in 2002 and concluded that 4.5 miles of Piute creek between Piute Basin Reservoir and the Owyhee River (includes 2.6 miles in pasture 2) are not dependent on riparian vegetation for streambank stability.

Pasture 3 - Forty-Five Field

According to the NHD, pasture 3 of the allotment contains 171.8 miles of intermittent streams and 24 range improvements (reservoirs). Most of the streams in pasture 3 are ephemeral and do not support riparian-wetland areas.

Approximately 2.5 miles of Piute Creek north of the Piute Basin Reservoir were assessed in 2004 as functional-at-risk³ (Map 6). This reach of the creek is influenced by water backing up from the reservoir, which has altered the natural and desired width and depth ratios. The reach lacks woody riparian vegetation, and may lack the potential to support it. The assessment indicated that the reach appears to be static with no apparent trend in condition.

Western Range Service conducted a stream classification analysis in 2002 and concluded that 4.5 miles of Piute creek between Piute Basin Reservoir and the Owyhee River (includes 0.7 miles in pasture 3) are not dependent on riparian vegetation for streambank stability.

Pasture 4 – Kimball

According to the NHD, pasture 4 of the allotment contains 113.9 miles of intermittent streams, and 24 range improvements (reservoirs). Most of the streams in pasture 4 are ephemeral and do not support riparian-wetland areas. None of the streams in pasture 4 have been assessed with the BLM PFC protocol.

Western Range Service conducted a stream classification analysis in 2002 and concluded that 4.5 miles of Piute creek between Piute Basin Reservoir and the Owyhee River (includes 1.2 miles in pasture 4) are not dependent on riparian vegetation for streambank stability.

³ FAR indicates that the riparian-wetland area does not have sufficient vegetation, landform, or large woody debris to dissipate stream energy, filter sediment, aid ground water recharge, aid in floodplain development, stabilize streambanks, and/or maintain channel characteristics.

In 2003, two of the reservoirs/springs in pasture 4 were assessed as non-functioning (Map 7). However, the PFC protocol used to assess the springs may not be appropriate based on the reservoir nature of the water developments. The intent of the PFC protocol and the indicators used to assess functional condition of riparian/wetland areas are not conducive for manmade and altered water developments (i.e. reservoirs).

Pasture 5 - Big Horse

According to the NHD, pasture 5 of the allotment contains 104.8 miles of intermittent streams, five springs, and 10 range improvements (reservoirs). The streams in pasture 5 are ephemeral and do not support riparian-wetland areas. None of the streams or springs identified in the NHD have been assessed.

Pasture 6 - Juniper Basin

According to the NHD, pasture 6 of the allotment contains 157.8 miles of intermittent streams, and 12 range improvements (reservoirs). Most of the streams in pasture 6 are ephemeral and do not support riparian-wetland areas.

The Idaho Department of Environmental Quality (IDEQ) has assessed the watershed (Integrated report 2002) and assigned beneficial uses. Information collected by the state during the reconnaissance found issues with sedimentation and siltation of the water bodies within the watershed, and Juniper Basin Reservoir was placed on the 303(d) list of impaired waters. However, in their 5-year review (2009), IDEQ questioned the appropriateness of the designation based on the beneficial use (cold-water aquatic life) that was assigned to the reservoir, since the intent was for irrigation.

Juniper Basin Reservoir was not assessed for functional condition using the PFC protocol; however, field observations made in 2011 indicate there is heavy livestock use surrounding the reservoir. Distribution of grazing is concentrated adjacent to reservoirs and utilization is higher in these areas and decreases farther away from water sources.

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

Meeting the Standard

Not meeting the Standard, but making significant progress towards meeting

Not meeting the Standard

Rationale for Evaluation Finding

The Owyhee RMP Objectives/ Desired Conditions include:

Maintain or improve riparian-wetland areas to attain proper functioning and satisfactory conditions. Riparian-wetland areas include streams, springs, seeps, and wetlands.

As noted above, 2.5 miles of Piute Creek between the Piute Basin Reservoir and the fence between pastures 2 and 4 were assessed in 2004 as functional-at-risk. This

reach of the creek is influenced by water backing up from the reservoir which has altered the natural/ desired width and depth ratios. The reach lacks woody riparian vegetation, but may lack the potential for such vegetation. The assessment indicated that the reach appears to be static with no apparent trend in condition. In 2003, two springs were assessed as non-functioning. However, the PFC protocol used to assess the springs may not be appropriate based on the reservoir-like nature. The intent of the PFC protocol and the indicators used to assess functional condition of riparian/wetland areas are not conducive for manmade and altered water developments (i.e., reservoirs). There are numerous reservoirs within the allotment that were not assessed for this reason.

In addition, the WRS 2002 analysis concluded that 4.5 miles of Piute creek between Piute Basin Reservoir and the Owyhee River are not dependent on riparian vegetation for streambank stability. Also, the IDEQ 2002 report found issues with sedimentation and siltation of the water bodies within the watershed, and Juniper Basin Reservoir was placed on the 303(d) list. Field observations of Juniper Basin made in 2011 indicate there is heavy livestock use surrounding the reservoir and the impacts adjacent to the water body will be discussed in the watershed and upland sections.

Information Sources

Idaho Department of Environmental Quality. 2002. Lower Owyhee Watershed Integrated Report. http://www.deq.idaho.gov/media/458038-integrated_report_2002_final_entire.pdf

Idaho Department of Environmental Quality. 2009. Lower Owyhee Watershed Five Year Review. http://www.deq.idaho.gov/media/455477-_water_data_reports_surface_water_tmdls_owyhee_watershed_upper_owyhee_watershed_upper_five_year_review_0609.pdf

Idaho Department of Environmental Quality Lower Owyhee Watershed TMDLs: <http://www.deq.idaho.gov/water-quality/surface-water/tmdls/table-of-sbas-tmdls.aspx>

USDA Farm Services Agency. 2009. NAIP Aerial Imagery [.http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai](http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai)

USDI Bureau of Land Management, 1999. Owyhee Resource Management Plan. Available at the Owyhee Field Office, Marsing, ID.

USDI Bureau of Land Management. 1998. Technical Reference 1737-15 - A user guide to assess proper functioning condition and support science for lotic areas: <ftp://ftp.blm.gov/pub/nstc/techrefs/Final%20TR%201737-15.pdf>

USDI Bureau of Land Management. 1998. Technical Reference 1737-11 - Process for assessing proper functioning condition for lentic riparian-wetland areas: <ftp://ftp.blm.gov/pub/nstc/techrefs/Final%20TR%201737-11.pdf>

Standard 3 – Stream Channel/Floodplain Standard Doesn't Apply

Stream channels and flood plains 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.

1. Indicators may include but are not limited to:
2. Stream channels and floodplains dissipate energy of high water flows and transport sediment. Soils support appropriate riparian-wetland species, allowing water movement, sediment filtration, and water storage. Stream channels are not entrenching.
3. Stream width/depth ratio, gradient, sinuosity, and pool, riffle and run frequency are appropriate for the valley bottom type, geology, hydrology, and soils.
4. Streams have access to their floodplains and sediment deposition is evident.
5. There is little evidence of excessive soil compaction on the floodplain due to human activities.
6. Streambanks are within an appropriate range of stability according to site potential.
7. Noxious weeds are not increasing.

Overview

See discussion under Standard 2 above.

Previous Assessment Summary

See discussion under Standard 2 above.

Current Assessment

See discussion under Standard 2 above.

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

Meeting the Standard

Not meeting the Standard, but making significant progress towards meeting

Not meeting the Standard

See discussion under Standard 2 above.

RMP Objectives/ Desired Conditions

See discussion under Standard 2 above.

Rationale for Evaluation Finding

See discussion under Standard 2 above.

Information Sources

See sources under Standard 2 above.

Standard 4 – Native Plant Communities Standard Doesn't Apply

The Garat Allotment is composed of five major ecological sites (Appendix I - Map 7). They include a mountain big sagebrush/bluebunch wheatgrass and Idaho fescue site, a low sagebrush site, a shallow claypan low sagebrush site, and steep rocky canyons. See USDA-NRCS 2005 for a more detailed description of the dominant ecological sites. See Appendix I for a list of common and scientific names of plants used in this document.

Nine of the 17 rangeland health indicators included in the standard matrix are related to Standard 4 and the attribute of biotic integrity. Ratings for these nine indicators are summarized in Table VEG 1 by pasture and degree of departure from reference conditions. For example, five sites were evaluated in pasture 1, for a total of 45 indicator ratings related to biotic integrity. Of these, 25 were rated as having a slight-to-moderate departure from reference site conditions or ecological site guides.

Diversity of forb⁴ component is present; however there is a departure from the standard correlating with the ecological balance in the native plant community. This departure is connected with the functional structural groups in pastures 1, 4, and 5. Pasture 3 showed a low forb diversity and density where eight out of 10 sites rated a moderate departure from ecological site indicators.

The ecological sites indicate that under a natural disturbance regime, the Garat allotment should be dominated by sagebrush/bunchgrass communities. Other vegetation types such as western juniper (*Juniperus occidentalis*), aspen (*Populus tremuloides*), and small riparian areas, are expected to occur as unmapped inclusions within the larger ecological sites.

Indicators of rangeland health were interpreted by the BLM ID team in accordance with Technical Reference 1734-6 based on field assessments conducted in 2003 and re-assessed with the NPR Team in 2011. Available data includes 2003 RHFA and Trend data. RHFAs were performed at various locations in each pasture for a total of 62 assessment sites.

⁴ Forb changes may be a product of different methodologies (in past years, forbs were often not recorded) or time of year sites were visited.

Table VEG-1: Summary of biotic-related indicator ratings by pasture from 2003-2004 Rangeland Health Field Assessments for the Garat allotment (Appendix H)

Standard 1 Biotic	Degree of Departure				
	None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
	#	#	#	#	#
Pasture 1 ¹ – Dry Lakes West	6	25	14	0	0
Pasture 2 ² – Piute Creek	8	42	11	2	0
Pasture 3 ³ – Forty-Five	16	35	32	7	0
Pasture 4 ⁴ – Kimball	32	40	19	7	1
Pasture 5 ⁵ – Big Horse	61	28	27	8	2
Pasture 6 ⁶ – Juniper Basin	42	58	24	11	0

¹ Summarizes ratings for: 4 Loamy 10-13” sites and 1 Shallow-Claypan 11-13” site.

² Summarizes ratings for: 5 Loamy 10-13” sites and 2 Shallow-Claypan 11-13” sites.

³ Summarizes ratings for: 9 Loamy 10-13” sites and 1 Shallow-Claypan 11-13” site.

⁴ Summarizes ratings for: 6 Loamy 10-13” sites, 2 Shallow Claypan 12-16” sites, and 3 Shallow-Claypan 11-13” sites.

⁵ Summarizes ratings for: 14 Loamy 10-13” sites.

⁶ Summarizes ratings for: 13 Loamy 10-13” sites, 1 11-13” Shallow-Claypan site, and 1 12-16” Shallow-Claypan site.

Pastures 1 and 2 (Dry Lakes and Piute Creek)

Pastures 1 and 2 are dominated by native plant communities. These pastures are in a Loamy 10-13”/Shallow Claypan 11-13”. The eastern portion of pasture 2 was burned by a 1985 wildfire and has returned to a native plant community (Map 8).

Rangeland Health: The plant communities in pastures 1 and 2 are dominated by Wyoming big sagebrush/low sagebrush plant communities, with bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass as the understory component. Table VEG 1 summarizes the range health field assessment indicator ratings related to Standard 4 in these pastures.

Thirty-one of the 45 indicators relating to Standard 4 were rated in the none-to-slight or slight-to-moderate degree of departure from reference conditions in pasture 1.

Fourteen indicators were rated as showing a moderate degree of departure from reference site conditions, and no indicators were rated as moderate-to-extreme or extreme. The indicators of litter amount and plant mortality/decadence were rated as showing a moderate departure from reference conditions at all sites in pasture 1.

Decadence of mature sagebrush was commonly noted, and crown die-out was noted on

bunchgrasses associated with active pedestals. Litter is reduced in shrub interspaces, particularly where perennial bunchgrasses are poorly distributed. Few invasive species were noted in pasture 1, curvseed butterwort (*Ceratocephala testiculata*) was scattered along roads and livestock trails and a trace of cheatgrass was noted at site 13S04W28.

In pasture 2, 51 of the 63 indicator ratings related to Standard 4 were rated in the none-to-slight or slight-to-moderate categories. Ten were moderate and two were moderate-to-extreme. The most common departures from reference conditions were for the plant mortality/decadence and invasive plants indicators. Plant mortality/decadence was rated as showing a moderate departure from reference conditions at four sites in pasture 4 due to observed crown die-out on Idaho fescue and Sandberg bluegrass and decadence of mature sagebrush. The indicator for invasive plants was rated as moderate-to-extreme at two sites in the eastern portion of the pasture, due to patches dominated by cheatgrass and scattered curvseed butterwort.

For both pastures, functional/structural groups, reproductive capability of perennial plants, annual production, and soil surface loss showed only slight departures from reference site conditions. Biotic crusts were present at all sites, but somewhat less than expected in the shrub interspaces. At most sites, an increase in Sandberg bluegrass and corresponding decrease in the larger, longer-lived bunchgrasses such as bluebunch wheatgrass and Idaho fescue was noted. Wyoming big sagebrush canopy was denser than expected on unburned sites and decadent plants were common. On low sagebrush sites, the shrub canopy cover was similar to reference areas. During range health evaluations in 2003, indicators relating to plant vigor were rated as slightly to moderately less than expected. Plant vigor and production appeared to be comparable to reference areas during field review in June 2006, and seedhead production was adequate on all species. Invasive plant occurrence was scattered and incidental on Wyoming big sagebrush sites and absent from low sagebrush sites. No noxious weeds were observed in these pastures during rangeland health evaluations.

Trend: Nested plot frequency transects (NPFT) study sites were established in 1989 at two sites in pasture 1 and two sites in pasture 2 (Appendix G-Map 2). Sites 13S04W29, 14S03W07, 14S04W18 and T14S03W10 were read in 1989, 2003 and 2009.

Few changes in plant community composition were detected between years. Sandberg bluegrass frequency had no significant change. Bluebunch wheatgrass frequencies showed one site significantly decreasing and three sites increasing in frequency. Wyoming big sagebrush showed three out of four sites decreased in frequency one site increased slightly (Table VEG 2).

Squirreltail (*Elymus elymoides*) showed a long term decrease in frequency from 1989 to 2009; however, in pasture 2 both sites showed a short-term increase in frequency from 2003-2009.

Photo plot comparisons at two sites in each pasture indicated little to no change in ecological condition between 1989 and 2003 for both shrub canopy and bunchgrasses and are generally consistent with NPFT data. (2006 Rangeland Health Assessment)

Table VEG-2: Nested Plot Frequency for Key Species

Pasture 1	1989	2003	2009	P-value	1989	2003	2009	P-value
Species	Site 13S04W29				Site 14S04W18			
Wyoming Big Sagebrush	--	19	13	0.235	29	26	11	0.023
Bluebunch wheatgrass	73	70	65	0.034	38	42	52	0.275
Sandberg bluegrass	97	92	89	0.501	92	94	94	1
Squirreltail	22	20	11	0.137	73	41	43	0.374
Pasture 2	Site 14S03W10				Site 14S03W07			
Wyoming Big Sagebrush	29	26	22	--	18	19	20	--
Bluebunch wheatgrass	67	56	66	--	22	48	55	--
Sandberg bluegrass	95	98	99	--	97	99	94	--
Squirreltail	29	8	19	--	63	8	20	--

--No Data

Figure VEG-1: Pasture 1 Grass Frequency site # 13S04W29

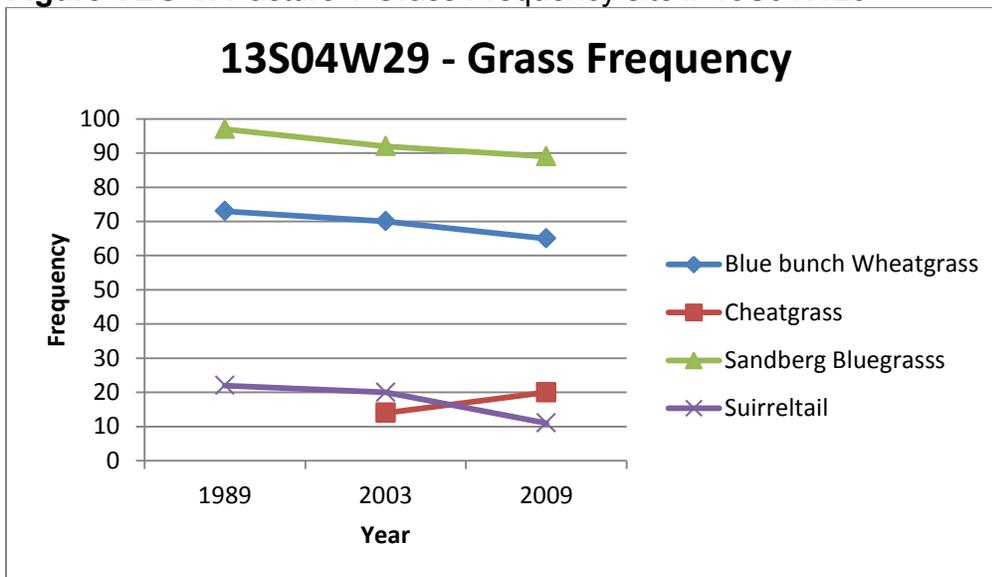


Figure VEG-2: Pasture 1 Grass Frequency site # 14S04W18

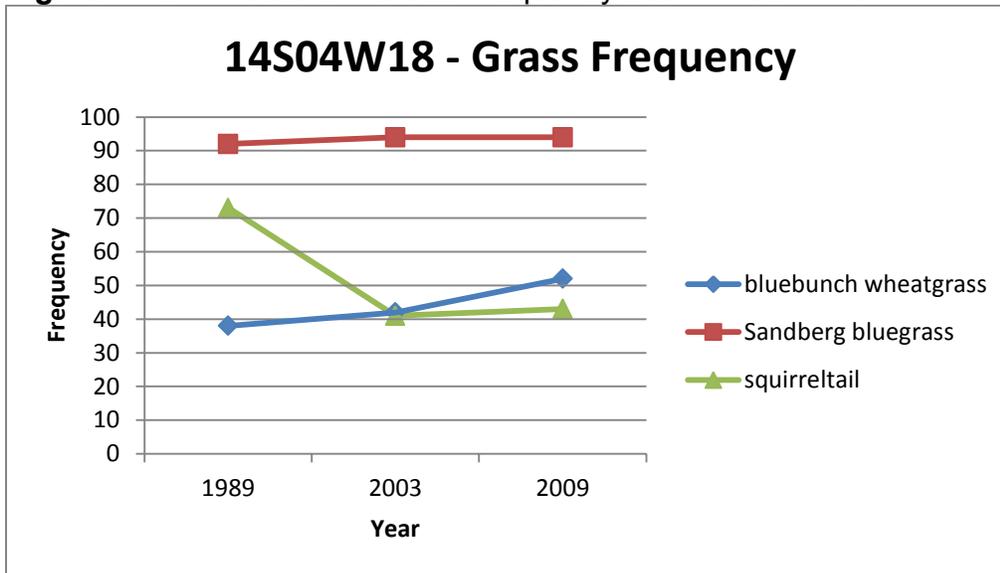


Figure VEG-3: Pasture 2 Grass Frequency site # 14S03W10

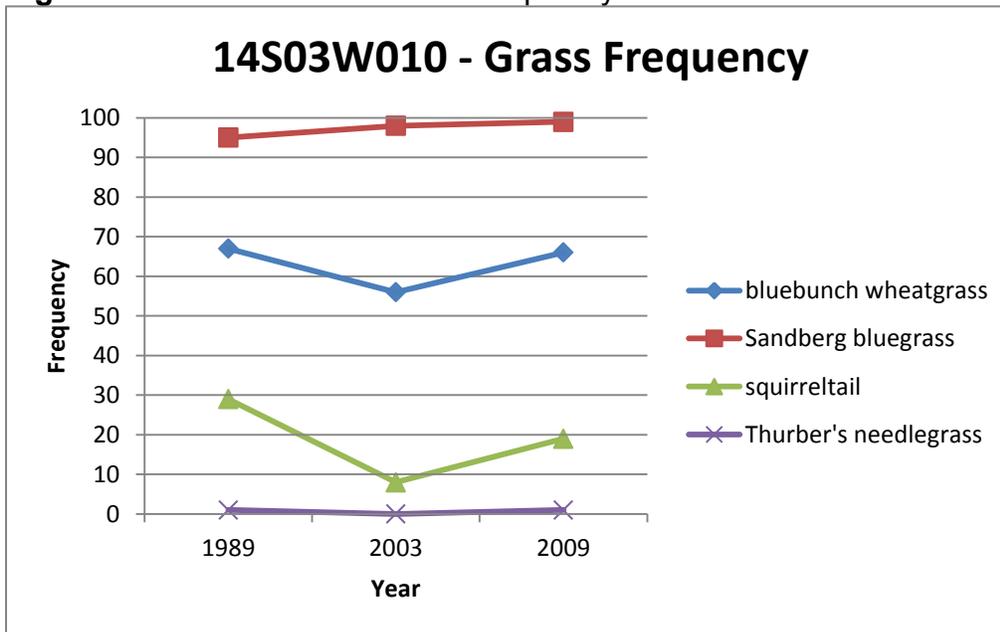
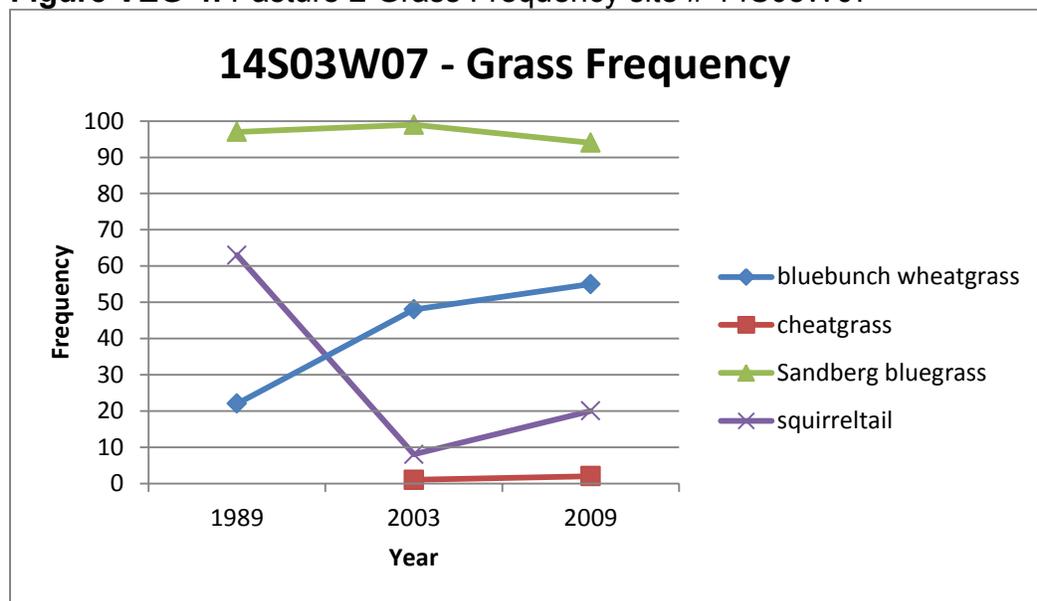


Figure VEG-4: Pasture 2 Grass Frequency site # 14S03W07



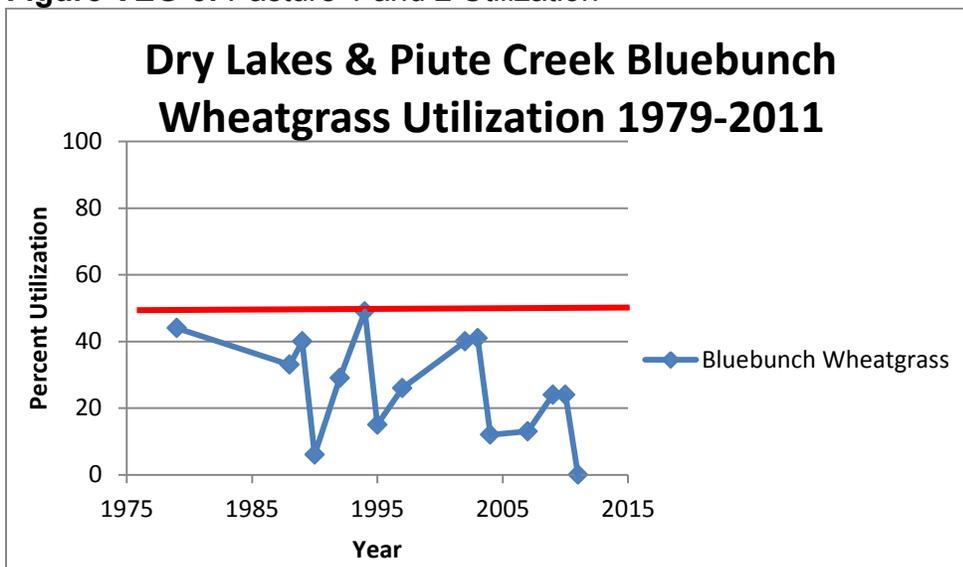
Ecological Status/Production: Ecological status and production data were collected by Western Range Services (WRS) at four vegetation study sites (VSS) located adjacent to NPFT sites in pastures 1 and 2 in 1997, 2003 and 2009. BLM staff assisted with data collection in 2003 and 2009. In order to estimate long-term trend, the ecological status at the trend sites for 1979 was estimated based on 1979 ecological site inventory write-ups for similar sites.

Ecological status sites VSS-07, VSS-08, VSS-09 and VSS-11 rated at late seral condition in 2009 (see monitoring discussion above page 8-9 RHA). No apparent change occurred between 1997 and 2009 for three sites and one site showed a trend away from the potential natural community (Appendix C).

All four VSS sites were in Loamy 10-13" ecological sites with expected median production of 525 to 925 pounds of vegetation per acre. Observed production in 1997 and 2009 ranged from 238 to 656 pounds per acre. Production values at three of four sites observed production values were no different than expected median production. One site observed production values were significantly lower than the expected range for years with average precipitation (Appendix C).

Utilization: Utilization levels from 1979 to 2011 for key species in these two pastures have generally been light. For years in which data were collected, bluebunch wheatgrass ranged from 16 to 52 percent and averaged 26 percent utilization in pastures 1 and 2 (Appendix C).

Figure VEG-5: Pasture 1 and 2 Utilization



Line represents 50 percent utilization as specified in Owyhee Resource Management Plan.

Pasture 3 (Forty-Five)

Pasture 3 is comprised almost entirely of native plant communities; only small portions of the pasture were affected by wildfires in 1985 (Map 8). The ecological sites for this pasture are Loamy 10"-13" and Shallow Claypan 11"-13".

Rangeland Health: Fifty of the 90 indicator ratings related to Standard 4 were in the none-to-slight or slight-to-moderate degree of departure from reference site conditions. However, 33 ratings were moderate and seven were moderate-to-extreme. The indicator of plant mortality/decadence was rated as moderate at six sites and moderate-to-extreme at three sites. Litter amount was slightly to moderately reduced at most sites and was rated as moderately to extremely reduced at two sites. At two sites (15S04W09, 15S02W06) the invasive plants indicator was rated as moderate-to-extreme due to common occurrence of cheatgrass at both sites and presence of curvseed butterwort at one site. The most commonly noted departures from reference conditions were for the indicators of Functional/Structural Groups, Plant Mortality/Decadence, and Litter Amount. For specific indicator ratings at each site, refer to Appendix H.

In pasture 3, plant communities were composed almost entirely of the appropriate native plant species. Nearly all sites exhibited higher-than-expected sagebrush density and cover and many sagebrush plants were old and appeared decadent. Large, longer-lived perennial bunchgrass species and biotic soil crusts were less than expected, while smaller, shorter lived perennial bunchgrasses were more common than expected.

Indicators relating to plant vigor in pasture 3 were often rated as moderate and moderate-to-extreme in 2003. Following favorable precipitation years of 2005 and

2006, plant vigor appeared to be near reference conditions during site visits in June 2006. Exotic annual grasses (primarily cheatgrass) were present in incidental to trace amounts at most sites and no noxious weeds were observed. Generally the low sagebrush plant communities showed less departure from reference conditions than the Wyoming big sagebrush communities.

No noxious weeds were observed in pasture 3. Invasive plant occurrence was scattered and incidental on Wyoming big sagebrush sites and absent from low sagebrush sites.

Trend: Two NPFT study sites were established in pasture 3 in 1989 (Maps 3). In 2003 and 2009, site 14S03W20 was re-read, but site 14S04W34 could not be located and therefore was not read.

Few changes in plant community composition were detected between years. Sandberg bluegrass frequency had no significant change. Bluebunch wheatgrass, squirreltail and Wyoming big sagebrush frequency declined slightly and Sandberg bluegrass frequency increased (Table VEG 3).

Shrub density at the nested frequency site in pasture 3 was estimated to be approximately 5,100 sagebrush plants per acre in 1989, decreased slightly to 4,350 plants per acre in 2003, and increased slightly to 4,500 plants per acre in 2009.

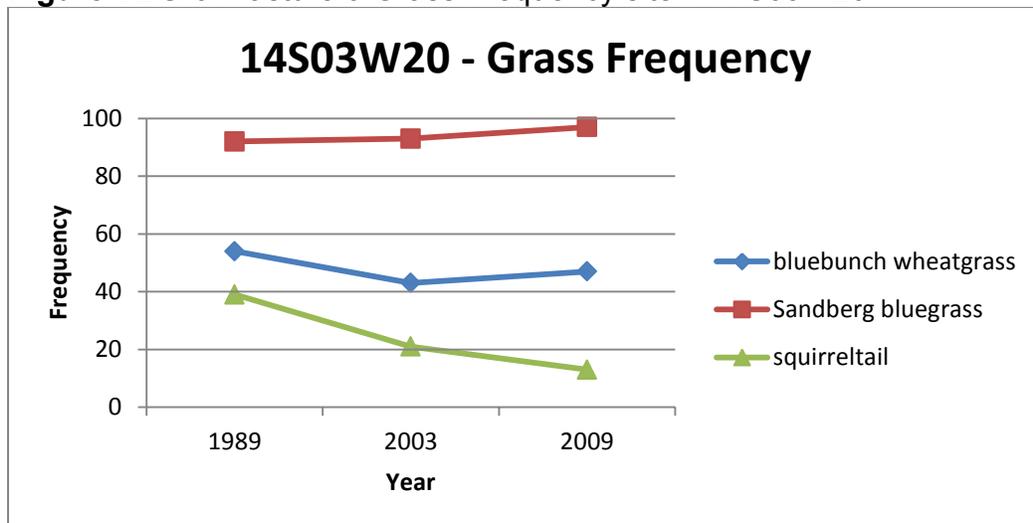
There are four photo trend sites in pasture 3. At 15S04W22 (1986 and 2003) and 15S04W05 (1986 and 1999), photos show vigorous bunchgrasses and no apparent changes in general condition. At 14S04W34B, photos are available for 1970 to 1977 and show no apparent trend. At 14S04W34A, photos are available from 1970 to 1977 and 1988. Relative abundance of perennial bunchgrasses appears to be higher in the 1988 photos as compared to earlier photos (2006 Garat Rangeland Health Assessment).

Line-point Intercept data were collected at two sites in pasture 3 in 2003 by BLM staff and in 2007 by Western Range Services (WRS). The data showed static to increased shrub canopy cover and static bareground (Appendix E)

Table VEG-3: Nested Plot Frequency- Pasture 3

Species	Site 14S03W20			
	1989	2003	2009	P-value
Wyoming Big Sagebrush	54	56	49	0.160
Bluebunch wheatgrass	54	43	47	0.577
Sandberg bluegrass	92	93	97	0.242
Squirreltail	39	21	13	0.256

Figure VEG-6: Pasture 3 Grass Frequency site # 14S03W20

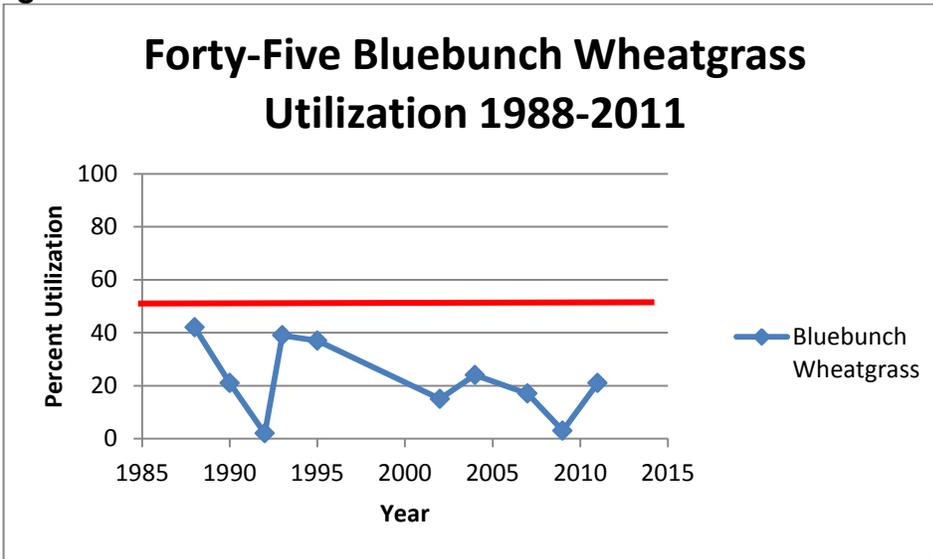


Ecological Status/Production: Ecological status and production data were collected by Western Range Services (WRS) at one VSS site in pasture 3 in 1997, 2003 and 2009. BLM staff assisted with data collection in 2003 and 2009. Ecological site inventory write-ups for similar sites in 1979 were used to estimate long-term trend. VSS-10 was observed to be late seral (51 percent) in 1979, and mid-seral (50 percent) in 2009. No apparent trend in ecological status was detected for this VSS. (Appendix C).

VSS-10 is a Loamy 10-13" ecological site with expected median production of 525 to 925 pounds of vegetation per acre. Observed production was 310 pounds per acre in 1997 and 398 pounds per acre in 2009 (Appendix C). While observed production values were lower than the expected range for years with average precipitation, no significant differences were detected at the 90 percent confidence level, and no changes were detected between 1997 and 2009.

Utilization: Utilization levels from 1988 to 2011 for key species in pasture 3 have generally been slight (6 to 19 percent) to light (20 to 40 percent). Bluebunch wheatgrass, for years in which data were collected, ranged from 16 to 52 percent and averaged 22 percent utilization in pasture 3 (Appendix D).

Figure VEG-7: Pasture 3 Utilization



Line represents 50 percent utilization as specified in Owyhee Resource Management Plan.

Pasture 4 Kimball

Vegetation in pasture 4 is comprised almost entirely of native species. Wyoming big sagebrush/bunchgrass or low sagebrush/bunchgrass plant communities occupy the entire pasture. Wildfires in pasture 4 burned about 14,165 acres in 1985 and 258 acres in 1996 (Map 8). These burns were in Wyoming big sagebrush vegetation, and a large portion of the area burned in 1985 was seeded with crested wheatgrass as post-burn rehabilitation. Plant communities associated with the 1985 fire show a lack of species diversity and shrub component. A portion of the sites have an increase in rabbitbrush (*Ericameria spp.*) and a decrease of deep-rooted perennials, which shows the departure from the ecological potential in the structural functional groups. This pasture is currently being managed as a native plant pasture with an inclusion of this remnant seeding. Pasture 4 major ecological sites are Loamy 10-13", Shallow Claypan 11-13", and Shallow Claypan 12-16".

Rangeland Health:

The majority (72 of 99) of the indicator ratings related to Standard 4 were in the none-to-slight and slight-to-moderate degree of departure from reference conditions. Plant community integrity and native species diversity display only minimal changes from reference conditions at several sites in Pasture 4 (5S01W23, 14S02W11, 14S02W25, 15S02W08, 15S02W14, and 15S02W19). However, of the total of 99 indicator ratings associated with this standard, 19 were rated as moderate, seven were rated as moderate-to-extreme, and one was extreme. Seven moderate ratings and one moderate-to-extreme rating occurred at 14S02W22, a Loamy 10-13" ecological site in the northern half of pasture. Occurrence of large, longer-lived grasses (bluebunch wheatgrass, Idaho fescue) is somewhat below expected conditions at sites 15S02W12,

15S01W15 and 15S02W08 and at the low ranges of expected at the remaining sites (Appendix H). Occurrence of relatively smaller-shorter lived bunchgrasses (Sandberg bluegrass, bottlebrush squirreltail) is similar to expected at sites 15S01W23, 15S02W14, and 15S02W12, and slightly greater than expected at the remaining sites. The composition of interspatial grasses at the remaining sites has shifted toward a greater occurrence of smaller perennial grasses than expected. Sagebrush abundance is somewhat increased at the majority of sites in this pasture. Rabbitbrush is the dominant overstory species at sites 14S02W11 and 14S02W15, and shrubs are lacking at 14S02W22, which is a previously burned area. The functional/structural groups indicator was rated as showing a moderate departure from reference conditions at these three sites. Crested wheatgrass and bluebunch wheatgrass are the dominant species in areas seeded following wildfire, including evaluation sites T14SR02W19 and 14SR02W15 (Map 8).

Plant vigor rating based on annual production, reproductive capability and plant mortality/decadence indicate that most sites showed slight-to-moderate and moderate departures from reference conditions. Plant mortality/decadence was rated as moderate at five sites, and moderate-to-extreme at one site, due to common crown die-out of pedestaled Sandberg bluegrass. Crown die-out was observed on Idaho fescue plants at 15S02W12 and 15S02W25, and shrub decadence was noted at 15S2W14 and 15S2W19. Plant vigor appeared to be much closer to reference conditions during a field review in June of 2006 (following two favorable winter/spring precipitation years).

Biological soil crust cover is similar to expected conditions at 15S02W08 and reduced in shrub interspaces in the remaining sites. Cheatgrass occurs in limited amounts in big sagebrush communities and is not present at the low sagebrush sites. Annual production appears to be within the expected range, although the proportion of production is somewhat skewed towards smaller bunchgrass species. Perennial forb diversity and abundance are similar to expected in low sagebrush communities but less than expected at site 15S02W12.

No noxious weeds were observed in pasture 4.

Trend:

Nested plot frequency transect study sites were established at 15S02W12 and 14S02W11 (Appendix G-Map 4) in 1989 and revisited in 2003 and 2009.

Wyoming big sagebrush and squirreltail showed no apparent change from 2003 to 2009. At site 14S02W11, Thurber's needlegrass and Bluebunch wheatgrass showed a significant decrease in frequency. At site 15S02W12 Idaho fescue shows a decrease in frequency and Bluebunch wheatgrass showed a significant decrease in frequency. Sandberg bluegrass showed an increase at both sites (Table VEG-4).

Shrub density at 14S02W11 as estimated to be 750 plants per acre for rabbit brush in 1989, 1,350 plants per acre in 2003, and 1,600 plants per acre in 2009. At 15S02W12, density of low sage was 9,850 plants per acre in 1989, 7,700 plants per acre in 2003,

and 5,450 plants per acre in 2009. Density of Wyoming big sagebrush was estimated at 850 plants per acre in 1989, 500 plants per acre in 2003 and 600 plants per acre in 2009.

No photo trend sites are established in pasture 4.

Line-point intercept data were collected at one site in pasture 4 in 2003 by BLM staff and 2007 by Western Range Services (WRS). The data showed increased shrub canopy cover and static bare ground (Appendix E).

Table VEG-4: Nested Plot Frequency- Pasture 4

Species	Site 15S02W12				Site 14S02W11			
	1989 (%)	2003 (%)	2009 (%)	P-Value	1989 (%)	2003 (%)	2009 (%)	P-Value
Wyoming Big Sagebrush	--	6	4	0.587	1	1	1	--
Bluebunch wheatgrass	45	56	20	0.015	15	43	12	0.033
Thurber's needlegrass	--	--	2	--	16	1	--	0.058
Idaho fescue	53	25	9	0.160	--	--	--	--
Sandberg bluegrass	--	89	94	0.230	43	81	90	0.194
Bottlebrush squirreltail	--	6	6	1	4	--	2	--

--No Data

Figure VEG-8: Pasture 4 Grass Frequency site # 15S02W12

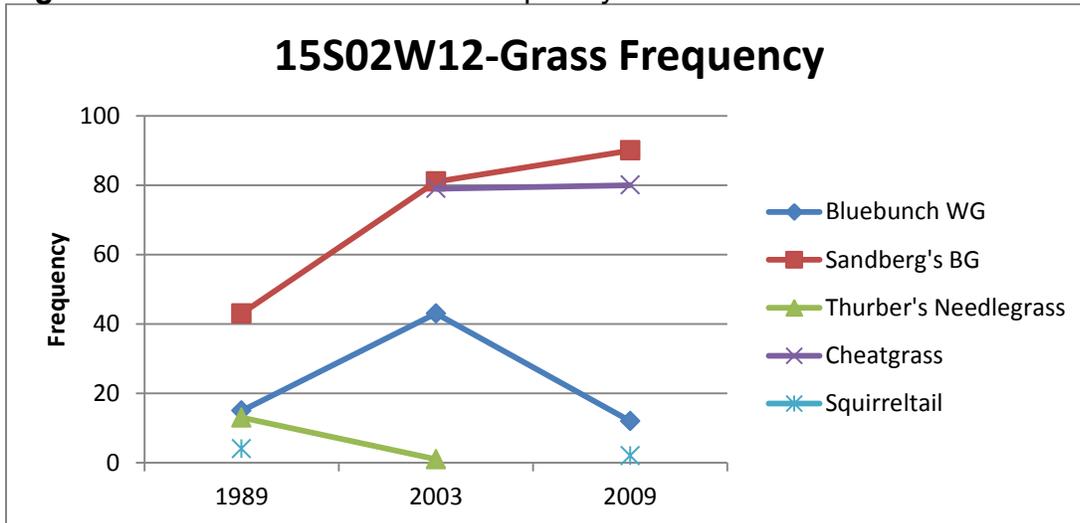
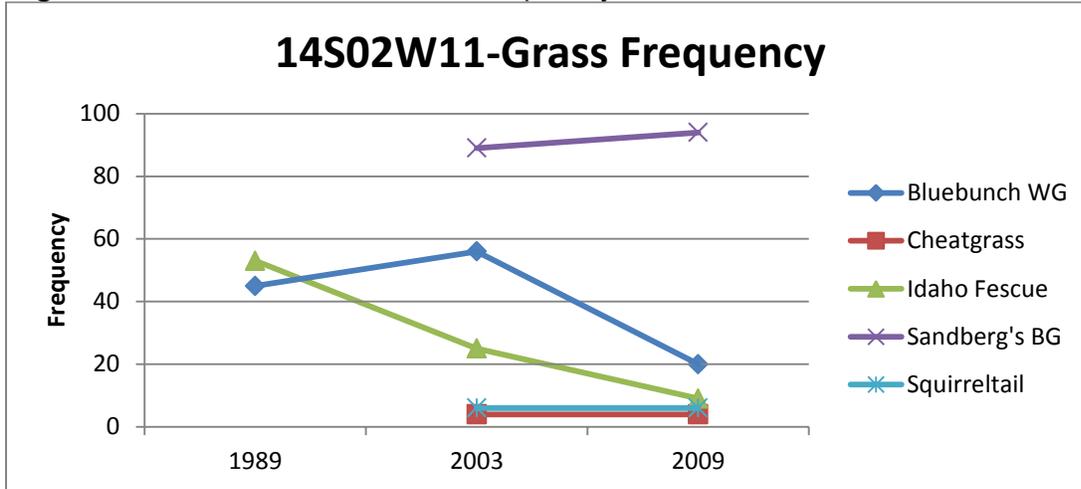


Figure VEG-9: Pasture 4 Grass Frequency site # 14S02W11



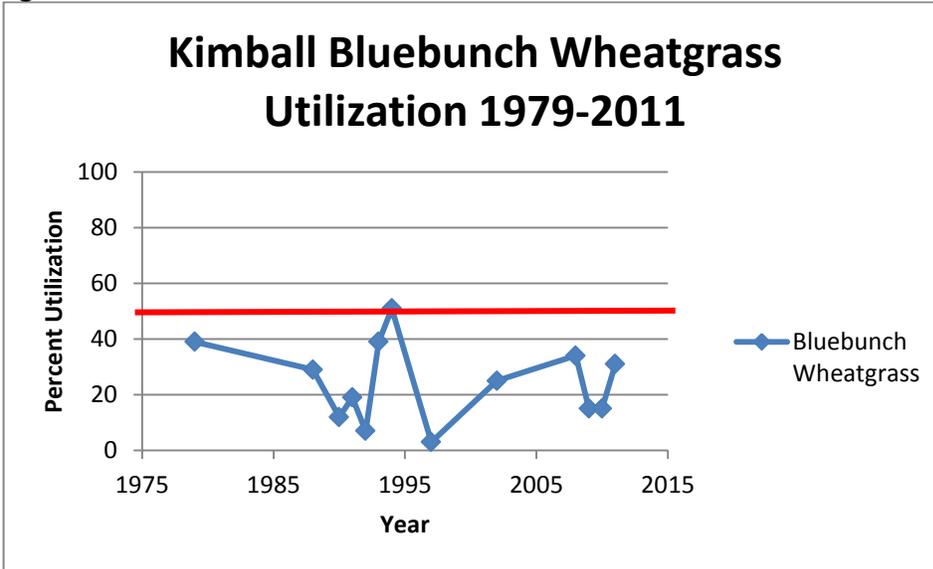
Ecological Status/Production: Ecological status and production data were collected by Western Range Services (WRS) at two VSSs adjacent to NPFT sites in pasture 4 in 1997, 2003 and 2009. BLM staff assisted with data collection in 2003 and 2009. Ecological site inventory write-ups for similar sites in 1979 were used to estimate long-term trend.

VSS-04 was estimated to be in late seral ecological status in 1979 (58 percent), and late seral ecological status in 2009 (74 percent). No apparent trend in ecological status was detected for VSS-04. VSS-12 was estimated to be in early seral ecological status in 1979 (17 percent), and observed to be in mid seral ecological status in 2009 (50 percent). Apparent trend in ecological status was detected to be moving toward potential natural community for VSS-12, however this site is not meeting climax plant communities with increased small bunchgrasses (Appendix C).

VSS-04 is a Shallow Claypan 12-16" ecological site with expected median production of 500 to 800 pounds per acre. Observed production was 319 pounds per acre in 1997 and 502 pounds per acre in 2009. No apparent change of production was detected between 1997 and 2009, this data suggests lower than expected production in 1997 and at the low end of the expected production range in 2009. VSS-12 is a Loamy 12-16" ecological site with expected median production of 975 to 1,300 pounds per acre. Observed production was 775 pounds per acre in 1997 and 990 pounds per acre in 2009, this data suggests lower than expected production in 1997 and at the low end of the expected production range in 2009; No apparent changes in production were detected between 1997 and 2009 at this site (Appendix C).

Utilization: Utilization levels from 1979 to 2011 for key species in pasture 4 have generally been slight to light. Utilization data for Idaho fescue and squirreltail was not completed in some recent years but was light in the years collected. Bluebunch wheatgrass, for years in which data were collected, ranged from 3 to 51 percent and averaged 25 percent utilization in pasture 4 (Appendix D).

Figure VEG-10: Pasture 4 Utilization



Line represents 50 percent utilization as specified in Owyhee Resource Management Plan.

Pasture 5 Big Horse

The native plant community in pasture 5 is predominantly Wyoming big sagebrush/ bunchgrass vegetation. Two wildfires have burned portions of the Big Horse pasture since 1984. In 1984, approximately 858 acres were burned in the east central portion of the pasture, and in 1985, approximately 3,750 acres were burned in the northwest corner of the pasture (Map 8). These areas were subsequently seeded with crested wheatgrass. Shrub dominated site showing moderate departure in plant mortality, due to shrub die-off. Functional/Structural Groups and vigor have a moderate departure from the ecological site (Loamy 10-13”).

Rangeland Health: Of the 126 indicator ratings related to Standard 4 in pasture 5, 28 were rated as none-to-slight, 61 were slight to moderate, 27 were moderate, eight were moderate-to-extreme, and two were extreme. The most notable departures from reference site conditions occurred at five of the 14 evaluation sites in this pasture (16S03W01, 26S03W04, 16S03W24, 15S03W25 and 16S03W16). At these sites, the most notable departures from reference site conditions were for the following indicators: Functional/Structural Groups, Plant Mortality/Decadence, and Invasive Plants. The indicator for functional/structural groups was rated as showing a moderate departure at five sites and a moderate-to-extreme departure at one site (15S03W21). At 15S03W21, sagebrush is dominant and herbaceous vegetation is much less than expected. In general, functional/structural groups at these sites have shifted toward mature shrub/small bunchgrass dominated plant communities, with a corresponding decrease in large, perennial bunchgrasses such as bluebunch wheatgrass and Idaho fescue. Sagebrush decadence and mortality was noted at a majority of the evaluation sites, while bunchgrass crown die-out was noted at several sites. The primary invasive

species noted was cheatgrass (usually scattered, but co-dominant at one site), though rabbitbrush was somewhat higher than expected, particularly in previously burned sites. At the remaining sites in this pasture, departures from reference plant community conditions were generally slight-to-moderate.

Annual production was lower than expected at 15S03W and 15S02W25 due to lack of large perennial bunchgrasses. Wyoming big sagebrush decadence was more common than expected and crown die-out of bunchgrass centers was observed. Reproductive capability of perennial plants was rated as showing a moderate departure at five sites, due to reduced vigor and seedhead production of perennial bunchgrasses. Plant vigor, growth and seed production appeared to have improved during June 2006 field reviews, following favorable precipitation conditions.

No Idaho state listed noxious weeds were observed in pasture 5, but several invasive annual plant species were found in varying amounts. Cheatgrass was the most common invasive plant (especially in burned, unseeded areas), but curvseed butterwort, tansy mustard and clasping pepper weed were occasionally observed. These invasive species were incidental components of the plant community and represented slight-to-moderate departures from expected conditions in the sagebrush/bunchgrass sites (Appendix H).

Trend: Two nested-plot frequency transect study sites are established in pasture 5. Both study sites were established in 1989 and re-visited in 2003 and 2009.

Wyoming big sagebrush frequency had no apparent change in frequency from 1989 to 2009. At 16S03W05, bluebunch wheatgrass was found and no change in Sandberg bluegrass frequency occurred. At 15S03W25 bluebunch wheatgrass showed a slight decrease in short term frequency but was static from 1989 to 2009 in frequency. Nested plot frequency data is shown in Table VEG 5.

Shrub density at 15S03W25 was estimated to be 1,350 plants per acre for rabbitbrush in 1989, 1,300 plants per acre in 2003, and 1,300 plants per acre in 2009. At 16S03W05, density of Wyoming big sage was 4,450 plants per acre in 1989, 5,350 plants per acre in 2003 and 5,100 plants per acre in 2009.

Photo trend plots at site 16S03W05 indicate that sagebrush and perennial grass frequencies did not change significantly between 1989 and 2003. The density of Wyoming big sagebrush at the trend site increased from 4,450 to 5,350 plants per acres from 1989 to 2003 (2006 Garat Rangeland Health Assessment).

Line-point intercept data were collected at one site in pasture 5 in 2003 by BLM staff and 2007 by Western Range Services (WRS). The data showed increased shrub canopy cover and static bare ground (Appendix E).

Table VEG-5: Nested Plot Frequency, Pasture 5.

Species	Site 15S03W25				Site 16S03W05			
	1989 (%)	2003 (%)	2009 (%)	P-Value	1989 (%)	2003 (%)	2009 (%)	P-Value*
Wyoming big sagebrush	--	1	1	1	46	45	39	0.493
Bluebunch wheatgrass	9	17	14	0.426	--	--	3	--
Bottlebrush squirreltail	26	19	19	1	91	71	37	0.011
Sandberg bluegrass	59	89	83	0.358	84	74	86	0.125
Needlegrass	12	0	3	0.070	1	1	--	--
Green rabbitbrush	10	15	13	0.374	--	--	--	--

-- No data

* Any number below 0.01 is significant

Figure VEG-11: Pasture 5 Grass Frequency site #16S03W05

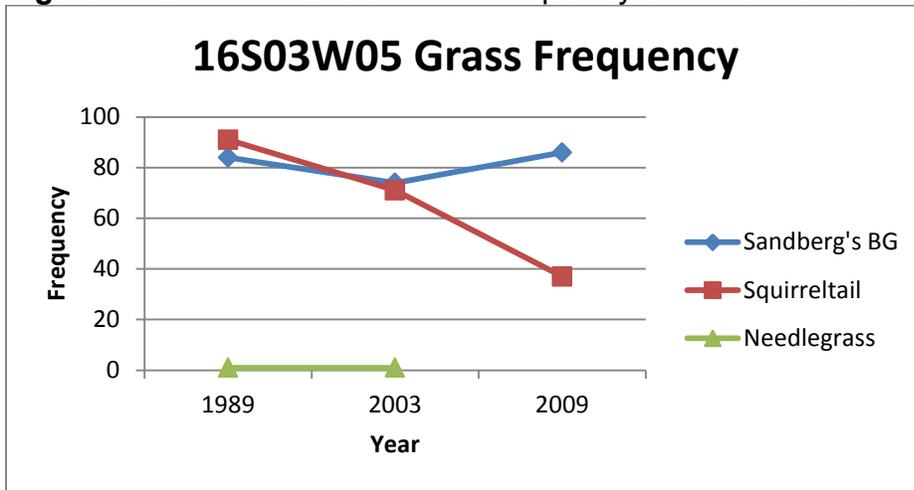
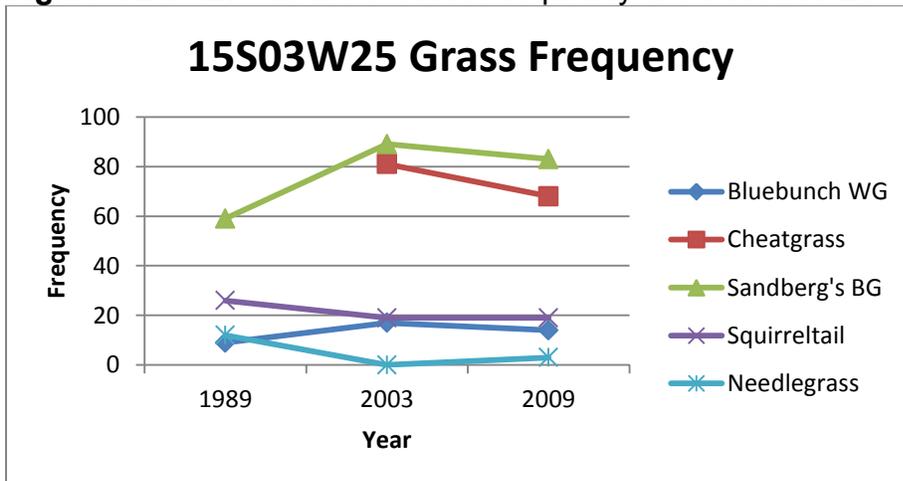


Figure VEG-12: Pasture 5 Grass Frequency site #15S03W25



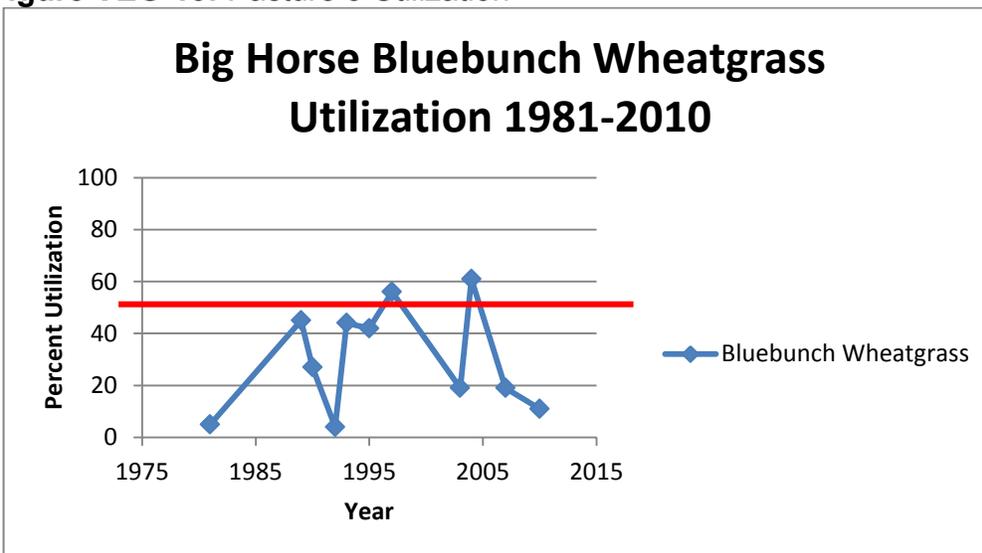
Ecological Status/Production: Ecological status and production data were collected by Western Range Services (WRS) at two VSSs adjacent to NPFT sites in pasture 5 in 1997, 2003 and 2009. BLM staff assisted with data collection in 2003 and 2009. 1979 ecological status at the trend sites was estimated based on 1979 ecological site inventory write-ups for similar sites, in order to estimate long-term trend. Ecological site inventory write-ups for similar sites in 1979 were used to estimate long-term trend.

Both VSS-05 and VSS-06 were estimated to be in mid-seral ecological status in 1979 (47 percent and 46 percent, respectively). In 2009, VSS-05 was observed to be mid-seral (50 percent) while VSS-06 was rated as PNC (86 percent). No change in ecological status trend was observed for site VSS-05, however site VCC-06 showed the ecological status trend towards PNC from 1979 to 2009 (Appendix C).

VSS-05 is a Loamy 10-13" ecological site with expected median production of 525 to 925 pounds of vegetation per acre. Observed production was 644 pounds per acre in 1997 and 277 pounds per acre in 2009. Production at this site was decreased significantly relative to expected. VSS-06 is a Loamy 7-10" ecological site with expected median production of 425 to 700 pounds per acre. Observed production was 518 pounds per acre in 1997, and 270 pounds per acre in 2009. Production at this site was decreased significantly relative to expected (Appendix C).

Utilization: Utilization levels from 1981 to 2010 for key species in pasture 5 have generally been slight to light. Bluebunch wheatgrass, for years in which data were collected, ranged from 4 to 61 percent and averaged 30 percent utilization in pasture 5 (Appendix D).

Figure VEG-13: Pasture 5 Utilization



Line represents 50 percent utilization as specified in Owyhee Resource Management Plan.

Pasture 6 Juniper Basin

The native plant community in pasture 6 is entirely sagebrush/bunchgrass vegetation; however, wildfires in 1973, 1984, 1985 and 1986 burned more than 24,000 acres or nearly 50 percent of the pasture. During the past 35 years, numerous wildfires have burned large portions of the Juniper Basin pasture. In 1973, 1,534 acres burned in the central-western portion of the pasture (Horse Basin). In 1984, another 8,637 acres burned in the central-western portion of the pasture. Most of the area burned in 1973 burned again in this 1984 fire. In 1985, 4,019 acres burned in the south-central portion of the pasture and in 1986, 11,421 acres burned in the eastern portion of the pasture (Map 8). Approximately 6,980 acres were drill-seeded and aerial seeded with crested wheatgrass in 1985 as a post-fire rehabilitation treatment. Some burned areas have rabbitbrush presence and sagebrush is lacking. However, native species have re-colonized significant portions of these seeded areas. The major ecological sites for this pasture are Loamy 10-13", Shallow Claypan 11-13", and Shallow Claypan 12-16".

Rangeland Health: Sixteen Rangeland Health Evaluations were completed in pasture 6, for a total of 144 indicator ratings related to Standard 4. Of these, the majority of ratings (108) were in the none-to-slight or slight-to-moderate degree of departure, but 25 were moderate and 11 were moderate-to-extreme (Appendix H). The most notable departures from reference conditions were for the invasive plants indicator, which was rated as moderate-to-extreme at eight sites due to occurrence of cheatgrass, bulbous bluegrass and green rabbitbrush (*Ericameria teretifolia*). Plant mortality/decadence was rated as moderate at five sites, and moderate-to-extreme at one site due to mature, decadent sagebrush and some bunchgrass crown die-out. Several of the big sagebrush sites in this pasture supported a greater-than-expected shrub canopy cover, less biological crust and fewer large bunchgrasses in the shrub interspaces than expected. The occurrence of increaser bunchgrass species was somewhat greater than expected, while litter was somewhat reduced. However, departures from reference conditions for the functional/structural groups indicator was rated as none-to-slight or slight-to-moderate at all evaluation sites. Annual production was similar to expected conditions at all sites in pasture 6. Reproductive capability of perennial grass species was near expected at most sites, but was rated as a moderate departure at 15S01W35, and 15S02W34, and moderate-to-extreme at 16S01W30 due to fewer-than-expected seedheads on perennial grasses. Shrub vigor and recruitment appeared to be adequate at most sites, but poor leader growth was associated with mature, decadent sagebrush plants.

Rangeland health evaluations at 16S02W12 and 16S02W10B were conducted in areas seeded with crested wheatgrass. Perennial bunchgrass cover is similar to expected conditions, and shrub cover has recovered to pre-fire levels in some areas. Perennial grass vigor is similar to expected, although standing dead material was observed in some of the larger crested wheatgrass plants. Seed production of perennial grasses was similar to expected conditions and sagebrush recruitment was observed. Big sagebrush had become re-established to various degrees in these seedings, and the occurrence of rabbitbrush was greater than in the unburned areas. Biological soil crust cover is largely absent, although early successional crusts are present.

Noxious weeds were not observed in the unburned portions of pasture 6, although invasive annual species were present in varying amounts at most sites. Cheatgrass was the most common invasive species. Occasional occurrences of curvseed butterwort and clasping pepper weed were also observed.

Trend: Three NPFT sites were established in pasture 6 in 1989 and all three sites were read in 2003 and 2009. Nested plot frequency data are shown in Table VEG 6.

At 16S01E18, bluebunch wheatgrass frequency increased from 1989 to 2003 and then significantly decreased in 2009, while Idaho fescue and bottlebrush squirreltail declined. No significant changes were detected in Sandberg bluegrass. Low sage showed a decrease from 1989 to 2003 and a slight increase in frequency in 2009.

At 16S01W06B, bluebunch wheatgrass appeared to increase from 1989 to 2003 and again in 2009, but this increase was not significant at the 95 percent level. Over the same time period, bottlebrush squirreltail declined, Sandberg bluegrass increased, and Wyoming big sagebrush changed very little. Idaho fescue was detected at low levels in 1989.

At 16S02W15, bluebunch wheatgrass frequency increased between 1989 and 2003 and slightly decreased in 2009; however, frequencies were too low for reliable tests of significance. No significant changes in frequency were observed for Sandberg bluegrass or bottlebrush squirreltail.

In addition to NPFT study sites, a photo plot was established in 1970 and subsequently photographed in 1971, 1972, 1975, 1976, 1977, 1983, 1986, 1988, 1989, and 2003. Based on site photos, the plant community appears similar in 1970 to 1975 and 1983 to 1989, with co-dominant, vigorous bunchgrasses and shrubs. Bunchgrasses appear to be nearly absent in 1977 photos, and plant vigor again appears to be reduced in 2003, following multiple drought years.

Shrub density was estimated at two trend sites. Wyoming big sagebrush at site 16S01W6B was 700 plants per acre in 1989, 950 plants per acre in 2003 and 500 plants per acre in 2009. At site 16S01W18, low sagebrush declined from 2,100 to 1,100 to 750 plants per acre between 1989, 2003 and 2009.

Line-point intercept data were collected at one site in pasture 3 in 2003 by BLM staff and 2007 by Western Range Services (WRS). The data showed increased shrub canopy cover and static bareground (Appendix E).

Table VEG-6: Nested plot frequency data 1989-2009 – Pasture 6.

Species	1989	2003	2009	P-Value
Site 16S01E18				
Bluebunch wheatgrass	13	35	11	0.024
Idaho fescue	50	16	14	0.799
Sandberg bluegrass	95	89	98	0.121
Bottlebrush squirreltail	40	23	21	0.740
Low sage	15	6	8	0.587
Site 16S01W06B				
Bluebunch wheatgrass	34	37	41	0.577
Sandberg bluegrass	32	57	47	0.266
Bottlebrush squirreltail	27	14	19	0.460
Wyoming big sagebrush	15	7	10	0.305
Site 16S02W15				
Bluebunch wheatgrass	4	16	12	0.242
Sandberg bluegrass	67	75	78	0.501
Bottlebrush squirreltail	35	35	37	0.541

Figure VEG-14: Pasture 6 Grass Frequency site # 16S01E18

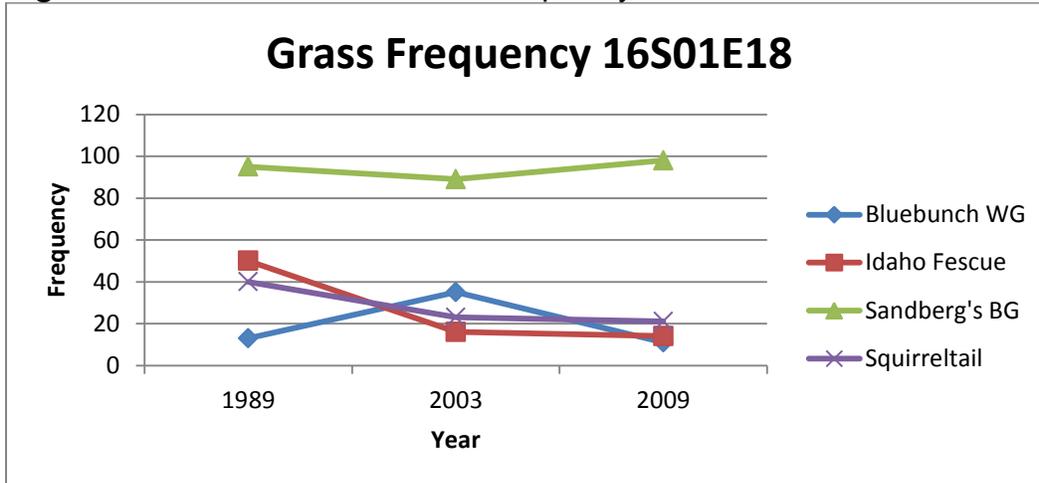


Figure VEG-15: Pasture 6 Grass Frequency site # 16S02W15

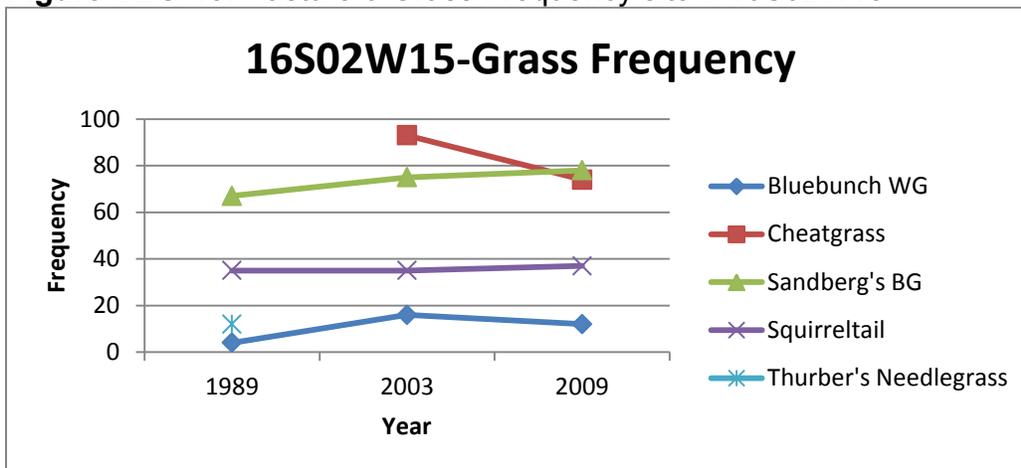
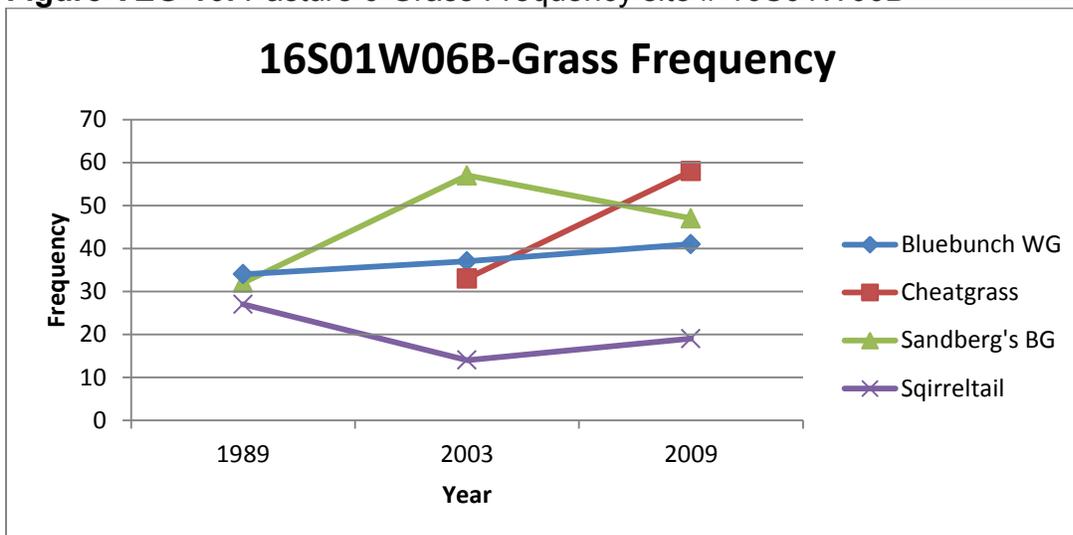


Figure VEG-16: Pasture 6 Grass Frequency site # 16S01W06B



Ecological Status/Production: Ecological status and production data were collected by Western Range Services (WRS) at three VSSs in pasture 6 in 1997, 2003 and 2009. BLM staff assisted with data collection in 2003 and 2009. Ecological site inventory write-ups for similar sites in 1979 were used to estimate long-term trend.

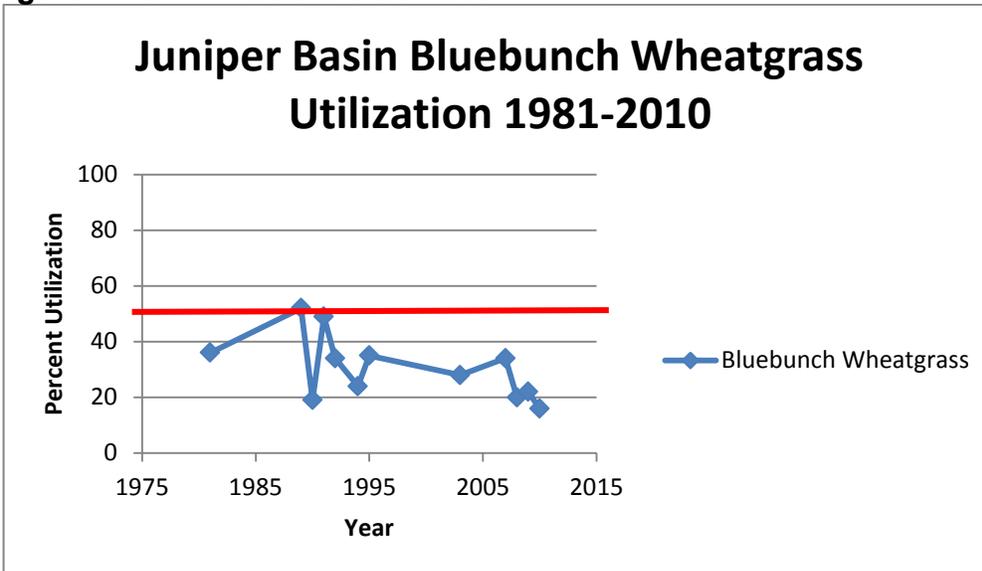
Both VSS-01 and VSS-02 were estimated to be in late-seral ecological status in 1979 (60 percent, 60 percent) and late seral ecological status in 2009 (63 percent and 64 percent). There was no apparent trend in ecological status from 1979 to 2009 (Appendix C).

VSS-01 is a Shallow-Claypan 12-16" ecological site with expected median production of 500 to 800 pounds of vegetation per acre. Observed production was 426 pounds per acre in 1997 and 319 pounds per acre in 2009. Production values at this site were lower than the expected median range; no apparent change in production was detected between 1997 and 2009. VSS-02 is a Loamy 10-13" ecological site with expected

median production of 525 to 925 pounds per acre. Observed production was 563 pounds per acre in 1997, and 418 pounds per acre in 2009; no changes in production were detected between 1997 and 2009 at this site (Appendix C).

Utilization: Utilization levels from 1981 to 2010 on key species in pasture 6 have generally been light. Bluebunch wheatgrass, for years in which data were collected, ranged from 16 to 52 percent and averaged 31 percent utilization in pasture 6 (Appendix D).

Figure VEG-17: Pasture 6 Utilization



Line represents 50 percent utilization as specified in Owyhee Resource Management Plan.

Evaluation of Standard 4

Evaluation Finding –Allotment/watershed is:

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

Desired Conditions:

Livestock Grazing Management

- LVST 1: Provide for sustained level of livestock use compatible with meeting other resource objectives.
- MNGMTN ACTIONS: The livestock allocation is the current active permitted use for livestock in the Owyhee Resource Area. In order to meet resource objectives, the forage allocation will be adjusted based upon monitoring and assessment. Evaluation of monitoring data will determine future stocking levels.
- Limit upland forage use to 50 percent unless higher or lower level of use is appropriate to meet standards for healthy rangelands.

Vegetation

- VEGE 1: Improve unsatisfactory and maintain satisfactory vegetation health/condition on all areas.
- MNGMTN ACTIONS: Implement grazing practices that during and at the end of the grazing season provide adequate amounts of ground cover (determined on an ecological site basis) to support proper infiltration, maintain soil moisture, stabilize soils, and maintain site productivity.
- Implement grazing practices that improve or maintain native rangeland species to attain composition, density, foliar cover and vigor appropriate to site potential.

1989 Garat Grazing Agreement pertaining to standard 4

- Continue to improve the vigor of the key forage plants and establish an upward trend on 75 percent of the allotment area. Increase the composition of the key forage plants by 20 percent. Key forage plants are bluebunch wheatgrass and squirreltail. Within 10 years reach a good ecological site condition class on 50 percent of the allotment, and at least fair condition on the remainder.
- 50 percent utilization upland key species bluebunch & squirreltail.
- 30 percent use on bitterbrush and browse.
- Protect, maintain or improve the habitat to at least a good ecological range site condition class.

Rangeland Health: The majority of range sites on the Garat allotment are meeting Standard 4. However, in many areas, the plant community has historically shifted from what is expected. In most of pasture 5 and the northern half of Pasture 6, exotic annual grass species are present in higher than expected amounts. In many areas dominated by native plant communities, the sagebrush component is heavier than expected in terms of cover, while relative abundance of bunchgrasses has decreased correspondingly. This departure is associated with the balance of the structural functional groups and plant vigor that correlates with the biotic integrity of these sites. Shrub mortality and decadence are common at sites throughout the allotment that have not burned within the last several decades.

Shrub canopy cover is slightly higher than desired. Bare ground has shown a decrease. Overall production was lower than expected for the ecological site descriptions on the Garat allotment.

Trend: Monitoring data show no apparent trend over the majority of the allotment. Frequency trend was static or mixed at most sites. From 1997 to 2009, ecological status was toward the potential natural community at two sites, away from PNC at one site, and not apparent at the remaining nine sites. Only one out of twelve sites was meeting the potential natural community suggesting a departure from the historic climax plant communities. Line-point intercept data from 2003 and 2007 showed two static and two increased trend in shrub canopy cover and overall static bare ground.

Livestock Grazing Management: Utilization levels have been light on key species and light (22 to 31 percent) on bluebunch wheatgrass average from 1979 to 2011. These utilization levels are appropriate to allow for maintenance of plant communities capable

of facilitating proper infiltration and runoff processes and move towards desired conditions. Distribution of grazing is concentrated adjacent to water troughs, dirt tanks, salt, Piute Creek and Juniper Reservoir and utilization is higher in these areas and decreases farther away from water sources. Utilization is not a significant influence in failure to meet Standard 4.

Pasture rotations in Pasture 1 and 2 have been used from March 15 to July 15 for four out of the past six years. Pasture 3 (Forty-Five) has been used from March 15 to July 15 for four out of the past six years. Pastures 1, 2, 3 and 5 have been rested on a regular basis in the past six years. Grazing in pasture 4 (Kimball) has shown some regular spring deferment and pasture 6 (Juniper Basin) is regularly deferred until after seed ripening of key perennial grass species annually. Pasture rotations have been deviated from rotations in the Allotment Management Plan (Table 6) since 2006. Rest has been added to the Big Horse pasture due to large amounts of poison in the spring and limited water in the fall; however no rest has occurred in the Kimball pasture in the past six years to compensate.

Season of use in pastures 1, 2 and 3 have been grazed during seed ripe through seed set (spring to summer grazing) continuously when not rested. Pasture rotations could conform to the following livestock grazing management guideline better:

- Guideline 4. Implement grazing management practices that provide periodic rest or deferment during critical growth stages to allow sufficient regrowth to achieve and maintain healthy, properly functioning conditions, including good plant vigor and adequate vegetative cover appropriate to site potential

Rationale for Evaluation Finding

Decreased large bunchgrasses and higher than-expected shrub cover and shrub decadence including poor vegetation re-establishment in burned, unseeded areas as compared to the desired condition is apparent across the allotment. The sagebrush/bluebunch wheatgrass ecological site potential in the Garat allotment is not expressed in the current vegetation and is at more of sagebrush/sandberg bluegrass-dominated ecological sites. In addition, overall production was lower than expected for the ecological site descriptions on the Garat allotment (Appendix C).

Information Sources

USDA Natural Resources Conservation Service. 2005, 2006 and 2010. Ecological Site Descriptions. Available from the Idaho State Office of BLM, Boise ID or the Idaho State Office of NRCS, Boise ID.

USDI Bureau of Land Management. 2000. Interpreting Indicators of Rangeland Health-Version 3. Technical Reference 1734-6. Denver CO. 118 p.

USDI Bureau of Land Management. 2006. Final Rangeland Health Assessment for the Garat Allotment. Owyhee Field Office. Marsing, Idaho.

Standard 5 – Seedings

Standard Doesn't Apply

There are inclusions of burned areas in pastures 4 and 6 that have remnant seedings but are currently managed for native plant communities. Seeded plant communities do not form the dominant vegetation type in significant portions of any pasture in the allotment. Therefore, Standard 5 does not apply. Pastures that have inclusions of seeded areas are discussed in Standard 4.

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

Meeting the Standard

Not meeting the Standard, but making significant progress towards meeting

Not meeting the Standard

Standard 6 – Exotic Plant Communities, Other Than Seedings **Standard Doesn't Apply**

Although exotic plant species occur in the Garat Allotment, the predominant vegetation is native with some seeded plant communities. Management is designed to maintain these native and seeded species. Exotic plant communities do not form the dominant vegetation type in significant portions of any pasture in the allotment. Therefore, Standard 6 does not apply. Pastures that have inclusions of exotic plant species are discussed in Standard 4.

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

Meeting the Standard

Not meeting the Standard, but making significant progress towards meeting

Not meeting the Standard

Standard 7 – Water Quality

Standard Doesn't Apply

Surface and groundwater on public lands comply with the Idaho Water Quality Standards.

Indicators may include but are not limited to:

1. Physical, chemical, and biologic parameters described in the Idaho Water Quality Standards.

Overview

The Idaho Department of Environmental Quality (IDEQ) is the state agency tasked with implementing the federal Clean Water Act. IDEQ sets the state's standards through the integrated report and beneficial use process. Idaho BLM is expected to implement grazing practices that make progress towards achieving proper functioning condition and satisfactory riparian condition on stream segments listed as water quality limited in the current IDEQ 303(d) list.

The Garat allotment is within the Upper Owyhee River watershed that was assessed by IDEQ in 2002 (integrated report) and reviewed in 2009 (5-year review). The watershed was assigned beneficial uses that include: cold water aquatic life and primary and secondary recreation contact. Streams that are identified by IDEQ as not supporting the beneficial use include the South Fork Owyhee River and Juniper Basin Reservoir. There are no streams on the 303(d) list at this time.

Previous Assessment Summary

The Garat Grazing Allotment Rangeland Health Assessment dated December 2006 discussed the Upper Owyhee Watershed Assessment (IDEQ 2003, *Integrated Report*) and the information available that lists Juniper Basin Reservoir on the 303(d) list. The RHA states that there is a lack of data available to justify present support status of the designated beneficial uses for the reservoir.

Current Assessment

Pastures 1-5 (Dry Lakes, Piute Creek, Forty Five, and Big Horse)

None of the streams in pastures 1-5 are on the IDEQ 303(d) list of impaired waters, nor does BLM have any water quality monitoring sites in this pasture.

Pasture 6- Juniper Basin

Juniper Basin Reservoir is the only water body within the allotment discussed in the 2003 integrated report (IDEQ). The reservoir was not supporting the beneficial uses assigned to the Upper Owyhee Watershed Assessment (Map 9). However, in the 5-year review published in 2009, the department questioned the appropriateness of the designation (IDEQ 2009, *Five Year Review*).

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

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

RMP Objectives/ Desired Conditions

Meet or exceed State of Idaho water quality standards on all Federally administered waters within the Owyhee Resource Area. Follow current State water rights processes

and procedures to acquire water rights for beneficial uses and support establishment of in-stream flows which are in the public interest.

Rationale for Evaluation Finding

Juniper Basin Reservoir falls within the Upper Owyhee watershed that was assigned cold water aquatic life, and primary and secondary recreation contact beneficial uses. The reservoir is currently not supporting the beneficial use. However, the reservoir was created for irrigation water storage, rather than cold water biota or recreational use. In June 2009, IDEQ prepared a 5-year review for the watershed that the Garat Allotment falls in (Upper Owyhee), and stated, "It is unclear how appropriate the beneficial use assigned to Juniper Reservoir is"...

Juniper Reservoir was not assessed by the BLM for functional condition; however, 2011 field visits indicate there is heavy livestock use surrounding the reservoir and the impacts adjacent to the water body. Distribution of grazing is concentrated adjacent to reservoirs and utilization is higher in these areas and decreases farther away from water sources.

Information Sources:

Idaho Department of Environmental Quality. 2002. Lower Owyhee Watershed Integrated Report. http://www.deq.idaho.gov/media/458038-integrated_report_2002_final_entire.pdf

Idaho Department of Environmental Quality. 2009. Lower Owyhee Watershed Five Year Review. http://www.deq.idaho.gov/media/455477-_water_data_reports_surface_water_tmdls_owyhee_watershed_upper_owyhee_watershed_upper_five_year_review_0609.pdf

Idaho Department of Environmental Quality Lower Owyhee Watershed TMDLs: <http://www.deq.idaho.gov/water-quality/surface-water/tmdls/table-of-sbas-tmdls.aspx>

USDI Bureau of Land Management. 1999. Owyhee Resource Management Plan. Available at the Owyhee Field Office, Marsing, Idaho.

Standard 8 – Threatened And Endangered Plants and Animals

___ Standard Doesn't Apply

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

Plants

Special status plant information is based on botanical surveys conducted in the Garat allotment, BLM records, and data on file with Idaho Natural Heritage Program (INHP). Systematic inventories for special status plants have not been conducted in this allotment. Incidental clearance surveys for other projects is the main source for locating known occurrences within the allotment, although the number of projects and subsequent acres surveyed is minimal in this area.

Special Status Plants

Slickspot peppergrass (*Lepidium papilliferum*) is listed as threatened under the Endangered Species Act and occurs in eastern Owyhee County (USDI-USFWS 2009 and USDI-USFWS 2010b). The U.S. Fish and Wildlife Service considers approximately 45 square miles of the county (less than 1 percent) south of Mountain Home and west of Rogerson, Idaho, to be within the critical habitat range of slickspot peppergrass. The Garat allotment is approximately 45 miles due west of the critical habitat area, within Owyhee County. Currently there are no known occurrences of slickspot peppergrass in Owyhee Field Office Resource Area or western Owyhee County and is thus not present in the Garat allotment (USDI-USFWS 2011, Federal Register RIN 1018-AX16).

A small area in the Garat allotment is of the same geologic provinces with the same Quaternary alluvial deposits and gravels of slickspot microsites as those slickspots located within eastern Owyhee County and the Snake River Plain regions that are currently occupied by slickspot peppergrass. These Garat allotment slickspots were observed during an October 2011 field visit (Maps 4 and 9). The single late-in-the-season visit is not sufficient to determine whether slickspot peppergrass is present in the Garat allotment, due to seed dormancy that can extend for at least 12 years (Meyer et al. 2005), the annual and biennial nature of the species and a life cycle that is generally complete by mid-summer. A model (Colket 2006) that was developed to predict distribution of the species based on known suitable habitat shows a probability for slickspot peppergrass to occur throughout the Garat allotment of 0 to 10 percent. Although this is a weak prediction, the Garat allotment should not necessarily be discounted from future surveys.

The U.S. Fish and Wildlife Service consider all of Idaho to be within the potential range of Ute ladies'-tresses (*Spiranthes diluvialis*), a federally threatened orchid species. This plant occurs in spring, seep, and riparian habitats. Due to the difficulty in narrowly defining potential habitat for this species, USFWS has chosen to apply a loose definition and requires Section 7 consultation only in three counties of southeast Idaho or in areas where the plant is actually found (USFWS 2002). Surveys specifically for this plant are recommended prior to authorizing federal actions in southwest Idaho, but not required. Therefore, these plants will not be discussed further.

Several peripheral special status species occur along the perimeter of the Garat allotment within the canyon rimrock or riparian habitat, however, only five BLM special status plant species are known to occur within the Garat allotment: Stream orchid

(*Epipactis gigantea*), rattlesnake stickseed (*Hackelia ophiobia*), Inch-high lupine (*Lupinus uncialis*), Newberry's milkvetch (*Astragalus newberryi* var. *castoreus*), and Davis' peppergrass (*Lepidium davisii*) (Table SPSS-1).

Table SPSS-1: Garat allotment special status plants by pasture.

Scientific Name	Common Name	Pasture				
		1	2	3	4	5
<i>Astragalus newberryi</i> var. <i>castoreus</i>	Newberry's milkvetch					X
<i>Epipactis gigantea</i>	Stream orchid					X
<i>Hackelia ophiobia</i>	Rattlesnake stickseed		X		X	
<i>Lepidium davisii</i>	Davis' peppergrass			X		X
<i>Lupinus uncialis</i>	Inch-high Lupine			X		X

Pasture 1 Dry Lakes West

There are no known special status plants in pasture 1.

Pasture 2 Dry Lakes East

There is one known special status plant species in pasture 2. Rattlesnake stickseed is a Type 3 on the BLM Special Status Plant List. This ranking is given to plant populations that are globally rare or very rare in Idaho, with moderate endangerment factors. Their global or state rarity and the inherent risks associated with rarity make them imperiled species. This species occurs at one location in pasture 2 in a cliffside community in rock crevices on the shady north faces of the East Fork of the Owyhee River. The most recent report at this occurrence observed a population with excellent vigor and no threats (INHP 2011).

Pasture 3 Forty-five

Two populations of special status plant species occur within Pasture 3, Davis' peppergrass and inch-high lupine. Davis' peppergrass is a white-flowered, deep-rooted, perennial forb occurring in playas formed by vernal pools within Wyoming big sagebrush plant communities, and is ranked as a BLM Type 3 species. The single occurrence of Davis' peppergrass within pasture 3, EO 142, consists of one playa within 60 feet of a developed two track road. Using 1 meter accuracy aerial imagery from 2011 (USDA 2011) there does not appear to be noticeable OHV activity off of designated two tracks or established livestock trails in the immediate vicinity of the playa. .

Season of grazing use is an important consideration for Davis' peppergrass and should be kept to a minimum during times of saturation, mainly spring and winter. Late summer light mechanical disturbance may be tolerated post seed set when the plant is more resistant and the habitat is less susceptible to trampling with posing dry conditions. However, the past 10 years' grazing management schedule of rest-rotation every 1 in 3

years (Appendix F) has not caused any noticeable impacts to the species and its habitat. It has been noted that when stock ponds or salt are not located on or near the playa habitat livestock disturbance tends to be lacking (Mosely 1996).

Inch-high lupine is a BLM Type 4 species. Type 4 species are considered sensitive, with small or localized populations. These are species that are not globally rare but may be jeopardized without active management or removal of known threats. Inch-high lupine is a yellowish-white very small flowering, stemless, annual, plant, occurring typically in sparsely vegetated areas of rhyolite and volcanic cinder with springtime standing water or runoff accumulation in open Wyoming big sagebrush and low sagebrush plant communities. Based on GIS and aerial photography from 2011, (NAIP 2011 Nature Conservancy) the EO sites in this allotment are located along the Owyhee River rim. There are no cattle trails as threats to these EO sites. (EOs 2 and 4)

Pasture 4 Kimball

One special status plant species is known to occur within pasture 4, rattlesnake stickseed. Similar to Pasture 3 this species occurs in the rimrock, cliff faces and talus slopes of the Owyhee River canyon. A recent site visit in 2010 identified few potential threats with the majority of the population occurring in The Tules ACEC. The ACEC, which is immediately adjacent to the Garat allotment, was excluded from livestock grazing following the Owyhee Resource Management Plan (DOI-BLM 1999). Current boundaries for the Garat allotment do not include The Tules ACEC. Western germander (*Teucrium canadense* var. *occidentale*), a BLM Type 4 species, also occurs in The Tules ACEC, and thus is not within the Garat allotment. Because of the removal of the ACEC from the Garat allotment and subsequent livestock exclusion these species will lack impacts from livestock and remain secure in their habitat.

Pasture 5 Big Horse

Four species of BLM special status plants occur within Pasture 5. Davis' peppergrass, inch-high lupine, Newberry's milkvetch, and stream orchid all occur within the pasture or between the canyon rim and the river.

As described above in pasture 3, Davis' peppergrass is ranked as a BLM Type 3 special status plant. Most recent Element Occurrence (EO) reports completed between 1993 and 1998 for the seven EOs (21, 27, 30, 90, 91, 92, 170) of Davis' peppergrass in pasture 5, documented that playas are used by livestock but not extensively. The use was described as minor to moderate livestock trails within the immediate perimeter of the playa. Only EO 30 within pasture 5 has current replicated monitoring data that was collected in 2009 and 2010 by Mancuso (2011). This most recent data notes an overall sparse occurrence of introduced weeds with a slight increase from 2009 to 2010 for this one EO. Of the introduced species noted medusahead (*Taeniatherum caput-medusae*) is of the greatest concern due to its propensity to occupy clay soils and its extremely competitive nature. Livestock tracks and congregation were noted within the playa in 2010 yet there were no reports of trampled plants by livestock for both years and these impacts were slated to be of minimal impact to the EO. Aerial imagery from 2011

(USDA 2011) depicts a major livestock movement corridor adjacent to the east side of EO 30. There is an area of livestock congregation at the reservoir approximately one-third of a mile to the east of the playa. As proximity to range developments such as reservoirs and salts decreases, playa habitat is more likely to be negatively affected. There are also several less conspicuous dispersed trails radiating into the playa that are of concern. Playas associated with EO 92 have a very defined livestock trail terminating in one of the three playas (USDA 2011). In addition, there are noticeable dispersed livestock trails in the vicinity of the three playas although not as distinct as those connected to EO 30. For the other five EOs within pasture 5 aerial imagery from 2011 does not show adjacent defined trails or noticeable dispersed trails. Livestock congregation was noted to be a disturbance within the EO 30 playa in 2010. One of the three playas associated with EO 21 is bisected by an established two-track, however, no disturbance within the playa off of the established two-track has been noted.

Inch-high lupine is a BLM Type 4 species. Type 4 species are considered sensitive, with small or localized populations. These are species that are not globally rare but may be jeopardized without active management or removal of known threats. Inch-high lupine typically grows in sparsely vegetated areas of rhyolite and volcanic cinder with springtime standing water or runoff accumulation in low sagebrush plant communities. There are three EO sites located in pasture 5 (EOs 1, 8, and 11). Elemental occurrences 8 and 11 are located within the Owyhee River Bighorn Sheep Habitat ACEC. Element Occurrence 1 is located on the eastern side of the canyon rim. Based on GIS and aerial photography from 2011, (NAIP 2011 Nature Conservancy) the EO sites in this allotment are located along the Owyhee River rim.

Newberry's milkvetch and stream orchid are BLM Type 4 species. Within this allotment Newberry's milkvetch occurs in the bluffs and badlands of Wyoming sagebrush communities on thin, poor soil, with gravely silt. The sites are generally variably rocky with playa-like openings of heavy clay-silt. The somewhat sparsely vegetated habitat has an understory of bunchgrasses which attract livestock herbivory. The Newberry's milkvetch population consists of two EOs both at a minimum of 350 feet from established two-track roads (USDA 2011). The most recent recorded site visit in 1999 (INHP 2011) notes the threats include light to moderate cattle use, causing some soil disturbance but overall threats are mostly low. Cheatgrass presence was noted as patchy within the population. Using aerial imagery (USDA 2011) defined or dispersed livestock trails are apparent within the immediate area of the population.

Stream orchid occurs at one site in the southwest corner of pasture 5. This species occurs below the canyon rim along a steep basalt boulder spring channel that flows into the South Fork of the Owyhee River. This species has a very restricted habitat on or near springs and in this case with a narrow riparian zone. The most recent site observation was taken in 1998 (INHP 2011) and notes only a few plants observed that were in a reproductive state. No threats were observed at the time.

Pasture 6 Juniper Basin

No populations of special status plants are known to occur within Pasture 6.

Wildlife

Summary of the 2006 Assessment

Sage-grouse (*Centrocercus urophasianus*) nesting habitat was evaluated using *A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Lands in Idaho-Sage-grouse* (USDI BLM 2000). Eighteen breeding habitat assessments, three per pasture, were conducted in 2003 and 2004. The general results of the sage-grouse habitat assessment were as follows:

- Pasture 1 – suitable
- Pasture 2 – marginal to suitable
- Pasture 3 – unsuitable to marginal
- Pasture 4 – unsuitable to suitable
- Pasture 5 – marginal
- Pasture 6 – marginal to suitable

Below in Table WDLF - 1 are descriptions of the indicators used to evaluate sage-grouse breeding habitat suitability during the 2003 and 2004 assessments. The habitat indicators below should not be viewed independently but rather as a collection of vegetation elements required to provide effective sage-grouse breeding habitat. For clarification, Sandberg bluegrass was not included in generating average perennial grass canopy cover estimates for sage-grouse breeding habitat suitability. This approach is consistent with *A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho* (USDI BLM 2000) and provided information regarding larger robust grasses with more effective growth forms and herbaceous height.

Table WDLF – 1. Sage-grouse Breeding Habitat Suitability Indicators (USDI BLM 2000)

Habitat Indicator	Suitable Habitat	Marginal Habitat	Unsuitable Habitat
Average Sagebrush Canopy Cover	≥15% but ≤25%	10-<15% or >25%	<10%
Average Sagebrush Height Mesic	15-30"	10-14" or >30"	<10"
Arid	12-30"	10-11" or >30"	<10"
Sagebrush Growth Form	Spreading form, few, if any, dead branches for most plants	Mix of spreading and columnar growth forms present	Tall, columnar growth form with dead branches for most plants
Average Grass and Forb Height	≥7"	5- <7"	<5"
Average Perennial Grass Canopy Cover ¹ Mesic	≥15%	5- <15%	<5%
Arid	≥10%	5- <10%	<5%

Habitat Indicator	Suitable Habitat	Marginal Habitat	Unsuitable Habitat
Average Forb Canopy Cover Mesic	≥10%	5- <10%	<5%
Arid	≥5%	3- <5%	<3%
Preferred Forb Abundance and Diversity	Forbs common with at least a few preferred species present	Forbs common but only 1 or 2 preferred species present	Forbs rare to sparsely present
Overall Site Evaluation			

¹Average perennial grass canopy does not include Sandberg bluegrass.

2011 Assessment

Special Status Species (SSS)

There are no federally listed threatened or endangered species (Endangered Species Act of 1973, as amended), nor is there any designated critical habitat listed within or reasonably near the Garat allotment.

The greater sage-grouse, a candidate species, is known to occur within and adjacent to the Garat allotment (Map 9). Findings by the United States Fish and Wildlife Service (USFWS) in 2010 concluded that “listing of the greater sage-grouse is warranted but is precluded by higher priority listing actions”. Although there is no legal protection for the greater sage-grouse under the ESA at this time, BLM Manual 6840 – Special Status Species Management (SSS) provides policy and guidance in conserving special status species and the ecosystems on which they depend to reduce the likelihood and need for future listing under the ESA. Common and scientific names of special status wildlife species, their status, key habitat associations, and information regarding occurrence and potential habitat within the allotment are summarized in Appendix J. Modeled greater sage-grouse preliminary priority and general areas (Makela and Major 2011) overlay the entire allotment (Map 9). No sage-grouse nesting habitat assessments have been conducted since 2004.

The primary issue associated with greater sage-grouse populations is maintaining sagebrush/grass habitat function and structure to provide adequate cover for breeding, nesting, brood-rearing, and winter protection. Additionally, fences within sage-grouse habitat have become a recent issue of concern across the west and have been identified as a potential hazard for flying grouse.

California bighorn sheep (*Ovis canadensis californicus*) are known to occur within the canyon lands of the Owyhee River. The BLM has identified bighorn sheep as a SSS. The Owyhee Resource Management Plan in 1999 designated 141,796 acres as an Area of Critical Environmental Concern (ACEC), a portion of which is within Garat allotment, for the conservation of bighorn sheep (Map 10). Livestock management is restricted within the ACEC that overlaps with the allotment and is not allowed within the

canyons. The primary issue is the access of livestock within the Owyhee River Canyons and resulting livestock competition for forage and water resources.

Further SSS consideration is given to those species afforded special management emphasis under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. As of 2010, under a signed Memorandum of Understanding with the USFWS, the BLM has a responsibility to “as practical, protect, restore, and conserve habitat of migratory birds, addressing the responsibilities in Executive Order 13186 (USDI 2001).” The Garat allotment provides foraging and nesting habitat for golden eagles (*Aquila chrysaetos*) and sagebrush-dependent migratory birds. Providing intact sagebrush for foraging and nesting are the primary issues.

Other SSS identified within the Owyhee Field Office that occur, or potentially occur, within the Garat allotment include Brewer’s sparrow (*Spizella breweri*), ferruginous hawk (*Buteo regalis*), loggerhead shrike (*Lanius ludovicianus*), mountain quail (*Oreortyx pictus*), Piute ground squirrel (*Spermophilus mollis artemisea*), prairie falcon (*Falco mexicanus*), pygmy rabbit (*Brachylagus idahonesis*), sage sparrow (*Amphispiza belli*), spotted bat (*Euderma maculatum*), Townsend’s big-eared bat (*Plecotus townsendii*), western toad (*Bufo boreas*), and white-faced ibis (*Plegadis chihi*). Habitat availability, function, and structure similar to that discussed within the greater sage-grouse paragraph and within the riparian/wetland sections would apply.

Pronghorn (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) are known to occur within the Garat allotment. Both species are year-round residents of shrub-steppe habitat and utilize sagebrush, grass, and forbs. Pronghorn can be found on the expanses of the upper plains, whereas mule deer would likely inhabit the Owyhee River breaks. Both depend on sagebrush browse during the winter. Mule deer winter range is identified in the southern portion of pastures 5 and 6. Issues related to livestock use, fencing, areas of concentration, and trails can reduce habitat values and increase fragmentation.

Strategy for Assessing and Evaluating the Garat Allotment

The Garat allotment is entirely a sagebrush/grass habitat type. The landform is rolling plateau that extends northwest from the Duck Valley Reservation and is bounded by the east and west forks of the Owyhee River canyons (Map 1). Three basin features surrounded by basalt rimrock occur at the upper portion of the major drainages. From canyon rim to canyon rim, the allotment varies in elevation by approximately 140 m (462 feet). Given 1) the homogenous vegetation and topography of the allotment; 2) the priority to conserve sagebrush habitat types for a variety of special status species; and 3) the current status of sage-grouse and BLM’s policy under Manual-6840, the strategy in assessing/evaluating the Garat allotment is to apply a landscape-level approach focused on habitat values required by sage-grouse. Resources fundamental to this assessment/evaluation include *Guidelines to Manage Sage-grouse Populations and Their Habitats* (Connelly et al. 2000); the *Sage-Grouse Habitat Assessment Framework* (Stiver et al. 2010); the *Framework to Identify Greater Sage-grouse Priority Areas and*

General Areas in Management Zone IV and the Bear Lake Plateau of Southeastern Idaho (Makela and Major 2011) and the *Owyhee Resource Management Plan* (USDI BLM 1999).

Further, there were no additional sage-grouse nesting habitat assessments conducted after 2004. Given the consistency of livestock management from 2006 to 2011 and the slow changes in vegetation communities in arid environments, an assumption is made that habitat conditions described in the 2003/2004 sage-grouse breeding habitat assessments are still applicable and will serve as baseline habitat conditions in creating the 2011 Garat assessment. For creating the 2011 Garat assessment, assembling information from the 2003/2004 sage-grouse nesting habitat assessments; livestock utilization; vegetation trend; rangeland health assessments, fire history and an allotment visit on October 13/14, 2011, will provide the foundation for the assessment. Rangeland health assessment information collected by Petan 2007 that matched with sage-grouse breeding habitat assessment locations was also used to help assess/evaluate conditions in sagebrush and perennial grass canopy cover.

Pasture 1 Dry Lakes

Site 14-4-9: This site rated overall as suitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with an average grass/forb height of greater than 7 inches with a good abundance/diversity of forbs. Marginal habitat indicators showed greater than 30 inch sagebrush height with a mix of columnar and spreading growth form (Table WDLF-2).

Field evaluators in 2004 noted:

“Good grass density and diversity dominated by bluebunch wheatgrass and Idaho fescue, with poor interspatial vegetation cover and 38 percent bare ground. Old sage-grouse scat was observed.”

Site 14-4-18: This site rated overall as suitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with a height of 12 to 30 inches and good abundance/diversity of forbs. Marginal habitat indicators showed a mix of columnar and spreading growth forms of sagebrush. An unsuitable habitat indicator identified less than 5 inches for average grass/forb height (Table WDLF-2).

Field evaluators in 2004 noted:

“Good density of grasses but short and of poor stature not producing much vegetative cover. Poor interspatial vegetation cover and an estimated 38 percent bare ground was also observed, however, with good diversity and abundance of forbs.”

Site 14-4-15: This site rated overall as suitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 to 25 percent with a height of 12 to 30 inches and an average grass/forb height of greater than 7 inches with a good abundance/diversity of forbs. Marginal habitat indicators showed a mix of columnar and spreading growth forms of sagebrush (Table WDLF-2).

Field evaluators in 2004 noted:

“Good density and diversity of perennial grasses dominated by bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass. Poor interspatial vegetation cover and 36 percent bare ground. Old sage-grouse scat was observed.”

Table WDLF-2: Pasture 1 (Dry Lakes) Sage-grouse Breeding Habitat Assessment. Conducted May 17/18, 2004 prior to grazing period

Habitat Indicator	Site 14-4-9	Site 14-4-18	Site 14-4-15
Avg. Sagebrush Canopy Cover	suitable	suitable	suitable
Avg. Sagebrush Height	marginal	suitable	suitable
Sagebrush Growth Form	marginal	marginal	marginal
Avg. Grass and Forb Height	suitable	unsuitable	suitable
Avg. Perennial Grass Canopy Cover	suitable	suitable	suitable
Avg. Forb Canopy Cover	suitable	suitable	suitable
Preferred Forb Abundance & Diversity	suitable	suitable	suitable
Overall Site Evaluation	suitable	suitable	suitable

Three sage-grouse habitat assessments were conducted in pasture 1 on May 17/18, 2004, start of the grazing year. This pasture falls within the ranges illustrated by *A Framework to Identify Greater Sage-grouse Preliminary Priority Area and General Areas in Management Zone IV and the Bear Lake Plateau of Southeastern Idaho* (Map 9, Makela and Major 2011). Two leks have been documented in this pasture and old sage-grouse scat was observed by evaluators in 2004. This pasture appears to be used for breeding and possibly for nesting and early brood-rearing. There is limited information available classifying sage-grouse numbers and seasonal habitat use patterns.

There are 40.75 miles of ephemeral drainage paths and six developed livestock reservoirs in this pasture. Classic riparian habitat function and structure does not exist (Standard 2); although mesic habitat features in shallow drainages and reservoir perimeters may persist for periods of time with adequate soil moisture.

Pasture 1 is grazed simultaneously with pasture 2 (Piute Creek) in the spring to mid-summer (Tables Allot-5 and 6). From 1997 to 2011, average livestock use has been light for both pastures, with an average utilization of 26 percent on bluebunch wheatgrass (Figure VEG-5).

Six acres burned during the Crutcher Crossing fire in 2007. It is unknown if there are any lasting impacts from the fire in combination with grazing.

Rangeland health field assessments showed 69 percent of the sites at a none-slight departure of the ecological reference site conditions, 31 percent at a moderate departure, and 0 percent at a moderate-to-extreme departure (Standard 4). The assessment also noted that decadence of mature sagebrush was common, along with crown-die off on bunchgrasses associated with active pedestaling. According to monitoring data submitted to BLM by WRS (2007), ecological status of this pasture is late-seral (Standard 4).

Nested frequency trend plots monitored from 1989 to 2009 (Table VEG-2) did not identify any noteworthy trends in vegetation change (Standard 4).

Sage-grouse breeding habitat indicators rated this pasture as suitable. Sagebrush canopy cover/height and understory grasses/forb are adequate to provide nesting and security cover. Forbs appear to be abundant and possibly increasing. Occurrence of excessive shrub decadence and columnar growth forms are an issue and compromise effective nesting and security cover. Significant loss or degraded habitat conditions at locations of repeated concentration such as reservoirs, salt licks, corrals, trails and fence lines is occurring. Fence lines have also recently been identified as potential hazards throughout the west for flying sage-grouse. Installation of wire indicators should be considered in high risk areas such as leks, nests, and ridgetops to minimize collisions and potential mortality hazards (USDI BLM 2009).

The 2006 Garat Assessment notes that there are at least four locations where livestock can access the canyon areas of the Bighorn Sheep Area of Critical Environmental Concern (ACEC) that was designated by the Owyhee Resource Management Plan in 1999. However, that assessment noted that it does not appear that livestock are entering the canyon at these locations.

Mule deer and pronghorn antelope can be observed within these pastures. During a site visit in October 2011, it was observed that the top pasture fence wire was approximately 5 feet from the ground. This height is not consistent with Owyhee RMP fence construction standards in mule deer and pronghorn antelope ranges. Fences can fragment habitat and alter movement patterns as well as cause direct mortality. Building fences to BLM standards helps to mitigate these issues.

Pasture 2 Piute Creek

Site 14-4-12: This site rated overall as suitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with a height of 12 to 30 inches and an average grass/forb height of greater than 7 inches with a good abundance/diversity of forbs. Marginal habitat indicators showed a mix of columnar and spreading growth forms of sagebrush (Table WDLF-3).

Field evaluators in 2003 noted:

“Sandberg bluegrass is the dominant understory species with a reduced potential, but common, occurrence of bluebunch wheatgrass. Sagebrush has increased on this site.”

Site 14-4-14: This site rated overall as marginal sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with a height of 12 to 30 inches and an average grass/forb height of greater than 7 inches. Marginal habitat indicators showed a mix of columnar and spreading growth forms of sagebrush and a reduced abundance/diversity of forbs (Table WDLF-3).

Field evaluators in 2003 noted:

“Sandberg bluegrass is dominant in the understory with a reduced occurrence of bluebunch wheatgrass. Grass cover is less than expected.”

Site 14-3-10: This site was rated as suitable sage-grouse breeding habitat in 2006. Suitable habitat showed sagebrush height of 12 to 30 inches and an average grass/forb height of greater than 7 inches with a good abundance/diversity of preferred forbs. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with a mix of columnar and spreading growth forms (Table WDLF-3).

Field evaluators in 2003 noted:

“There is a reduced occurrence of bluebunch wheatgrass. Frequency of forbs was less than expected.”

Table WDLF-3: Pasture 2 (Piute Creek) Sage-grouse Breeding Habitat Assessment. Conducted May 23, 2003 in the middle of the grazing period

Habitat Indicator	Site 14-4-12	Site 14-4-14	Site 14-3-10
Avg. Sagebrush Canopy Cover	suitable	suitable	marginal
Avg. Sagebrush Height	suitable	suitable	suitable
Sagebrush Growth Form	marginal	marginal	marginal
Avg. Grass and Forb Height	suitable	suitable	suitable
Avg. Perennial Grass Canopy Cover	suitable	suitable	suitable
Avg. Forb Canopy Cover	suitable	suitable	suitable
Preferred Forb Abundance & Diversity	suitable	marginal	suitable
Overall Site Evaluation	suitable	marginal	suitable

Sage-grouse habitat assessments were conducted in pasture 2 on May 23, 2003 during the spring grazing season of use. This pasture falls within the ranges illustrated by *A Framework to Identify Greater Sage-grouse Preliminary Priority Area and General Areas in Management Zone IV and the Bear Lake Plateau of Southeastern Idaho* (Map 9,

Makela and Major 2011). There is limited information available identifying sage-grouse numbers and seasonal habitat use patterns.

There are 63.6 miles of ephemeral drainage paths and eight developed livestock reservoirs in this pasture. Three of the reservoirs are developed natural playas. Classic riparian habitat function and structure does not exist (Standard 2); although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture.

In most years, pasture 2 is grazed concurrently with pasture 1 (Dry Lake) generally from mid-March to late mid-July (Table Allot-5 and 6). From 1997 to 2011, average livestock use has been light for both pastures with an average utilization of 26 percent on bluebunch wheatgrass (Figure VEG-5).

A wildfire in 1985 burned 7,118 acres (31 percent) of the pasture largely in the Piute Basin. No burned area rest occurred after the fire and grazing continued until the pasture was rested in 1990. No fire rehabilitation was noted (Map 8 and Table Allot-3).

Rangeland health field assessments showed 81 percent of the sites at a none-moderate departure from the ecological reference site conditions, 16 percent at a moderate departure, and 3 percent at a moderate-to-extreme departure (Standard 4). Decadence of mature sagebrush and crown die-off on bunchgrasses was recorded, as were patches of cheatgrass and curvseed butterwort. According to monitoring data submitted to the BLM by WRS (2007), ecological status of this pasture is late-seral (Standard 4). The 1985 burned area has returned to a native plant community.

Nested frequency trend plots monitored from 1989-2009 (Table VEG-2) did not identify any notable trends in vegetation changes.

Sage-grouse nesting habitat indicators rated this pasture at marginal – suitable (Table WDLF-3). Sagebrush canopy cover and height are adequate to provide nesting and security cover but is compromised with the occurrence of sagebrush decadence and columnar growth forms that exposes the understory and reduces effective nesting and security cover. Significant loss or degraded habitat conditions at locations of repeated concentration such as reservoirs, salt licks, corrals, trails and fence lines is occurring. Fence lines have also recently been identified as potential hazards throughout the west for flying sage-grouse. Installation of wire indicators should be considered in high risk areas such as leks, nests, and ridgetops to minimize collisions and potential mortality hazards (USDI BLM 2009).

The California bighorn Sheep ACEC and pasture fence construction issues for this pasture are discussed in pasture 1.

Pasture 3 Forty-Five

Site 15-4-12: This site was rated as marginal for sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush height of 12 to 30 inches with a perennial grass canopy cover greater than 10 percent. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with a mix of columnar and spreading growth forms, an average grass/forb height between 5 and 7 inches, and a reduced abundance/diversity of forbs (Table WDLF-4).

Field evaluators in 2003 observed:

“Sandberg bluegrass is common in the understory and bluebunch wheatgrass is in low vigor. Sagebrush appears to be increasing. Sage-grouse scat was observed on site.”

Petan (2007) line-point intercept data matched this location. Comparison of the data showed no difference between the 2003 and 2007 data in sagebrush canopy cover suggesting a static condition near or greater than 25 percent that is consistent with the marginal rating of the sage-grouse breeding habitat assessment for this site (Appendix E). Comparison of average perennial grass canopy cover showed a notable difference of the two data periods suggesting a substantial decrease in canopy cover of larger bunchgrasses from 10% to 3% that would change the indicator rating from suitable to unsuitable (Table WDLF-1&4 and Appendix E). With the addition of this data the overall site rating would change to unsuitable.

Site 15-3-13: This site was rated as marginal for breeding sage-grouse habitat in 2006. Suitable habitat indicators showed sagebrush height of 12 to 30 inches with an average grass/forb height of greater than 7 inches and good abundance/diversity of forbs. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with columnar and spreading growth form with the occurrence between 5 and 10 percent perennial grass canopy cover (Table WDLF-4).

Field evaluators in 2003 noted:

“Sandberg bluegrass is providing the main understory component with a common occurrence of bluebunch wheatgrass and squirreltail. Past livestock utilization appears high with many grasses experiencing decadence and reduced vigor. Recruitment of bluebunch wheatgrass and squirreltail were noted.”

Petan (2007) line-point intercept data matched this location. Comparison of the sagebrush data showed a difference between the 2003 and 2007 data suggesting an increase in sagebrush canopy cover within the greater than 15% to less than 25% range for a suitable sage-grouse habitat rating (Appendix E). Comparison of average perennial grass canopy cover showed a difference of the two data periods suggesting a slight decrease in larger bunchgrasses from 6% to 4% and changing the indicator rating

from marginal to unsuitable (Table WDFL-1&4 and Appendix E). This additional data did not change the overall site rating of marginal.

Site 15-4-9: This site was rated as unsuitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with good abundance/diversity of forbs. Marginal habitat indicators showed a greater than 30-inch average height of sagebrush with a mix of columnar and spreading growth forms. Unsuitable habitat indicators showed average grass/forb height of less than 5 inches and average perennial grass canopy cover of less than 5 percent (Table WDLF-4).

Field evaluators in 2003 noted:

“There is a higher occurrence of sagebrush decadence and reduced occurrence of perennial grasses than expected.”

Evaluators in 2003 also rated this site as marginal/unsuitable. To eliminate confusion, BLM erred on the side of effective sage-grouse habitat requirements and rated the site as unsuitable.

Table WDLF-4: Pasture 3 (Forty-Five) Sage-grouse Breeding Habitat Assessment. Conducted June 10, 20, 25, 2003 during a rested year

Habitat Indicator	Site 15-4-12	Site 15-3-13	Site 15-4-9
Avg. Sagebrush Canopy Cover	marginal	marginal (suitable) ³	suitable
Avg. Sagebrush Height	suitable	suitable	marginal
Sagebrush Growth Form	marginal	marginal	marginal
Avg. Grass and Forb Height	marginal	suitable	un-suitable
Avg. Perennial Grass Canopy Cover	suitable (unsuitable) ¹	marginal (unsuitable) ⁴	un-suitable
Avg. Forb Canopy Cover	suitable	marginal	marginal
Preferred Forb Abundance & Diversity	marginal	suitable	suitable
Overall Site Evaluation	marginal (unsuitable)²	marginal	unsuitable

¹ Application of the Petan data (2007) would change this indicator from suitable to unsuitable.

² Application of the Petan data (2007) would change overall site suitability rating from marginal to unsuitable due to the combination of marginal sagebrush growth form and avg. grass/forb height and unsuitable perennial grass cover.

³ Application of the Petan data (2007) would change this indicator from marginal to suitable.

⁴ Application of the Petan data (2007) would change this indicator from suitable to unsuitable.

Sage-grouse habitat assessments were conducted in Pasture 3 on June 10, 20, and 25, 2003, during a year when the pasture was rested from livestock grazing. This pasture falls within the ranges illustrated by *A Framework to Identify Greater Sage-grouse Preliminary Priority Area and General Ares in Management Zone IV and the Bear Lake*

Plateau of Southeastern Idaho (Map 9, Makela and Major 2011). Old sage-grouse scat was observed at one of the breeding habitat assessment sites. There is limited information available identifying sage-grouse numbers and seasonal habitat use patterns.

There are 171.8 miles of ephemeral drainage paths and twenty-four developed livestock reservoirs in this pasture. Classic riparian habitat function and structure does not exist (Standard 2); although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture.

Season of use for livestock grazing in pasture 3 generally occurs from mid-March to mid-July (Table Allot-5 and 6). From 1979 to 2011, livestock use has been slight to light, with an average utilization of 22 percent on bluebunch wheatgrass (Figure VEG-8).

Three wildfires burned in this pasture in 1985 totaling 3,934 acres (9 percent of the pasture). No fire rehabilitation was noted. No burned area rest occurred after the fire and grazing continued until the pasture was rested in 1988 (Map 8 and Table Allot-3).

Rangeland health field assessments showed 55 percent of the sites at a none-to-moderate departure from the ecological reference site conditions, 37 percent at a moderate departure, and 8 percent at a moderate-to-extreme departure (Standard 4). Decadence of mature sagebrush and the reduced occurrence of large, longer-lived bunchgrasses and the increased presence of shorter lived perennial grasses were noted. According to monitoring data submitted to BLM by WRS (2007), ecological status of this pasture is late-seral (Standard 4).

Nested frequency trend plots monitored from 1989 to 2009 (Table VEG-3) did not identify any significant vegetation changes, although a slight decline in bluebunch wheatgrass, squirreltail and Wyoming big sagebrush were indicated along with a slight increase in Sandberg bluegrass (Figure VEG-6).

Sage-grouse breeding habitat assessment indicators rated this pasture unsuitable to marginal. Sagebrush height is adequate, but its effectiveness to provide nesting and security cover is compromised when combined with the negative effects of sagebrush decadence and columnar growth forms that expose the understory. This is further complicated when there is a decline of larger perennial grasses in the understory. Significant loss or degraded habitat conditions at locations of repeated concentration such as reservoirs, salt licks, corrals, trails and fence lines is occurring. Fence lines have also recently been identified as potential hazards throughout the west for flying sage-grouse. Installation of wire indicators should be considered in high risk areas such as leks, nests, and ridgetops to minimize collisions and potential mortality hazards (USDI BLM 2009).

Comparison of the Petan (2007) line –point intercept data with the 2003 sage-grouse breeding habitat assessments suggests that sagebrush canopy cover is suitable

(Appendix E), but that average perennial grass canopy cover is decreasing to an unsuitable habitat indicator level (Table WDLF-5 and Figure WDLF-9). This situation will favor an increase in canopy cover and reduced height of smaller and less robust grasses such as Sandberg bluegrass (Appendix E).

Livestock access to the Bighorn Sheep ACEC was not noted in the 2006 Garat Allotment Assessment and appears to not be occurring in this pasture.

See the pasture 1 section for discussion concerning fence construction standards within the range of mule deer and pronghorn antelope.

Pasture 4 Kimball

Site 15-1-23: This site rated overall as suitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with a height of 12 to 30 inches and an average grass/forb height of greater than 7 inches with a good abundance/diversity of forbs. Marginal habitat indicators showed sagebrush height greater than 30 inches with a mix of columnar and spreading growth forms (Table WDLF-5).

Field evaluators in 2004 noted:

“The occurrence of bluebunch wheatgrass and Idaho fescue is observed. Grasses are at or near potential and providing adequate cover. Shrubs appear to be increasing. Forb diversity and abundance good and near what might be expected.”

Petan (2007) line-point intercept data matched this location. Comparison of the sagebrush data showed a difference in the two data years suggesting an increase in sagebrush canopy cover to greater than 25% and changing this indicator from suitable to marginal (Appendix E and Table WDLF-5). Comparison of average perennial grass canopy cover showed a significant difference of the two data periods suggesting a substantial decrease in large bunchgrasses from 24% to 6% (Table WDLF-1 and Appendix E) and changing the indicator rating from suitable to marginal (Table WDLF-5). With the addition of this data the overall site rating would be changed to from suitable to marginal.

Site 14-2-19: This site rated overall as unsuitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush height of 12 to 30 inches with a spreading growth form and few dead branches and a perennial grass cover of greater than 10 percent. Marginal habitat indicators showed an average grass/forb height of 5 to 7 inches. Unsuitable habitat indicators showed a less than 10 percent average sagebrush canopy cover and a sparse abundance/diversity of forbs (Table WDLF-5).

Field evaluators in 2003 noted:

“This site had been burned by wildfire in 1985 and was drill seeded. Sagebrush grows in small unconnected patches. Siberian wheatgrass, bluebunch wheatgrass, and Sandberg bluegrass make up the grass community.”

Site 15-2-12: This site rated overall as suitable sage-grouse breeding habitat in 2006. Suitable habitat indicators showed sagebrush height of 12 to 30 inches; average grass/forb height of greater than 7 inches; and perennial grass canopy cover greater than 10 percent. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with a mix of columnar and spreading growth forms, and a moderate abundance/diversity of forbs (Table WDLF-5).

Field evaluators in 2003 noted:

“On both the claypan and loamy sites, shrubs are dominant with decrease grasses in the understory. Grasses are fairly vigorous. Idaho fescue had been heavily grazed and decadent. Forb diversity and abundance was low on the Loamy sites, but higher occurrence on the Claypan sites. Burr buttercup (not a preferred forb) was the most common forb.”

Table WDLF-5: Pasture 4 (Kimball) Sage-grouse Breeding Habitat Assessment. Conducted May, 29 and June 11/12, 2003 in the later portion of the grazing period

Habitat Indicator	Site 15-1-23	Site 14-2-19	Site 15-2-12
Avg. Sagebrush Canopy Cover	suitable (marginal) ¹	unsuitable	marginal
Avg. Sagebrush Height	marginal	suitable	suitable
Sagebrush Growth Form	marginal	suitable	marginal
Avg. Grass and Forb Height	suitable	marginal	suitable
Avg. Perennial Grass Canopy Cover	suitable (marginal) ²	suitable	suitable
Avg. Forb Canopy Cover	suitable	marginal	suitable
Preferred Forb Abundance & Diversity	suitable	unsuitable	marginal
Overall Site Evaluation	suitable (marginal)³	unsuitable	suitable

¹ Application of the Petan data (2007) would change this indicator from suitable to marginal.

² Application of the Petan data (2007) would change this indicator from suitable to marginal.

³ Application of the Petan data (2007) would change the overall site suitability rating from suitable to marginal due to the combination of marginal sagebrush canopy cover, sagebrush growth form and avg. perennial grass cover.

Sage-grouse habitat assessments were conducted in pasture 4 on May 29 and June 11/12, 2003 in the latter portion of the spring season of use. This pasture falls within the ranges illustrated by *A Framework to Identify Greater Sage-grouse Preliminary Priority Area and General Areas in Management Zone IV and the Bear Lake Plateau of Southeastern Idaho* (Map 9, Makela and Major 2011). There is limited information available identifying sage-grouse numbers and seasonal habitat use patterns.

There are 112.9 miles of ephemeral drainages and twenty-four developed livestock reservoirs in this pasture. Classic riparian habitat function and structure does not exist (Standard 2); although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture. An intermittent portion of Piute Creek occurs in the northern portion of this pasture. Subsurface flows from Piute Reservoir support discontinuous reaches of heavily grazed (less than 0.5 inches tall) herbaceous vegetation. No riparian shrub component occurs.

Pasture 4 is grazed on a spring/summer/rest rotation. Actual grazing periods have been variable from 2006 to 2011 (Table Allot-5 and 6). From 1979 to 2011, livestock use has been slight to light, with an average utilization of 25 percent on bluebunch wheatgrass (Figure VEG-10).

One wildfire covering 14,165 acres (33 percent of the pasture) burned in this pasture in 1985 largely in the Piute Basin and was followed up by a 2,701-acre (19 percent of the burned area) seeding of crested wheatgrass and small burnett. No burned area rest occurred after the fire and grazing continued until the pasture was rested in 1989 (Map 8 and Table Allot-3).

Rangeland health field assessments showed 73 percent of the sites at a none-moderate departure of the ecological reference site conditions, 19 percent at a moderate departure, and 7 percent at a moderate to extreme departure, and 1 percent at an extreme departure (Standard 4). The rangeland health assessment noted the reduced occurrence of bluebunch wheatgrass and Idaho fescue with a slight increase in Sandberg bluegrass. Sagebrush appears to be increasing. Within the areas burned, dominant species are rabbitbrush, bluebunch wheatgrass, and crested wheatgrass. According to the monitoring data submitted to BLM by WSR (2007), the ecological status of this pasture is early-late seral (Standard 4).

Nested frequency trend plots monitored from 1989 to 2009 (Table VEG-4) showed no change in Wyoming big sagebrush but did show a significant decrease in frequency of bluebunch wheatgrass and Thurber's needlegrass (*Achnatherum therburianum*) with an apparent increase in Sandberg bluegrass. Idaho fescue showed a reduced frequency as well (Figure VEG-8 and 9).

Sage-grouse breeding habitat assessment indicators rated this pasture unsuitable to suitable, primarily due the diversity in land form of the Piute Basin and the upper bench, the areas burned by wildfire, and soil types (Table WDLF-5). The unfavorable rating occurs in the Piute Basin, which was a large portion of the 1985 fire. In this portion of the pasture, sagebrush cover is less than 10 percent, with spreading growth forms and occurs in small disconnected patches. Other assessment locations showed adequate sagebrush canopy cover and grass/forb height; however effective nesting and security cover is compromised with a notable occurrence of sagebrush with columnar growth forms and dead branches. Significant loss or degraded habitat conditions at locations of

repeated concentration such as reservoirs, salt licks, corrals, trails and fence lines is occurring. Fence lines have also recently been identified as potential hazards throughout the west for flying sage-grouse. Installation of wire indicators should be considered in high risk areas such as leks, nests, and ridgetops to minimize collisions and potential mortality hazards (USDI BLM 2009).

Comparison of the Petan (2007) line –point intercept data with the 2003 sage-grouse breeding habitat assessments data suggests that sagebrush canopy cover has increased to a marginal rating of greater than 25% and that average perennial grass canopy cover has decreased from 24% to 6% and changing the habitat indicator rating from suitable to marginal (Table WDLF-5). This habitat progression will favor an increase in canopy cover and reduced height of smaller and less robust grasses such as Sandberg bluegrass (Appendix E). With the addition of this data the overall habitat rating for this pasture did not change.

Livestock access to the California Bighorn Sheep ACEC was noted in the 2006 Garat Allotment. Access was identified via the road at Garat Crossing, at a break in the canyon rim on the west side of The Tules and another break in the canyon rim about 1.3 miles upstream of The Tules.

See the pasture 1 write-up concerning fence construction standards within the range of mule deer and pronghorn antelope.

Pasture 5 Horse Basin

Site 15-2-31: This site rated overall as marginal sage-grouse breeding habitat. Suitable habitat indicators showed sagebrush height of 12 to 30 inches with good abundance/diversity of forbs. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with a mix of columnar and spreading growth forms. Unsuitable habitat indicators showed an average grass/forb height of less than 5 inches (Table WDLF-6).

Field evaluators in 2003 noted:

“Sagebrush was often decadent and perennial grass cover was low. Perennial grasses are not providing good ground cover between shrubs. Good abundance and diversity of forbs was observed, but they were low in stature. Evaluators also noted this site as suitable/marginal and recorded as marginal.”

Site 15-3-27: This site rated overall as marginal sage-grouse breeding habitat. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent, with a height of 12 to 20 inches with spreading growth forms and few dead branches. Marginal habitat indicators showed an average grass/forb height of greater than 7 inches. Unsuitable habitat indicators showed a reduced abundance/diversity of forbs (Table WDLF-6).

Field evaluators in 2003 noted:

“The shrub community was at the high range for suitable habitat and height. A major concern for the site is the shift from decreasers (bluebunch wheatgrass, Indian rice grass) to increasers (Sandberg bluegrass, bottlebrush squirreltail), lowering the average height and cover of grasses. Forb diversity is poor/fair with low abundance; however this may be partially due the late timing (late June) and drier conditions when the assessment was conducted.”

Site 16-3-4: This site rated overall as marginal sage-grouse breeding habitat. Suitable habitat indicators showed sagebrush height of 12 to 30 inches. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with a mix of columnar and spreading growth forms along with an average grass/forb height of 5 to 7 inches. Reduced abundance/diversity of forbs identified this indicator as unsuitable (Table WDLF-6).

Field evaluators in 2003 noted:

“Sagebrush are commonly decadent, with only a few live branches. Perennial grasses appear good but leaves are often sparse with crown die-out fairly common. Forbs are seriously lacking, but this may be more due to the time of year (late June) when the assessment was conducted.”

Petan (2007) line-point intercept data matched this location. Comparison of the sagebrush data showed little difference between 2003 and 2007 suggesting a static condition of sagebrush canopy cover greater than 25% and a consistent marginal habitat rating (Appendix E and Table WDLF-6). Comparison of average perennial grass canopy cover showed a significant difference of the two data periods suggesting a substantial decrease in larger bunchgrasses from 12% to 3% and changing the indicator rating from suitable to unsuitable (Table WDLF-6 and Figure WDLF-9). With the addition of this data the site rating would change from marginal to unsuitable.

Table WDLF-6: Pasture 5 (Big Horse) Sage-grouse Breeding Habitat Assessment. Conducted June 25/26, 2003, after the grazing period

Habitat Indicator	Site 15-2-31	Site 15-3-27	Site 16-3-4
Avg. Sagebrush Canopy Cover	marginal	suitable	marginal
Avg. Sagebrush Height	suitable	suitable	suitable
Sagebrush Growth Form	marginal	suitable	marginal
Avg. Grass and Forb Height	unsuitable	suitable	marginal
Avg. Perennial Grass Canopy Cover	marginal	marginal	suitable (unsuitable) ¹
Avg. Forb Canopy Cover	suitable	marginal	unsuitable
Preferred Forb Abundance & Diversity	suitable	unsuitable	unsuitable
Overall Site Evaluation	marginal	marginal	marginal (unsuitable)²

¹ Application of the Petan data (2007) would change this indicator from suitable to unsuitable.

² Application of the Petan data (2007) would change the overall site suitability rating from marginal to unsuitable due to the combination of marginal sagebrush canopy cover, sagebrush growth form, avg. grass/forb height and poor avg. perennial grass canopy cover, avg. forb canopy cover and low abundance of forbs.

Sage-grouse habitat assessments were conducted in pasture 5 on June 25/26 2003, after the grazing season of use. This pasture falls within the ranges illustrated by *A Framework to Identify Greater Sage-grouse Preliminary Priority Area and General Areas in Management Zone IV and the Bear Lake Plateau of Southeastern Idaho* (Map9, Makela and Major 2011). One occupied lek is documented in this pasture. Nesting and brood rearing is highly likely to occur. There is limited information available identifying sage-grouse numbers and seasonal habitat use patterns.

There are 104.8 miles of ephemeral drainages and ten developed livestock reservoirs in this pasture. Classic riparian habitat function and structure does not exist (Standard 2); although mesic habitat features on shallow slopes, low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture. There are also five springs identified in this pasture. The functional and structural status of the springs is unknown.

Pasture 5 was grazed during the summer season from July to September from 1986 to 1991, and again in 1997. Between 1992 and 2011, this pasture was rested from livestock grazing in nine of the twenty years, and when grazed, grazing occurred from mid-March to the end of June (Table Allot-5 and 6). From 1981 to 2010, livestock use has been slight to light, with an average utilization of 30 percent on bluebunch wheatgrass (Figure VEG-13).

Wildfire burned 858 acres (2 percent of the pasture) of this pasture in 1984 and 3,750 acres (10 percent of the pasture) in 1985. A small portion of the pasture was seeded post-fire as part of stabilization seeding in pasture 6. No burned area rest occurred after the fire and grazing continued until the pasture was rested in 1992 (Map 8 and Table Allot-3).

Rangeland health field assessments showed 22 percent of the sites at a none-to-slight departure of the ecological reference site conditions, 48 percent at slight-to-moderate departure, 21 percent at a moderate departure, 6 percent at moderate-to-extreme, and 2 percent at extreme departure (Standard 4). Decadence of sagebrush and the crown die-off of bunchgrasses were noted. According to monitoring data submitted to the BLM by WRS (2007), the ecological status of this pasture is mid – late seral (Standard 4).

Nested frequency trend plots monitored from 1989 to 2009 (Table VEG-5) showed no change in Wyoming big sagebrush, although the trends did indicate a significant decrease in needlegrass (*Achnatherum spp.*) and squirreltail with an apparent increase in Sandberg bluegrass (Figures VEG-11 and 12).

Sage-grouse nesting habitat assessment indicators rated this pasture marginal (WDLF 21). Sagebrush canopy cover and height are adequate; although columnar sagebrush growth form combined with poor grass/forb height, grass/forb cover expose the understory and reduce the structure of the habitat to provide effective nesting and security cover. Significant loss or degraded habitat conditions at locations of repeated concentration such as reservoirs, salt licks, corrals, trails and fence lines is occurring. Fence lines have also recently been identified as potential hazards throughout the west for flying sage-grouse. Installation of wire indicators should be considered in high risk areas such as leks, nests, and ridgetops to minimize collisions and potential mortality hazards (USDI BLM 2009).

Comparison of the Petan (2007) line –point intercept data with the 2003 sage-grouse breeding habitat assessments data suggests a static sagebrush canopy cover from 2003 to 2007(Appendix E) at greater than 25% that would rate this indicator as marginal. Comparison of the two data years suggests a decrease in average perennial grass canopy cover from 12% to 3% that would change this habitat indicator from suitable to unsuitable (Table WDLF-1&6 and Appendix E). This habitat progression would favor an increase canopy cover and reduced height of smaller and less robust grasses such as Sandberg bluegrass (Appendix E). With this addition of the data the overall pasture rating would be marginal to unsuitable for effective sage-grouse breeding habitat.

Access of livestock into the California Bighorn Sheep ACEC was not noted in the 2006 Garat Assessment and does not appear to be occurring.

See the pasture 1 write-up concerning fence construction standards within the range of mule deer and pronghorn antelope.

Pasture 6 Juniper Basin

Site 15-2-28: This site rated overall as suitable sage-grouse breeding habitat. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent with a height of 12 to 30 inches with a good abundance/diversity of forbs. Marginal habitat indicators showed a mix of sagebrush columnar and spreading growth forms and an average grass/forb height of 5 to 7 inches (Table WDLF-7).

Evaluators in 2004 noted:

“There is a good density and height of shrubs with a good abundance of bluebunch wheatgrass and Idaho fescue with an average height of about 5 inches. A majority of the grasses are young and short robust plants throughout the site. Good forb diversity and abundance occurred on the site. Bare ground was estimated at 44 percent. Three male sage-grouse flushed from the area. The site appears to be good nesting and early brood-rearing habitat.”

Site 16-1-5: This site rated overall as marginal sage-grouse breeding habitat. Suitable habitat indicators showed sagebrush height of 12 to 30 inches. Marginal habitat indicators showed greater than 25 percent sagebrush canopy cover with a mix of columnar and spreading growth forms along with an average grass/forb height of 5 to 7 inches and a reduced abundance/diversity of forbs (Table WDLF-7).

Field evaluators on 2004 noted:

“Good sagebrush height. Grasses in the area are about 5 to 7 inches tall with fair/good interspace distribution. Sandberg bluegrass is the dominant grass, with the occurrence of bluebunch wheatgrass and squirreltail throughout the area. Bare ground was estimated at 42 percent.”

Site 15-1-31: This site rated overall as marginal sage-grouse breeding habitat. Suitable habitat indicators showed sagebrush canopy cover between 15 and 25 percent, with a height of 12 to 30 inches and a good abundance/diversity of forbs. Marginal habitat indicators showed a mix of sagebrush columnar and spreading growth forms and an average grass/forb height of 5 to 7 inches (Table WDLF-7).

Field evaluators in 2004 noted:

“Good sagebrush density and height. Bluebunch wheatgrass and Idaho fescue were observed as the dominant grasses but mostly new plants poor in stature and about 5 inches in diameter. Good forb diversity was observed, with poor interspace vegetative cover.”

Table WDLF-7: Pasture 6 (Juniper) Sage-grouse Breeding Habitat Assessment. Conducted May 11/14, 2004 prior to the grazing period

Habitat Indicator	Site 15-2-28	Site 16-1-5	Site 15-1-31
Avg. Sagebrush Canopy Cover	suitable	marginal	suitable
Avg. Sagebrush Height	suitable	suitable	suitable
Sagebrush Growth Form	marginal	marginal	marginal
Avg. Grass and Forb Height	marginal	marginal	marginal
Avg. Perennial Grass Canopy Cover	suitable	suitable	suitable
Avg. Forb Canopy Cover	suitable	suitable	suitable
Preferred Forb Abundance & Diversity	suitable	marginal	unsuitable
Overall Site Evaluation	suitable	marginal	marginal

Sage-grouse habitat assessments were conducted in pasture 6 on May 11/14, 2003 prior to the grazing period. This pasture falls within the sage-grouse ranges illustrated by *A Framework to Identify Greater Sage-grouse Preliminary Priority Area and General Ares in Management Zone IV and the Bear Lake Plateau of Southeastern Idaho* (Map 9, Makela and Major 2011). Three male sage-grouse were flushed from this pasture during the 2003 assessments. There is no information available identifying sage-grouse numbers and seasonal habitat use patterns.

There are 157.8 miles of ephemeral drainages and twelve developed livestock reservoirs in this pasture. Classic riparian habitat function and structure does not exist (Standard 2); although mesic habitat features on shallow slopes, in low gradient drainages, and reservoir perimeters may persist for periods of time with adequate soil moisture. Juniper Reservoir is heavily impacted by livestock concentration and lacks any functional and structural riparian habitat.

Wildfires fire burned 1,534 acres (3 percent of the pasture) in 1973, 8,637 acres (17 percent of the pasture) in 1984, 4,019 acres (8 percent of the pasture) in 1985, and 11,421 acres (22 percent of the pasture) in 1986. After the 1985 fire, approximately 6,980 acres were drilled and seeded with crested wheatgrass. There was no burned area rest after the fire and grazing has continued since the fire (Map 8 and Table Allot-3).

Rangeland health field assessments showed 75 percent of the sites at a none-to-slight departure of the ecological reference site conditions, 17 percent at a moderate departure, and 8 percent at a moderate-to-extreme departure from the ecological site potential (Standard 4). Most notable departure was for the high occurrence of cheatgrass, bulbous bluegrass, and green rabbitbrush. An increase in occurrence and recruitment of sagebrush was also noted.

Pasture 6 is grazed from mid-June to mid-October and has never been rested (Table Allot-5 and 6). From 1981 to 2010, livestock use has been slight to light, with an average utilization of 31 percent on bluebunch wheatgrass (Figure VEG-17).

Nested frequency trends conducted from 1989 to 2009 (Table VEG-6) showed no notable changes in vegetation occurrence with the exception of reduced frequency of bluebunch wheatgrass (Figure VEG-14 and 15).

Sage-grouse nesting habitat assessment indicators rated this pasture marginal to suitable (Table WDLF-7). Sagebrush canopy cover and perennial grass/forb cover provide an adequate distribution of shrubs and grasses; however the moderate occurrence of sagebrush columnar growth form combined with poor grass/forb height exposes the understory and reduces the ability of the habitat to provide effective nesting and security cover. Significant loss or degraded habitat conditions at locations of repeated concentration such as reservoirs, salt licks, corrals, trails and fence lines is occurring. Fence lines have also recently been identified as potential hazards throughout the west for flying sage-grouse. Installation of wire indicators should be considered in high risk areas such as leks, nests, and ridgetops to minimize collisions and potential mortality hazards (USD I BLM 2011).

Access of livestock into the Bighorn Sheep ACEC was not noted in the 2006 Garat Assessment and does not appear to be occurring.

See the pasture 1 write-up concerning fence construction standards within the range of mule deer and pronghorn antelope.

Evaluation of Standard

Evaluation Finding – Allotment/watershed is:

Meeting the Standard

Not meeting the Standard, but making significant progress towards meeting

Not meeting the Standard

RMP Objectives/Desired Conditions:

SPSS1: Manage special status species and habitats to increase or maintain populations at levels where their existence is no longer threatened and there is no need for listing under the Endangered Species Act of 1973, as amended.

Management Actions and Allocations:

1. Prepare, revise, and implement Habitat Management Plans (HMPs) and other resource activity plans and cooperate in the development and implementation of Recovery Plans, Conservation Agreements and Strategies and species management plans to ensure that objectives for special status plant and animal species are incorporated and met.
2. Limit the adverse impacts of various land use activities, management actions and land tenure adjustments to special status plant and animal species populations and habitats through implementation of management actions identified in objectives FORS 2, WHRS 1, LVST 1, FIRE 1-4, LAND 1-6, LOCM 1, FLUM 1, MMAT 1, RECT 1 and HAZM 1. To limit adverse impacts, fencing of populations and their habitats will occasionally be required.
3. Protect and enhance habitat for a diversity of special status species through implementation of management actions identified in objectives SOIL 1 and 2, WATR 1 and 2, VEGE 1, RIPN 1, FORS 1 and 2, WDLF 1, FISH 1 and 2, RECT 3, WNES 1 and 2, HAZM 1 and ACEC 1.
4. Identify, protect and enhance key sage-grouse habitats and populations. Guidance for enhancement and protection is addressed in the Memorandum of Agreement in the 1997 Idaho Sage-grouse Management Plan (March 1998). Subsequent guidance may become available through development of plans by local sage-grouse working groups or similar efforts.
5. Protect and enhance California bighorn sheep habitat and populations within the boundaries of Owyhee River Bighorn Sheep Habitat Area ACEC through continued implementation of the ACEC Management Plan.

WDLF1: Maintain or enhance the condition, abundance structural stage and distribution of plant communities and special habitat features required to support a high diversity and desired populations of wildlife.

Management Actions and Allocations:

1. Ensure that all activity plans include objectives for maintaining or enhancing habitat for those wildlife species known or likely to occur within the planning area.
2. Limit the adverse impacts of various land use activities, management actions and land tenure adjustments to wildlife populations and habitats through implementation of management actions identified in objectives FORS 2, WHRS 1, LVST 1, FIRE 1-4, LAND 1-6, LOCM 1, FLUM 1, MMAT 1, RECT 1 and HAZM 1.
3. Protect and enhance habitat for a diversity of wildlife through implementation of management actions identified in objectives SOIL 1 and 2, WATR 1 and 2, VEGE 1, RIPN 1, FORS 1 and 2, FISH 1 and 2, RECT 3, WNES 1 and 2, HAZM 1 and ACEC 1.
4. Adjust overall grazing management practices to ensure that adequate upland forage and cover remains to accommodate the needs of wildlife. Specifically:
5. limit utilization of key browse species, as measured in the fall, to a maximum of 30 percent within all deer winter habitat and 50 percent within all other habitats.
6. limit utilization of key upland herbaceous forage species to a maximum of 50 percent at the time of livestock removal from a pasture.
7. More restrictive utilization standards may be imposed where necessary to accomplish specific wildlife or other resource objectives.
8. Minimize barriers to big game movement by constructing new fences and modifying existing fences to meet or exceed Boise District Fence Policy standards for the species present.
9. Protect and enhance habitat for wildlife at all developed springs and selected undeveloped springs, wet meadows, reservoirs and stream riparian reaches by fencing to exclude livestock. Close all enclosures to livestock grazing for the life of this plan except where it is determined that controlled grazing is necessary to achieve a specific resource objective.
10. Protect raptor nests and manage adjacent vegetation to ensure adequate habitat for prey species. Authorize no human caused disturbance within a 0.5 mile radius of any known golden eagle nest between February 1 and June 30 and other species' nests between March 15 and June 30. Disturbance is defined as any

activity which could result in frequent flushing of adults or young, nest abandonment or significant loss of prey base.

Rationale for Evaluation Finding

Plants

Rattlesnake stickseed - All occurrences of this species are on the periphery of the Garat allotment within the canyon rimrock on cliff faces or talus slopes of the East Fork of the Owyhee River. No threats were observed at any of the sites, most likely due to the restricted habitat of this species. The remoteness and precipitous nature of these locations provide adequate protection from impacts of livestock and, therefore, have extremely low probability of disturbance making this species relatively secure within the Garat allotment and meeting Standard 8.

Davis' peppergrass inhabits playas with no to little vegetative density. When other associated species are present they are quite sparse and rarely include palatable forage to livestock. However, these playas are merely microsites within the greater sagebrush-steppe regional vegetation which have supported a long history of livestock grazing. In average or above-average years of precipitation these playas, which consist of a hard clay bottom, are inundated with water and dry as hard as concrete during the summer. Conversely, low precipitation years may preclude water presence. In those years that water is held within the playas in spring or winter and grazing is present, livestock congregation and trampling is a threat to this species and its habitat. Currently there are two of the eight EO's (EO 30 and 92 both in pasture 5) with dispersed livestock trails leading into the playas and a major livestock corridor in the immediate vicinity. It has been noted that livestock tracks can disappear from the playa surface within a year (Mancuso 2011) and, thus, were not noted in the monitoring report to have any short-term noticeable negative impact. It is unknown whether there are overall residual impacts from livestock grazing on *Davis' peppergrass* persistence/recruitment. Due to the remoteness of the Garat allotment and the lack of visitors at this time, OHV activity is not a threat but should be surveyed during future monitoring and site visits. Currently several EOs are in close proximity to established two-tracks and the unobstructed nature of playas are often a lure to the OHV enthusiast. Introduced weed species were not reported as an issue within the INHP Element Occurrence reports from 1993 to 1998 but was mentioned in the 2011 Mancuso report as having a sparse presence.

In relation to all EOs, a minor presence of introduced weeds, livestock trails and livestock congregation were observed. These concerns are not widespread or imminent threats on *Davis' peppergrass* as a whole within the Garat allotment but are of more immediate concern within pasture 5 EOs 30 and 92, which have a concentration of livestock trails along the periphery of the playas. Severe cattle trampling disturbance was attributed to the extirpation of *Davis' peppergrass* at two playas in Idaho (Moseley 1996). For these reasons, Standard 8 is not being met within pasture 5 at EOs 30 and 92. *Davis' peppergrass* would benefit from a grazing rotation that includes grazing outside of spring or winter seasons to provide some protection to the playa habitat when playas are desirable to livestock due to water inundation and easily damaged due to wet

soils. Placement of livestock of reservoirs and salt away from playas inhabited by Davis' peppergrass can decrease the amount of livestock activity in the vicinity.

Inch-high lupine – The most recent EO records completed were in 1999. Inch-high lupine occurs in rhyolite gravels and desert pavement with varying amounts of silt and sand. This plant generally grows on a southwest aspect with slopes from almost flat to 20 percent, hot and droughty sites: in open *Artemisia tridentata wyomingensis* with *Poa secunda* sites. Because of the diminutive stature of this plant, herbivory is not a threat, and the trampling is unlikely due to the terrain. The remoteness of these populations and lack of vegetation typical of the habitats of this species suggest very low probability of disturbance. This species is meeting Standard 8.

Newberry's milkvetch occurs on scabby often sparsely vegetated soils where livestock are less likely to forage. The most recent observations of this population note only minor impacts from livestock use and most recent aerial imagery (USDA 2011) does not show any noticeable cattle trails in the immediate area. This species is meeting Standard 8.

Stream orchid occurs on a steep unvegetated talus slope below the basalt canyon rim near the South Fork of the Owyhee River, making access by livestock to the site virtually impossible. Aerial imagery (USDA 2011) shows no sign of livestock trails moving through the canyon rim towards the river or in the vicinity of stream orchid. This species is meeting Standard 8.

Summary

Due to habitat location of rattlesnake stickseed and stream orchid, it is extremely unlikely these species will have any impacts from livestock. The habitat is rocky steep and inaccessible. While inch-high lupine and Newberry's milkvetch occur in sparsely vegetated often gravelly substrate, they are still susceptible to livestock disturbance such as trails and trampling. These soil disturbance activities can accelerate weed invasion to the habitat as well. However, available site reports note these impacts are minor, intuitively due to their lack of proximity to water sources, fencelines, salting areas, major movement corridors, OHV routes, and a lack of forage. Field observations for Davis' peppergrass parallels that of inch-high lupine and Newberry's milkvetch with the exception of two occurrences that are experiencing dispersed trails on the periphery of the playas within pasture 5. Available data show these kinds of disturbances do not appear to be widespread or imminent threats throughout the Garat allotment Davis' peppergrass sites, yet it is necessary to improve the condition of special status species and their habitats to a point where their special status recognition is no longer warranted (BLM 2008). This would entail proactive conservation measures such as grazing regimes that provide rest during the spring and winter when sensitive habitats are more susceptible to disturbance due to moist soils and plants are flowering/seeding. Overall, Standard 8 for Threatened and Endangered Plants is not being met, specifically in pasture 5 where Davis' peppergrass is being compromised at two known occurrences, EO 30 and 92.

Wildlife

In general, key habitat components for sage-grouse include adequate canopy cover of tall grasses and medium height shrubs for nesting, abundant forbs and insects for brood rearing, and availability of herbaceous riparian species for late growing-season foraging (USDI BLM 2004). Although the 2003/2004 sage-grouse breeding habitat assessments focused on indicators characterizing breeding habitat cover and structure, information collected also allows an insight to conditions across the allotment and how the landscape may seasonally provide brood-rearing and winter habitat as well. Table WDLF-8 below characterizes vegetation elements required for productive sage-grouse habitat as characterized by Connelly et al. (2000).

Table WDLF-8: Sagebrush rangeland elements characterized by Connelly et al. 2000 for productive sage-grouse habitat

	Breeding		Brood-rearing		Winter ^d	
	Height (in)	% Canopy	Height (in)	% Canopy	Height (in)	% Canopy
Mesic Sites ^a						
Sagebrush	15- 30	15-25	15-30	10-25	10-15	10-30
Grass/Forb	>7 ^b	>25 ^c	variable	>15	NA	NA
Arid Sites ^a						
Sagebrush	12-30	15-25	15-30	15-25	10-15	10-30
Grass/forb	>7 ^b	>15	variable	>15	NA	NA

- a. Mesic and arid sites should be defined on a local basis; annual precipitation, herbaceous understory, and soils should be considered.
- b. Measured as “droop height”; the highest naturally growing portion of the plant.
- c. Coverage should exceed 15% for perennial grasses and 10% for forbs; values should be substantially greater if most sagebrush has growth form that provides little lateral cover.
- d. Values for the height and canopy coverage are for shrubs exposed above the snow.

The Garat allotment does provide sage-grouse habitat, but information reflecting to the extent of seasonal use and population trends is largely unavailable. This may be largely due to the isolation and remoteness of the allotment that is difficult for personnel to regularly visit. However, incidental observations suggest that sage-grouse may be using the Garat allotment year-round. An email from Arther Talsma (Nature Conservancy) to Jason Sutter (BLM-Idaho State Wildlife Biologist) in December 2011, reported observing a hen with five or six chicks in late June and more than 200 adult birds along the 45 Ranch Road in January. Both observations occurred in 2011.

Overall, the Garat allotment appears to be an older, late-seral shrub-steppe community comprised of high sagebrush cover greater than 25 percent with columnar growth forms and increased frequency of dead branches. The understory appears to be dominated a

community of increaser species such as Sandberg bluegrass and a lesser prevalence of decreaseers such as bluebunch wheatgrass, Idaho fescue, needlegrass, and squirreltail. This condition reduces lateral structure, opens up the understory and reduces the ability of sagebrush/grass interface to provide effective nesting and security cover. There is an abundance and diversity of forbs, with the exception of a few specific assessment locations. Pastures 1 and 2 reflected the highest potential for suitable sage-grouse breeding habitat although sagebrush cover and decadence/mortality, and crown-die off in bunchgrasses is occurring and becoming less effective.

Petan (2007) line-point intercept data matched four locations: two sites in pastures 3 (sites 15S03W13 and 15S04W12) and one each in pastures 4 (site 15S01W23) and 5 (16S03W04) where sage-grouse breeding habitat assessments were conducted in 2003. In comparison, sites 15S03W13 (Pasture 3) and 15S01W23 (Pasture 4) showed an increase in sagebrush canopy cover; and sites 16S03W04 (Pasture 5) 15S01W23 (Pasture 4) appear static (Appendix E). Three out of four sites rated near or above the greater than 25% marginal habitat rating. The most notable difference between the two data periods is the overall decrease in average perennial grass canopy cover at all four assessment locations where three out of four sites recorded less than 5% canopy cover that would rate this habitat indicator as unsuitable for effective sage-grouse breeding habitat (Figure WDLF-9). In parallel, this habitat progression would result in a substantially high canopy cover of less desirable smaller and less robust grasses (i.e. Sandberg bluegrass and cheatgrass) and a significantly reduced overall herbaceous height (Appendix E).

Pastures 4, 5, and 6, which have experienced past wildfires, appeared to have less suitability for productive sage-grouse habitat. These pastures were never rested and were continued to be grazed after the fire. This combination can have long-lasting implications to habitat productivity and effectiveness. Much of the discussion in the above paragraph reflects these issues and concerns within these pastures.

Riparian habitat or mesic areas that occur in the Garat allotment are very limited or have been developed for use as stock reservoirs. Piute Creek, below the reservoir on pasture 4, provides the only semblance of known riparian habitat on the plateau; although there is no information available as to the condition of the five springs in pasture 5. The creek is fed by subsurface flow from the reservoir, creating intermittent reaches of perennial vegetation. During the field visit (Oct. 14, 2011), stubble height of existing riparian vegetation was observed at less than 0.5 inches in height, with no observable shrub component.

There are 87 reservoirs within the allotment that have been built for livestock watering and vary in size, depth and how long they persist throughout the year. There are mesic habitats associated with these developments that occur at various times and durations through the year, depending on their location. Although free water provided by these developments may not be critical to sage-grouse survival, mesic areas located in shallow drainages and reservoir perimeters may provide islands of succulent vegetation (Knick and Connelly 2011) and forbs that may be beneficial. Livestock tend to

concentrate around these developments and reduce or remove the immediate vegetation. This concentration effect is most notable at Juniper Reservoir (which is more of a lake than a livestock reservoir), where pasture 6 is grazed yearly and has never been rested. Also of management concern is the propagation of West Nile virus carrying mosquitos (*Culex tarsalis*) and the increased risk of infection to concentrating sage-grouse at these developments.

Livestock are known to occasionally access the Owyhee River canyons. As per the 1999 Owyhee RMP, a 141,796-acre ACEC was designated for the conservation of bighorn sheep. Grazing within the ACEC is restricted and not allowed within the canyon areas.

Fences contribute to habitat fragmentation and cause wildlife to adjust movement patterns. Mule deer and pronghorn antelope occur within this allotment. Pasture fences are approximately 5 feet tall from the ground and are not built to Owyhee RMP standards. Part of the purpose for fence standards is to mitigate for impacts (i.e., habitat fragmentation, movement barriers, and mortalities) to big game. Fences have also become an issue in the west for flying sage-grouse. Pasture fences in high risk areas will need to be assessed and possibly tagged with wire indicators.

Habitat conditions on the Garat allotment are a combination of man-made and natural forces (i.e. livestock management, wildfire, and natural progression) on the plant community over time. Currently, the condition of the habitat has shifted from a Historic Climax Plant Community (HCPC) of sagebrush/bluebunch wheatgrass (described within the Ecological Site Description for Loamy 8-12", 2006) to a community of sagebrush/Sandberg bluegrass with a reduced frequency of larger bunchgrasses. In areas that have been burned by wildfire, the combination of fire and continued grazing has increased mortality and decadence of sagebrush and reduced frequency of larger bunchgrasses.

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APPENDIX A: IDAHO STANDARDS FOR RANGELAND HEALTH AND GUIDELINES FOR LIVESTOCK GRAZING MANAGEMENT

Standards for Rangeland Health

Introduction

The Standards for Rangeland Health, as applied in the State of Idaho, are to be used as the Bureau of Land Management's management goals for the betterment of the environment, protection of cultural resources, and sustained productivity of the range. They are developed with the specific intent of providing for the multiple use of the public lands. Application of the standards should involve collaboration between the authorized officer, interested publics, and resource users.

Rangelands should be meeting the Standards for Rangeland Health or making significant progress toward meeting the standards. Meeting the standards provides for proper nutrient cycling, hydrologic cycling, and energy flow.

Monitoring of all uses is necessary to determine if the standards are being met. It is the primary tool for determining rangeland health, condition, and trend. It will be performed on representative sites.

Appropriate to soil type, climate, and landform, indicators are a list of typical physical and biological factors and processes that can be measured and/or observed (e.g., photographic monitoring). They are used in combination to provide information necessary to determine the health and condition of the rangelands. Usually, no single indicator provides sufficient information to determine rangeland health. Only those indicators appropriate to a particular site are to be used. The indicators listed below each standard are not intended to be all inclusive.

The issue of scale must be kept in mind in evaluating the indicators listed after each standard. It is recognized that individual isolated sites within a landscape may not be meeting the standards; however, broader areas must be in proper functioning condition. Furthermore, fragmentation of habitat that reduces the effective size of large areas must also be evaluated for its consequences.

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.

Indicators may include, but are not limited to, the following:

1. The amount and distribution of ground cover, including litter, for identified ecological site/s) or soil-plant associations are appropriate for site stability.

2. Evidence of accelerated erosion in the form of rills and/or gullies, erosional pedestals, flow patterns, physical soil crusts/surface sealing, and compaction layers below the soil surface is minimal for soil type and landform.

Standard 2 (Riparian Areas and 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.

Indicators may include, but are not limited to, the following:

1. The riparian/wetland vegetation is controlling erosion, stabilizing streambanks, shading water areas to reduce water temperature, stabilizing shorelines, filtering sediment, aiding in floodplain development, dissipating energy, delaying flood water, and increasing recharge of groundwater appropriate to site potential.
2. Riparian/wetland vegetation with deep strong binding roots is sufficient to stabilize streambanks and shorelines. Invader and shallow rooted species are a minor component of the floodplain.
3. Age class and structural diversity of riparian/wetland vegetation is appropriate for the site.
4. Noxious weeds are not increasing.

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.

Indicators may include, but are not limited to, the following:

1. Stream channels and floodplains dissipate energy of high water flows and transport sediment. Soils support appropriate riparian-wetland species, allowing water movement, sediment filtration, and water storage. Stream channels are not entrenching.
2. Stream width/depth ratio, gradient, sinuosity, and pool, riffle and run frequency are appropriate for the valley bottom type, geology, hydrology, and soils.
3. Streams have access to their floodplains and sediment deposition is evident.
4. There is little evidence of excessive soil compaction on the floodplain due to human activities.
5. Streambanks are within an appropriate range of stability according to site potential.
6. Noxious weeds are not increasing.

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.

Indicators may include, but are not limited to, the following:

1. Native plant communities (flora and microbiotic crusts) are maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant species.
2. The diversity of native species is maintained.
3. Plant vigor (total plant production, seed and seedstalk production, cover, etc.) is adequate to enable reproduction and recruitment of plants when favorable climatic events occur.
4. Noxious weeds are not increasing.
5. Adequate litter and standing dead plant material are present for site protection and for decomposition to replenish soil nutrients relative to site potential.

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.

Indicators may include, but are not limited to, the following:

1. In established seedings, the diversity of perennial species is not diminishing over time.
2. Plant production, seed production, and cover are adequate to enable recruitment when favorable climatic events occur.
3. Noxious weeds are not increasing.
4. Adequate litter and standing dead plant material are present for site protection and for decomposition to replenish soil nutrients relative to site potential.

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.

Indicators may include, but are not limited to, the following:

1. Noxious weeds are not increasing.
2. The number of perennial species is not diminishing over time.
3. Plant vigor (production of seed and seedstalk production cover etc.) of remnant native or seeded (introduced) plants is maintained to enable reproduction and recruitment when favorable climatic or other environmental events occur.
4. Adequate litter and standing dead plant material is present for site protection and for decomposition to replenish soil nutrients relative to site potential.

Standard 7 (Water Quality)

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

Indicators may include, but are not limited to, the following:

1. Physical, chemical, and biologic parameters described in the Idaho Water Quality Standards.

Standard 8 (Threatened and Endangered Plants and Animals)

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

Indicators may include, but are not limited to the following:

2. Parameters described in the Idaho Water Quality Standards.
3. Riparian/wetland vegetation with deep, strong, binding roots is sufficient to stabilize streambanks and shorelines. Invader and shallow rooted species are a minor component of the floodplain.
4. Age class and structural diversity of riparian/wetland vegetation are appropriate for the site.
5. Native plant communities (flora and microbotic crusts) are maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant species.
6. The diversity of native species is maintained.
7. The amount and distribution of ground cover, including litter, for identified ecological site(s) or soil-plant associations are appropriate for site stability.
8. Noxious weeds are not increasing.

Guidelines for Livestock Grazing Management

Introduction

Guidelines direct the selection of grazing management practices, and where appropriate, livestock management facilities to promote significant progress toward, or the attainment and maintenance of, the standards. Grazing management practices are livestock management techniques. They include the manipulation of season, duration (time), and intensity of use, as well as numbers, distribution, and kind of livestock. Livestock management facilities are structures such as fences, corrals, and water developments (ponds, springs, pipelines, troughs, etc.) used to facilitate the application of grazing management practices. Livestock grazing management practices and guidelines will be consistent with the Idaho Agricultural Pollution Abatement plan.

Grazing management practices and facilities are implemented locally, usually on an allotment or watershed basis. Grazing management programs are based on a combination of appropriate grazing management practices and facilities developed through consultation, coordination, and cooperation with the Bureau of Land Management, permittees, other agencies, Indian tribes, and interested publics.

These guidelines were prepared under the assumption that regulations and policies regarding grazing on the public lands will be implemented and will be adhered to by the

grazing permittees and agency personnel. Anything not covered in these guidelines will be addressed by existing laws, regulations, Indian treaties, and policies.

The BLM will identify and document within the local watershed all impacts that affect the ability to meet the standards. If a standard is not being met due to livestock grazing, then allotment management will be adjusted unless it can be demonstrated that significant progress toward the standard is being achieved. This applies to all subsequent guidelines.

Guidelines

1. Use grazing management practices and/or facilities to maintain or promote significant progress toward adequate amounts of ground cover [determined on an ecological site basis) to support infiltration, maintain soil moisture storage, and stabilize soils.
2. Locate livestock management facilities away from riparian areas wherever they conflict with achieving or maintaining riparian-wetland functions.
3. Use grazing management practices and/or facilities to maintain or promote soil conditions that support water infiltration, plant vigor, and permeability rates and minimize soil compaction appropriate to site potential.
4. Implement grazing management practices that provide periodic rest or deferment during critical growth stages to allow sufficient regrowth to achieve and maintain healthy, properly functioning conditions, including good plant vigor and adequate vegetative cover appropriate to site potential.
5. Maintain or promote grazing management practices that provide sufficient residual vegetation to improve, restore, or maintain healthy riparian-wetland functions and structure for energy dissipation, sediment capture, ground water recharge, streambank stability, and wildlife habitat appropriate to site potential.
6. The development of springs, seeps, or other projects affecting water and associated resources shall be designed to protect the ecological functions, wildlife habitat, and significant cultural and historical/ archaeological/paleontological values associated with the water source.
7. Apply grazing management practices to maintain, promote, or progress toward appropriate stream channel and streambank morphology and functions. Adverse impacts due to livestock grazing will be addressed.
8. Apply grazing management practices that maintain or promote the interaction of the hydrologic cycle, nutrient cycle, and energy flow that will support the appropriate types and amounts of soil organisms, plants, and animals appropriate to soil type, climate, and landform.
9. Apply grazing management practices to maintain adequate plant vigor for seed production, seed dispersal, and seedling survival of desired species relative to soil type, climate, and landform.
10. Implement grazing management practices and/or facilities that provide for complying with the Idaho Water Quality Standards.
11. Use grazing management practices developed in recovery plans, conservation agreements, and Endangered Species Act, Section 7 consultations to maintain or

- improve habitat for federally listed threatened, endangered, and sensitive plants and animals.
12. Apply grazing management practices and/or facilities that maintain or promote the physical and biological conditions necessary to sustain native plant populations and wildlife habitats in native plant communities.
 13. On areas seeded predominantly with non-native plants, use grazing management practices to maintain or promote the physical and biological conditions to achieve healthy rangelands.
 14. Where native communities exist, the conversion to exotic communities after disturbance will be minimized. Native species are emphasized for rehabilitating disturbed rangelands. Evaluate whether native plants are adapted, available, and able to compete with weeds or seeded exotics.
 15. Use non-native plant species for rehabilitation only in those situations where:
 - a. native species are not readily available in sufficient quantities;
 - b. native plant species cannot maintain or achieve the standards; or
 - c. non-native plant species provide for management and protection of native rangelands.
 16. Include a diversity of appropriate grasses, forbs, and shrubs in rehabilitation efforts.⁵
 17. On burned areas, allow natural regeneration when it is determined that populations of native perennial shrubs, grasses, and forbs are sufficient to revegetate the site. Rest burned or rehabilitated areas to allow recovery or establishment of perennial plant species.
 18. Carefully consider the effects of new management facilities (e.g., water developments, fences) on healthy and properly functioning rangelands prior to implementation.
 19. Use grazing management practices, where feasible, for wildfire control and to reduce the spread of targeted undesirable plants (e.g., cheatgrass, medusa head, wildrye, and noxious weeds) while enhancing vigor and abundance of desirable native or seeded species.
 20. Employ grazing management practices that promote natural forest regeneration and protect reforestation projects until the Idaho Forest Practices Act requirements for timber stand replacement are met.
 21. Design management fences to minimize adverse impacts, such as habitat fragmentation, to maintain habitat integrity and connectivity for native plants and animals.

⁵ An apparent editing mistake with numbering the 1997 Idaho guidelines was carried forward in this appendix to avoid misidentifying specific guidelines.

APPENDIX B: METHODS

This section describes methods used to collect data for this assessment. Resources of interest, as identified by the Idaho Rangeland Health Standards and Guidelines, are assessed to determine whether they are meeting, or making significant progress toward meeting the Standards. The information collected includes data that enables an Interdisciplinary Team (ID Team) to analyze the condition of upland and riparian areas, as well as habitat for wildlife species and areas of concern for special status plants.

Uplands

Rangeland Health Field Assessments (RHFAs) - Outlined in *BLM technical reference 1734-6 Interpreting Indicators of Rangeland Health*, and other available qualitative and quantitative data are used to determine if rangelands are meeting or making significant progress toward meeting the Standards for Rangeland Health.

The RHFAs consists of 17 indicators, each of which is rated on the degree of departure from the appropriate ecological site description or ecological reference area. Areas without a nearby reference site are evaluated using the appropriate ecological site description, familiarity of the area, and incorporating the best professional judgment of the evaluators. The 17 indicators, from the summary worksheet, are compiled into three interlocking attribute categories representing soil/site stability, hydrologic function, and biotic integrity. The preponderance of evidence of each attribute determines the condition of the site.

Nested Plot Frequency and Photo Plots -Nested Plot Frequency Transect (NPFT) data provide insight into changes in the plant community, such as plant occurrence, vigor, and/or health. NPFT data are collected at permanently located study' sites and includes; species frequency, cover data, as well as shrub density where applicable. The methodology used to establish and collect data at these sites is described in detail in *BLM technical references 1400-4 and 1730-1*.

Frequency data shows changes in the occurrence of plants. Additional phenological information and photographs provides information on the reproductive capabilities of plants. Cover data describes the percent of ground covered by plant material, biological soil crusts, gravel, rock, and plant litter.

Photographs are taken at NPFT sites as well as photo plot sites. A minimum of three photographs are taken, two general landscape views and one close-up of the photo plot. Additionally, the photo plot is sketched to help illustrate species composition, size, and vigor, and is used to help corroborate the photograph. Shrub density is collected when shrubs are present, in either 1/100th or 1/200th acre plots, depending on shrub distribution, and calculated and expressed as plants per acre.

Utilization - Utilization data is important in evaluating the effects of grazing and browse on specific areas of rangeland. Utilization refers to the percentage of forage that has been removed by animals during the grazing period. It is expressed as a percentage, and can characterize the amount of use on vegetation in an area or the use of individual plant species. Generally, utilization data are collected on transects located at pre-selected key use areas, such as permanently located study sites, although utilization may be collected at appropriate sites throughout a pasture or allotment.

Numerous methods are available for measuring utilization, some of which include: the Landscape Appearance Method, Key Species Method, Grazed Class Method, Cole Browse Method or Extensive Browse Method (*Interagency Technical Reference 1996 BLM/RS/ST-96/004+1730*). In general, the utilization data used in this assessment were collected using the Key Species Method and the Cole Browse Method.

Riparian/Wetland - A Standard Checklist, outlined in the 1998 BLM *Technical Reference 1737-15, A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas* (flowing water), and other available qualitative and quantitative data are used to determine if riparian areas are meeting Rangeland Health Standards.

The standard checklist consists of 17 indicators that are used to assess the functioning condition of riparian areas. The indicators are compiled into three interlocking attribute categories representing erosion/deposition, hydrologic function, and vegetative status. Status of noxious weeds is also considered when evaluating riparian health.

Spring wetland areas were assessed for proper functioning condition as outlined in *Technical Reference 1737-11, Process for assessing proper functioning condition for lentic riparian-wetland areas* (USDI 1994). Lentic areas are defined as wetland-riparian areas adjacent to standing water habitats such as lakes, ponds, seeps, and meadows.

Special Status Species

Wildlife - A Framework to Identify Greater Sage-grouse Priority Areas and General Areas in Management Zone IV and Bear Lake Plateau of Southwestern Idaho was used to identify the relationship of sage-grouse populations and the Garat allotment at the regional scale. Priority Areas represent high priority sage-grouse areas characterized by a combined high male lek attendance, high lek density and high lek connectivity. General Areas represent areas of occupied sage-grouse habitats not contained within Priority Areas. General Areas may serve as important connectivity corridors between Priority Areas, potential stepping stones (habitat islands) for grouse movements within corridors, or occupied habitats characterized by low lek density.

Sage-grouse nesting habitat assessment was collected in 2003/2004 using *A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho – Sage-grouse 2001*. Quantitative information for habitat indicators (canopy cover measurements, height measurements, etc.) was

collected using a line-point intercept method consistent with guidance developed by an interagency technical team for rangeland vegetation monitoring (USDI BLM 2000).

Botany - Special status plant populations are tracked by both the BLM and the Idaho Natural Heritage Program (INHP). BLM databases and files and INHP databases are consulted for known occurrences of special status plants. Additional inventories are conducted on an ongoing basis for range projects. Monitoring of known populations occurs as time and staff allow.

APPENDIX C: ECOLOGICAL STATUS AND PRODUCTION

Copies of field data sheets, as well as a full description of data collection methods for Ecological Status and Production are on file at the BLM Owyhee Field Office in Marsing, Idaho.

Ecological Status Scores, Changes and Trends

1979, 1997, 2003 and 2009 ecological status scores at 12 VSSs in the Garat allotment, and trend in ecological status based on changes in status scores between 1979 and 2009.

Table C-1: Ecological Status Scores at 12 VSS in the Garat allotment

VSS Number (Ecological Site Name; Number)	ECOLOGICAL STATUS SCORE % of Potential (Class)					ECOLOGICAL STATUS SCORE % of Potential (Class)			
	1979	1997	2003	2009	90% C.I.	1979-1997	1997-2003	2003-2009	1997-2009
	est. %	Obs. %	Obs. %						
VSS-01 (Shallow Claypan 12-16"; 25-10)	60 (Late)	48 (Mid)	78 (PNC)	63 (Late)	± 10.2	NA	Trace	NA	NA
VSS-02 (Loamy 10-13"; 25-19)	60 (Late)	56 (Late)	59 (Late)	64 (Late)	± 4.4	NA	NA	NA	NA
VSS-03** (Loamy 10-13"; 25-19)	22 (Early)	23 (Early)	26 (Mid)	22 (Early)	± 4.6	NA	NA	NA	NA
VSS-04 (Shallow-Claypan 12-16"; 25-10)	58 (Late)	72 (Late)	75 (Late)	74 (Late)	± 5.6	NA	NA	NA	NA
VSS-05 (Loamy 10-13"; 25-19)	47 (Mid)	48 (Mid)	52 (Late)	50 (Mid)	± 8.2	NA	NA	NA	NA
VSS-06 (Loamy 7-10"; 25-20)	46 (Mid)	65 (Late)	70 (Late)	86 (PNC)	± 3.0	Trace	NA	Trace	Trace
VSS-07 (Loamy 10-13"; 25-19)	57 (Late)	70 (Late)	71 (Late)	63 (Late)	± 7.3	NA	NA	NA	NA
VSS-08 (Loamy 10-13"; 25-19)	88 (PNC)	78 (PNC)	79 (PNC)	69 (Late)	± 7.1	NA	NA	NA	NA
VSS-09 (Loamy 10-13"; 25-19)	63 (Late)	66 (Late)	59 (Late)	56 (Late)	± 8.7	NA	A	NA	NA
VSS-10 (Loamy 10-13"; 25-19)	51 (Late)	51 (Late)	55 (Late)	50 (Mid)	± 3.6	NA	NA	NA	NA
VSS-11 (Loamy 10-13"; 25-19)	73 (Late)	76 (PNC)	73 (Late)	62 (Late)	± 5.4	NA	NA	A	A
VSS-12 (Loamy 12-16"; 25-09)	17 (Early)	16 (Early)	32 (Mid)	50 (Mid)	± 10.6	NA	Trace	NA	Trace

C.I. = Confidence Interval. The 1997 confidence interval was assumed to equal the average 2009 confidence interval for all VSSs located within the same range site.

PNC = Potential Natural Community

Est % = Estimated % ecological status at VSSs in 1979 based upon proportional change over time at similar write-up sites studied by the BLM in 1979 and WRS in 1997

Obs. % - Observed % ecological status at VSSs in 1997 and 2003

** Site burned in the recent past

Vegetative Production, Changes, and Expectations

Average total production at 12 VSSs in 1997 and 2009, significant changes in production, and 2009 total production relative to expected production in a median year in the Garat allotment.

Table C-2: Average total production at 12 VSS in the Garat allotment

VSS Number (Ecological Site Name; Number)	TOTAL PRODUCTION (LBS./ACRE)					Change from 1997 to 2009 (Significant at 90% C.I.)	2009 Production Relative to Expected Median
	Expected Median* (lbs/acre)	Observed					
		1997		2009			
		lbs./ac.	90% C.I.	lbs./ac.	90% C.I.		
VSS-01 (Shallow Claypan 12-16"; 25-10)	500 to 800	426	± 276	525	± 319	No Change	No Difference
VSS-02 (Loamy 10-13"; 25-19)	525 to 925	563	±191	418	±180	No Change	No Difference
VSS-03** (Loamy 10-13"; 25-19)	525 to 925	282	±276	620	±252	No Change	No Difference
VSS-04 (Shallow-Claypan 12-16"; 25-10)	500 to 800	319	±191	502	±233	No Change	No Difference
VSS-05 (Loamy 10-13"; 25-19)	525 to 925	644	±191	277	±94	Decrease	Significantly Lower
VSS-06 (Loamy 7-10"; 25- 20)	425 to 700	518	±191	270	±123	Decrease	Significantly Lower
VSS-07 (Loamy 10-13"; 25-19)	525 to 925	294	±191	423	±207	No Change	No Difference
VSS-08 (Loamy 10-13"; 25-19)	525 to 925	336	±191	244	±81	No Change	Significantly Lower
VSS-09 (Loamy 10-13"; 25-19)	525 to 925	238	±191	490	±209	No Change	No Difference

VSS Number (Ecological Site Name; Number)	TOTAL PRODUCTION (LBS./ACRE)					Change from 1997 to 2009 (Significant at 90% C.I.)	2009 Production Relative to Expected Median
	Expected Median* (lbs/acre)	Observed					
		1997		2009			
		lbs./ac.	90% C.I.	lbs./ac.	90% C.I.		
VSS-10 (Loamy 10-13"; 25-19)	525 to 925	310	±191	398	±187	No Change	No Difference
VSS-11 (Loamy 10-13"; 25-19)	525 to 925	437	±191	656	±314	No Change	No Difference
VSS-12 (Loamy 12-16"; 25-09)	975 to 1,300	775	±362	990	±362	No Change	No Difference
Allotment Average		429	±625	484	±213	No Change	

C.I. = Confidence Interval. The 1997 confidence interval was assumed to equal the average 2009 confidence interval for all VSSs located within the same range site.

* Expected total production in a year with a Median amount of growing season precipitation from the NRCS range site descriptions.

** Site burned in the modern era.

APPENDIX D: GARAT UTILIZATION

Table D-1: Percent (%) Bluebunch wheatgrass utilization by pasture, 1979-2011

<u>Year</u>	Dry Lakes & Piute Creek	Forty Five	Kimball	Big Horse	Juniper Basin
1979	--	--	39	--	--
1981	36	36	--	5	36
1988	--	--	29	--	--
1989	52	52	--	45	52
1990	19	19	12	27	19
1991	49	49	19	--	49
1992	34	34	7	4	34
1993	--	--	39	44	--
1994	24	24	51	--	24
1995	35	35	--	42	35
1997	--	--	3	56	--
2002	--	--	25	--	--
2003	28	28	--	19	--
2004	--	--	--	61	--
2007	34	34	--	19	34
2008	20	20	34	--	20
2009	22	22	15	--	22
2010	16	16	15	11	16
2011	--	--	31	--	--
Average	<u>26</u>	<u>22</u>	<u>25</u>	<u>30</u>	<u>31</u>

--No Data or Rested

APPENDIX E: LINE INTERCEPT DATA 2003-2007

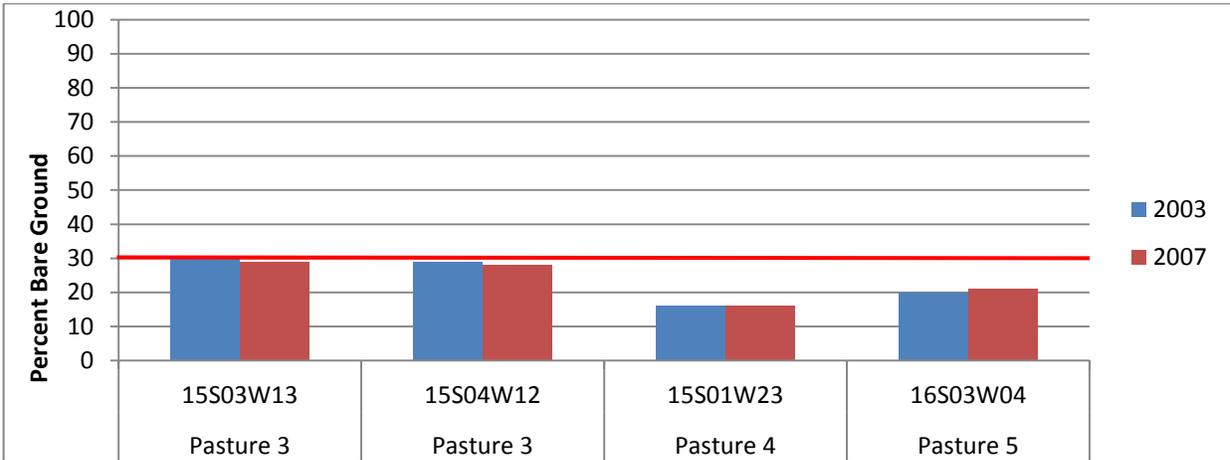
Copies of field data sheets, as well as a full description of data collection methods for Line-Point Intercept methods are on file at the BLM Owyhee Field Office in Marsing, Idaho.

Sage-grouse breeding habitat assessments were conducted in 2003 by the Owyhee Field Office at or near established BLM trend plot locations. In 2007, Western Range Resources, contracted by the Petan Company, visited the BLM trend plot locations and collected line-point intercept data from those sites. Four sage-grouse breeding habitat assessments and Petan line-point intercept sites occurred at common BLM trend plot locations providing an opportunity to compare sagebrush canopy cover and average perennial grass canopy cover between 2003 and 2007. The following table and graphs show the comparison of these data. For clarification, both the sage-grouse breeding habitat assessments and the Petan data were both collected using the line-point intercept method (USDA ARS 2009). Although both methods collected information on Sandberg bluegrass, this species was not included by the BLM in 2003 for generating percent average perennial grass canopy cover. Therefore, to make the comparison between the two data sets agreeable, information on non-Sandberg bluegrass species was used from the Petan data to allow for a direct evaluation of the two years. However, Table E-1 and Figure E-4 illustrate the average perennial grass canopy cover with the inclusion of Sandberg bluegrass.

Table E-1: Comparison of Petan (2007) Point-Line Intercept Data and 2003 Sage-grouse breeding Habitat Assessments for Percent Bare Ground, Percent Shrub Canopy Cover, and Average Perennial Grass Canopy Cover that Coincided with BLM trend plot locations

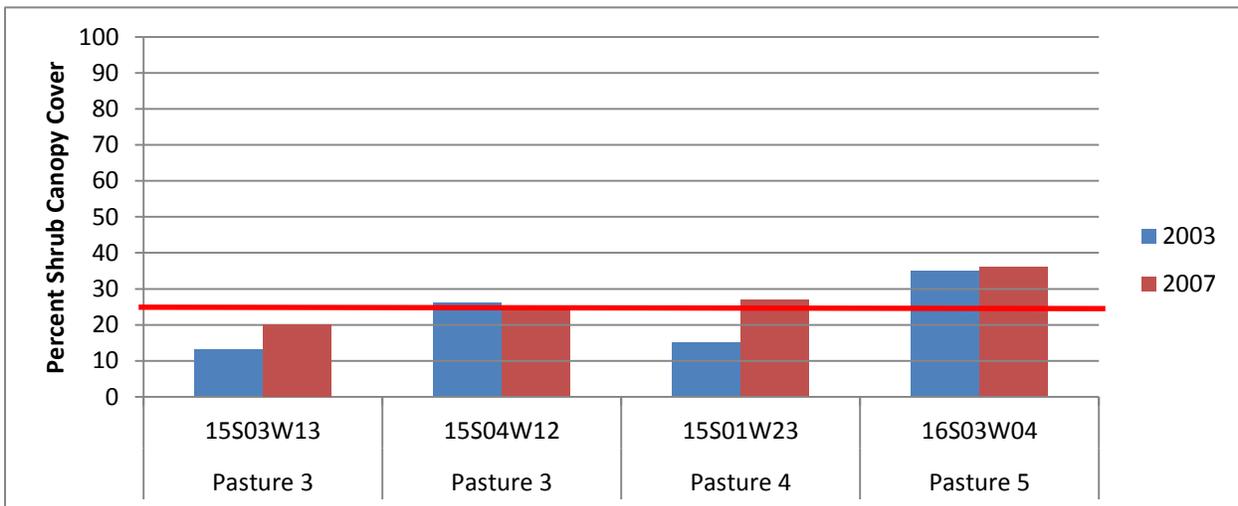
		PERCENT BARE GROUND		PERCENT SAGEBRUSH CANOPY COVER		PERCENT AVERAGE PERENNIAL GRASS CANOPY COVER		PERCENT AVERAGE PERENNIAL GRASS CANOPY COVER (including POA spp)	
		2003	2007	2003	2007	2003	2007	2003	2004
Pasture 3	15S03 W13	30	29	13	20	6	4	30	24
Pasture 3	15S04 W12	29	28	26	25	10	3	36	25
Pasture 4	15S01 W23	16	16	15	27	24	6	40	23
Pasture 5	16S03 W04	20	21	35	11	12	3	30	17

Figure E-1: Comparison of Percent Bare Ground Between Petan (2007) line-point intercept data and 2003 Sage-grouse Breeding Habitat Assessment that Coincided at BLM Trend Plot Locations



*Red line denotes 30 percent mid-point for bare ground as described within the ecological site description for Loamy 10-13" ARTRW8/PSSPS.

Figure E-2: Comparison of Sagebrush Canopy Cover between Petan (2007) Data and 2003 Sage-grouse Breeding Assessments that Coincided with BLM Trend Plot Locations

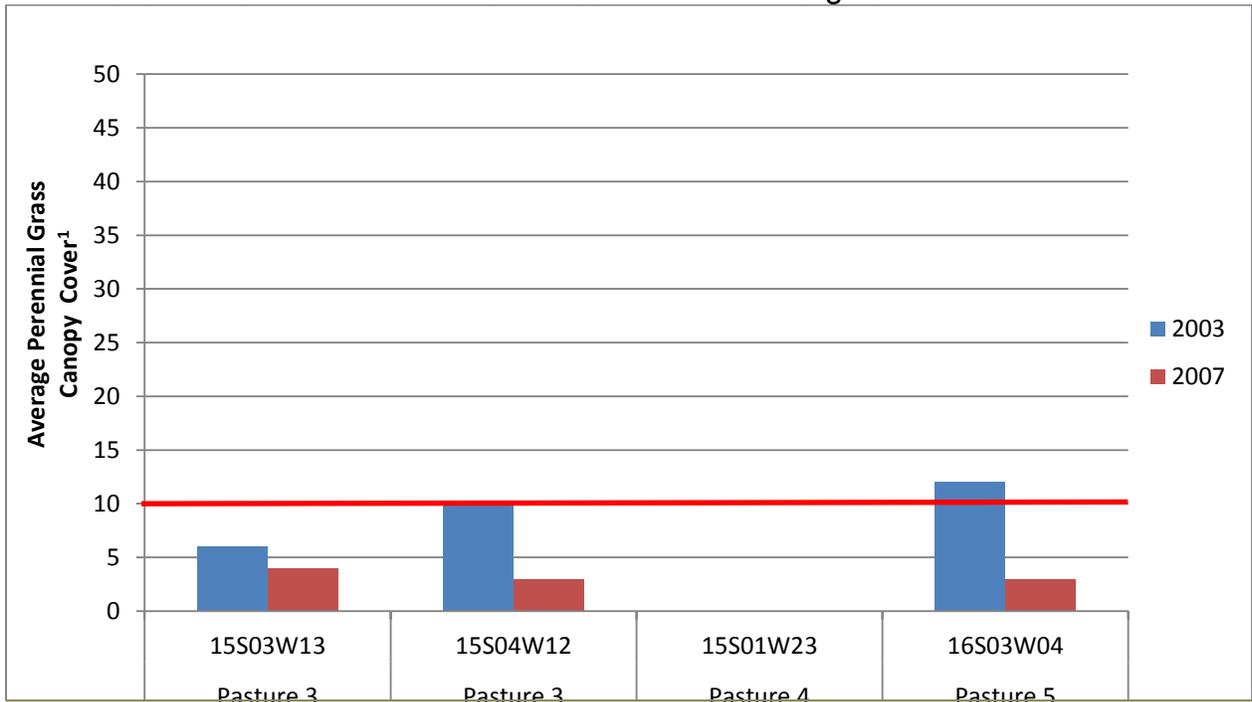


*Red line represents 25% maximum shrub canopy cover identified as suitable ($\geq 15\%$ but $\leq 25\%$) sage-grouse breeding habitat .

Figure E-3: Comparison of Average Perennial Grass Canopy Cover Between Petan (2007) Point-Line Intercept Data and 2003 Sage-grouse Breeding Habitat Assessments at Coinciding BLM Trend Plot Locations

Average perennial grass height (no POA spp. included; no forbs) data obtained from the 2003 sage-grouse breeding habitat assessments and corresponding habitat indicator rating:

Site	15S03W13	8 inches	suitable
Site	15S04W12	6 inches	marginal
Site	15S01W23	14 inches	suitable
Site	16S03W04	6 inches	marginal



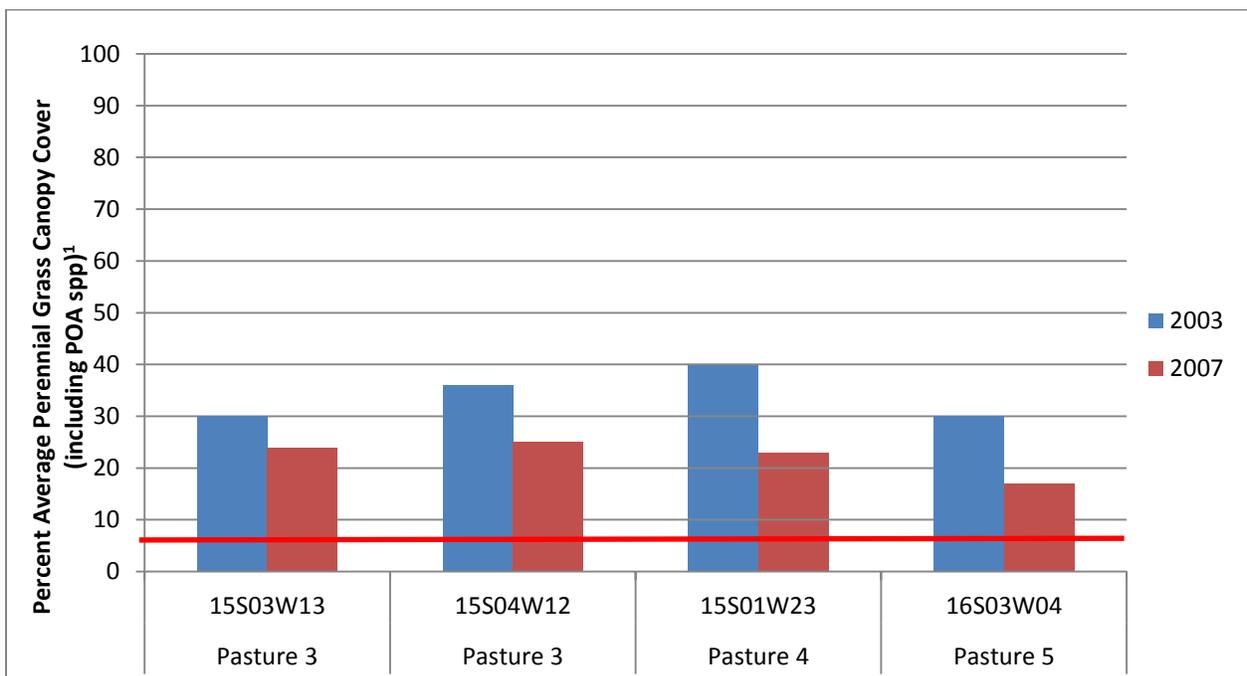
¹ Sandberg bluegrass (POA spp) is not included in average perennial grass canopy cover estimates.

*Red-line denotes minimum average perennial grass canopy cover of 10% for a suitable habitat indicator rating (Table WDLF-1).

Figure E-4: Comparison of Average Perennial Grass Canopy Cover Between Petan (2007) Point-Line Intercept Data and 2003 Sage-grouse Breeding Habitat Assessments at Coinciding BLM Trend Plot Locations (including Sandberg bluegrass)

Average perennial grass height (including POA spp.; no forbs) data obtained from the 2003 sage-grouse breeding habitat assessments and corresponding habitat indicator rating:

Site	15S03W13	3 inches	unsuitable
Site	15S04W12	3 inches	unsuitable
Site	15S01W23	9 inches	suitable
Site	16S03W04	4 inches	unsuitable



¹ Sandberg bluegrass (POA spp) is included in average perennial grass canopy cover estimates.

*Red-line denotes minimum average perennial grass canopy cover of 10% for a suitable habitat indicator rating (Table WDLF-1).

References

Petan Co. of NV. 2007. Comments regarding the final Garat Allotment Rangeland Health Assessment/Evaluation and Determination and the forthcoming Draft Environmental Assessment and Garat Term Permit Renewal. YP Ranch, Tuscarora, NV. 328 p.

USDA ARS 2009. Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems. USDA-ARDS Jornada Experimental Range. 200p

USDI BLM 2003/2004. Sage-grouse Nesting Habitat Assessment Worksheet –
Breeding Habitat (5-23-01). Field Data. Owyhee Field Office.

APPENDIX F: Actual use GARAT ALLOTMENT

Table F-1: Update (calculated at 94 percent PD on spreadsheet from 2006 forward)

Year	Pastures 1 and 2			Pasture 3			Pasture 4			Pasture 5			Pasture 6			Allotment AUMs
	From	To	AUMs	From	To	AUMs	From	To	AUMs	From	To	AUMs	From	To	AUMs	
1986	3/22	7/22	2,299	3/22	7/24	1,159	4/7	7/20	3,395	7/26	9/20	697	7/27	9/22	1640	9,190
1987	4/1-10/15*															10,904
1988	4/1	6/20	3,535	RESTED			3/15	8/1	7,401	7/1	8/5	751	8/1	9/25	2,607	14,294
1989	3/15	6/28	3,670	3/20	7/19	5,343	RESTED			7/11	9/25	1,928	6/21	9/27	4,493	15,434
1990	RESTED			3/20	7/26	3,548	3/15	7/19	6,102	7/17	9/28	2,139	7/9	9/27	5,519	17,308
1991	3/19	5/31	1,127	RESTED			3/15	8/2	6,945	7/26	9/20	646	7/11	9/20	3,824	12,542
1992	3/15	6/20	3,309	3/18	6/20	2,327	6/15	8/18	1,442	RESTED			4/16	8/6	6,090	13,168
1993	RESTED			4/4	7/19	4,062	7/8	9/26	2,743	3/31	7/9	3,645	7/10	10/10	3,292	13,742
1994	3/17	7/14	4,438	RESTED			3/22	7/15	5,368	RESTED			6/26	9/28	4,720	14,526
1995	3/25	6/24	996	3/19	6/28	3,144	RESTED			3/15	6/25	3,730	6/21	9/28	6,568	14,438
1996	RESTED			3/19	6/23	4,101	6/17	9/8	2,368	3/15	6/12	3,063	6/10	10/12	5,519	15,051
1997	3/20	6/24	3,802	6/21	6/27	169**	3/16	6/16	3,958	6/25	9/10	2,310	6/11	10/14	5,507	15,746
1998	3/17	6/27	4,514	3/20	6/28	3,018	6/15	8/25	3,018	RESTED			8/20	10/15	5,650	16,200
1999	RESTED			3/17	6/14	4,948	6/24	9/18	4,017	3/15	6/23	4,615	6/21	10/15	5,296	18,876
2000	3/19	7/10	4,896	RESTED			3/16	6/22	4,393	RESTED			6/15	10/15	7,863	17,152
2001	RESTED			3/18	7/15	5,059	6/30	9/18	3,500	3/15	6/23	4,610	6/19	10/15	5,485	18,654
2002	3/17	7/14	4,423	3/20	7/13	4,657	6/18	9/28	4,249	RESTED			6/21	10/15	4,901	18,230
2003	3/17	7/10	1,623	RESTED			3/20	6/21	2,512	3/16	5/15	966	4/10	9/15	5,618	10,719
2004	4/16	7/1	9,06	3/31	7/15	3,390	RESTED			3/27	7/5	3,030	7/25	9/18	3873	11,199
2005	3/15	7/9	3,140	3/15	7/11	1,739	3/18	7/15	4,528	RESTED			7/18	10/15	6,081	15,488
2006	3/27	7/8	2,251	RESTED			3/18	7/15	5,264	3/15	6/27	2,817	6/25	10/15	8,538	18,870
2007	3/15	7/9	4,612	3/19	6/1	2,454	4/17	8/30	3,533	RESTED			6/18	10/10	3,781	14,380
2008	RESTED			3/27	7/14	3,341	5/12	8/23	3,657	3/22	5/15	1,980	6/19	10/15	4,342	13,320
2009	3/16	7/9	4,254	3/20	7/6	4,501	6/16	10/11	2,724	RESTED			6/27	10/13	3,487	14,966
2010	3/21	7/7	4,391	RESTED			3/24	7/14	4,640	RESTED			6/22	9/20	4,975	13,106
2011	RESTED			3/21	7/15	4,908	5/18	9/12	3,694	3/17	7/1	4,183	6/17	9/30	4,565	17,350

*Actual use reported on an allotment basis in 1987.

** Considered a rest year in rest-rotation schematic.

APPENDIX G: TREND DATA – SUMMARY & ANALYSIS

Twelve trend monitoring sites have been established within the Garat allotment. Eight of the monitoring sites are mapped within a Loamy 10-13" low sagebrush/bluebunch wheatgrass ecological site, two are within the Shallow Claypan 11-13" low sagebrush/bluebunch wheatgrass ecological site, one is within the Shallow Claypan 12-16" low sagebrush/Idaho fescue ecological site, and one in the Loamy 8-12" low sagebrush/bluebunch wheatgrass-Thurber's needlegrass ecological site.

A note on statistical methods:

In the past, apparently Chi Square analysis was used to compare means between years. This statistical approach is not appropriate because Chi Square assumes independent random sampling within a population each year. That is not the case with repeated measurements of fixed transect lines.

A paired Student's T test addresses this requirement. An analysis of variance (ANOVA) or a regression analysis could be useful for determining trends across multiple years. However, these methods are generally appropriate for sample sizes of ten or more; our four (or 5) years of data are not enough to show a meaningful trend using this method. The Student's T test assumes that the two populations sampled have similar variances, and samples for each mean are normally distributed. For this analysis, these parameters were assumed, but not tested.

Frequency:

At each site and for each species, the total number of hits for the 20 quadrats per belt was used as the sampling unit, providing an $n = 5$ for each site/species/year combination. The largest plot size (plot 4, 50 cm x 50 cm) of the nested frequency set was used for each species. The five samples per site were averaged and the standard deviation calculated. Then a paired, two-tailed Student's T test was run to determine whether the difference between the means of two adjacent sampling years (i.e. 1989 to 2003 and 2003 to 2009) was significantly different at $p < 0.1$.

Ground Cover:

Ground cover was compared between 1989 and 2009 at the revisited trend sites. Ground cover is recorded as a point intercept for 80 points at each of the five belts, resulting in 400 hits per site. Paired, two-tailed Student's T tests were calculated on the mean percentages of each belt.

Shrub and Tree Density:

Shrub and tree densities were counted in two 0.01-acre plots at each monitoring site. No statistical tests were run on these data since only two samples per site were taken.

Pasture 1 – Dry Lakes

Frequency Table Statistics

- T-test Using # Hits (not % frequency)
- For years in which a species was not encountered but had been encountered in previous years, data values were entered as zeros. (Data values for species not encountered in a given year but encountered in later

years were not entered as zeros since many plants were intentionally not recorded in previous years, i.e. annuals.)

- 1989 indicates a year and/or data which were taken from old data reports, not access reports.
- A p-value <0.1 indicates a statistically significant difference.

Table G-1: Pasture 1 grasses and shrubs

GRASSES	<i>Site 13S04W29</i>				<i>Site 14S04W18</i>			
	Belt	1989	2003	2009	Belt	1989	2003	2009
Bluebunch Wheatgrass AGSP	13S04W29 – Bluebunch Wheatgrass, Plot 4				14S04W18 – Bluebunch Wheatgrass, Plot 4			
	1	17	17	16	1	10	3	11
	2	19	16	15	2	9	9	10
	3	10	8	7	3	5	14	13
	4	15	12	12	4	9	10	10
	5	12	17	15	5	5	6	8
	Average	14.6	14	13	Average	7.6	8.4	10.4
S	3.64692	3.93700	3.67423	S	2.40832	4.15933	1.81659	
p		0.71020	0.03411	p		0.76834	0.27458	
Cheatgrass	13S04W29 - Cheatgrass, Plot 4				No Data			
BRTE	Belt	1989	2003	2009				
	1		3	2				
	2		6	2				
	3		3	7				
	4		1	6				
	5		1	3				
	Average		2.8	4				
	S		2.04939	2.34521				
	p			0.50862				
Sandberg Bluegrass	13S04W29 – Sandberg Bluegrass, Plot 4				14S04W18 – Sandberg Bluegrass, Plot 4			
POSA3	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	20	17	17	1	20	18	20
	2	19	20	17	2	16	20	20
	3	20	19	20	3	20	20	19
	4	18	18	19	4	18	18	20
	5	20	18	16	5	18	18	15
	Average	19.4	18.4	17.8	Average	18.4	18.8	18.8
	S	0.89443	1.14018	1.64317	S	1.67332	1.09545	2.16795
	p		0.23020	0.50117	p		0.70400	1.00000
Squirreltail	13S04W29 - Squirreltail, Plot 4				14S04W18 - Squirreltail, Plot 4			
SIHY	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	6	5	3	1	15	10	9
	2	2	3	1	2	11	6	7
	3	7	2	3	3	16	8	8
	4	4	5	4	4	17	8	9

GRASSES	Site 13S04W29				Site 14S04W18			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	5	3	5	0	5	14	9	10
	Average	4.4	4	2.2	Average	14.6	8.2	8.6
	S	2.07364	1.41421	1.64317	S	2.30217	1.48324	1.14018
	p		0.76481	0.13695	p		0.00183	0.37390
SHRUBS								
Big Sagebrush (Wyoming) ARTRW	13S04W29 - Big Sagebrush (WY), Plot 4				14S04W18 - Big Sagebrush (Wyoming), Plot 4			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		3	0	1	4	7	2
	2		5	3	2	8	9	4
	3		3	5	3	8	5	3
	4		5	3	4	4	4	2
	5		3	2	5	5	1	0
	Average		3.8	2.6	Average		5.2	2.2
	S		1.09545	1.81659	S		3.03315	1.48324
p			0.23550	p			0.02305	

Ground Cover by Percentage

- Although they appear to be similar, data collection methods for years recorded in the access reports may be different than those conducted for 1989.
- Total Vegetation" and "Canopy Cover" cannot be determined from old data reports.
- A p-value < 0.1 is significant.
- Long-term 1989-2009 reflects comparison between first and last monitored year (values <0.1 are significant).

Table G-2: Pasture 1 ground cover (NOTE: In 1989 from the old report, belts 1 and 5 had totals of 81.)

	Site 13S04W29				Site 14S04W18			
	Belt	1989	2003	2009	Belt	1989	2003	2009
Bare Ground Under "bare ground" intsp+cpy	13S04W29 - Bare Ground, Plot 4, %				14S04W18 - Bare Ground, Plot 4, %			
	1	53.1	55.0	31.3	1	58.0	60.0	43.8
	2	40.0	58.8	27.5	2	42.5	40.0	41.3
	3	30.0	52.5	18.8	3	56.3	56.3	38.8
	4	50.0	51.3	26.3	4	52.5	57.5	35.0
	5	70.0	61.3	53.8	5	58.8	77.5	52.5
	Avg	48.6	55.8	31.5	Avg	53.6	58.3	42.3
	S	14.99972	4.20193	13.24056	S	6.66226	13.33464	6.57885
	p		0.28996	0.00614	p		0.28141	0.02538
	Long-term 1989-2009			0.00230				0.02522
Basal Vegetation Under "vegetation" shrub+intsp+cpy	13S04W29 - Basal Vegetation, Plot 4, %				14S04W18 - Basal Vegetation, Plot 4, %			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	11.1	12.5	0.0	1	0.0	6.3	1.3
	2	1.3	10.0	0.0	2	5.0	10.0	0.0
	3	15.0	8.8	1.3	3	6.3	3.8	0.0

	Site 13S04W29				Site 14S04W18			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	4	6.3	13.8	1.3	4	7.5	10.0	2.5
	5	8.8	8.8	7.5	5	7.5	1.3	0.0
	Avg	8.5	10.8	2.0	Avg	5.3	6.3	0.8
	S	5.16603	2.27074	3.13748	S	3.11247	3.85276	1.11803
	P		0.44933	0.01388	P		0.69257	0.02194
	Long-term 1989-2009			0.06487				0.04076
Gravel	13S04W29 - GR, RK, PL, CR, Plot 4, %				14S04W18 - GR, RK, PL, CR, Plot 4, %			
Rock	Belt	1989	2003	2009	Belt	1989	2003	2009
Persistent Litter	1	11.1	6.3	5.0	1	12.3	27.5	27.5
Biological Crust	2	31.3	8.8	15.0	2	20.0	13.8	38.8
Under "per litter", "cryptogams", "gravel", and "stones", (all) instp+(all) cpy	3				3			
		17.5	23.8	11.3		15.0	12.5	40.0
	4	17.5	20.0	13.8	4	17.5	17.5	36.3
	5				5			
		5.0	15.0	3.8		12.5	8.8	26.3
	Avg				Avg			
		16.5	14.8	9.8		15.5	16.0	33.8
	S				S			
		9.75767	7.36334	5.10820		3.29564	7.14799	6.43477
	P				P			
			0.77932	0.22041			0.89544	0.02109
	Long-term 1989-2009			0.05788				0.00072
Non-Persistent Litter	13S04W29 - Non-Persistent Litter, Plot 4, %				14S04W18 - Non-Persistent Litter, Plot 4, %			
Under "nonper litter" instp+cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1				1			
		24.7	25.0	63.8		28.4	6.3	27.5
	2				2			
		27.5	22.5	57.5		32.5	36.3	20.0
	3				3			
		37.5	15.0	68.8		22.5	27.5	21.3
	4				4			
		26.3	15.0	58.8		22.5	15.0	26.3
	5				5			
		17.5	15.0	35.0		21.3	12.5	21.3
	Avg				Avg			
		26.7	18.5	56.8		25.4	19.5	23.3
	S				S			
		7.17907	4.87340	12.94821		4.83267	12.13852	3.37731

	Site 13S04W29				Site 14S04W18			
	<i>Belt</i>	1989	2003	2009	<i>Belt</i>	1989	2003	2009
	<i>p</i>		0.11361	0.00231	<i>p</i>		0.29561	0.60353
	Long-term 1989-2009			0.00102				0.46930
Total Vegetation	13S04W29 - Total Vegetation, Plot 4, %				14S04W18 - Total Vegetation, Plot 4, %			
"Vegetation"+all cpy sections	<i>Belt</i>	1989	2003	2009	<i>Belt</i>	1989	2003	2009
	1		26.25	15	1		22.5	22.5
	2		26.25	28.75	2		23.75	23.75
	3		20	20	3		25	23.75
	4		28.75	20	4		26.25	31.25
	5		8.75	11.25	5		12.5	11.25
	Avg		22	19	Avg		22	22.5
	S		8.08161	6.57885	S		5.49147	7.18070
	<i>p</i>			0.36242	<i>p</i>			0.68846
Canopy Cover	13S04W29 - Canopy Cover, Plot 4, %				14S04W18 - Canopy Cover, Plot 4, %			
Add all cpy	<i>Belt</i>	1989	2003	2009	<i>Belt</i>	1989	2003	2009
	1		13.75	15	1		16.25	31.25
	2		17.5	28.75	2		13.75	27.5
	3		11.25	20	3		23.75	18.75
	4		16.25	20	4		20	26.25
	5		0	11.25	5		11.25	53.75
	Avg		11.75	19	Avg		17	31.5
	S		6.99330	6.57885	S		4.96865	13.24056

	Site 13S04W29				Site 14S04W18			
	<i>Belt</i>	1989	2003	2009	<i>Belt</i>	1989	2003	2009
	<i>p</i>			0.02338	<i>p</i>			0.13853

Shrub and Tree Density

- Plants/acre from mean of two plots.
- X = Seedling.
- A misidentification of shrubs may have impacted the data for ARTRW and ARAR8.

Table G-3: Pasture 1 shrub and tree density

Site 13S04W29	1989	2003	2009
Big Sagebrush (Wyoming)	0	2650	850
X Big Sagebrush (Wyoming)	0	100	0
Big Sagebrush (Mountain)	2700	0	0
X Big Sagebrush (Mountain)	50	0	0
Low Sagebrush	0	0	1450
Site 14S04W18	1989	2003	2009
Big Sagebrush (Wyoming)	3700	3550	100
X Big Sagebrush (Wyoming)	150	400	0
Low Sagebrush	0	0	3100
X Low Sagebrush	50	0	0

Pasture 2 – Piute Creek

Frequency Table Statistics

- T-test Using # Hits (not % frequency)
- For years in which a species was not encountered but had been encountered in previous years, data values were entered as zeros. (Data values for species not encountered in a given year but encountered in later years were not entered as zeros since many plants were intentionally not recorded in previous years, i.e. annuals.)
- 1989 indicates a year and/or data which were taken from old data reports, not access reports.
- A p-value <0.1 indicates a statistically significant difference.

Table G-4: Pasture 2 grasses and shrubs

GRASSES	Site 14S03W07					Site 14S03W10			
	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
Bluebunch Wheatgrass AGSP	14S03W07 - Bluebunch Wheatgrass, Plot 4					14S03W10 - bluebunch wheatgrass, Plot 4			
	1	6	9	13	11	1	12	12	11
	2	8	8	11	14	2	14	8	12
	3		2	8	15	3	13	13	12
	4		2	6	3	4	16	10	15
	5		1	10	12	5	12	13	16
	Avg	7	4.4	9.6	11	Avg	13.4	11.2	13.2
	S	1.41421	3.78153	2.70185	4.74342	S	1.67332	2.16795	2.16795
p		0.50000	0.00822	0.48140	p		0.23179	0.18900	

GRASSES	Site 14S03W07					Site 14S03W10			
	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
Cheatgrass	14S03W07 - Cheatgrass, Plot 4					14S03W10 - Thurber's Needlegrass, Plot 4			
BRTE & Thurber's Needlegrass	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
	1			0	1	1	1		0
STTH2	2			0	1	2	0		0
	3			1	0	3	0		1
	4			0	0	4	0		0
	5			0	0	5	0		0
	Avg			0.2	0.4	Avg	0.2		0.2
	S			0.44721	0.54772	S	0.44721		0.44721
	p				0.62131	p			1.00000
Sandberg Bluegrass	14S03W07 - Sandberg Bluegrass, Plot 4					14S03W10 - Sandberg bluegrass, Plot 4			
POSA3	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
	1	18	19	20	19	1	19	20	20
	2	10	20	20	20	2	17	18	19
	3		19	19	18	3	19	20	20
	4		19	20	17	4	20	20	20
	5		20	20	20	5	20	20	20
	Avg	14	19.4	19.8	18.8	Avg	19	19.6	19.8
	S	5.65685	0.54772	0.44721	1.30384	S	1.22474	0.89443	0.44721
	p		0.43655	0.17781	0.14193	p		0.07048	0.37390
Squirreltail	14S03W07 - Squirreltail, Plot 4					14S03W10 - squirreltail, Plot 4			
SIHY	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
	1	13	5	3	3	1	7	1	5
	2	11	12	3	4	2	4	1	6
	3		20	1	4	3	8	2	3
	4		11	1	7	4	7	4	3
	5		15	0	2	5	3	0	2
	Avg	12	12.6	1.6	4	Avg	5.8	1.6	3.8
	S	1.41421	5.50454	1.34164	1.87083	S	2.16795	1.51658	1.64317
	p			0.01881	0.08016	p		0.00464	0.10839

SHRUBS

	14S03W07 - Big Sagebrush (Wyoming), Plot 4					14S03W10 - Big sagebrush (WY), Plot 4			
	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
Big Sagebrush (Wyoming) ARTRW									
	1		6	7		1	12	10	7
	2		4	5		2	4	4	2
	3		4	4		3	4	3	5
	4		2	1		4	5	6	4
	5		2	2		5	4	3	4

	14S03W07 - Big Sagebrush (Wyoming), Plot 4				14S03W10 - Big sagebrush (WY), Plot 4				
	Belt	1983	1989	2003	2009	Belt	1989	2003	2009
	Avg		3.6	3.8		Avg	5.8	5.2	4.4
	S		1.67332	2.38747		S	3.49285	2.94958	1.81659
	p			0.62131		p		0.30456	0.45566
Big Sagebrush (Mountain) ARTRV	14S03W07 - Big Sagebrush (Montain), Plot 4								
	Belt	1983	1989	2003	2009				
	1	5	6	7					
	2	3	4	5					
	3		4	4					
	4		2	1					
	5		2	2					
	Avg	4	3.6	3.8					
	S	1.41421	1.67332	2.38747					
p			0.62131						
Green Rabbitbrush CHVI8	14S03W07 - Green Rabbitbrush, Plot 4								
	Belt	1983	1989	2003	2009				
	1		0	0	0				
	2			0	0				
	3		1	1	0				
	4		0	0	0				
	5		0	0	0				
	Avg		0.25	0.2	0				
	S		0.50000	0.44721	0.00000				
p				0.37390					
X Big Sagebrush (Wyoming) XARTRW	14S03W07 - Big Sagebrush (Wyoming), Plot 4								
	Belt	1983	1989	2003	2009				
	1		1	0	2				
	2		0	0	4				
	3		0	1	5				
	4		0	2	5				
	5		0	9	4				
	Avg		0.2	2.4	4				
	S		0.44721	3.78153	1.22474				
p			0.28224	0.39767					

Ground Cover by Percentage

- Although they appear to be similar, data collection methods for years recorded in the access reports may be different than those conducted for 1989.
- Total Vegetation" and "Canopy Cover" cannot be determined from old data reports.
- A p-value < 0.1 is significant
- Long-term 1989-2009 reflects comparison between first and last monitored year (values <0.1 are significant)

Table G-5: Pasture 2 ground cover (NOTE: Data for 1989 taken from old data reports.)

	Site 14S03W07				Site 14S03W10			
	14S03W07 - Bare Ground, Plot 4, %				14S04W10 - Bare Ground, Plot 4, %			
Bare Ground Under "bare ground"	Belt	1989	2003	2009	Belt	1989	2003	2009
intsp+cpy	1	58.02	61.25	45	1	57.50	60	36.25
	2	37.50	53.75	40	2	72.50	76.25	40
	3	48.75	61.25	33.75	3	53.75	51.25	2.5
	4	50.00	67.5	43.75	4	61.25	63.75	30
	5	51.25	43.75	30	5	51.25	58.75	40
	Avg	49.10	57.5	38.5	Avg	59.25	62	29.75
	S	7.41224	9.10014	6.45901	S	8.31978	9.16856	15.77181
	p		0.14827	0.00248	p		0.16094	0.00349
	Long-term 1989-20090.05917							0.01141
Basal Vegetation Under "vegetation"	14S03W07 - Basal Vegetation, Plot 4, %				14S03W10 - Basal Vegetation, Plot 4, %			
	Belt	1989	2003	2009	Belt	1989	2003	2009
shrub+intsp+cpy	1	7.41	10	1.25	1	9.88	2.5	1.25
	2	13.75	10	2.5	2	11.25	3.75	0
	3	7.50	6.25	0	3	12.50	10	0
	4	10.00	2.5	0	4	2.50	10	3.75
	5	7.50	13.75	1.25	5	5.00	7.5	2.5
	Avg	9.23	8.5	1	Avg	8.23	6.75	1.5
	S	2.75368	4.27566	1.04583	S	4.28165	3.49106	1.62980
	p		0.77553	0.01002	p		0.63804	0.02219
	Long-term 1989-2009							0.06317
				0.00130				
Gravel Rock Persistent Litter Biological Crust Under "per litter", "cryptogams", "gravel", and "stones" (all) insp+(all) cpy	14S03W07 - GR, RK, PL, CR, Plot 4, %				14S03W10 - GR, RK, PL, CR, Plot 4, %			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	16.05	5	11.25	1	9.88	8.75	12.5
	2	6.25	11.25	16.25	2	5.00	8.75	33.75
	3	16.25	21.25	11.25	3	7.50	12.5	53.75
	4	13.75	11.25	10	4	21.25	18.75	23.75
	5	18.75	10	11.25	5	17.50	21.25	12.5
	Avg	14.21	11.75	12	Avg	12.23	14	27.25
	S	4.78878	5.90286	2.43670	S	6.87964	5.75543	17.26177

	Site 14S03W07				Site 14S03W10			
	14S03W07 - Bare Ground, Plot 4, %				14S04W10 - Bare Ground, Plot 4, %			
	p		0.50367	0.93519	p		0.30179	0.20845
	Long-term 1989-2009							
Non-Persistent Litter	14S03W07 - Non-Persist. Litter, Plot 4, %				14S03W10 - Non-Persistent Litter, Plot 4, %			
Under "nonper litter" instp+cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	17.28	23.75	42.5	1	22.22	28.75	50
	2	42.50	25	41.25	2	11.25	11.25	26.25
	3	27.50	11.25	55	3	26.25	26.25	43.75
	4	26.25	18.75	46.25	4	15.00	7.5	42.5
	5	22.50	31.25	57.5	5	26.25	12.5	45
	Avg	27.21	22	48.5	Avg	20.19	17.25	41.5
	S	9.42736	7.47914	7.36334	S	6.79037	9.57699	8.98784
	p		0.39895	0.00532	p		0.44719	0.00382
	Long-term 1989-2009							
				0.02551				0.00131
Total Vegetation	14S03W07 - Total Vegetation, Plot 4, %				14S03W10 - Total Vegetation, Plot 4, %			
"Vegetation"+all cpy sections	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		26.25	20	1		25	33.75
	2		31.25	26.25	2		18.75	18.75
	3		18.75	17.5	3		38.75	56.25
	4		12.5	22.5	4		27.5	17.5
	5		37.5	25	5		28.75	15
	Average		25.25	22.25	Average		27.75	28.25
	S		9.89792	3.57946	S		7.25646	17.28891
	p			0.46528	p			0.93534
Canopy Cover	14S03W07 - Canopy Cover, Plot 4, %				14S03W10 - Canopy Cover, Plot 4, %			
Add all cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		18.75	18.75	1		22.5	33.75
	2		22.5	25	2		15	18.75
	3		12.5	17.5	3		30	56.25
	4		10	22.5	4		17.5	17.5
	5		25	23.75	5		21.25	15
	Average		17.75	21.5	Average		21.25	28.25
	S		6.39824	3.23554	S		5.72822	17.28891
	p			0.19864	p			0.27831

Shrub and Tree Density

- Plants/acre from mean of two plots.
- X = Seeding.

Table G-6: Pasture 2 shrub and tree density

Site 14S03W07	1989	2003	2009
Big Sagebrush (Wyoming)	1650	3650	3300
X Big Sagebrush (Wyoming)	100	450	0

NOTE: In 2009 there were 100 seedlings/acre recorded under XARTR, which are likely XARTRW.

Site 14S03W10	1989	2003	2009
Big Sagebrush (Wyoming)	2300	2350	2500
X Big Sagebrush (Wyoming)	50	100	100

Pasture 3 – Forty-Five Frequency Table Statistics

- T-test Using # Hits (not % frequency)
- For years in which a species was not encountered BUT which had been encountered in previous years, data values were entered as zeros. (Data values for species not encountered in a given year but encountered in later years were not entered as zeros since many plants were intentionally not recorded in previous years, i.e. annuals.)
- 1989 indicates a year and/or data which were taken from old data reports, not access reports.
- A p-value <0.1 indicates a statistically significant difference.

Table G-7: Pasture 3 grasses and shrubs

GRASSES	Site 14S03W20			
	Belt	1989	2003	2009
14S03W20 - Bluebunch Wheatgrass, Plot 4				
Bluebunch Wheatgrass				
AGSP	1	9	10	10
	2	9	9	11
	3	8	5	10
	4	17	10	10
	5	11	9	6
	Average	10.8	8.6	9.4
	S	3.63318	2.07364	1.94936
	p		0.18937	0.57693
14S03W20 - Sandberg Bluegrass, Plot 4				
Sandberg Bluegrass				
POSA3	Belt	1989	2003	2009
	1	16	19	18
	2	20	18	20
	3	18	18	20
	4	19	18	19
	5	19	20	20
	Average	18.4	18.6	19.4
	S	1.51658	0.89443	0.89443
	p		0.82756	0.24198
14S03W20 - Squirreltail, Plot 4				

Squirreltail SIHY	Belt	1989	2003	2009
	1	10	5	5
	2	8	8	3
	3	7	4	2
	4	8	0	2
	5	6	4	1
	Average		4.2	7.8
	S		2.86356	1.48324
	p		0.05760	0.25604
SHRUBS				
Big Sagebrush (Wyoming) ARTRW	14S03W20 - Big Sagebrush (Wyoming), Plot 4			
	Belt	1989	2003	2009
	1	11	14	11
	2	13	15	13
	3	12	10	10
	4	10	9	6
	5	8	8	9
	Average	10.8	11.2	9.8
	S	1.92354	3.11448	2.58844
p		0.68846	0.15993	
X Big Sagebrush (Wyoming) XARTRW	14S03W20 - X Big Sagebrush (Wyoming), Plot 4			
	Belt	1989	2003	2009
	1	5	0	
	2	6	0	
	3	6	0	
	4	7	0	
	5	4	3	
	Average	5.6	0.6	
	S	1.14018	1.34164	
p		0.00886		

Ground Cover by Percentage

- Although they appear to be similar, data collection methods for years recorded in the access reports may be different than those conducted for 1989.
- Total Vegetation" and "Canopy Cover" cannot be determined from old data reports.
- A p-value <0.1 is significant.
- Long- term 1989-2009 reflects comparison between first and last monitored year (values <0.1 are significant).

Table G-8: Pasture 3 ground cover

Site 14S03W20				
	Belt	1989	2003	2009
14S03W07 - Bare Ground, Plot 4, %				
Bare Ground Under "bare ground" intsp+cpy	1	61.25	61.25	38.75
	2	65	48.75	47.5
	3	60	81.25	48.75
	4	48.75	67.5	45
	5	50	55	46.25
	Average	57	62.75	45.25
	S	7.21327	12.48124	3.89310
	p		0.44587	0.03437
	Long-term 1989-2009			0.03425
Basal Vegetation				
14S03W07 - Basal Vegetation, Plot 4, %				
Under "vegetation"	Belt	1989	2003	2009
shrub+intsp+cpy	1	8.75	6.25	1.25
	2	11.25	15	8.75
	3	10	3.75	1.25
	4	7.5	6.25	6.25
	5	3.75	7.5	0
	Average	8.25	7.75	3.5
	S	2.87772	4.27566	3.79144
	p		0.80743	0.03429
	Long-term 1989-2009			0.03042
Gravel				
14S03W07 - GR, RK, PL, CR, Plot 4, %				
Rock	Belt	1989	2003	2009
Persistent Litter	1	11.25	7.5	22.5
Biological Crust	2	16.25	20	17.5
Under "per litter", "cryptogams",	3	8.75	6.25	11.25
"gravel", and "stones"	4	36.25	22.5	26.25
(all) instp+(all) cpy	5	31.25	13.75	21.25
	Average	20.75	14	19.75
	S	12.29837	7.25646	5.68716
	p		0.15731	0.11285
	Long-term 1989-2009			0.81749
Non-Persistent Litter				
14S03W07 - Non-Persistent Litter, Plot 4, %				
Under "nonper litter"	Belt	1989	2003	2009
instp+cpy	1	17.5	25	37.5
	2	7.5	16.25	26.25
	3	21.25	8.75	38.75
	4	7.5	3.75	22.5
	5	15	23.75	32.5
	Average	13.75	15.5	31.5
	S	6.12372	9.25338	7.03784
	p		0.70282	0.01484

Site 14S03W20				
	Belt	1989	2003	2009
	Long-term 1989-2009			0.00003
Total Vegetation	14S03W07 - Total Vegetation, Plot 4, %			
"Vegetation"+all cpy sections	Belt	1989	2003	2009
	1		30	26.25
	2		36.25	26.25
	3		11.25	22.5
	4		12.5	22.5
	5		27.5	18.75
	Average		23.5	23.25
	S		11.08913	3.13748
	p			0.95896
Canopy Cover	14S03W07 - Canopy Cover, Plot 4, %			
Add all cpy	Belt	1989	2003	2009
	1		23.75	25
	2		23.75	17.5
	3		7.5	21.25
	4		6.25	17.5
	5		20	18.75
	Average		16.25	20
	S		8.70524	3.18689
	p			0.37862

Shrub and Tree Density

- Plants/acre from mean of two plots.
- X = Seedling.

Table G-9: Pasture 3 shrub and tree density

Site 14S03W20	1989	2003	2009
Big Sagebrush (Wyoming)	5100	4350	4500
X Big Sagebrush (Wyoming)	2600	500	0

Pasture 4 – Kimball Frequency Table Statistics

- T-test Using # Hits (not % frequency)
- For years in which a species was not encountered BUT which had been encountered in previous years, data values were entered as zeros. (Data values for species not encountered in a given year but encountered in later years were not entered as zeros since many plants were intentionally not recorded in previous years, i.e. annuals.)
- 1989 indicates a year and/or data which were taken from old data reports, not access reports.
- A p-value <0.1 indicates a statistically significant difference.

**Table G-10: Pasture 4 grasses and shrubs
GRASSES**

Site 15S02W12				Site 14S02W11			
Belt	1989	2003	2009	Belt	1989	2003	2009
Site 15S02W12 - Bluebunch WG, Plot 4				Site 14S02W11 - Bluebunch WG, Plot 4			
1	6	14	7	1	0	7	0
2	8	10	5	2	4	9	0
3	10	10	6	3	2	12	1
4	12	8	2	4	2	7	3
5	9	14	0	5	7	8	8
Average	9	11.2	4	Average	3	8.6	2.4
S	2.23607	2.68328	2.91548	S	2.64575	2.07364	3.36155
p		0.34552	0.01531	p		0.01893	0.03272
Site 15S02W12 - Cheatgrass, Plot 4				Site 14S02W11 - Sandberg's BG, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		0	0	1	5	19	20
2		1	0	2	9	17	20
3		3	2	3	5	15	17
4		0	1	4	10	18	16
5		0	1	5	14	12	17
Average		0.8	0.8	Average	8.6	16.2	18
S		1.30384	0.83666	S	3.78153	2.77489	1.87083
p			1.00000	p		0.04498	0.19493
Site 15S02W12 - Idaho Fescue, Plot 4				Site 14S02W11 - Sandberg's BG, Plot 2			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	8	2	4	1	2	13	20
2	9	4	4	2	5	14	19
3	11	7	1	3	3	5	15
4	10	8	0	4	6	11	14
5	15	4	0	5	7	7	13
Average	10.6	5	1.8	Average	4.6	10	16.2
S	2.70185	2.44949	2.04939	S	2.07364	3.87298	3.11448
p		0.02038	0.15955	p		0.05903	0.00586
Site 15S02W12 - Sandberg's BG, Plot 4				Site 14S02W11 - Thurber's Needlegrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		18	17	1	5	0	
2		19	19	2	6	0	
3		17	20	3	3	0	
4		17	19	4	1	0	
5		18	19	5	1	1	
Average		17.8	18.8	Average	3.2	0.2	
S		0.83666	1.09545	S	2.28035	0.44721	
p			0.23020	p		0.05811	
Site 15S02W12 - Squirreltail, Plot 4				Site 14S02W11 - Cheatgrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		2	2	1		12	13

Site 15S02W12				Site 14S02W11			
Belt	1989	2003	2009	Belt	1989	2003	2009
2		1	2	2		14	14
3		1	2	3		20	16
4		1	0	4		19	17
5		1	0	5		14	20
Average		1.2	1.2	Average		15.8	16
S		0.44721	1.09545	S		3.49285	2.73861
p			1.00000	p			0.91125
Site 15S02W12 - Low Sagebrush, Plot 4				Site 14S02W11 - Squirreltail, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		13	11	1	2		2
2		6	11	2	1		0
3		7	10	3	0		0
4		9	0	4	0		0
5		5	0	5	1		0
Average		8	6.4	Average	0.8		0.4
S		3.16228	5.85662	S	0.83666		0.89443
p			0.56604	p			
Site 15S02W12 Wyoming Big Sagebrush, Plot 4				Site 14S02W11 - Mountain Big Sagebrush, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		0	2	1	0	0	
2		2	1	2	0	0	
3		3	1	3	1	1	
4		1	0	4	0	0	
5		0	0	5	0	0	
Average		1.2	0.8	Average	0.2	0.2	
S		1.30384	0.83666	S	0.44721	0.44721	
p			0.58705	p			
Site 15S02W12 - Low Sagebrush Seedling, Plot 4				Site 14S02W11 - Green Rabbitbrush, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		0	1	1	1	1	0
2		3	0	2	1	1	3
3		0	0	3	0	0	0
4		0	9	4	0	4	3
5		1	6	5	0	2	2
Average		0.8	3.2	Average	0.4	1.6	1.6
S		1.30384	4.08656	S	0.54772	1.51658	1.51658
p			0.31445	p		0.20800	1.00000

Ground Cover by Percentage

- Although they appear to be similar, data collection methods for years recorded in the access reports may be different than those conducted for 1989.
- Total Vegetation" and "Canopy Cover" cannot be determined from old data reports.
- A p-value <0.1 is significant.
- Long- term 1989-2009 reflects comparison between first and last monitored year (values <0.1 are significant).

Table G-11: Pasture 4 ground cover

	Site 15S02W12				Site 14S02W11			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	15S02W12 - Bare Ground, Plot 4, %				14S02W11 - Bare Ground, Plot 4, %			
Bare Ground Under "bare ground" intsp+cpy	1	45	63.75	45	1	35	80	46.25
	2	62.5	66.25	43.75	2	33.75	78.75	30
	3	66.25	66.25	32.5	3	21.25	60	28.75
	4	58.75	68.75	47.5	4	43.75	47.5	13.75
	5	42.5	67.5	41.25	5	40	0	13.75
	Avg	55	66.5	42	Avg	34.75	53.25	26.5
	S	10.643366	1.8540496	5.7689904	S	8.5421748	32.710854	13.532369
	p		0.0680681	0.0007177	p		0.3253238	0.0649247
	Long-term 1989-2009			0.104824				0.3868073
	15S02W12 - Basal Vegetation, Plot 4, %				14S02W11 - Basal Vegetation, Plot 4, %			
Basal Vegetation Under "vegetation" shrub+intsp+cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	7.5	3.75	0	1	1.25	2.5	0
	2	13.75	8.75	0	2	6.25	3.75	2.5
	3	6.25	11.25	0	3	1.25	3.75	0
	4	12.5	11.25	0	4	2.5	6.25	0
	5	6.25	1.25	0	5	2.5	3.75	2.5
	Avg	9.25	7.25	0	Avg	2.75	4	1
	S	3.6012151	4.5414755	0	S	2.0539596	1.3693064	1.3693064
	p		0.3471731		p		0.2980148	0.0326779
	Long-term 1989-2009							0.051606
	15S02W12 - GR, ST, PL, CR, Plot 4, %				14S02W11 - GR, ST, PL, CR, Plot 4, %			
Gravel Rock Persistent Litter Biological Crust Under "per litter", "cryptogams", "gravel", and "stones" (all) insp+(all) cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	25	11.25	10	1	2.5	2.5	1.25
	2	7.5	5	6.25	2	17.5	3.75	12.5
	3	17.5	6.25	13.75	3	11.25	7.5	20
	4	11.25	12.5	17.5	4	13.75	6.25	25
	5	20	1.25	6.25	5	25	77.5	10
	Avg	16.25	7.25	10.75	Avg	14	19.5	13.75
	S	6.9597055	4.6266889	4.8894018	S	8.2632469	32.483169	9.1855865
	p		0.070484	0.0870356	p		0.6696851	0.7339329
	Long-term 1989-2009			0.2395871				0.9606848
	15S02W12 - Non-Persistent Litter, Plot 4, %				14S02W11 - Non-Persistent Litter, Plot 4, %			
Non-Persistent Litter Under "nonper litter" instp+cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	22.5	21.25	45	1	61.25	15	52.5

	Site 15S02W12				Site 14S02W11			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	2	16.25	20	50	2	42.5	13.75	55
	3	10	16.25	53.75	3	66.25	28.75	51.25
	4	17.5	7.5	35	4	40	40	61.25
	5	31.25	30	52.5	5	32.5	18.75	73.75
	Avg	19.5	19	47.25	Avg	48.5	23.25	58.75
	S	7.9352851	8.1681546	7.6239753	S	14.507541	11.060911	9.2280144
	p		0.8661937	0.0004511	p		0.0381272	0.0048317
	Long-term 1989-2009			0.0045541				0.3722988
Total Vegetation	15S02W12 - Total Vegetation, Plot 4, %				14S02W11 - Total Vegetation, Plot 4, %			
"Vegetation "+all cpy sections	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		23.75	32.5	1		6.25	5
	2		23.75	23.75	2		12.5	20
	3		22.5	25	3		8.75	6.25
	4		13.75	21.25	4		27.5	18.75
	5		13.75	15	5		10	17.5
	Avg		19.5	23.5	Avg		13	13.5
	S		5.2737558	6.3368959	S		8.4131593	7.2564626
	p			0.0831706	p			0.8807301
Canopy Cover	15S02W12 - Canopy Cover, Plot 4, %				14S02W11 - Canopy Cover, Plot 4, %			
Add all cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		20	32.5	1		3.75	5
	2		15	23.75	2		8.75	20
	3		11.25	25	3		5	6.25
	4		2.5	21.25	4		22.5	18.75
	5		12.5	15	5		6.25	15
	Avg		12.25	23.5	Avg		9.25	13
	S		6.3982419	6.3368959	S		7.6342157	6.9933004
	p			0.0142442	p			0.2427498

Shrub and Tree Density

- Plants/acre from mean of two plots.
- X = Seedling.

Table G-12: Pasture 4 shrub and tree density

Site 15S02W12	1989	2003	2009
Low Sagebrush	9850	7700	5450
Wyoming Big Sagebrush	850	500	600
Low Sagebrush Seedling	100	150	
Wyoming Big Sagebrush Seedling		100	
Site 14S02W11	1989	2003	2009
Green Rabbitbrush	750	1350	1600

Pasture 5 – Big Horse Frequency Table Statistics

- T-test Using # Hits (not % frequency)
- For years in which a species was not encountered BUT which had been encountered in previous years, data values were entered as zeros. (Data values for species not encountered in a given year but encountered in later years were not entered as zeros since many plants were intentionally not recorded in previous years, i.e. annuals.)
- 1989 indicates a year and/or data which were taken from old data reports, not access reports.
- A p-value < 0.1 indicates a statistically significant difference.

**Table G-13: Pasture 5 grasses and shrubs
GRASSES**

Site 15S03W25				Site 16S03W05			
Site 15S03W25 - Bluebunch wheatgrass, Plot 4				Site 16S03W05 - Sandberg bluegrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	1	1	1	1	20	17	20
2	0	4	3	2	15	11	17
3	1	2	3	3	18	17	18
4	3	5	2	4	16	15	16
5	4	5	5	5	15	14	15
Average	1.8	3.4	2.8	Average	16.8	14.8	17.2
S	1.64317	1.81659	1.48324	S	2.16795	2.48998	1.92354
p		0.07774	0.42632	p		0.03411	0.07048
Site 15S03W25 - Cheatgrass, Plot 4				Site 16S03W05 - Sandberg bluegrass, Plot 2			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		15	14	1	18	15	15
2		15	12	2	12	4	13
3		17	13	3	15	11	14
4		19	14	4	12	9	13
5		15	15	5	11	9	9
Average		16.2	13.6	Average	13.6	9.6	12.8
S		1.78885	1.14018	S	2.88097	3.97492	2.28035
p			0.04863	p		0.01888	0.12535
Site 15S03W25 - Sandberg bluegrass Plot 4				Site 16S03W05 - Squirreltail, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	14	19	14	1	20	14	8
2	12	17	15	2	17	17	5
3	12	18	17	3	19	15	10
4	11	19	19	4	15	15	7
5	10	16	18	5	20	10	7
Average	11.8	17.8	16.6	Average	18.2	14.2	7.4
S	1.48324	1.30384	2.07364	S	2.16795	2.58844	1.81659
p		0.00039	0.35846	p		0.10270	0.01129

Site 15S03W25 - Squirreltail, Plot 4				Site 16S03W05 - Needlegrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	6	5	5	1	1	0	
2	5	5	3	2	0	0	
3	5	3	7	3	0	1	
4	4	4	2	4	0	0	
5	6	2	2	5	0	0	
Average	5.2	3.8	3.8	Average	0.2	0.2	
S	0.83666	1.30384	2.16795	S	0.44721	0.44721	
p		0.13470	1.00000	p		1.00000	

SHRUBS

Site 15S03W25 - Green Rabbitbrush, Plot 4				16S03W05 - Wyoming Big Sagebrush, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	1	3	2	1	11	10	9
2	0	3	3	2	10	6	10
3	4	3	4	3	11	9	8
4	2	1	0	4	6	10	4
5	3	5	4	5	8	10	8
Average	2	3	2.6	Average	9.2	9	7.8
S	1.58114	1.41421	1.67332	S	2.16795	1.73205	2.28035
p		0.29801	0.37390	p		0.89541	0.49337
15S03W25 - Wyoming Big Sagebrush, Plot 4				16S03W05 - Big Sagebrush Seedling, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		0	0	1	0	0	
2		1	1	2	2	0	
3		0	0	3	2	2	
4		0	0	4	1	0	
5		0	0	5	3	1	
Average		0.2	0.2	Average	1.6	0.6	
S		0.44721	0.44721	S	1.14018	0.89443	
p			1.00000	p		0.08901	

Ground Cover by Percentage

- Although they appear to be similar, data collection methods for years recorded in the access reports may be different than those conducted for 1989.
- Total Vegetation" and "Canopy Cover" cannot be determined from old data reports.
- A p-value <0.1 is significant.
- Long- term 1989-2009 reflects comparison between first and last monitored year (values <0.1 are significant).

Table G-14: Pasture 5 ground cover

	Site 15S03W25				Site 16S03W05			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	15S03W25 - Bare Ground, Plot 4, %				16S03W05 - Bare Ground, Plot 4, %			
Bare Ground	1	50	63.75	46.25	1	55	73.75	61.25
Under "bare ground"	2	48.75	71.25	32.5	2	38.75	57.5	35
intsp+cpy	3	42.5	51.25	25	3	41.25	53.75	41.25
	4	42.5	47.5	28.75	4	51.25	55	41.25
	5	40	50	22.5	5	50	72.5	43.75
	Avg	44.75	56.75	31	Avg	47.25	62.5	44.5
	S	4.3660623	10.254572	9.3290541	S	6.9259476	9.802742	9.9058064
	p		0.0156663	0.0024844	p		0.0097994	0.0053353
	Long-term 1989-2009			0.006068				0.3782908
Basal Vegetation	15S03W25 - Basal Vegetation, Plot 4, %				16S03W05 - Basal Vegetation, Plot 4, %			
Under "vegetation"	Belt	1989	2003	2009	Belt	1989	2003	2009
shrub+ints	1	3.75	3.75	1.25	1	8.75	8.75	0
p+cpy	2	2.5	1.25	3.75	2	5	6.25	1.25
	3	5	13.75	8.75	3	3.75	10	1.25
	4	7.5	13.75	10	4	12.5	13.75	1.25
	5	5	5	8.75	5	7.5	8.75	0
	Avg	4.75	7.5	6.5	Avg	7.5	9.5	0.75
	S	1.8540496	5.8630197	3.7914377	S	3.423266	2.7386128	0.6846532
	p		0.2395871	0.5964759	p		0.1403574	0.0017983
	Long-term 1989-2009			0.20564				0.013793
Gravel	15S03W25 - GR, ST, PL, CR, Plot 4, %				16S03W05 - GR, ST, PL, CR, Plot 4, %			
Rock	Belt	1989	2003	2009	Belt	1989	2003	2009
Persistent Litter	1	21.25	26.25	15	1	8.75	16.25	12.5
Biological Crust	2	18.75	13.75	13.75	2	32.5	33.75	35
Under "per litter", "cryptogams",	3	15	18.75	17.5	3	36.25	20	20
"gravel", and "stones"	4	11.25	13.75	23.75	4	12.5	18.75	27.5
(all) insp+(all) cpy	5	11.25	25	13.75	5	30	18.75	13.75
	Avg	15.5	19.5	16.75	Avg	24	21.5	21.75
	S	4.472136	5.9686682	4.2019341	S	12.481236	6.98212	9.5032889
	p		0.252595	0.5276412	p		0.6283376	0.9226092
	Long-term 1989-2009			0.7282948				0.7316001
Non-Persistent Litter	15S03W25 - Non-persistent Litter, Plot 4, %				16S03W05 - Non-persistent Litter, Plot 4, %			
Under "nonper litter"	Belt	1989	2003	2009	Belt	1989	2003	2009
	1	25	6.25	37.5	1	27.5	1.25	26.25
	2	30	13.75	50	2	23.75	2.5	28.75
	3	37.5	16.25	48.75	3	18.75	16.25	37.5

	Site 15S03W25				Site 16S03W05			
	Belt	1989	2003	2009	Belt	1989	2003	2009
instp+cpy	4	38.75	25	37.5	4	23.75	12.5	30
	5	43.75	20	55	5	12.5	0	42.5
	Avg	35	16.25	45.75	Avg	21.25	6.5	33
	S	7.4477346	7.0156076	7.8859051	S	5.7960116	7.3633382	6.7661843
	p		0.0004472	0.0024489	p		0.0234265	0.0034679
		Long-term 1989-2009		0.0345577				0.1037987
Total Vegetation "Vegetation"+all cpy sections	15S03W25 - Total Vegetation, Plot 4, %				16S03W05 - Total Vegetation, Plot 4, %			
	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		11.25	7.5	1		25	16.25
	2		17.5	7.5	2		30	27.5
	3		17.5	16.25	3		32.5	22.5
	4		18.75	12.5	4		38.75	28.75
	5		16.25	16.25	5		16.25	27.5
	Avg		16.25	12	Avg		28.5	24.5
	S		2.9315098	4.3839195	S		8.4502219	5.1991586
p			0.0769137	p			0.3800992	
Canopy Cover	15S03W25 - Canopy Cover, Plot 4, %				16S03W05 - Canopy Cover, Plot 4, %			
Add all cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		7.5	6.25	1		16.25	16.25
	2		16.25	3.75	2		25	26.25
	3		3.75	7.5	3		22.5	21.25
	4		5	2.5	4		27.5	28.75
	5		11.25	10	5		7.5	27.5
	Avg		8.75	6	Avg		19.75	24
	S		5.077524	2.9843341	S		8.0234033	5.1841103
	p			0.360169	p			0.3441055

Shrub and Tree Density

- Plants/acre from mean of two plots.
- X = Seedling.

Table G-15: Pasture 5 shrub and tree density

Site 15S03W25	1989	2003	2009
Green Rabbitbrush	1350	1300	1300
Wyoming Big Sagebrush	50		

Site 16S03W05	1989	2003	2009
Wyoming Big Sagebrush	4450	5350	5100
Big Sagebrush Seedling	1150	450	50

Pasture 6 – Juniper Basin

Frequency Table Statistics

- T-test Using # Hits (not % frequency)
- For years in which a species was not encountered BUT which had been encountered in previous years, data values were entered as zeros. (Data values for species not encountered in a given year but encountered in later years were not entered as zeros since many plants were intentionally not recorded in previous years, i.e. annuals.)
- 1989 indicates a year and/or data which were taken from old data reports, not access reports.
- A p-value <0.1 indicates a statistically significant difference.

Table G-16: Pasture 6 grasses and shrubs
GRASSES & SHRUBS

Site 16S01W06B				Site 16S01E18			
Site 16S01W06B - Bluebunch wheatgrass, Plot 4				Site 16S01E18- Bluebunch wheatgrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	6	5	9	1	0	9	4
2	3	7	3	2	1	2	1
3	9	10	12	3	2	6	0
4	9	9	10	4	2	9	0
5	7	6	7	5	8	9	6
Average	6.8	7.4	8.2	Average	2.6	7	2.2
S	2.4899799	2.0736441	3.4205263	S	3.1304952	3.082207	2.6832816
p		0.5528894	0.5769328	p		0.0513744	0.0240435
Site 16S01W06B – Sandberg bluegrass, Plot 4				Site 16S01E18- Idaho Fescue, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	11	10	11	1	10	3	2
2	7	13	14	2	11	0	0
3	5	11	4	3	10	6	3
4	5	11	10	4	11	5	2
5	4	12	8	5	8	2	7
Average	6.4	11.4	9.4	Average	10	3.2	2.8
S	2.792848	1.1401754	3.7148351	S	1.2247449	2.3874673	2.5884358
p		0.0320519	0.2662646	p		0.0041952	0.7989659
Site 16S01W06B - Squirreltail, Plot 4				Site 16S01E18- Sandberg bluegrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	7	4	6	1	19	18	20
2	13	4	9	2	18	19	19
3	3	3	1	3	19	18	20
4	2	1	2	4	20	15	20
5	2	2	1	5	19	19	19
Average	5.4	2.8	3.8	Average	19	17.8	19.6
S	4.7222876	1.3038405	3.5637059	S	0.7071068	1.6431677	0.5477226
p		0.1990094	0.4600508	p		0.3045588	0.1210039

Site 16S01W06B - Cheatgrass, Plot 4				Site 16S01E18- Sandberg bluegrass, Plot 2			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		3	9	1	16	14	18
2		4	11	2	17	19	19
3		4	12	3	15	13	16
4		10	11	4	16	13	15
5		12	15	5	15	14	13
Average		6.6	11.6	Average	15.8	14.6	16.2
S		4.0987803	2.1908902	S	0.83666	2.5099801	2.3874673
p			0.0185414	p		0.2354964	0.1595529
Site 16S01W06B - Basin Big Sagebrush, Plot 4				Site 16S01E18- Squirreltail, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	0	0		1	5	5	5
2	0	0		2	8	4	7
3	1	0		3	13	5	5
4	0	0		4	9	5	4
5	0	1		5	5	4	0
Average	0.2	0.2		Average	8	4.6	4.2
S	0.4472136	0.4472136		S	3.3166248	0.5477226	2.5884358
p		1		p		0.0720921	0.7395812

Site 16S01W06B - Wyoming Big Sagebrush, Plot 4				Site 16S01E18- Cheatgrass, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	8	3	2	1		0	0
2	2	2	4	2		0	2
3	2	0	1	3		1	2
4	1	0	1	4		0	1
5	2	2	2	5		0	0
Average	3	1.4	2	Average		0.2	1
S	2.8284271	1.3416408	1.2247449	S		0.4472136	1
p		0.1595529	0.3045588	p			0.0993007
Site 16S01W06B - Carpet Phlox, Plot 4				Site 16S01E18- Low Sagebrush, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		2	3	1	2	1	1
2		6	8	2	4	1	1
3		2	4	3	2	0	0
4		3	4	4	5	2	5
5		4	4	5	2	2	1
Average		3.4	4.6	Average	3	1.2	1.6
S		1.67332	1.94936	S	1.41421	0.83666	1.94936
p			0.03268	p		0.03668	0.58705

Site 16S02W15				Site 16S02W15			
Site 16S02W15 - Bluebunch WG, Plot 4				Site 16S02W15 - Squirreltail, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	2	3	3	1	7	8	9
2	0	0	0	2	7	4	5
3	1	6	5	3	8	8	6
4	1	4	1	4	6	7	8
5	0	3	3	5	7	8	9
Average	0.8	3.2	2.4	Average	7	7	7.4
S	0.83666	2.1679483	1.9493589	S	0.7071068	1.7320508	1.8165902
p		0.0512169	0.2419815	p		1	0.5414697
Site 16S02W15 - Cheatgrass, Plot 4				Site 16S02W15 - Carpet Phlox, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1		16	10	1		1	1
2		18	16	2		2	3
3		20	15	3		0	0
4		19	16	4		0	0
5		20	17	5		3	0
Average		18.6	14.8	Average		1.2	0.8
S		1.6733201	2.7748874	S		1.3038405	1.3038405
p			0.0066467	p			0.5870496
Site 16S02W15 - Sandberg's BG, Plot 4				Site 16S02W15 - Clasping Pepperweed, Plot 4			
Belt	1989	2003	2009	Belt	1989	2003	2009
1	13	14	14	1		4	7
2	15	20	18	2		0	2
3	12	16	17	3		4	5
4	15	15	16	4		9	3
5	12	10	13	5		8	9
Average	13.4	15	15.6	Average		5	5.2
S	1.5165751	3.6055513	2.0736441	S		3.6055513	2.8635642
p		0.2821353	0.5011694	p			0.9061891

Ground Cover by Percentage

- Although they appear to be similar, data collection methods for years recorded in the access reports may be different than those conducted for 1989.
- Total Vegetation" and "Canopy Cover" cannot be determined from old data reports.
- A p-value < 0.1 is significant.
- Long- term 1989-2009 reflects comparison between first and last monitored year (values <0.1 are significant).

Table G-17: Pasture 6 ground cover

	Site 16S01W06B				Site 16S02W15			
Bare Ground	16S01W06B - Bare Ground, Plot 4, %				16S02W15 - Bare Ground, Plot 4, %			
Under "bare ground"	Belt	1989	2003	2009	Belt	1989	2003	2009
intsp+cpy	1	31.25	68.75	51.25	1	25	18.75	37.5
	2	27.5	80	55	2	20	35	20
	3	23.75	65	48.75	3	12.5	18.75	38.75
	4	11.25	61.25	46.25	4	11.25	0	10
	5	8.75	43.75	40	5	22.5	17.5	26.25
	Average	20.5	63.75	48.25	Average	18.25	18	26.5
	S	9.98436	13.19920	5.63194	S	6.09816	12.39329	12.09985
	p		0.00023	0.01050	p		0.96068	0.24810
	Long-term 1989-2009			0.00042				0.18119
Basal Vegetation	16S01W06B - Basal Vegetation, Plot 4, %				16S02W15 - Basal Vegetation, Plot 4, %			
Under "vegetation"	Belt	1989	2003	2009	Belt	1989	2003	2009
shrub+intsp+cpy	1	1.25	1.25	1.25	1	5	6.25	0
	2	12.5	2.5	3.75	2	5	7.5	5
	3	5	2.5	0	3	2.5	12.5	0
	4	7.5	5	1.25	4	2.5	7.5	5
	5	8.75	5	1.25	5	0	12.5	0
	Average	7	3.25	1.5	Average	3	9.25	2
	S	4.20193	1.67705	1.36931	S	2.09165	3.01040	2.73861
	p		0.08901	0.15993	p		0.04471	0.03221
	Long-term 1989-2009			0.02194				0.47662

Gravel	16S01W06B - GR, ST, PL, CR, Plot 4, %				16S02W15 - GR, ST, PL, CR, Plot 4, %			
Rock	Belt	1989	2003	2009	Belt	1989	2003	2009
Persistent Litter	1	30	13.75	22.5	1	37.5	67.5	41.25
Biological Crust	2	6.25	1.25	13.75	2	28.75	45	38.75
Under "per litter", "cryptogams", "gravel", and "stones"	3	18.75	5	18.75	3	37.5	35	28.75
(all) insp+(all) cpy	4	27.5	8.75	11.25	4	46.25	67.5	58.75
	5	20	7.5	13.75	5	28.75	32.5	22.5
	Average	20.5	7.25	16	Average	35.75	49.5	38
	S	9.29550	4.62669	4.54148	S	7.32078	17.08435	13.85190
	p		0.00469	0.01305	p		0.07939	0.03766
	Long-term 1989-2009			0.31977				0.62425

Non-Persistent Litter	16S01W06B - Non-persistent Litter, Plot 4, %				16S02W15 - Non-persistent Litter, Plot 4, %			
Under "nonper litter"	Belt	1989	2003	2009	Belt	1989	2003	2009
instp+cpy	1	37.5	16.25	25	1	32.5	7.5	21.25
	2	53.75	16.25	5	2	46.25	12.5	36.25
	3	52.5	27.5	13.75	3	47.5	33.75	32.5
	4	53.75	25	41.25	4	40	25	26.25
	5	62.5	43.75	45	5	48.75	37.5	51.25
	Average	52	25.75	26	Average	43	23.25	33.5
	S	9.03984	11.27081	17.21645	S	6.76618	13.03840	11.47007
	p		0.00133	0.96731	p		0.00936	0.08894
	Long-term 1989-2009			0.02537				0.03849
Total Vegetation	16S01W06B - Total Vegetation, Plot 4, %				16S02W15 - Total Vegetation, Plot 4, %			
"Vegetation" +all cpy sections	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		11.25	18.75	1		7.5	5
	2		18.75	10	2		7.5	7.5
	3		17.5	12.5	3		13.75	1.25
	4		17.5	8.75	4		11.25	13.75
	5		37.5	20	5		15	1.25
	Average		20.5	14.0	Average		11.0	5.8
	S		9.94516	5.10820	S		3.46861	5.19916
	p			0.18448	p			0.18860
Canopy Cover	16S01W06B - Canopy Cover, Plot 4, %				16S02W15 - Canopy Cover, Plot 4, %			
Add all cpy	Belt	1989	2003	2009	Belt	1989	2003	2009
	1		10	17.5	1		1.25	5
	2		16.25	6.25	2		0	2.5
	3		15	12.5	3		1.25	1.25
	4		12.5	7.5	4		5	10
	5		32.5	20	5		2.5	1.25
	Average		17.3	12.8	Average		2.0	4.0
	S		8.85649	6.02080	S		1.89572	3.68697
	p			0.26585	p			0.15955

Bare Ground Under "bare ground" intsp+cpy	16S01E18 - Bare Ground, Plot 4, %				Basal Vegetation Under "vegetation" shrub+intsp+cpy	16S01E18 - Basal Vegetation, Plot 4, %			
	Belt	1989	2003	2009		Belt	1989	2003	2009
	1	47.5	38.75	22.5		1	8.75	15	0
	2	46.25	41.25	13.75		2	10	11.25	0
	3	36.25	40	18.75		3	8.75	3.75	0
	4	27.5	47.5	21.25		4	11.25	7.5	0
	5	35	43.75	22.5		5	6.25	10	0
	Average	38.5	42.25	19.75		Average	9	9.5	0
S	8.35726	3.46861	3.68697	S	1.85405	4.20193	0.00000		
p		0.50359	0.00037	p		0.82756			
Long-term 1989-2009			0.01525						

Gravel Rock Persistent Litter Biological Crust Under "perlitter", "cryptogams", "gravel", and "stones" (all) insp+(all) cpy	16S01E18 - GR, ST, PL, CR, Plot 4, %				Non-Persistent Litter Under "nonperlitter" instp+cpy	16S01E18 - Non-persistent Litter, Plot 4, %			
	Belt	1989	2003	2009		Belt	1989	2003	2009
	1	32.5	16.25	28.75		1	11.25	30	50
	2	36.25	27.5	32.5		2	7.5	20	53.75
	3	43.75	40	38.75		3	11.25	16.25	42.5
	4	37.5	31.25	32.5		4	23.75	13.75	46.25
	5	31.25	37.5	25		5	27.5	8.75	52.5
	Average	36.25	30.5	31.5		Average	16.25	17.75	49
S	4.92125	9.37917	5.10820	S	8.79453	7.97457	4.62669		
p		0.19100	0.81915	p		0.84025	0.00141		
Long-term 1989-2009			0.00053		Long-term 1989-2009			0.00173	
Total Vegetation "Vegetation" +all cpy sections	16S01E18 - Total Vegetation, Plot 4, %				Canopy Cover Add all cpy	16S01E18 - Canopy Cover, Plot 4, %			
	Belt	1989	2003	2009		Belt	1989	2003	2009
	1		21.25	2.5		1		6.25	2.5
	2		13.75	1.25		2		2.5	1.25
	3		3.75	1.25		3		0	1.25
	4		12.5	12.5		4		5	12.5
	5		13.75	5		5		3.75	5
	Average		13.0	4.5		Average		3.5	4.5
S		6.22495	4.72692	S		2.40442	4.72692		
p			0.06606	p			0.62131		

Shrub and Tree Density

- Plants/acre from mean of two plots.
- X = Seedling.

Table G-18: Pasture 6 shrub and tree density

Site 16S01W06B	1989	2003	2009
Basin Big Sagebrush	50	150	500
Wyoming Big Sagebrush	700	800	
Site16S01E18	1989	2003	2009
Low Sagebrush	2100	1100	750

APPENDIX H: RANGELAND HEALTH FIELD ASSESSMENT TABLES – INDICATORS AND ATTRIBUTE RATINGS

Pasture 1 - Dry Lakes

Table H-1: Garat location information for pasture 1

Pasture	Site # ID	Location (Sec., Township, Range)	Ecological Site
Dry Lakes (1)	051903-1A	13S04W29	Loamy 10-13
	052103-2A	14S04W05	Loamy 10-13
	052103-4A	14S04W15	Loamy 10-13
	052103-3A	14S04W18	Loamy 10-13
	052103-1A	13S04W28	Shallow Claypan 11-13

Table H-2: Garat 2003 Rangeland Health Indicator ratings² for pasture 1

Indicator	Indicator Type ¹	Site 051903-1A	Site 052103-2A	Site 052103-4A	Site 052103-3A	Site 052103-1A
1. Rills	S,H	n-s	n-s	n-s	n-s	n-s
2. Water Flow Patterns	S,H	m	m	m	m	s-m
3. Pedestals/Terracettes	S,H	s-m	s-m	s-m	s-m	m
4. Bare Ground	S,H	m	m	m	m	s-m
5. Gullies	S,H	n-s	n-s	n-s	n-s	n-s
6. Wind Scoured, Blowouts and/or Depositions	S	n-s	n-s	n-s	n-s	n-s
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s
8. Soil Surface Resistance to Erosion	S,H,B	m	s-m	m	s-m	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	m	m	s-m
11. Compaction Layer	S,H,B	n-s	n-s	s-m	m	n-s

Indicator	Indicator Type ¹	Site 051903-1A	Site 052103-2A	Site 052103-4A	Site 052103-3A	Site 052103-1A
12. Functional/Structural Groups	B	s-m	s-m	s-m	m	s-m
13. Plant Mortality/Decadence	B	m	m	m	m	m
14. Litter Amount	H,B	m	m	m	m	m
15. Annual Production	B	s-m	s-m	s-m	s-m	s-m
16. Invasive Plants	B	s-m	n-s	s-m	n-s	s-m
17. Reproductive Capability of Perennial Plants	B	s-m	n-s	s-m	s-m	s-m

Table H-3: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 1

Attribute	Rating				
	051903-1A	052103-2A	052103-4A	052103-3A	052103-1A
Site # ID					
Soil/Site Stability (S)	<i>m</i>	s-m	m	s-m (<i>m</i>)	s-m
Hydrologic Function (H)	<i>m</i>	s-m	m	m/s-m (<i>m</i>)	s-m
Biotic Integrity (B)	<i>s-m</i>	s-m	s-m	m/s-m (<i>m</i>)	s-m

Letters in italics display final ratings determined during the interdisciplinary team revision in 2011 where final calls were missing or were the original call was borderline. Changes to previous calls made in 2003 were applied based on all available information.

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Pasture 2 – Piute Creek

Table H-4: Garat location information for pasture 2

Pasture	Site # ID	Location (Sec., Township, Range)	Ecological Site
Piute Creek (2)	052903-3A	14S02W06	Loamy 10-13
	052903-1A	14S02W08	Loamy 10-13
	052803-4A	14S03W10	Loamy 10-13
	052803-1A	14S04W11	Loamy 10-13
	052803-3A	14S04W14	Loamy 10-13
	052903-4A	14S03W03	Shallow Claypan 11-13
	052903-5A	14S03W17	Shallow Claypan 11-13

Table H-5: Garat 2003 Rangeland Health Indicator ratings for pasture 2

Indicator	Indicator Type ¹	Site 052903-3A	Site 052903-1A	Site 052803-4A	Site 052803-1A	Site 052803-3A	Site 052903-4A	Site 052903-5A
1. Rills	S,H	n-s						
2. Water Flow Patterns	S,H	m	m	m	m	m	s-m	s-m
3. Pedestals/Terracettes	S,H	m	s-m	s-m	s-m	m	m	m
4. Bare Ground	S,H	n-s	s-m	s-m	m	m	s-m	s-m
5. Gullies	S,H	n-s						
6. Wind Scoured, Blowouts and/or Depositions	S	n-s						
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s	s-m	s-m
8. Soil Surface to Erosion	S,H,B	s-m	m	s-m	s-m	s-m	n-s	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m						
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	m	m	m	s-m	m	m	s-m
11. Compaction Layer	S,H,B	n-s	s-m	m	s-m	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m	m	s-m	s-m	s-m	s-m	s-m
13. Plant Mortality/Decadence	B	m	s-m	s-m	m	m	m	s-m
14. Litter Amount	H,B	s-m	s-m	m	s-m	m	s-m	s-m
15. Annual Production	B	s-m	m	s-m	s-m	s-m	s-m	s-m
16. Invasive Plants	B	m-e	m-e	s-m	s-m	s-m	s-m	m
17. Reproductive Capability of Perennial Plants	B	s-m	s-m	n-s	s-m	s-m	n-s	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-6: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 2

Attribute	Rating						
	052903-3A	052903-1A	052803-4A	052803-1A	052803-3A	052903-4A	052903-5A
Site # ID							
Soil/Site Stability (S)	s-m	s-m	m (<i>s-m</i>)	s-m	m	s-m	s-m
Hydrologic Function (H)	s-m	s-m	s-m	s-m	m	s-m	s-m
Biotic Integrity (B)	m	m	s-m	s-m	s-m	s-m	s-m

Letters in italics display final ratings determined during the interdisciplinary team revision in 2011 where final calls were missing or were the original call was borderline. Changes to previous calls made in 2003 were applied based on all available information.

Pasture 3 - Forty-Five

Table H-7: Garat location information for pasture 3

Pasture	Site # ID	Location (Sec., Township, Range)	Ecological Site
Forty-five (3)	052003-3A	14S03W30	Loamy 10-13
	070203-3A	14S03W34	Loamy 10-13
	052003-4A	14S04W21	Loamy 10-13
	070203-1A	14S04W33	Loamy 10-13
	070203-2A	14S04W35	Loamy 10-13
	052003-2A	15S03W09	Loamy 10-13
	061003-1A	15S03W13	Loamy 10-13
	052003-1A	15S04W09	Loamy 10-13
	062503-1A	15S04W12	Loamy 10-13
	061003-2A	15S02W06	Shallow Claypan 11-13

Table H-8: Garat 2003 Rangeland Health Indicator ratings² for pasture 3

Indicator	Indicator Type ¹	Site 052003-3A	Site 070203-3A	Site 052003-4A	Site 070203-1A	Site 070203-2A	Site 052003-2A	Site 061003-1A	Site 052003-1A	Site 062503-1A	Site 061003-2A
1. Rills	S,H	n-s									
2. Water Flow Patterns	S,H	m	m	m-e	m-e	m-e	m-e	m	m	m-e	m
3. Pedestals/Terracettes	S,H	s-m	s-m	m-e	m	s-m	m-e	m-e	s-m	s-m	m
4. Bare Ground	S,H	m	s-m	m-e	s-m	m	m-e	m	s-m	m-e	s
5. Gullies	S,H	n-s									
6. Wind Scoured, Blowouts and/or Depositions	S	n-s									
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s	n-s	s-m	n-s	n-s	s-m
8. Soil Surface to Erosion	S,H,B	s-m	s-m	m	s-m	s-m	m	m	s-m	m	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	m	s-m	s-m	m	m	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	m	s-m	m	s-m	m	m	m	m	m-e	m
11. Compaction Layer	S,H,B	m	n-s	m	n-s						
12. Functional/Structural Groups	B	m	s-m	s-m	s-m	s-m	m	s-m	s-m	m	m
13. Plant Mortality/Decadence	B	m-e	m	m	m	m	m-e	m	s-m	m-e	m
14. Litter Amount	H,B	s-m	s-m	m	s-m	m	m-e	m	m	m-e	m
15. Annual Production	B	s-m	s-m	s-m	s-m	s-m	m	s-m	s-m	m	m
16. Invasive Plants	B	s-m	n-s	n-s	n-s	n-s	n-s	m	m-e	n-s	m-e
17. Reproductive Capability of Perennial Plants	B	m	s-m	s-m	s-m	m	m	s-m	n-s	m	s-m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-9: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 3

Attribute	Rating									
	052003-3A	070203-3A	052003-4A	070203-1A	070203-2A	052003-2A	061003-1A	052003-1A	062503-1A	061003-2A
Soil/Site Stability (S)	m	s-m	m	s-m (<i>m</i>)	s-m	m-e	m	s-m	m	s-m
Hydrologic Function (H)	m	s-m	m	s-m	s-m (<i>m</i>)	m-e	m	s-m	m (<i>m-e</i>)	s-m
Biotic Integrity (B)	m	s-m	m	s-m	m	m	m	s-m (<i>m</i>)	m	m

Letters in italics display final ratings determined during the interdisciplinary team revision in 2011 where final calls were missing or were the original call was borderline. Changes to previous calls made in 2003 were applied based on all available information.

Pasture 4 – Kimball

Table H-10: Garat location information for pasture 4

Pasture	Site # ID	Location (Sec., Township, Range)	Ecological Site
Kimball (4)	053003-1A	14S02W11	Loamy 10-13
	061203-1A	14S02W15	Loamy 10-13
	052903-2A	14S02W19	Loamy 10-13
	061203-2A	14S02W22	Loamy 10-13
	061203-3A	15S01W23	Loamy 10-13
	061103-1A	15S02W12	Loamy 10-13
	061103-4A	14S02W25	Shallow Claypan 12-16
	052203-1A	15S01W15	Shallow Claypan 11-13
	061003-3A	15S02W08	Shallow Claypan 12-16
	061103-2A	15S02W14	Shallow Claypan 11-13
	061103-3A	15S02W19	Shallow Claypan 11-13

Table H-11: Garat 2003 Rangeland Health Indicator ratings² for pasture 4

Indicator	Indicator Type ¹	Site 053003-1A	Site 061203-1A	Site 052903-2A	Site 061203-2A	Site 061203-3A	Site 061103-1A	Site 061103-4A	Site 052203-1A	Site 061003-3A	Site 061103-2A	Site 061103-3A
1. Rills	S,H	n-s										
2. Water Flow Patterns	S,H	s-m	m-e	m	m-e	n-s	m	m	m	n-s	s-m	m
3. Pedestals/Terracettes	S,H	s-m	m-e	s-m	m	s-m	s-m	s-m	e	s-m	s-m	m
4. Bare Ground	S,H	n-s	s-m	m	m-e	s-m	m	s-m	n-s	n-s	s-m	s-m
5. Gullies	S,H	n-s										
6. Wind Scoured, Blowouts and/or Depositions	S	n-s										
7. Litter Movement	S	n-s	s-m	n-s	s-m	n-s	s-m	s-m	n-s	n-s	n-s	s-m
8. Soil Surface to Erosion	S,H,B	n-s	s-m	s-m	m	s-m	s-m	s-m	n-s	n-s	s-m	s-m
9. Soil Surface Loss or Degradation	S,H,B	n-s	s-m	s-m	m	n-s	s-m	s-m	m	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	m	m	s-m	m-e	n-s	s-m	s-m	m	s-m	s-m	s-m
11. Compaction Layer	S,H,B	n-s	n-s	s-m	n-s							
12. Functional/Structural Groups	B	m	m	s-m	m	s-m						
13. Plant Mortality/Decadence	B	s-m	m	s-m	m	n-s	m-e	m	m-e	s-m	m	m
14. Litter Amount	H,B	n-s	s-m	m	m	n-s	s-m	s-m	s-m	s-m	s-m	m
15. Annual Production	B	n-s	m	s-m	m	n-s	s-m	n-s	s-m	n-s	n-s	s-m
16. Invasive Plants	B	e	m-e	m-e	m-e	m	m-e	n-s	m-e	s-m	n-s	n-s
17. Reproductive Capability of Perennial Plants	B	n-s	s-m	s-m	m	n-s	s-m	n-s	m	n-s	n-s	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-12: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 4

Attribute	Rating										
	053003-1A	061203-1A	052903-2A	061203-2A	061203-3A	061103-1A	061103-4A	052203-1A	061003-3A	061103-2A	061103-3A
Soil/Site Stability (S)	s-m	m-e	s-m	m	s-m	s-m	s-m	e	s-m	s-m	m
Hydrologic Function (H)	n-s	s-m	m	m-e	s-m	m	s-m	n-s	n-s	s-m	s-m
Biotic Integrity (B)	n-s										

Pasture 5 - Big Horse

Table H-13: Garat location information for pasture 5

Pasture	Site # ID	Location (Sec., Township, Range)	Ecological Site
Big Horse (5)	062603-1A	15S02W31	Loamy 10-13
	070203-4A	15S03W18	Loamy 10-13
	070303-1A	15S03W20	Loamy 10-13
	070103-2A	15S03W21	Loamy 10-13
	062503-2A	15S03W25	Loamy 10-13
	062503-3A	15S03W27	Loamy 10-13
	070303-2A	15S03W29	Loamy 10-13
	062503-4A	15S03W34	Loamy 10-13
	070103-1A	16S03W01	Loamy 10-13
	062503-5A	16S03W04	Loamy 10-13
	070303-4A	16S03W15	Loamy 10-13
	070303-3A	16S03W16	Loamy 10-13
	070303-5A	16S03W23	Loamy 10-13
	072203-1A	16S03W24	Loamy 10-13

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-14: Garat 2003 Rangeland Health Indicator ratings² for pasture 5

Indicator	Indicator Type ¹	Site						
		062603-1A	070203-4A	070303-1A	070103-2A	062503-2A	062503-3A	070303-2A
1. Rills	S,H	n-s						
2. Water Flow Patterns	S,H	m	s-m	m	m-e	m	s-m	m
3. Pedestals/Terracettes	S,H	m	s-m	s-m	m	m	m	m
4. Bare Ground	S,H	m	s-m	s-m	m	s-m	m	s-m
5. Gullies	S,H	n-s						
6. Wind Scoured, Blowouts and/or Depositions	S	n-s						
7. Litter Movement	S	s-m	n-s	n-s	s-m	n-s	n-s	s-m
8. Soil Surface to Erosion	S,H,B	s-m	s-m	s-m	m	s-m	m	s-m
9. Soil Surface Loss or Degradation	S,H,B	s-m	n-s	s-m	m	s-m	s-m	s-m
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	m	s-m	m	m-e	m	m	m
11. Compaction Layer	S,H,B	n-s	n-s	n-s	s-m	n-s	n-s	n-s
12. Functional/Structural Groups	B	s-m+	s-m	s-m	m-e	m	s-m	s-m
13. Plant Mortality/Decadence	B	m	s-m	s-m	m-e	m	m	s-m
14. Litter Amount	H,B	s-m	s-m	m	m	s-m	s-m	s-m
15. Annual Production	B	s-m	n-s	s-m	m	m	s-m	s-m
16. Invasive Plants	B	m	n-s	n-s	n-s	e	m	n-s
17. Reproductive Capability of Perennial Plants	B	s-m	s-m	s-m	m	m	s-m	s-m

Table H-15: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 5

Attribute	Rating						
	062603-1A	070203-4A	070303-1A	070103-2A	062503-2A	062503-3A	070303-2A
Site # ID							
Soil/Site Stability (S)	s-m	s-m	s-m	m	s-m	s-m	s-m
Hydrologic Function (H)	s-m (<i>m</i>)	s-m	s-m	m (<i>m-e</i>)	s-m	s-m	s-m
Biotic Integrity (B)	s-m	s-m	s-m	m	m	m	s-m

Letters in italics display final ratings determined during the interdisciplinary team revision in 2011 where final calls were missing or were the original call was borderline. Changes to previous calls made in 2003 were applied based on all available information.

Table H-16: Garat 2003 Rangeland Health Indicator ratings² for pasture 5 (continued)

Indicator	Indicator Type ¹	Site 062503-4A	Site 070103-1A	Site 062503-5A	Site 070303-4A	Site 070303-3A	Site 070303-5A	Site 072203-1A
1. Rills	S,H	n-s						
2. Water Flow Patterns	S,H	s-m	m-e	s-m	m	s-m	s-m	s-m
3. Pedestals/Terracettes	S,H	s-m	s-m	s-m	s-m	m	s-m	s-m
4. Bare Ground	S,H	s-m	s-m	m	s-m	s-m	s-m	n-s
5. Gullies	S,H	n-s						
6. Wind Scoured, Blowouts and/or Depositions	S	n-s						
7. Litter Movement	S	s-m	s-m	n-s	n-s	s-m	s-m	n-s
8. Soil Surface to Erosion	S,H,B	s-m	s-m	m	s-m	s-m	s-m	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	s-m	s-m	s-m	s-m	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	m	m	s-m	s-m	s-m	s-m
11. Compaction Layer	S,H,B	n-s						
12. Functional/Structural Groups	B	s-m	m	m	s-m	m	s-m	m
13. Plant Mortality/Decadence	B	m-e	m-e	m-e	m	e	m	m-e
14. Litter Amount	H,B	s-m	s-m	s-m	s-m	m	s-m	n-s
15. Annual Production	B	n-s	s-m	s-m	s-m	s-m	s-m	n-s
16. Invasive Plants	B	m	m-e	n-s	n-s	n-s	s-m	m-e
17. Reproductive Capability of Perennial Plants	B	n-s	m	m	s-m	s-m	s-m	m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-17: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 5 (continued)

Attribute	Rating						
	062503-4A	070103-1A	062503-5A	070303-4A	070303-3A	070303-5A	072203-1A
Soil/Site Stability (S)	s-m	m	s-m	s-m	s-m	s-m	n-s
Hydrologic Function (H)	s-m	m	s-m	s-m	s-m	s-m	n-s
Biotic Integrity (B)	s-m	m	m	s-m	m	s-m	m

Pasture 6 - Juniper Basin

Table H-18: Garat location information for pasture 6

Pasture	Site # ID	Location (Sec., Township, Range)	Ecological Site
Juniper Basin (6)	072403-2A	15S01W25	Loamy 10-13
	062603-5A	15S01W31B	Loamy 10-13
	072303-5A	15S01W35	Loamy 10-13
	062603-2A	15S02W32	Loamy 10-13
	072303-1A	15S02W34	Loamy 10-13
	072303-4A	16S01W06	Loamy 10-13
	072403-1A	16S01W12	Loamy 10-13
	072303-3A	16S01W30	Loamy 10-13
	052104-2A	16S02W10A (2004 DATA)	Loamy 10-13
	072303-2A	16S02W10B	Loamy 10-13
	052104-1A	16S02W12 (2004 DATA)	Loamy 10-13
	072203-2A	16S02W17	Loamy 10-13
	072203-3A	16S02W20	Loamy 10-13
	062603-3A	15S02W27	Shallow Claypan 11-13
	072403-3A	16S01E18	Shallow Claypan 11-13

Table H-19: Garat 2003 Rangeland Health Indicator ratings² for pasture 6

Indicator	Indicator Type ¹	Site 072403-2A	Site 062603-5A	Site 072303-5A	Site 062603-2A	Site 072303-1A	Site 072303-4A	Site 072403-1A
1. Rills	S,H	n-s						
2. Water Flow Patterns	S,H	s-m	m	m	m-e	s-m	m-e	s-m
3. Pedestals/Terracettes	S,H	s-m	s-m	s-m	m	s-m	s-m	s-m
4. Bare Ground	S,H	m	s-m	s-m	m	m	m	m
5. Gullies	S,H	n-s						
6. Wind Scoured, Blowouts and/or Depositions	S	n-s						
7. Litter Movement	S	n-s	n-s	n-s	s-m	n-s	s-m	n-s
8. Soil Surface to Erosion	S,H,B	m	s-m	s-m	s-m	s-m	m	s-m
9. Soil Surface Loss or	S,H,B	s-m	s-m	s-m	m	s-m	m	s-m

Indicator	Indicator Type ¹	Site 072403-2A	Site 062603-5A	Site 072303-5A	Site 062603-2A	Site 072303-1A	Site 072303-4A	Site 072403-1A
Degradation								
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	s-m	m	s-m	m	s-m
11. Compaction Layer	S,H,B	n-s						
12. Functional/Structural Groups	B	s-m						
13. Plant Mortality/Decadence	B	s-m	m-e	m	m	s-m	m	s-m
14. Litter Amount	H,B	m	s-m	m	s-m	m	m	m
15. Annual Production	B	n-s	n-s	s-m	s-m	s-m	s-m	s-m
16. Invasive Plants	B	n-s	m-e	n-s	m-e	m-e	m-e	s-m
17. Reproductive Capability of Perennial Plants	B	s-m	n-s	m	s-m	s-m	m	s-m

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-20: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 6

Attribute	Rating						
	072403-2A	062603-5A	072303-5A	062603-2A	072303-1A	072303-4A	072403-1A
Site # ID							
Soil/Site Stability (S)	s-m	s-m	s-m	m	s-m	m	s-m
Hydrologic Function (H)	s-m	s-m	s-m	m	s-m	m	s-m
Biotic Integrity (B)	s-m	m	m	m	s-m	m	s-m

Table H-21: Garat 2003/2004 Rangeland Health Indicator ratings² for pasture 6 (continued)

Indicator	Indicator Type ¹	072303-3A	052104-2A	072303-2A	052104-1A	072203-2A	072203-3A	062603-3A	072403-3A
1. Rills	S,H	n-s							
2. Water Flow Patterns	S,H	s-m	s-m	s-m	m	m	s-m	m	n-s
3. Pedestals/Terracettes	S,H	n-s	n-s	m	m	s-m	n-s	m-e	n-s
4. Bare Ground	S,H	m	m-e	n-s	m	s-m	n-s	s-m	n-s
5. Gullies	S,H	n-s							
6. Wind Scoured, Blowouts and/or Depositions	S	n-s							
7. Litter Movement	S	n-s	n-s	n-s	n-s	n-s	n-s	s-m	n-s
8. Soil Surface to Erosion	S,H,B	m	m	n-s	s-m	s-m	n-s	s-m	n-s
9. Soil Surface Loss or Degradation	S,H,B	s-m	s-m	s-m	s-m	s-m	n-s	m	n-s
10. Plant Community Comp. & Distribution Relative to Infiltration & Runoff	H	s-m	s-m	s-m	s-m	s-m	s-m	m	n-s
11. Compaction Layer	S,H,B	m	n-s						
12. Functional/Structural Groups	B	s-m	n-s						
13. Plant Mortality/Decadence	B	m	n-s	s-m	m	s-m	s-m	m-e	n-s
14. Litter Amount	H,B	m	m	n-s	s-m	s-m	s-m	m	n-s
15. Annual Production	B	n-s	n-s	n-s	n-s	n-s	s-m	s-m	n-s
16. Invasive Plants	B	n-s	m-e	m-e	m-e	m	m-e	n-s	n-s
17. Reproductive Capability of Perennial Plants	B	m-e	n-s	n-s	s-m	n-s	s-m	s-m	n-s

¹S = Soil/Site Stability Indicator, H = Hydrologic Function Indicator, B = Biotic Integrity Indicator

²Departures from reference conditions; n-s = none to slight, s-m = slight to moderate, m = moderate, m-e = moderate to extreme, e = extreme

Table H-22: 2011 Attribute Ratings for Rangeland Health Assessments for pasture 6 (continued)

Attribute	Rating							
	072303-3A	052104-2A	072303-2A	052104-1A	072203-2A	072203-3A	062603-3A	072403-3A
Site # ID								
Soil/Site Stability (S)	m	s-m	n-s	s-m	s-m	n-s	m	n-s
Hydrologic Function (H)	s-m	s-m	n-s	m	s-m	n-s	m	n-s
Biotic Integrity (B)	m	s-m	s-m	m	s-m	m	m	n-s

APPENDIX I: COMMON AND SCIENTIFIC PLANT NAMES USED IN THE CASTLEHEAD-LAMBERT, GARAT AND SWISHER EVALUATION REPORTS

Table I-1: Common and scientific names for plants referred to in allotment evaluation reports

Common Name	Scientific Name
Aspen	<i>Populus tremuloides</i>
Bitterbrush	<i>Purshia tridentata</i>
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
Bud sagebrush	<i>Picrothamnus desertorum</i>
Bulbous bluegrass	<i>Poa bulbosa</i>
Canada thistle	<i>Cirsium arvense</i>
Ceanothus	<i>Ceanothus velutinus</i>
Cheatgrass	<i>Bromus tectorum</i>
Crested wheatgrass	<i>Agropyron cristatum</i>
Curl-leaf mountain mahogany	<i>Cercocarpus ledifolius</i>
Currant	<i>Ribes spp.</i>
Curvseed butterwort (bur buttercup)	<i>Ceratocephala testiculata</i>
Davis' peppergrass	<i>Lepidium davisii</i>
Green rabbitbrush	<i>Ericameria teretifolia</i>
Idaho fescue	<i>Festuca idahoensis</i>
Inch-high lupine	<i>Lupinus uncialis</i>
Low sagebrush	<i>Artemisia arbuscula</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Mountain ball cactus	<i>Pediocactus simpsonii</i>
Mountain big sagebrush	<i>Artemisia tridentata ssp. vaseyana</i>
Needlegrass	<i>Achnatherum spp.</i>
Newberry's milkvetch	<i>Astragalus newberryi var. castoreus</i>
Rabbitbrush	<i>Chrysothamnus & Ericameria spp.</i>
Rattlesnake stickseed	<i>Hackelia ophiobia</i>
Sandberg bluegrass	<i>Poa secunda</i>
Scotch cottonthistle (Scotch thistle)	<i>Onopordum acanthium</i>
Slickspot peppergrass	<i>Lepidium papilliferum</i>
Small burnet	<i>Sanguisorba minor</i>
Mountain snowberry	<i>Symphoricarpos oreophilus</i>
Squirreltail	<i>Elymus elymoides</i>
Stream orchid	<i>Epipactis gigantea</i>
Thinleaf goldenhead	<i>Pyrrcoma linearis</i>
Thurber's needlegrass	<i>Achnatherum thurberianum</i>

Common Name	Scientific Name
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>
Western germander	<i>Teucrium canadense var. occidentale</i>
Western juniper (juniper)	<i>Juniperus occidentalis</i>
Whitetop	<i>Cardaria draba</i>
Wood's rose	<i>Rosa woodsii</i>
Willow	<i>Salix spp.</i>
Wyoming big sagebrush	<i>Artemisia tridentata ssp. wyomingensis</i>

Nomenclature reference: USDA, NRCS PLANTS database as of January 2012.

APPENDIX J: SPECIAL STATUS WILDLIFE SPECIES

Table J-1: Special status wildlife species in the Owyhee Field Office and occurrence potential within the Garat allotment

Common Name	Species	Status (conservation plans) ¹	General Habitat ²	Habitat Present ³	Species Present ⁴	Species/Habitat at Affected
Snake River Phya	<i>Physa natricina</i>	ESA E	Believed to inhabit deep water on the margins of moderately swift rapids or riffles. Individuals have been found in relatively undisturbed areas with gravel, boulder, or cobble substrates and low percentage of epiphytic algae or macrophytes.	No	Not Present	No
Columbia Spotted Frog	<i>Rana luteiventris</i>	ESA C (SGCN)	Cool, permanent, quiet water in streams, rivers, lakes, pools, springs, and marshes usually in hilly areas from sea level to about 3000 m. Highly aquatic, but may disperse into forests, grasslands, and shrublands	Yes; pastures 1-4	Improbable	No
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	ESA C (SGCN/HPBB/BCC)	Broad sagebrush covered valleys and foothills interspersed with wet meadows.	Yes; throughout allotment	Present	Yes
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	ESA C (SGCN/BCC)	Extensive, mature riparian woodlands, especially of cottonwoods or willows, and other open woodlands with dense understories at lower elevations. Mature riparian areas with willow and alder thickets.	No	Not Present	No
American White Pelican	<i>Pelecanus erythrorhynchos</i>	BLM 2 (SGCN/HPBB)	Typically occur on isolated islands in freshwater lakes, marshes or rivers, on lakes, reservoirs and rivers supporting large fish populations and on mud, sand or gravel shores.	No (yes)	Improbable	No (yes if fish in Juniper Res)
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGEPA – BLM 2 (SGCN/BCC)	Restricted to large rivers and water bodies near mixed conifer forest, occasionally sagebrush foothills. Nest in oldest trees in the stand. Always associated with aquatic forage area.	No (yes)	Possible	No (yes if fish in Juniper res)
Golden Eagle	<i>Aquila chrysaetos</i>	BGEPA (HPBB/BCC)	Open habitats in mountains and hill country, prairies and other grasslands. Open sagebrush areas adjacent to nesting cliffs. Found on prairies, tundra, open wooded country, and barren areas, especially in hilly or mountainous areas. In Idaho, prefers open and semi-open areas in deserts and mountains.	Yes; foraging habitat throughout allotment	Probable	Yes
Northern Leopard Frog	<i>Rana pipiens</i>	BLM 2 (SGCN)	Permanent water sources on the plains, foothill, and in montane zones	No	Not Present	No
Pygmy Rabbit	<i>Brachylagus idahoensis</i>	BLM 2 (SGCN)	Throughout much of the Great Basin; relatively large areas of tall/dense sagebrush and deep soils. In Idaho, closely associated with large stands of sagebrush; prefers areas of tall, dense sagebrush cover with high percent woody cover.	Yes; pastures 2, 4, and 6	Possible	Yes
Columbia River Redband Trout	<i>Oncorhynchus mykiss gibbsi</i>	BLM 2 (SGCN)	Redband trout are found in a range of stream habitats from desert areas in southwestern Idaho to forested mountain streams in central and northern Idaho.	No	Not Present	No
White Sturgeon	<i>Acipenser transmontanus</i>	BLM 2 (SGCN)	Rely on streams, rivers, and estuarine habitat as well as marine waters during their lifecycle. Prefer to spawn in rivers with swift currents and large cobble; no nest is built.	No	Not Present	No
Black Tern	<i>Chlidonias niger</i>	BLM 3 (SGCN)	Rivers and ponds. Nests in or on emergent vegetation in alkaline lakes and freshwater marshes, or in marshy areas along	Yes	Possible	Yes

Common Name	Species	Status (conservation plans) ¹	General Habitat ²	Habitat Present ³	Species Present ⁴	Species/Habitat at Affected
			rivers, lakes, or ponds. Forages within a few hundred meters of nest.			
Brewer's Sparrow	<i>Spizella breweri</i>	BLM 3 (SGCN/HPBB/BCC)	Sagebrush steppe. Idaho study found Brewer's Sparrows prefer large, living sagebrush for nesting. A recent study in southwestern Idaho concluded that their distribution was influenced by both local vegetation cover and landscape-level features such as patch size.	Yes; throughout allotment	Probable	Yes
California Bighorn Sheep	<i>Ovis canadensis californiana</i>	BLM 3 (SGCN)	Extremely rugged mountain areas with jutting crags, deep canyons and precipitous cliffs. Grassy slopes near cliffs and rocky ridges in mountains. Mesic to xeric grass. Avoids dense vegetation cover. Semi-desert grassland. Canyonlands and foothills of the Owyhee River drainage.	Yes; pastures 1-5 near canyons	Present	Yes
Calliope Hummingbird	<i>Stellula calliope</i>	BLM 3 (HPBB/BCC)	Secondary successional shrub/sapling. Aspen thickets, along streams, open montane forests. Shrubby riparian areas and sparsely timbered sites. In Idaho, found in mountains along meadows, canyons and streams, in open montane forests and willow and alder thickets	Yes; locally in pastures 3 and 6 and canyons	Possible	Yes
Columbia Sharp-tailed Grouse	<i>Tympanuchus phasianellus columbianus</i>	BLM 3 (SGCN/HPBB)	Found in grasslands (especially with scattered woodlands), arid sagebrush, brushy hills, oak savannas, and edges of riparian woodlands. In west-central Idaho study, grouse preferred big sagebrush to other summer cover types; mountain shrub and riparian cover types were critical components of winter habitat.	No	Not Present	No
Common Garter Snake	<i>Thamnophis sirtalis</i>	BLM 3	Usually found in habitats associated with water, such as streams, rivers, lakes, ponds and marshes. They can also be found in open meadows and coniferous forests.	Yes; Piute Creek pasture 2	Possible	Yes
Ferruginous Hawk	<i>Buteo regalis</i>	BLM 3 (SGCN/HPBB/BCC)	Found in shrub steppe at periphery of juniper or other woodlands.	Yes; nesting and foraging throughout allotment	Present	Yes
Flammulated Owl	<i>Otus flammeolus</i>	BLM 3 (SGCN/HPBB/BCC)	Prefers old growth. In Idaho, occupies older ponderosa pine, Douglas-fir, and mixed coniferous forests.	No	Improbable	No
Fringed Myotis	<i>Myotis thysanodes</i>	BLM 3 (SGCN)	Found primarily in desert shrublands, sagebrush-grassland, and woodland habitats (ponderosa pine forest, oak and pine habitats, Douglas-fir). Roosts in caves, mines, rock crevices, buildings, and other protected sites. Prefer to forage in riparian areas characterized by intermittent streams with wider channels (5.5 to 10.5 meters) than ones with channels less than 2.0 meters wide.	Yes; pastures 2 and 4	Possible	Yes
Hammond's Flycatcher	<i>Empidonax hammondi</i>	BLM 3 (HPBB)	Found in coniferous forests and woodlands. In Idaho, old-growth associates in Douglas-fir/ponderosa pine forests.	No	Improbable	No
Lewis' Woodpecker	<i>Melanerpes lewis</i>	BLM 3 (SGCN/HPBB/BCC)	Found in open forests and woodlands (often logged or burned), including oak, coniferous forests (primarily ponderosa pine), and riparian woodlands and orchards.	Yes; locally pastures 1 and 4	Possible	Yes
Loggerhead Shrike	<i>Lanius ludovicianus</i>	BLM 3 (HPBB/BCC)	Found in open country with scattered trees and shrubs, in savannas, desert scrub and, occasionally, in open juniper woodlands. Often found on poles, wires or fenceposts.	Yes; throughout allotment	Present	Yes

Common Name	Species	Status (conservation plans) ¹	General Habitat ²	Habitat Present ³	Species Present ⁴	Species/Habitat at Affected
Longnose Snake	<i>Rhinocheilus lecontei</i>	BLM 3 (SGCN)	Found in desert lowland areas that have sandy or loose soil and numerous burrows.	No	Not Present	No
Mojave Black-collared Lizard	<i>Crotaphytus bicinctores</i>	BLM 3 (SGCN)	Associated with arid habitats with sparse vegetation and the presence of rocks and boulders.	No	Not Present	No
Mountain Quail	<i>Oreortyx pictus</i>	BLM 3 (SGCN/HPBB)	Mountain quail breed and winter in shrub-dominated riparian communities of hawthorn, willow, and chokecherry in the intermountain West. Diet is dominated by plant material though invertebrates are very important during the first 8 weeks.	Yes	Not Present	No
Northern Goshawk	<i>Accipiter gentilis</i>	BLM 3 (HPBB)	Found in deciduous and coniferous forests, along forest edges and in open woodlands. In Idaho, summers and nests in coniferous and aspen forests; winters in riparian and agricultural areas.	No	Not Present	No
Olive-sided Flycatcher	<i>Contopus borealis</i>	BLM 3 (HPBB)	Found in forests and woodlands (especially in burned-over areas with standing dead trees)	No	Not Present	No
Peregrine Falcon	<i>Falco peregrinus</i>	BLM 3 (SGCN/BCC)	Cliffs near forest, lakes, ponds, and rivers. Most are thought to migrate south of Idaho during winter but individuals remain near urban nest sites in Nampa and Boise year around.	No	Improbable	No
Piute Ground Squirrel	<i>Spermophilus mollis</i>	BLM 3 (SGCN)	Sagebrush and grasslands.	Yes	Possible	Yes
Prairie Falcon	<i>Falco mexicanus</i>	BLM 3 (HPBB)	Cliffs and rock outcrops in sagebrush steppe, grassland, montane meadows, marshes, and riparian areas.	Yes; throughout allotment	Present	Yes
Sage Sparrow	<i>Amphispiza belli</i>	BLM 3 (HPBB/BCC)	Shrub steppe, mixed desert shrub/grassland communities.	Yes; throughout allotment	Probable	Yes
Spotted Bat	<i>Euderma maculatum</i>	BLM 3 (SGCN)	Various habitats from desert to montane coniferous forests. Observed in canyons of Owyhee County. Normally roost in deep rock crevices of canyon and cliff walls but specific roost characteristics are not well documented.	Yes; foraging throughout allotment	Present	Yes
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>	BLM 3 (SGCN)	Juniper, desert shrub, and dry coniferous forest throughout Idaho; day roosts and hibernates in caves and abandoned mines, forages over water	Yes; foraging throughout allotment	Possible	Yes
Western Groundsnake	<i>Sonora semiannulata</i>	BLM 3 (SGCN)	Xeric habitat characterized by sandy or loose soil textures, talus slopes, and boulder fields. Vegetation is typically sparse, comprising of shrubs, such as shadscale, sagebrush, greasewood, and bunchgrasses and annual grasses.	No	Not Present	No
Western Toad	<i>Bufo boreas</i>	BLM 3	Wide variety of habitats such as desert springs and streams, meadows and woodlands, and in and around ponds, lakes, reservoirs, and slow-moving rivers and streams.	Yes; throughout allotment	Possible	Yes
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	BLM 3 (HPBB/BCC)	Dry open woods, orchards, farmlands, and foothills	No	Not Present	No
Willow Flycatcher	<i>Empidonax traillii</i>	BLM 3 (HPBB/BCC)	Found in thickets, scrubby and brushy areas, open second growth, swamps, and open woodlands. In Idaho, associated with mesic and xeric willow (riparian) habitats.	Yes; locally in pastures 3 and 6 and canyons	Possible	Yes
Woodhouse Toad	<i>Bufo woodhousii</i>	BLM 3 (SGCN)	Found in grasslands, shrub steppe, woods, river valleys, floodplains, and agricultural lands, usually in areas with deep,	No	Not Present	No

Common Name	Species	Status (conservation plans) ¹	General Habitat ²	Habitat Present ³	Species Present ⁴	Species/Habitat at Affected
			friable soils.			
Black-throated Sparrow	<i>Amphispiza bilineata</i>	BLM 4	Open shrub areas with Sagebrush, Atriplex, Rabbitbrush, saltsage, horsebrush. Not found in dense sagebrush stands. Found in desert scrub, thorn bush. In Idaho prefers open shrub areas dominated by big sage, spiny hopsage, or horsebrush exceeding 50cm in height.	Yes; pastures 2, 3, 4 and 6	Improbable	No
Dark Kangaroo Mouse	<i>Microdipodops megacephalus</i>	BLM 4	Soft, sandy soils in hot dry sagebrush areas. In Idaho found in loose sands and gravel in shadscale scrub, sagebrush scrub, and alkali sink plant communities. May occur in sand dunes near margins of range	Yes; locally in pasture 1, 2, 3, 5, and 6	Possible	Yes
Kit Fox	<i>Vulpes velox</i>	BLM 4	Inhabits arid and semi-arid regions encompassing desert scrub, chaparral, halophytic, and grassland communities. Loose textured soils may be preferred for denning.	Yes	Improbable	No
Little Pocket Mouse	<i>Perognathus longimembris</i>	BLM 4	Shadscale and low sage areas on lower slopes of alluvial fans with pea-sized gravel. Found in sagebrush, creosote bush, and cactus communities. On slopes with widely spaced shrubs, found in firm, sandy soil overlain with pebbles. In Idaho, found in shadscale/low sage on lower slopes of alluvial fans.	Yes	Possible	Yes
Merriam's Ground Squirrel	<i>Spermophilus canus vigilis</i>	BLM 4	Prefers sandy soils in dry, open sagebrush and grassland habitats. Occurs in the lower Snake River Valley south and west of the Snake River in Owyhee County, Idaho and Malheur County, Oregon from Reynolds Creek to Huntington and west to Westfall.	No	Not Present	No
White-faced Ibis	<i>Plegadis chihi</i>	BLM 4 (SGCN/HPBB)	Found mostly in freshwater areas, on marshes, swamps, ponds and rivers. In Idaho, prefers shallow-water areas.	Yes; pasture 4 and reservoirs	Present	Yes
Wyoming Ground Squirrel	<i>Spermophilus elegans nevadensis</i>	BLM 4	Mountainous areas and higher plateaus in open and semi-forested habitats. Grasslands. In Idaho found in grasslands and sagebrush, especially on upland slopes with loose, sandy soils. Occupies a variety of sage plain and grassland habitats such as valley bottoms and foothills, montane meadows, subalpine talus slopes, and reclaimed surface-mine areas.	Yes	Possible	Yes

¹ Status includes Endangered (ESA E) and Candidate (ESA C) species listed under the Endangered Species Act (16 U.S.C. § 1531-1544), eagles (BGEPA) protected by the Bald and Golden Eagle Protection Act (16 U.S.C. § 668-668d), and BLM Type 2 (BLM 2), Type 3, (BLM 3), and Type 4 (BLM 4) special status species (USDI-BLM 2003). Additional designations under state and national conservation plans include Idaho Species of Greatest Conservation Need (SGCN; IDFG 2006), Idaho Partners in Flight High Priority Breeding Bird (HPBB; IPIF 2000), and U.S. Fish and Wildlife Service Birds of Conservation Concern (BCC; USDI-FWS 2008).

² Habitat descriptions modified from IDVMD 2011.

³ Presence of habitat within project area was determined from IDVMD 2011; OWE 2011; Yensen and Sherman 2003; Idaho, Oregon and Nevada BLM unpublished data; and specialist expertise.

⁴ Categories include species presence documented (**Present**), species likely to occur based on preferred habitat and local species abundance and nearby (<5 miles) occurrences within 5 miles (**Probable**), species may occur based on preferred habitat and/or occurrences within 25 miles (**Possible**), species not likely to occur based on limited or lack of preferred habitat and/or occurrence over 50 miles (**Improbable**), and species not present due to lack of habitat (**Not Present**).

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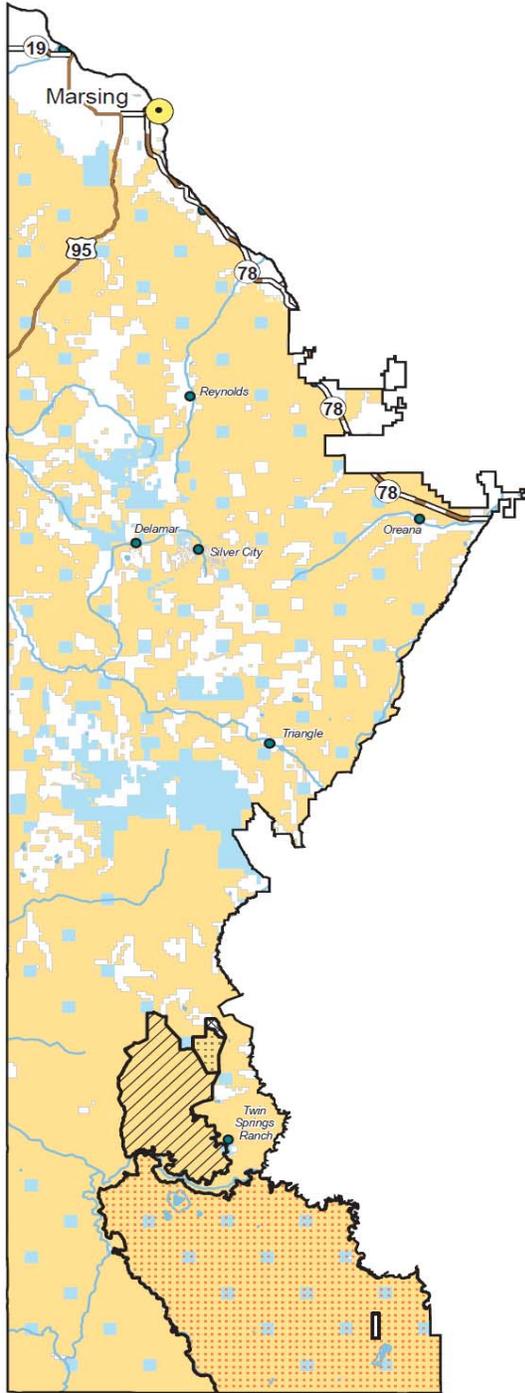
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Maps

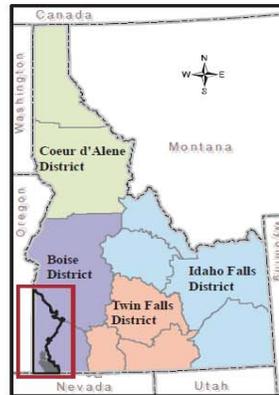
Map 1: Range Permit Renewals

MAP 1 RANGE PERMIT RENEWALS OWYHEE FIELD OFFICE GROUP 1 ALLOTMENTS



- BLM ADMINISTRATIVE OFFICE
- GROUP 1 GRAZING ALLOTMENTS**
- CASTLEHEAD/LAMBERT
- GARAT
- SWISHER FFR
- SWISHER SPRINGS
- SURFACE MANAGEMENT AGENCY**
- BUREAU OF LAND MANAGEMENT
- BUREAU OF RECLAMATION
- NATIONAL WILDLIFE REFUGE
- STATE
- STATE, OTHER
- PRIVATE

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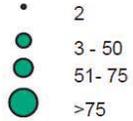


Map 2: Sage-grouse Management

MAP 2 OWYHEE FIELD OFFICE GROUP 1 ALLOTMENTS SAGE-GROUSE MANAGEMENT



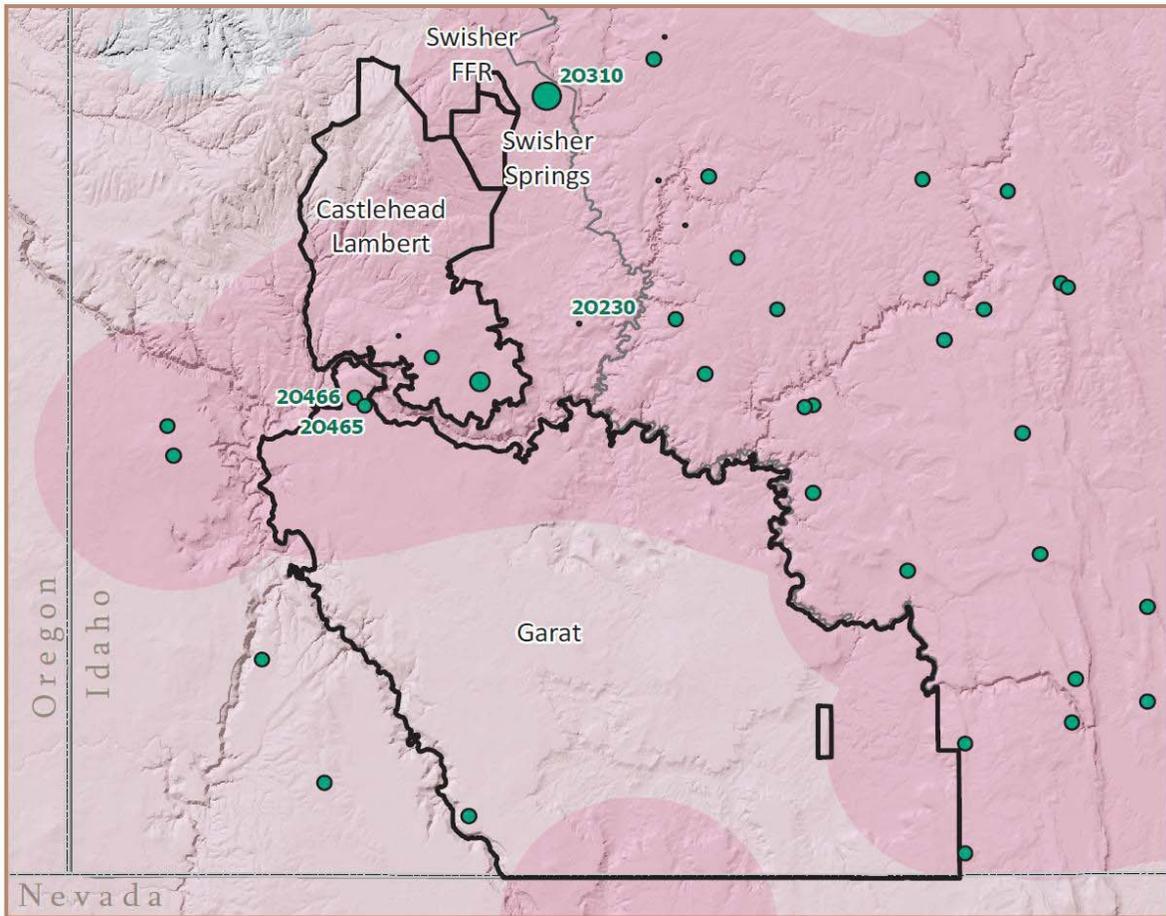
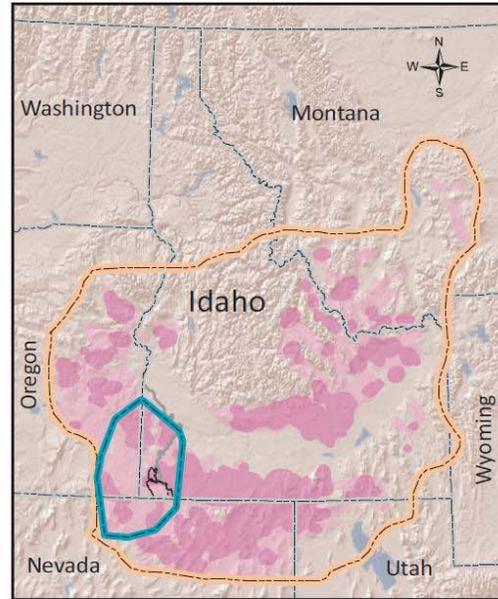
OCCUPIED SAGE-GROUSE LEKS
MAXIMUM COUNT (2006-2010)



SAGE-GROUSE
MANAGEMENT ZONE IV

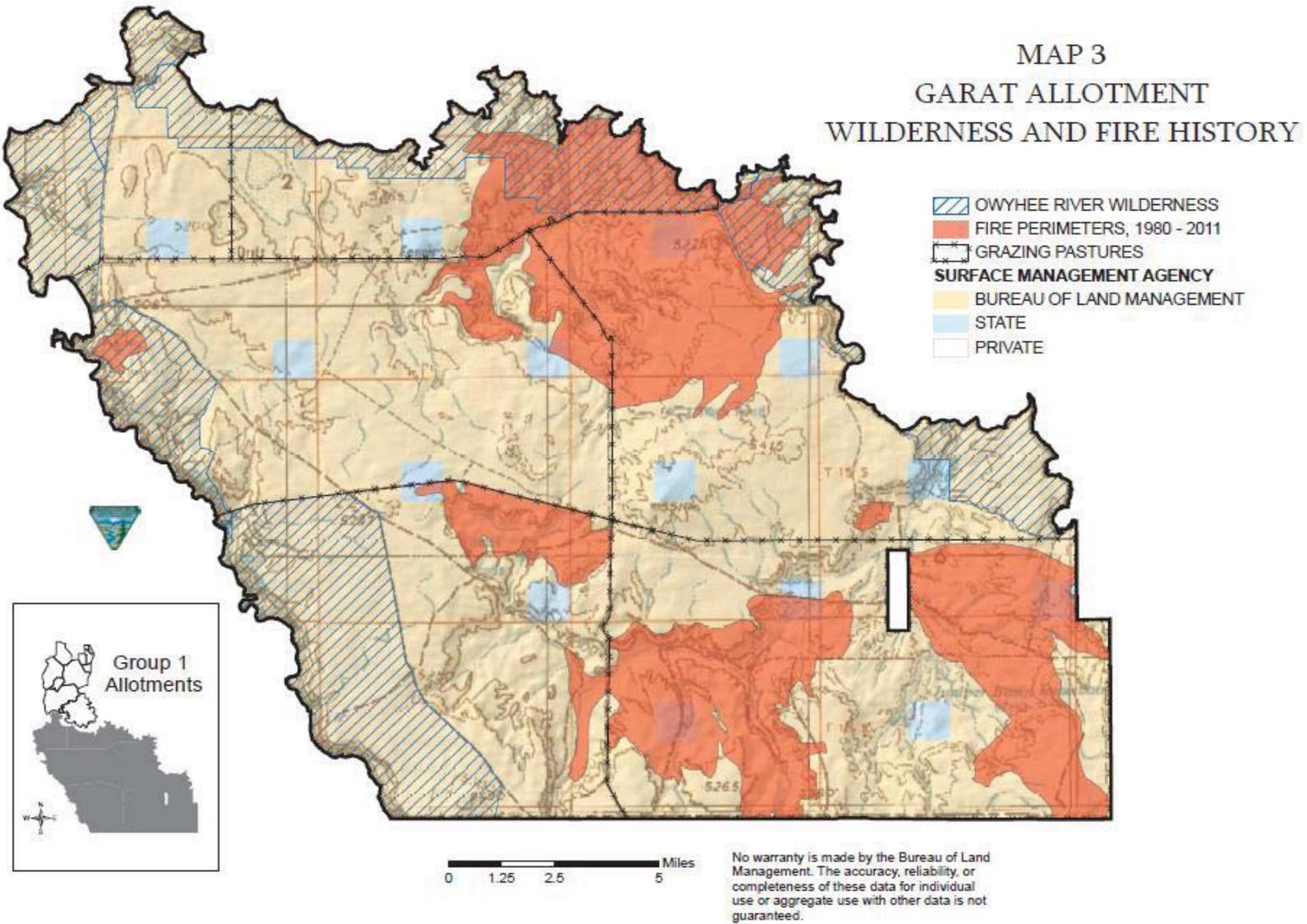


SAGE-GROUSE
PRELIMINARY PRIORITY AREAS



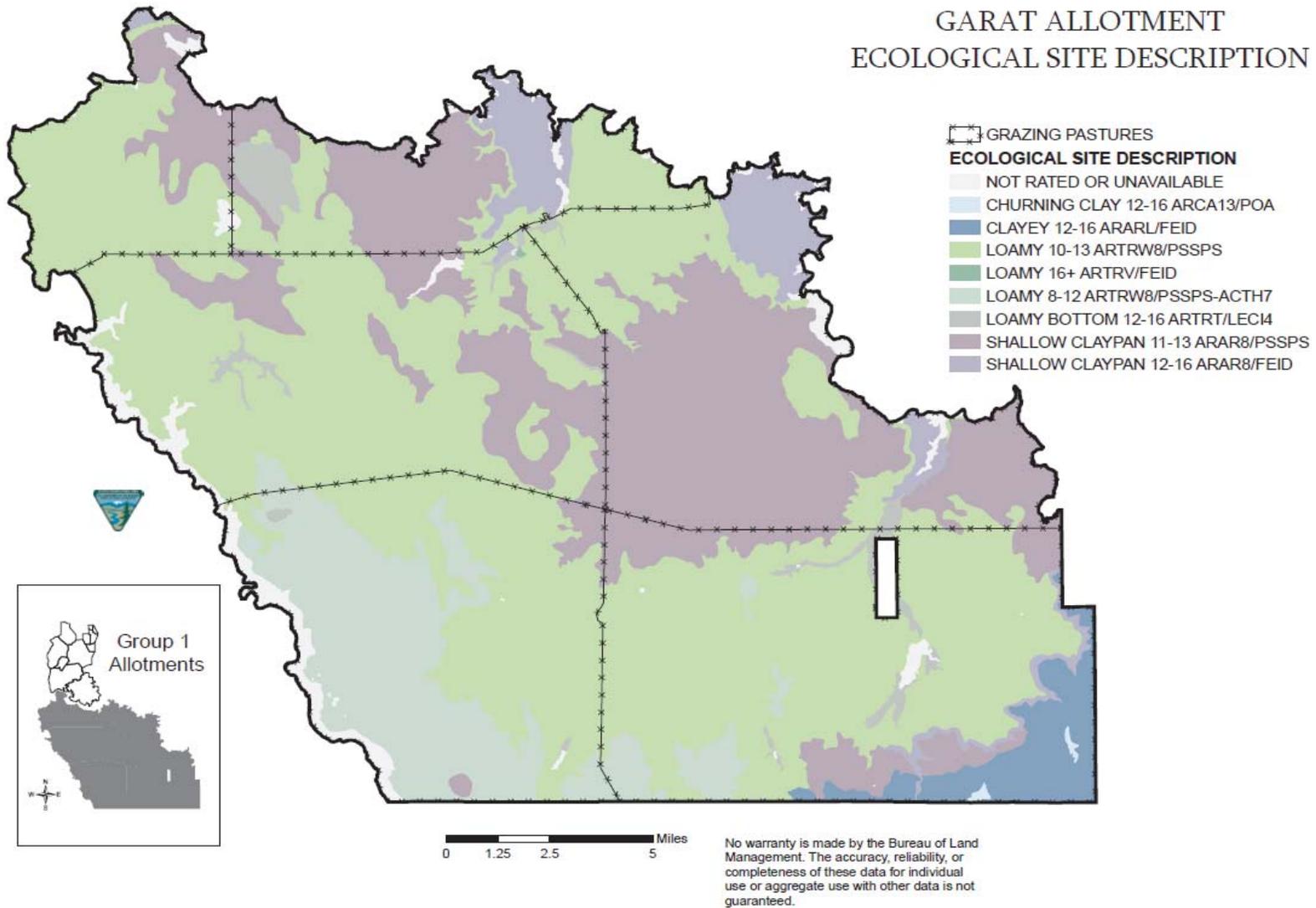
"No warranty is made by the Bureau of Land Management. The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed."

Map 3: Wilderness and Fire History



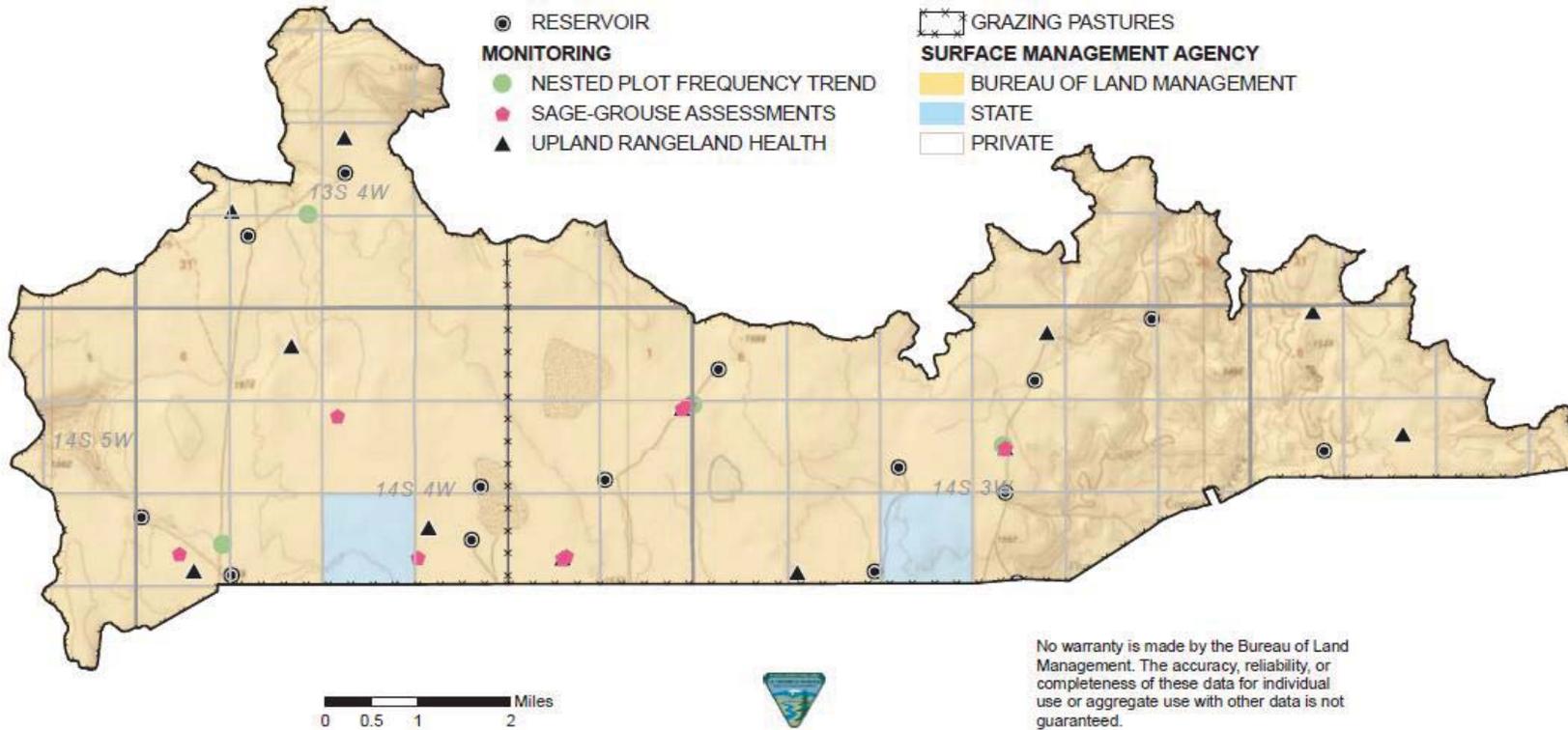
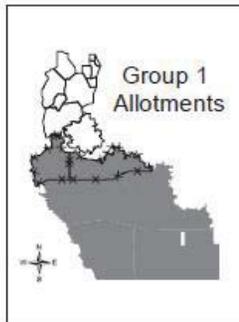
Map 4: Ecological Site Description

MAP 4
GARAT ALLOTMENT
ECOLOGICAL SITE DESCRIPTION



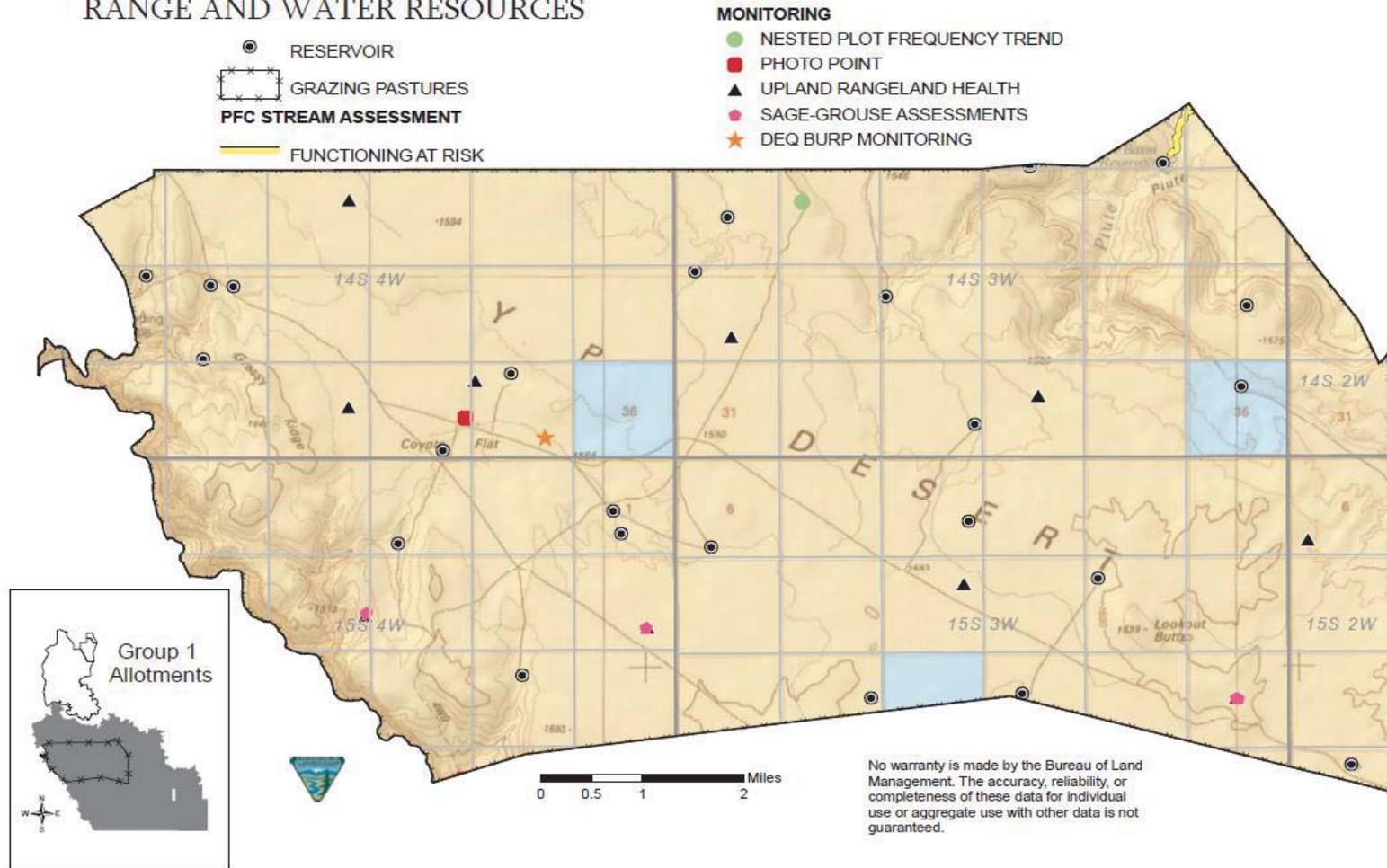
Map 5: Range and Water Resources – Pastures 1 and 2

MAP 5
 GARAT ALLOTMENT
 1 - DRY LAKE AND
 2 - PIUTE CREEK PASTURES
 RANGE AND WATER RESOURCES



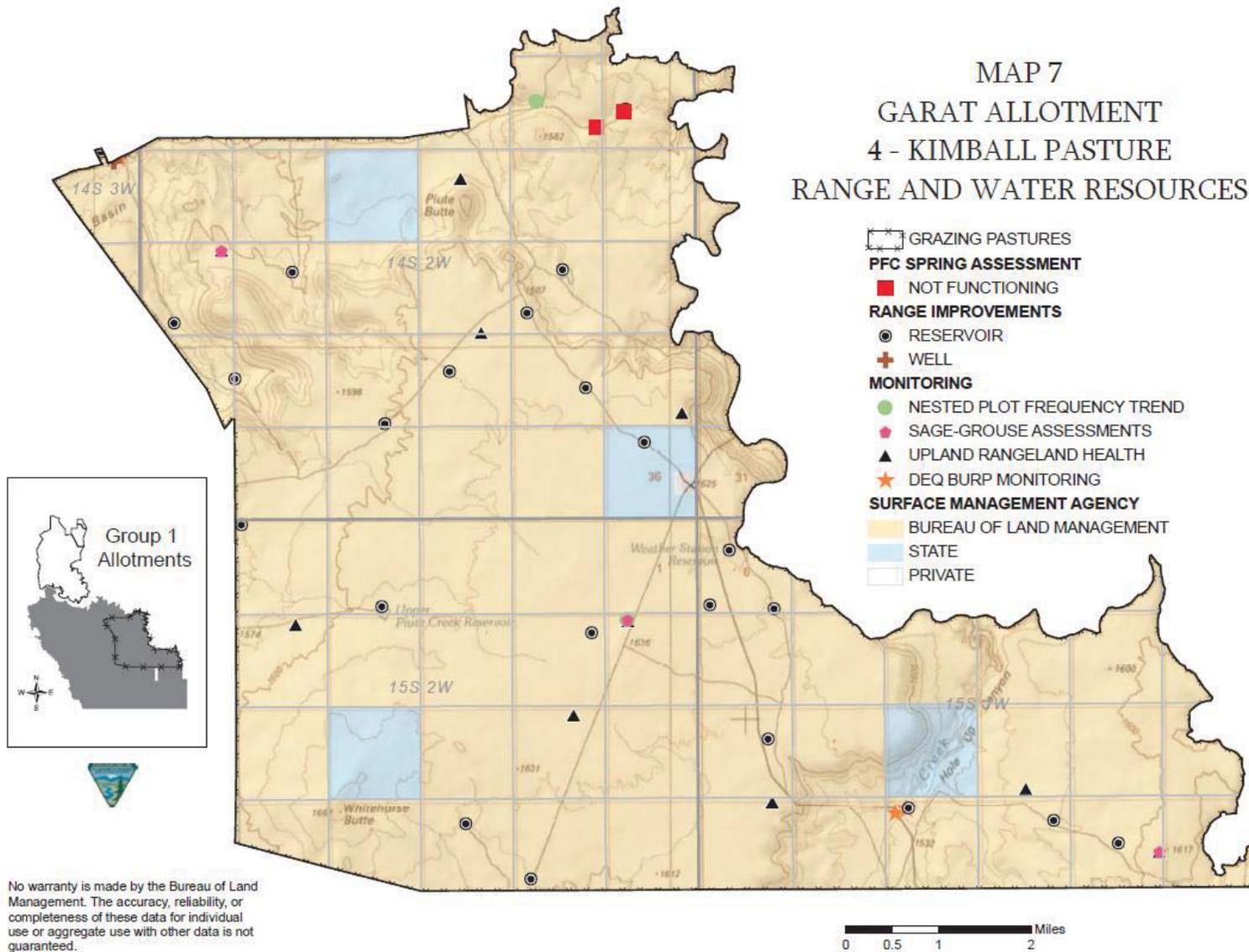
Map 6: Range and Water Resources – Pasture 3

MAP 6 GARAT ALLOTMENT 3 - FORTYFIVE FIELD PASTURE RANGE AND WATER RESOURCES

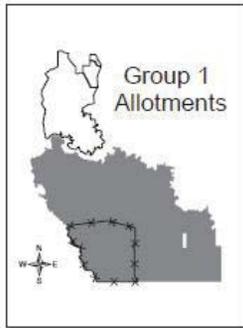


Map 7: Range and Water Resources – Pasture 4

MAP 7
GARAT ALLOTMENT
4 - KIMBALL PASTURE
RANGE AND WATER RESOURCES



Map 8: Range and Water Resources – Pasture 5



MAP 8
GARAT ALLOTMENT
5 - BIG HORSE BASIN PASTURE
RANGE AND WATER RESOURCES

GRAZING PASTURES

RANGE IMPROVEMENTS

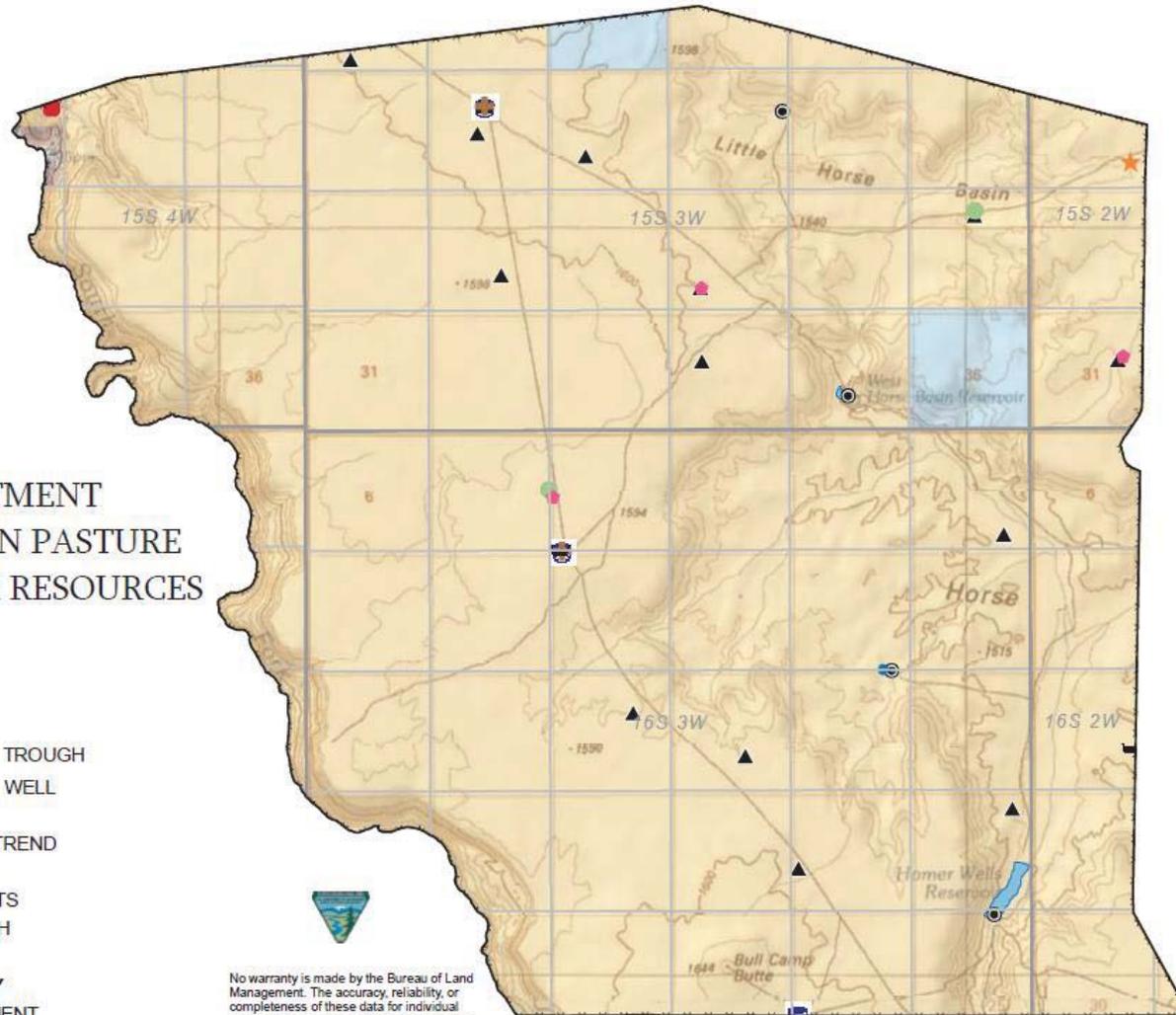
- RESERVOIR
- SPRING
- TROUGH
- TANK
- ⊕ WELL

MONITORING

- NESTED PLOT FREQUENCY TREND
- PHOTO POINT
- SAGE-GROUSE ASSESSMENTS
- ▲ UPLAND RANGELAND HEALTH
- ★ DEQ BURP MONITORING

SURFACE MANAGEMENT AGENCY

- BUREAU OF LAND MANAGEMENT
- STATE
- PRIVATE

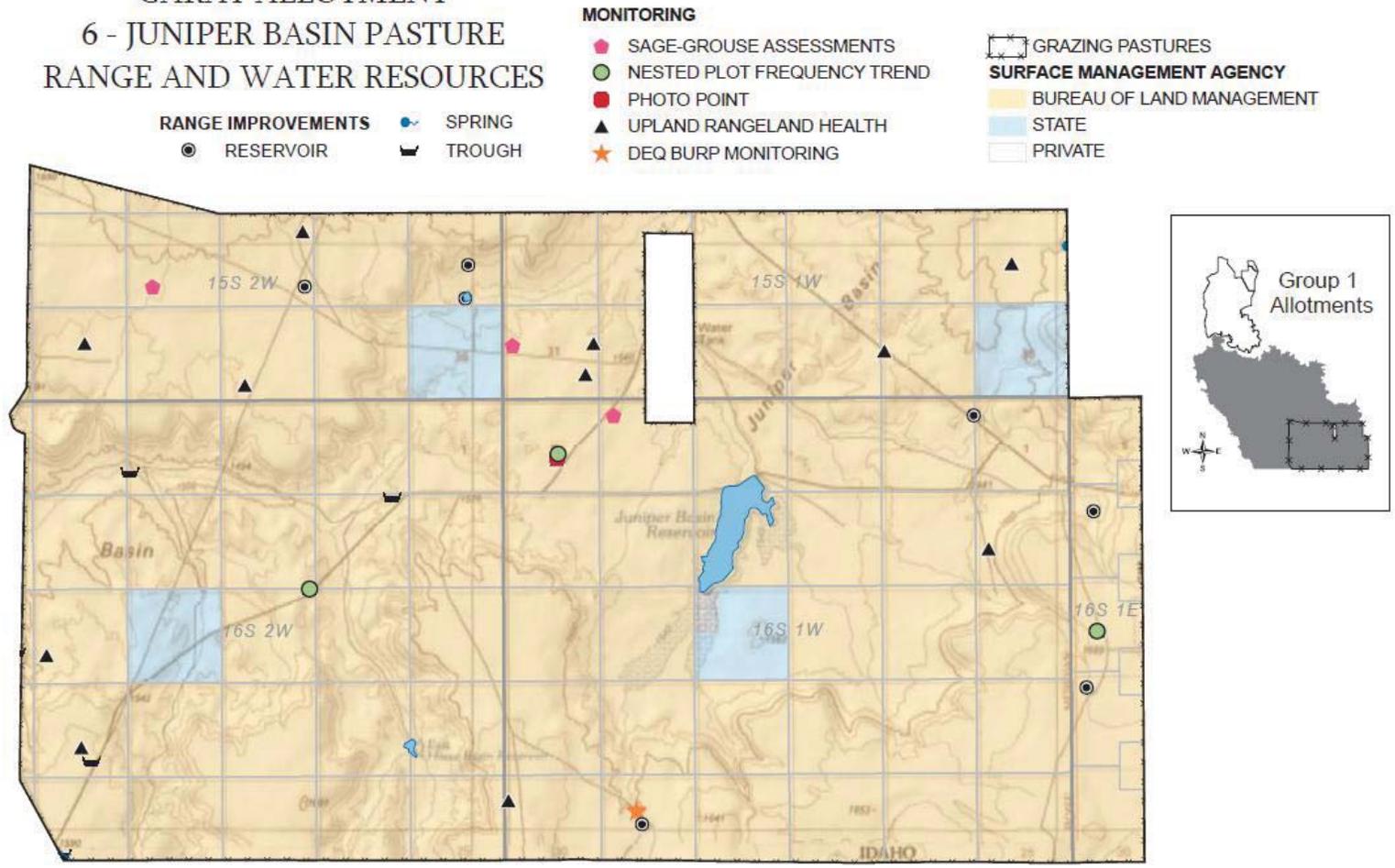


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Map 9: Range and Water Resources – Pasture 6

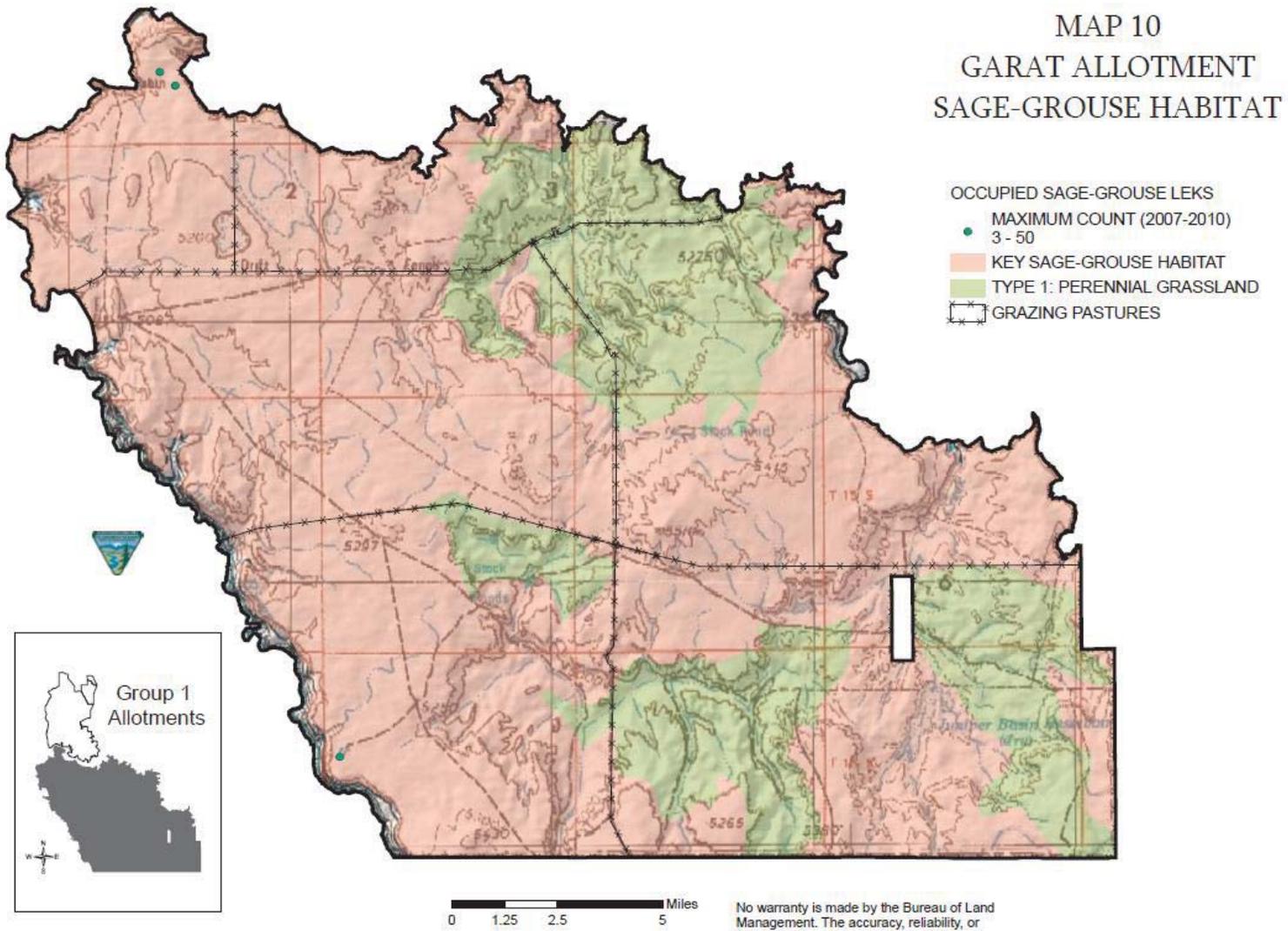
MAP 9 GARAT ALLOTMENT 6 - JUNIPER BASIN PASTURE RANGE AND WATER RESOURCES



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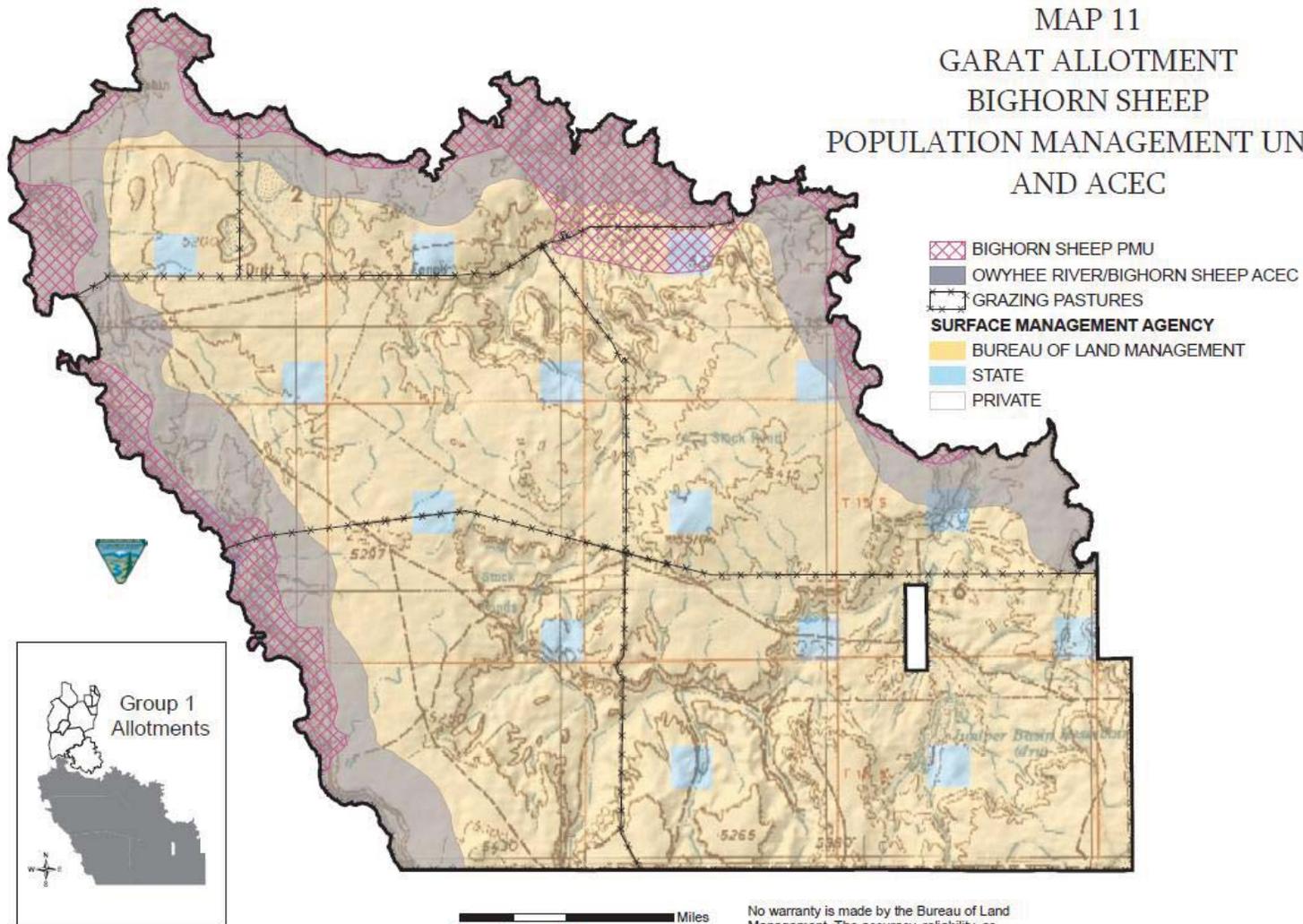


Map 10: Sage-grouse Habitat



Map 11: Bighorn Sheep Population Management Units and ACEC

MAP 11
GARAT ALLOTMENT
BIGHORN SHEEP
POPULATION MANAGEMENT UNITS
AND ACEC



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