Draft
Rangeland Health Assessment for
East Castle Creek Allotment #00893

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I. Overview of Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management

In accordance with 43 Code of Federal Regulations (CFR) 4180.2(b), the Idaho Bureau of Land Management (BLM) adopted Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Appendix A). The standards and guidelines were developed in coordination with BLM Idaho's Resource Advisory Councils and are in conformance with the Bruneau Management Framework Plan (MFP), the applicable land use plan for the East Castle Creek Allotment (United States Department of Interior BLM 1983).

There are eight standards and twenty guidelines, which may or may not apply to the allotment depending on the resources. Standards for rangeland health are expressions of the level of physical and biological condition or degree of function required for healthy, sustainable rangelands. Rangelands should be meeting or making significant progress toward meeting the standards. When the standards are being met, there should be proper nutrient and hydrologic cycling, and energy flow. This document contains information about the resources, and uses quantitative and qualitative information including inventory data, monitoring data, health assessment information or other observations to evaluate the current status of the standard.

Guidelines direct the selection of grazing (livestock) management practices, and where appropriate, livestock management facilities to promote significant progress toward, or the attainment and maintenance of, the standards. Management practices include the manipulation of season, grazing duration, and intensity of use, as well as numbers, distribution, and kind of livestock. Management facilities include structures such as fences and water developments

This Rangeland Health Assessment is meant to describe modifications to previous grazing practices and update condition and trend descriptions within East Castle Creek Allotment since the release of the Castle Creek Allotment Final Analysis, Interpretation, and Evaluation (AIE) dated September 1997. The AIE findings addressed Management Framework Plan (MFP) objectives because Standards for Rangeland Health and Guidelines for Livestock Grazing Practices had only been formalized for Idaho in the previous month, and no directives existed for implementing S&Gs in Idaho at the time. An evaluation of the Bruneau MFP objectives as they related to previous grazing management in the East Castle Creek Allotment is provided in Section VI of the Castle Creek Allotment Final AIE (1997). Updated data were collected from 1998 through 2007 and are presented in this document, along with a summary of pertinent AIE findings to provide a context for recent observations. See the Appendix B for a discussion of methods used.

A discussion as to whether or not this allotment is meeting or making significant progress toward meeting the Standards for Rangeland Health and Guidelines for Livestock Grazing Management will be provided in a separate evaluation and determination titled the East Castle Creek Allotment Evaluation and Determination. The Allotment Evaluation and Determination will contain the interpretation of data presented here and evaluate the cause of the resulting resource concerns, if any.

II. Current Management and Past Decisions

On August 21, 1990 the BLM issued a decision addressing the Castle Creek permittee's area of use, season-of-use, amount of use, and kind of livestock. That decision imposed a 36%

reduction in active preference, contingent on subsequent monitoring, and divided the Castle Creek Allotment into two separate allotments (East Castle Creek and West Castle Creek). That decision was subsequently appealed to the Office of Hearings and Appeals and on January 6, 1993 the BLM vacated that decision. On January 6, 1993, a Rangeline Agreement was approved that divided the Castle Creek Allotment into two management units – East and West – and the Agreement also designated which pastures would be managed as Fenced Federal Ranges (FFRs). The 1993 Agreement did not change the season of use, the pastures for use by season, the permitted use levels by season, or the total active preference for permittees on the East Castle Creek Allotment. The Agreement did, however, provide that future changes would be based on monitoring and the results of an allotment Analysis, Interpretation, and Evaluation (AIE). In September 1997, the BLM issued the Final Castle Creek Allotment AIE.

On December 22, 1997, BLM issued Final Decisions cancelling and modifying the Gordon King, Paul Black, Owyhee Calcium Products (OCP) and Glenns Ferry Grazing Association (GFGA) permits in East Castle Creek. Modifications imposed on previous grazing practices were based upon the findings of Final Castle Creek Allotment AIE and subsequent NEPA analysis of several alternatives.

The 1997 Final Decisions incorporated a combination of actions that included a deferred-rotation grazing system in summer ranges; deferred grazing of early spring, late spring, and summer riparian and wet meadow pastures; and development of a number of exclosures to improve livestock distribution and reduce localized impacts. The specific actions outlined in that decision are summarized below:

Winter Pastures – Use will occur in Pasture 5B each year from November 1 through January 31. A portion of Pasture 5B will be excluded (Pasture 5BEX) from livestock grazing around the Mud Flat Oolite ACEC.

Early Spring Pastures – Pastures 8BE, 8BW, 8BI and 8BIII will be used in a growing season deferred/rest-rotation system from April 14 through June 1 in a four-year cycle. Growing season use periods will be deferred to later in the growing season in at least one of the three years of use, with the fourth year in total rest.

Late Spring Pastures – Pasture 10B will be alternated with Pastures 11B, 12 and 44 in an alternate-year rest system with a use period of June 2 through June 24. Pasture 11B is subdivided into two pastures – 11B and 11BR. Pasture 11BR is excluded from grazing until land use plan objectives are met for Birch Creek. Pastures 11B, 12 and 44 will be used in conjunction with each other. The public lands in Pasture 44 are no longer considered Fenced Federal Range (FFR) and are managed in this grazing system.

Summer Pastures – Owyhee Calcium Products, Inc. (OCP) summer preference is in designated FFRs only. Pastures 28, 28A, 29A and 29B will be used in a deferred-rotation grazing system. Grazing will be deferred until after the critical growth period of the key forage species every other year. A portion of Pasture 29A is fenced separately to create Pasture 29N, which is not included in the deferred system.

Riparian and Wet Meadow Pastures – Pasture 11BR will be rested until land use plan objectives are met for Birch Creek, then used only in late spring. Pasture 29N will be used every other year in September.

FFR Pastures – FFR pastures will be used in conjunction with summer pastures in the deferred rotation system. These FFRs may be utilized at the discretion of the permittee at any time from

April 1 through November 30, providing the use of the public land portions is in conformance with the land use plan objectives and 43 CFR 4180 regulations – Rangeland Health Standards and Guidelines for Idaho.

Five new exclosures were also created by the 1997 Final Decision in the East Castle Creek Allotment:

- Mud Flat Oolite: this exclosure protected 1,395 acres of land containing rare plants in and around the Mud Flat Oolite.
- West Fork Shoofly Creek: this exclosure allowed for riparian management for redband trout and mountain quail on 320 acres.
- Wet Meadow Complex: this exclosure protected 242 acres of wet meadows for sage grouse and other upland birds.
- Browse: this exclosure enabled monitoring of livestock and big game use in 80 acres of mountain mahogany and bitterbrush habitat.
- Magpie Creek: this temporary exclosure was constructed on 228 acres of Magpie Creek in Pasture 28A to improve aquatic/riparian habitat associated with redband trout spawning.

On April 28, 1998 the Interior Board of Land Appeals granted a Stay in implementation of the Final Decisions for Gordon King and Glenns Ferry Grazing Association, Appellants pending resolution of the Appeal IBLA 98-128 in East Castle Creek Allotment. The permits for those two Appellants reverted to the previous Terms and Conditions. Since Owyhee Calcium Products did not join in that Appeal, the modifications imposed by the Final Decision were implemented for OCP in 1998. Since not every provision of the Final Decision was appealed, some projects were constructed. Although most of the previous grazing practices were allowed to continue, the stubble height term and condition (T&C) for Birch Creek that was imposed on the permits in February 1997 remained in effect.

On September 27, 1999 BLM issued a Final Decision cancelling and reissuing the Owyhee Calcium Products permits in the Battle Creek Allotment and reissuing fully processed permits in East and West Castle Creek allotments, respectively, for a concurrent ten year term with the Battle Creek permit.

Several important transfers of grazing permits also occurred during 1998 through 2007.

- On December 21, 2001 a 7(b) transfer application was submitted for 1,691 Animal Unit Months (AUMs) in East Castle Creek Allotment, from Glenns Ferry Grazing Association to Daryl & Jeannette Keck Trust.
- On December 2, 2003, 7(b) transfer applications to redesignate the base properties for Owyhee Calcium Products were submitted for 962 AUMs in East Castle Creek allotment and for 67 AUMs in the Battle Creek Allotment. OCP retained 278 AUMs of winter use in East Castle Creek Allotment, and has been leasing them to John Anchustegui. On December 18, 2003, John Anchustegui applied to attach the transferred OCP permit for East Castle Creek to his Carl Hite base property.
- On December 19, 2003, the Daryl & Jeannette Keck Trust sold their former base properties to John Anchustegui. On March 8, 2004, a 7(b) transfer application was submitted for 1,691 AUMs in East Castle Creek Allotment from Daryl & Jeannette Keck Trust to John Anchustegui who then attached them to his Carl Hite base property.

On July 9, 2004, BLM and Gordon King, John Anchustegui, Owyhee County Planning Commission & Idaho Watersheds Project (Appellants) in IBLA 98-128 submitted a "Stipulation to Adjust/Modify Final Decisions Relating to the East Castle Creek Allotment" to the Department of Interior, Office of Hearings and Appeals that resolved appeals of the Final Decisions of December 22, 1997, referred to as the '2004 Settlement' within this Assessment. The 2004 Settlement modified the permitted use that had been included under the former King, GFGA, and OCP grazing permits, and was to be in effect during the 2005 through 2007 grazing seasons. Several short-term leases have occurred since 2004; but conformed to requirements of the 2004 Settlement. The Paul Black winter permit was not affected by the 2004 Settlement, but has been inactive since about 2003.

III. Allotment Information

East Castle Creek Allotment (#893) is located in Owyhee County southwest of Grand View, Idaho, and south of State Highway 78 (See Map 1). The allotment extends southwest about 34 miles into the Owyhee Mountains. It is bordered by West Castle Creek Allotment (#801) on the west and Battle Creek Allotment (#802) on the east. Elevations range from approximately 2,700 feet to over 7,000 feet within the allotment.

There are three major landforms in East Castle Creek Allotment: the Snake River Plain or lakebed landform (predominantly composed of deposited lakebed sediments) at the north end of the allotment; the mountainous landform of the Owyhee Mountains on the western portion of the allotment; and the plateau landform at the southern end of the allotment. Streams that drain the Owyhee Mountains within East Castle Creek Allotment include Shoofly, West Fork Shoofly, Poison, Battle, Birch, Magpie, and South Fork Castle creeks.

The allotment includes 96,578 acres of BLM-administered public land, 8,944 acres of State of Idaho land, and 7,611 acres of private land. The total allotment acreage is divided into 35 pastures (Table 1, Map 2) and the total permitted AUMs is currently 10,872 total preference AUMs. There are currently three permittees (Tables 2A and 2B) and their grazing system and authorized livestock use on BLM lands are shown in Table 3A and 3B.

The following description of livestock grazing management contains management actions authorized under the various livestock grazing authorization listed above. For Actual Use, refer to Appendix C.

Table 1. East Castle Creek Allotment Pastures and Seasons of Use.

Pasture Number and Name	Season of Use	Acreage (Total)
5B East Winter Range	Winter	30,992
8B Early Spring	Early Spring	29,275
8BI (seeding)	Early Spring	1,235
8BIII (seeding)	Early Spring	3,064
10B Mid Spring	Late Spring	10,223
11B Late Spring (Birch Creek)	Late Spring	4,297
12 Late Spring (Poison Creek)	Late Spring	4,954
13 FFR	At discretion of permittee	708
14 FFR	At discretion of permittee	372
14R (Riparian)	Planned, but not built	195
15 FFR	At discretion of permittee	380
16 FFR	At discretion of permittee	169
17 FFR	At discretion of permittee	1,681
18 FFR	At discretion of permittee	156
19 FFR	At discretion of permittee	1,797
20 FFR	At discretion of permittee	811
21 FFR	At discretion of permittee	123
27 Juniper Station FFR	At discretion of permittee	156
28 Juniper	Summer	5,473
28A Anthill	Summer	5,952
29 State Section	At discretion of permittee	591
29A	Summer	2,730
29B Corner Pocket	Summer	596
29C (Riparian)	Summer	149
29D (Riparian)	Summer	
31 State Section	At discretion of permittee	634
33 FFR	At discretion of permittee	1,301
37 FFR	At discretion of permittee	355
37A FFR	At discretion of permittee	241
44 FFR	At discretion of permittee	1,582

Table 2A. Permittees, AUMs Authorized for BLM lands in East Castle Creek Allotment under the December 1997 Final Decision.[1]

Permittee	**Pastures**	**Total Preference** (AUMs)	**Suspended Preference** (AUMs)	**Stipulated Nonuse** (AUMs)	**Spring**	**Summer**	**Fall (FFR)**	**Winter**	**Total Active Preference** (AUMs of permitted use)
Gordon King	5B, 8B, 8BI, 8BIII, 10B, 11B, 12, 18, 19, 20, 21, 27, 28, 28A, 33, 37, 37A, 44	8,152	0	0	3,585	2,061	208	2,298	8,152
Paul Black	5B	68	0	0	0	0	0	68	68
Owyhee Calcium Products (OCP)	5B, 8BI, 8BIII, 10B, 11B, 12, 15, 16, 17	962	0	0	615	0	71	276	962
Glenn's Ferry Grazing Association (GFGA)	5B, 8B. 8BI, 8BIII, 10B, 11B, 12, 13, 14, 14R, 29, 29A, 29C, 29D, 31	1,690	0	0	960	625	15	90	1,690
Total		10,872	0	0	5,160	2,686	294	2,732	10,872

[1]As implemented through the 2004 grazing season (April 1 through January 31, 2005)

Table 2B. Permittees and AUMs Authorized for BLM lands in East Castle Creek Allotment under the 2004 Settlement.[2]

Permittee	**Pastures**	**Total Preference** (AUMs)	**Suspended Preference** (AUMs)	**Stipulated Nonuse** (AUMs)	**Spring**	**Summer**	**Fall (FFR)**	**Winter**	**Total Active Preference** (AUMs of permitted use)
Gordon King	5B, 8B, 8BI, 8BIII, 10B, 11B, 12, 18, 19, 20, 21, 27, 28, 28A, 33, 37, 37A, 44	8,152	0	756	2,753	2,061	281	2,297	8,152
Paul Black	5B	68	0	0	0	0	0	68	68
John Anchustegui (formerly OCP)	5B, 8B, 8BI, 8BIII, 10B, 11B, 12, 15, 16, 17	686	0	308	307	0	71		686
OCP (leased)	5B	278	0	0				278	278
John Anchustegui (formerly GFGA)	5B, 8B, 8BI, 8BIII, 10B, 11B, 12, 13, 14, 14R, 29, 29A, 29C, 29D, 31	1,690	0	207	754	624	16	91	1,690
Total		10,874	0	1,271	3,814	2,685	368	2,734	10,872

[2]As implemented March 1, 2005 under the 2004 Settlement and extending through February 28, 2008.

Table 3A. Grazing System and Authorized Livestock Use for BLM Lands in the East Castle Creek Allotment proposed by BLM's December 1997 Final Decision[1].

Season of Use	Pastures	Year 1 (1998, 2002, 2006)	Year 2 (1999, 2003, 2007)	Year 3 (2000, 2004, 2008)	Year 4 (2001, 2005, 2009)	Estimated Acres	Authorized Use (AUMs)
Winter	5B	11/1 – 1/31				29,900	2,732
Early Spring	8BW	4/15 – 5/8	5/9 – 6/1	Rest	4/15 – 5/8	11,075	1,736
	8BE	Rest	4/15 – 5/8	5/9 – 6/1	Rest	15,255	
	8BI, 8BIII	5/9 – 6/1	Rest	4/15 – 5/8	5/9 – 6/1	4,500	
Late Spring	10B	Rest	6/2 – 6/24	Rest	6/2 – 6/24	9,320	825
	11B, 12, 44	6/2 – 6/24	Rest	6/2 – 6/24	Rest	6,033	
	11BR	Rest until MFP objectives for Birch Creek are met, then 6/15 – 6/30				2,100	
Summer	28	6/25 – 7/28	7/29 – 8/31	6/25 – 7/28	7/29 – 8/31	5,025	2,061
	28A	7/29 – 8/31	6/25 – 7/28	7/29 – 8/31	6/25 – 7/28	5,935	
	29A	7/25 – 9/30	6/25 – 8/31	7/25 – 9/30	6/25 – 8/31	1,345	625
	29N	Rest	9/1 – 9/30	Rest	9/1 – 9/30	1,043	
	29C	Rest	6/15 – 6/30	Rest	6/15 – 6/30	163	
	29D	Rest until MFP objectives for Birch Creek are met, then 6/15 – 6/30				209	
FFR	13-15, 17-21, 27, 33, 37	Used at discretion of permittees 4/1 – 11/30				2,155	294
	14R	Rest	6/15 – 6/30	Rest	6/15 – 6/30		
						Total Authorized Use	8,273

[1]The grazing practices themselves and the construction of fencing necessary to implement these practices in Pastures 8BE, 8BW, 11BR, 44, and 29N were stayed by IBLA in April, 1998. The 2004 Settlement rejected these proposals for the balance of the term of the affected permits.

Table 3B. Grazing System and Authorized Livestock Use for BLM Lands in the East Castle Creek Allotment required under the 2004 Settlement[1].

Season of Use	Pastures	Year 1 (2005)	Year 2 (2006)	Year 3 (2007)	Estimated Acres	Authorized Use (AUMs)
Winter	5B	11/1 – 1/31			29,900	2,734
Early Spring	8B	4/1 – 4/30	5/1 – 6/1	4/1 – 4/30	26,330	3,814
	8BI, 8BIII	4/1 – 4/30	5/1 – 6/1	4/1 – 4/30	4,500	
Mid Spring	10B	5/1 – 5/23	4/1 – 4/30	5/1 – 6/1	9,320	
Late Spring	11B	5/24 – 6/17	Rest	6/2 – 6/17	6,033	
	12	5/24 – 6/17	6/2 – 6/17	Rest	2,100	
Summer	28	7/29 – 8/31	6/25 – 7/28	7/29 – 8/31	5,025	2,061
	28A	6/25 – 7/28	7/29 – 8/31	6/25 – 7/28	5,935	
	29A/29B	6/18 – 8/31	7/15 – 8/31	6/18 – 8/31	1,345	624
	29C	6/15 – 6/30	Rest	6/15 – 6/30	163	
	29D	Rest until MFP objectives are met, then 6/15 – 6/30			209	
FFR	13-21, 27, 29, 31, 33, 37, 37A	Used at discretion of permittees 4/1 – 11/30			2,155	368
					Total Authorized Use	9,601

[1] The 2004 Settlement Stipulation was adopted on July 9, 2004.

IV. Rangeland Health Standards Assessment

Resource conditions were evaluated according to how they relate to the Standards for Rangeland Health, as adopted by Idaho BLM in 1997. The following subsections discuss resource conditions as they relate to each standard.

Standard 1: Watersheds

Rangeland Health Evaluations

Rangeland Health Evaluations are used for Standard 1 and Standard 4. Twenty-three rangeland health evaluations were completed in the East Castle Creek Allotment from 2005 to 2007. The evaluations were conducted in accordance with the procedure described in BLM Technical Reference 1734-6 "Interpreting Indicators of Rangeland Health". The Rangeland Health Evaluations conducted in 2005 used Version 3 and the subsequent evaluations conducted in 2006 and 2007 used Version 4 of "Interpreting Indicators of Rangeland Health". The watershed standard includes both soil and site stability and hydrologic function attribute indicators. The final attribute ratings are based on the preponderance of evidence and specific key indicators were used to determine the final attribute ratings for Standard 1.

Table 4 shows the degree of departure from expected for Standard 1 for assessment sites in the East Castle Creek Allotment. Pastures which had more than one assessment are indicated by multiple marks within the table for the individual site ratings. The legal location, i.e., T. 6 S., R. 4 E., Section 32, abbreviated as 06S04E32, the ecological site name and the soil and site stability and hydrologic function ratings for each rangeland health field assessment site are shown in Tables 5 through 15. Ratings of individual indicators from the Rangeland Health Evaluations for all pastures are shown in Appendix D. Locations of all Rangeland Health Evaluations sites are shown on Map 3.

Table 4: Rangeland Health Evaluation Summary for Standard 1.

Standard 1-Watersheds	Degree of Departure				
	None to Slight (N-S)	Slight to Moderate (S-M)	Moderate (M)	Moderate to Extreme (M-E)	Extreme (E)
Pasture 5B		XX	X		
Mud Flat Oolite Exclosure (5BEX)		X			
Pasture 8B	X	XX	X		
Birch Creek Exclosure		X			
Pasture 8BI				X	
Pasture 8BIII				X	
Pasture 10B		X	X		
Pasture 11B		X			
Pasture 12	X	XX			

Standard 1-Watersheds	Degree of Departure				
	None to Slight (N-S)	Slight to Moderate (S-M)	Moderate (M)	Moderate to Extreme (M-E)	Extreme (E)
Pasture 28		X		X	
Pasture 28A		X	X		
Pasture 29A			X		
Pasture 44		X			

Pastures 5B and 5BEX

Grazing Management

The winter pasture was separated from the early spring pasture in September 1970, and a change in season of use from winter, spring, and fall use every year was implemented. Prior to that time, livestock followed the snow line and green-up at will throughout the area now occupied by the winter and spring pastures. Eleven troughs fed by 10.8 miles of pipeline were placed in winter pastures by 1984. The purpose of pipeline and troughs was to improve livestock distribution. The winter pasture was further divided into Pastures 5A and 5B in 1991 to create smaller, more manageable pastures and to implement a division of the Castle Creek Allotment among respective groups of permittees.

Neither the 1997 Final Decision nor the 2004 Settlement affected the season of use or amount of permitted use in the winter pasture. Although a stay of the Final Decision was issued by the Interior Board of Land Appeals (IBLA) construction of the Mud Flat Oolite Exclosure was not affected, and the exclosure fence was completed in 1999. The area within the exclosure was previously part of Pasture 5B.

Pasture 5B is the winter pasture on the East Castle Creek Allotment and has been grazed from November 1 to January 31 since the 1980's. Measures have been taken periodically to reduce utilization of palatable shrub populations or of perennial grasses in preferred locations, including construction of additional pipelines, water hauling, herding, and voluntary nonuse. Cheatgrass provides a substantial part of the available forage.

The Mud Flat Oolite Exclosure fence was completed in 1999. The area within the exclosure was previously part of Pasture 5B and had been grazed in winter since 1970.

AIE Findings

The winter pasture and the Mud Flat Oolite Exclosure are entirely within the lakebeds portion of the allotment. According to the 1997 AIE, winter pastures were consistently rated in poor condition since 1966. However, the 1959 and 1974 surveys recognized the existence of pockets of better condition communities with an Indian ricegrass understory. These pockets generally received limited livestock use because of steep slopes, broken topography, or distance from reliable natural water sources. These areas also had substantial remnant populations of increaser grasses. A fenceline contrast was evident in places between winter and spring pastures. In general, perennial grasses and palatable shrubs were more vigorous and abundant in winter pastures than spring pastures.

Trend in decreaser grasses, basal cover, was static. Transect 06S02E04, which had remnant populations of Sandberg bluegrass, showed an increase in increaser grass basal cover during the drought. Sites without remnant increaser populations did not show a similar increase. With the exception of site 06S02E04, bare ground was not being colonized by perennial grasses. Bare ground decreased in proportion to increases in nonpersistent litter (annual grasses). Nonpersistent litter was greatest during above average precipitation years prior to 1987 and after 1994. Microbiotic crusts increased slightly between 1993 and 1997.

According to the 1997 AIE (page 36), watersheds in winter pastures were not continuously protected because cover elements necessary to maintain them were minimal (live vegetation) or fluctuated with precipitation (non-persistent litter). During drought conditions, bare ground cover exceeded the level required to maintain watershed values (50%). Where cheatgrass was the predominant species, continued use (even at reduced levels) during drought conditions may not maintain adequate ground cover for watershed protection, according to the AIE.

The area within the Mud Flat Oolite Exclosure was not specifically addressed in the 1997 AIE except to note that the Mud Flat Oolite Research Natural Area/Area of Critical Environmental Concern (RNA/ACEC) had been designated in a 1992 Bruneau MFP amendment. Mulford's milkvetch was identified as one of several species in the RNA/ACEC to be protected by the following management actions: 1) manage livestock grazing in the vicinity of the RNA/ACEC to protect and prevent degradation of important resource values and 2) restrict livestock grazing within the RNA/ACEC to winter use.

Rangeland Health Evaluations

Rangeland Health Evaluation worksheets were completed in winter Pasture 5B and in the Mud Flat Oolite Exclosure (5BEX) in 2005. One site (06S03E21) was co-located with a trend site. Ratings for each attribute and photographs are presented in Appendix D. Shadscale/budsage communities are more typical of shallower soils on ridges and fan terraces; while greasewood, spiny hopsage, and Wyoming big sagebrush communities are more typical of deeper soils in drainages. Several additional shrub communities exist on the diverse soils and topographic features found in 5B and 5BEX; including those on badlands, but were not sampled. Increased bare ground and decreased interspatial vegetation were observed at these RHE worksheet locations compared to reference conditions. Primarily historic surface degradation was evident, with minor erosion at the worksheet location in the Mud Flat Oolite Exclosure.

Three sites were evaluated in Pasture 5B in 2005. All were located on fan terraces. One site had a moderate departure from expected with respect to indicators for Standard 1, and two sites had a slight to moderate departure. One site in Pasture 5B was dominated by shrubs, bare ground and remnant perennial grasses and two sites were dominated by cheatgrass at the time of examination. Perennial grasses were nearly absent from both cheatgrass communities. Results from the 2005 evaluations for Pastures 5B and 5BEX are presented in Table 5 below.

Table 5. Summary Rating of Rangeland Health Assessments –Pastures 5B and 5BEX.

Attributes	Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)			
	05S02E34	06S02E25	06S03E21	07S03E05 (5BEX)
	Silty 7-10"	Calcareous Loam 7"-10" mosaic with Sandy Loam 8-12"	Calcareous Loam 7-10"	Saline Bottom 8-12"
Soil and Site Stability	M	S-M	S-M	S-M
Hydrologic Function	M	S-M	S-M	S-M

The first evaluation site in Pasture 5B (05S02E34) represents a Silty 7-10" ecological site in the western portion of the pasture. It is located near a pipeline system, and the winterfat and Nuttall saltbush communities in this area are preferred by cattle. This assessment site had a moderate departure from expected with respect to indicators associated with Standard 1. Shrubs were the dominant visual aspect, winterfat was common throughout the site, and remnant perennial grasses were scattered to common. Bare areas were moderate-sized and sporadically connected. Soil surface resistance to erosion was significantly reduced in at least half of the plant canopy interspaces. Pedestals were slightly active in interspaces. Moderate soil surface degradation occurred in plant interspaces, with some degradation beneath plant canopies.

The second evaluation site in Pasture 5B (06S02E25) located in the center of the pasture represents a Calcareous Loam 7-10" with small inclusions of Sandy Loam 8-12" mosaic. This site had a slight to moderate departure from expected for attributes associated with Standard 1. Cheatgrass dominated the visual aspect of this site at the time of examination, with scattered taller shrubs. There were small, rarely connected patches of bare ground among the cheatgrass. Some reduction in soil surface stability was observed in plant interspaces due to reduced biological soil crust. However, there was no evidence of loss; and significant hydrologic problems were not observed.

The third evaluation site in Pasture 5B (06S03E21) had a slight to moderate departure from expected for attributes associated with Standard 1. The site was also dominated by cheatgrass but shrubs were more visually prominent and well-distributed over the site. There was slightly more bare ground than expected, but bare areas were small and rarely connected. Infiltration was moderately reduced due to a lack of deep rooted bunchgrasses on the site and some physical crusting. Soil structure shows signs of degradation in plant interspaces, but has stabilized now.

In 2005 one site was also evaluated in the Mud Flat Oolite Exclosure (Table 5). It had a slight to moderate departure from expected with respect to indicators for Standard 1. The badlands and oolite outcroppings which are the primary sensitive plant habitats were not sampled. Bare ground was common, cheatgrass cover was patchy, and interspatial bunchgrasses were reduced at the time of examination. The Rangeland Health Evaluation worksheet was on a southeast toeslope on the edge of a stream terrace. The dominant visual aspect of this site was greasewood, bare ground, and scattered large grasses (Indian ricegrass and basin wildrye). Cheatgrass was present around the shrub coppices rather than continuous at the time of examination.

Stabilizing agents were reduced below expected and some soil loss has occurred in plant interspaces. Bare ground was moderately higher than expected, with bare areas of moderate size and sporadically connected. Water flow paths associated with runoff from slopes above the site resulted in minor erosion, with some instability and deposition. Hydrologic problems were therefore stated to be evident. Infiltration was moderately reduced due to adverse changes in composition and distribution of interspatial bunch grasses compared to reference conditions.

Long-Term Cover Studies (Nested Plot Frequency Transects)
Locations of Nested Plot Frequency Transects (NPFT) and photo point sites are shown on Map 4. BLM has established three long-term trend studies within Pasture 5B. All (06S02E04, 06S02E35, and 06S03E21) are located on the lakebeds portion of the allotment on top of fan terraces. All studies are located in shadscale/bud sagebrush communities, but 06S02E04 has a prominent winterfat component. Interspatial perennial grasses are scarce at all three studies; but 06S02E04 has a more continuous cover of remnant perennial grasses than the other two study sites. The amount of cheatgrass fluctuates with climatic events at all, ranging from continuous to nonexistent.

During the period of evaluation (1998-2007), cover data were collected in 2006 (Appendix E, Cover Data). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Precipitation Data, Figures 1 and 2). At the trend sites, trend in increaser grass and decreaser grass basal cover was static for years when species basal cover was recorded at 06S02E04; and static at 0 at the other two sites. Basal cover of perennial species as a whole (live vegetation) was static during 1997 through 2007, except at 06S02E04. That site had a greater remnant population of perennial grasses to allow recruitment and crown expansion than the other two. In 2006, biological soil crust cover was less than in 1997 at 06S02E35 and was the same at the other sites. Bare ground and non-persistent litter showed an inverse relationship at all; with lower bare ground and higher non-persistent litter in 2007 than was measured in 1997 or during the early 1990's at two sites. 2005 and 2006 had exceptional spring precipitation, and cheatgrass, which is the primary component of non-persistent litter, showed a major increase in cover. Higher bare ground and lower non-persistent litter was observed at 06S02E04 in 2006.

At winter trend sites, bare ground basal cover likely did not exceed 50% during 1998-2007 except at 06S02E04, although no measurements were made in the driest years. The other basal cover categories provide protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of perennial grasses is low even at 06S02E04, and contributes relatively little to watershed function. However, other cover categories can partially compensate for loss of the original understory.

Pastures 8B, 8BI, and 8BIII

Grazing Management
Pastures 8B, 8BI, and 8BIII are the early spring pastures on the East Castle Creek Allotment and are grazed April 1 - May 1 and May 1 to June 1 in alternating years under the 2004 Settlement. All three pastures are open to use concurrently under the Settlement, but 8BI and 8BIII were basically rested in 2005 and 2006 to allow recovery from an extended period of drought. Although none of the permitted use was formally suspended, the permittees took a total of 1,271 AUMs (25% of the total spring permits) of voluntary nonuse in the aggregated spring pastures under the Settlement. During 1998 through 2004, the overall period of spring use continued to be April 1 through June 30.

The grazing practices, adjustments to permitted use, and most of the supporting improvements under the 1997 Final Decision were stayed by IBLA and were never implemented. During 1998 to 2004, spring use was not licensed by pasture, and pasture use or move dates are not reported separately in most cases. However, the overall period of spring use continued as April 1 through June 30, and these pastures were grazed from April into May as in the past. Pasture 8BIII was voluntarily rested in 2002.

Pastures 8BI and 8BIII are mostly historic seedings, while Pasture 8B is untreated native shrub communities. The two seedings were plowed and drilled to crested wheatgrass in 1988 and 1992, respectively. Under the 1997 Final Decision, the temporary fencing around the two seedings was replaced by permanent fences, and the temporary fence around the Phase I seeding was realigned to reflect a division of it between East and West Castle Creek allotments. The Birch Creek and Poison Creek Exclosures have been excluded from livestock grazing since 1967, and serve as reference areas for recovery of depleted native communities. Few if any burned areas occur within these pastures.

The electric fence that protected the Phase I Seeding during establishment was replaced by a permanent fence in 1998. Pasture 8BI was expanded by the new fence and now contains both plowed and seeded areas and untreated native range. Untreated areas occur primarily on the steep slopes of included foothills and around rock outcrops. This pasture was grazed from April into May as in the past from 1998 to 2004.

Birch Creek Exclosure

The Birch Creek Exclosure was constructed in 1967 to "evaluate plant succession on a depleted site which has granitic soil, low rainfall, and is presently dominated by big sagebrush" in cooperation with the University of Idaho. Practically no livestock use has been documented since construction of the exclosure. The exclosure was originally within the upper portion of the spring pasture that was grazed in common by predecessors of both East and West Castle Creek permittees. Use around the exclosure occurred during April and May each year. In 1986, a new fence reduced the use period around the exclosure to the month of April, with cattle gathering extending into early May. Spring use around the exclosure by West Castle Creek permittees was then eliminated by a new fence in fall, 1990. The exclosure is now surrounded by pasture 8BI. The area around the Exclosure was plowed and reseeded to crested wheatgrass, sand dropseed, Nomad alfalfa and flax in 1989. However, except for rest periods associated with the establishment and later management of the Phase I seeding, spring cattle grazing around the exclosure has continued since construction of the exclosure.

Poison Creek Exclosure

The Poison Creek Exclosure was constructed in 1967 to "evaluate plant succession on a site dominated by *Atriplex* species" in cooperation with the University of Idaho. A portion was to be reseeded to evaluate suitability of depleted shadscale communities for reseeding. No livestock use has been documented since construction of the exclosure. The exclosure is now surrounded by pasture 8BIII, which was separated from Pasture 8B by construction of a protective electric fence in 1992. The area around the exclosure was plowed and reseeded to crested wheatgrass and fourwing saltbush in 1992. However, except for rest periods associated with the establishment and later management of the Phase III seeding, spring cattle grazing around the exclosure has continued since construction of the exclosure. The exclosure is located on the lakebeds physiographic unit and is also a shadscale/budsage community

AIE Findings

Pasture 8B

The 1997 AIE subdivided the East Castle Creek Allotment into three physiographic and vegetation units, i.e., the lakebeds, the mountains (foothills), and the plateau areas to provide a geographic reference. According to the 1997 AIE, the lakebeds within the early spring pastures generally lacked any substantial perennial grass understory; however, small areas with increaser grass (primarily squirreltail) understories were observed. The mountains within the early spring pastures were primarily increaser or remnant increaser/decreaser grass communities, with pockets of decreaser communities on the highest mountains. Sandberg bluegrass was the predominant increaser in the mountains. There were strong fenceline contrasts in places between late spring and early spring pastures, with bluebunch wheatgrass abundant in Pasture 12, a late spring pasture, and almost absent in Pasture 8B, an early spring pasture.

According to the 1997 AIE, watersheds in historically accessible portions of the early spring pastures were not protected because cover elements necessary to maintain them were minimal (live vegetation) or fluctuated with precipitation (non-persistent litter). During drought conditions, bare ground cover exceeded the level required to maintain watershed values (50%). Trend in decreaser and increaser grass cover was static in early spring pastures. Trend in microbiotic crusts was static. Bare ground decreased in proportion to increases in nonpersistent litter (annual grasses). Nonpersistent litter was greatest during above average precipitation years prior to 1987 and after 1994.

The study of Sharp et. al. (1990) on an ungrazed shadscale stand in the Raft River Valley showed similar fluctuations in composition and recruitment after grazing ended in 1945. Specifically, shadscale showed cycles of mortality and recruitment as influenced by insects and by the amount and timing of spring precipitation. Forbs (particularly globemallow) were prominent in wet springs, and squirreltail gradually filled in many of the interspaces after about 20 years. However, production was suppressed in subsequent dry years. Cheatgrass was prominent in wet years after about 40 years from the time grazing ended. During later dry years, the stand was still dominated by perennial plants. Hironaka et. al. (1983) also noted that squirreltail is a relatively short-lived perennial, with a life span of less than 10 years. A significant fluctuation in the population density of squirreltail should be expected in the natural state.

Pastures 8BI and 8BIII

Also according to the 1997 AIE, the Phase I, II, and III seedings were completed too recently to make any conclusions about their effect on watershed conditions or to make any conclusions about trend under existing grazing use. The purpose of the Castle Creek Plow and Seed Project (Phase I, II, & III) was to improve watershed condition, wildlife habitat, and forage production within the early and mid spring pastures. The project would increase forage production in early spring pastures, and allow for spring deferment from livestock grazing in mid spring pastures (foothill area). The project was also intended to lessen the over-obligation of forage resources that existed in early spring pastures. The 786-acre Phase I seeding was completed in 1989 and grazing was initiated in 1992.

Siberian wheatgrass frequencies increased between 1992 and 1994 in the Phase I (06S01E35B) seeding. Frequencies of crested wheatgrass were static in the Phase I seeding between 1992 and 1994. A greater than 40% frequency of Sandberg bluegrass on two sites, including 06S01E35B, suggests that recovery of native grass species occurs even after plowing. Substantial populations

of Wyoming big sagebrush survived plowing or reestablished immediately afterwards. The treated areas were plowed to a depth of 5 to 7 inches. Crested wheatgrass seedings can revert to shrub dominated sites in 20-25 years with continued use during the critical growing phase of grasses.

Birch Creek Exclosure

According to the AIE, vigor and biomass of perennial grasses were greater in the Birch Creek exclosure than in the surrounding pasture. Thurber needlegrass was more dominant in the exclosure, indicating an upward trend in ecological condition in the exclosure and a static trend outside the exclosure.

Poison Creek Exclosure

Prior to 1990, squirreltail was more abundant in the Poison Creek exclosure than the surrounding early spring pasture. The contrast present at fencelines and exclosures indicated a static to downward trend in ecological condition in early spring pastures (up to that time).

According to the 1997 AIE, a squirreltail die-off was evident at low elevations both in grazed and ungrazed (Poison Creek exclosure) portions of early spring pastures. The decline in squirreltail occurred primarily at lower elevations in response to drought conditions beginning in 1987. Perennial grasses showed a downward trend in the Poison Creek exclosure. Ecological condition based on perennial grasses in photo plots and view photos was static to downward.

Rangeland Health Evaluations

Rangeland Health Evaluation worksheets were completed in the early spring pastures and in the Birch Creek Exclosure in 2005 and 2007. Wyoming big sagebrush is more typical of deeper soils in drainages and in foothill basins, while shadscale/budsage communities are more typical of shallower soils on ridges and fan terraces. Other shrub communities exist, including those on badlands, but were not sampled. The RHE worksheet locations were dominated by shrubs, mainly Wyoming big sagebrush. The density of native perennial grasses was reduced except for the exclosure and one site had an understory dominated by cheatgrass at the time of examination. Two locations had been plowed and reseeded to crested wheatgrass and other non-native species. Results from the 2005 and 2007 evaluations within these pastures are presented in Tables 6, 7 and 8 below.

Table 6. Summary Rating of Rangeland Health Assessments – Pasture 8B.

Attributes	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**			
	06S02E29	**07S01E01**	**07S02E22**	**07S02E09**
	Loamy 7-10”	**Loamy 7”-10”**	**Sandy Loam 8-12”**	**Calcareous Loam 7”-10”**
Soil and Site Stability	S-M	S-M	M	N-S
Hydrologic Function	S-M	S-M	M	S-M

This site represents the northern portion of Pasture 8B (06S02E29) and had a slight to moderate departure from expected for attributes associated with Standard 1. The general visual aspect was mostly shrubs with a very sparse understory of remnant perennial grasses. There was very little bare ground at this site due to abundant bio-crusts, lichen, and gravel, which served to stabilize the soil surface and kept cheatgrass from dominating. There was a slight to moderate departure

from expected for water flow patterns, which were mostly short. Some cut areas were observed but they were primarily historic in nature.

The second site evaluated in Pasture 8B (07S01E01) was also located on the fan terrace and had a slight to moderate departure for Standard 1. The dominant visual aspect of the site was also Wyoming big sagebrush with a very sparse understory of remnant perennial grasses. Soil surface resistance to erosion was reduced below expected. Gravel was abundant but bare ground was slightly increased. Some soil surface loss or degradation has occurred, but evidence of soil loss was rare. Water flow patterns exhibited a moderate departure from expected, but were short and not well defined with some minor cut areas. Infiltration was moderately reduced due to adverse changes in plant community composition and distribution, primarily because interspatial perennial grasses were rare.

The third site evaluated in Pasture 8B (07S02E22) showed a moderate departure from expected for Standard 1. The dominant visual aspect of this site was Wyoming big sagebrush and cheatgrass. Shrub interspaces, which were mostly void of perennial species, were bare other than patches of annuals. Some slightly active rills were observed on slopes surrounding the site. There were some very long, active, cut water flow paths that were sometimes connected on the site itself. Bare areas were large, connected, and very common on the site representing a moderate to extreme departure from expected.

The fourth site evaluated in Pasture 8B (07S02E09) had a none to slight departure from expected for attributes associated with Standard 1. The dominant visual aspect at this site was a mixture of shrubs (shadscale, bud and Wyoming big sagebrush, and horsebrush). Stones created a desert pavement on the ground surface, creating a very stable site. Infiltration was moderately reduced due to adverse changes in plant community composition and distribution, primarily because perennial grasses and forbs were now scarce on the site although they still existed in shrub protective canopies. Litter was greatly reduced because grasses were present only in trace amounts.

Pasture 8B1 and Birch Creek Exclosure

One plowed and seeded site was evaluated in Pasture 8BI in 2007; it had a moderate to extreme departure from expected for indicators associated with Standard 1 (Table 7). It was dominated by shrubs and deep rooted perennial grasses were reduced, and had active gullies and flow paths. This RHE site was located in the foothills portion of pasture 8BI. Ratings for each attribute and photographs are presented in Appendix D. The reference condition was taken from the Ecological Site Description.

Table 7. Summary Rating of Rangeland Health Assessments – Pasture 8BI and Birch Creek Exclosure.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**	
	07S01E03 (Phase I Seeding- 8BI)	**07S01E03A (Birch Creek Exclosure)**
	Sandy Loam 8-12”	**Sandy Loam 8-12”**
Soil and Site Stability	M-E	S-M
Hydrologic Function	M-E	S-M

The reseeded site evaluated in Pasture 8BI (07S01E03**)** had a moderate to extreme departure from expected for attributes associated with Standard 1. The dominant visual aspect of this site was bare ground, closely grazed grasses, minimal litter, and an open stand of small shrubs at the time of examination. Gullies within the site and steeper slopes above the site where plowing was less effective had a taller and generally more uniform shrub component. Areas of bare ground were large and occasionally connected. Erosion associated with water flow patterns was minor, with some instability and deposition. Soil surface resistance to erosion was significantly reduced in plant canopy interspaces and moderately reduced beneath canopies, with stabilizing agents present only in isolated patches. Soil surface degradation was severe throughout the site, with minimal differences in soil organic matter content and structure of surface and subsurface layers.

However, compared to adjacent untreated Wyoming big sagebrush communities, the increaser and (seeded) decreaser grass components were more abundant and evenly distributed, and the shrub component was reduced. Many of the soil surface characteristics (crusting, structure) and lack of biological soil crust on the sample site itself are largely the consequence of plowing in 1988. The gullies are an offsite influence created by runoff from the adjoining foothill slopes. The site was closely grazed in 2007, with little regrowth to provide for litter accumulation.

One site, within the exclosure (07S01E03A), had a slight to moderate departure from reference conditions for attributes associated with Standard 1 (Table 7). The dominant visual aspect of this site was Wyoming big sagebrush with a nearly continuous understory of Sandberg bluegrass and patches where Thurber needlegrass was dominant at the time of examination. The exclosure site had evidence of historic soil loss, but has had 40 years to recover from effects of unregulated grazing practices. Water flow patterns stable and short, with some evidence of minor erosion. Active pedestals and terracettes were rare. The other indicators consistently showed evidence of site recovery.

Pasture 8BIII

One plowed and seeded site was evaluated in Pasture 8BIII in 2007 (Table 8). The site had a moderate to extreme departure from expected for attributes associated with Standard 1. There was extensive sagebrush re-establishment and a low density of deep rooted cool season grasses. This RHE site was located in the lakebeds portion of pasture 8BIII, and is co-located with trend study 07S02E32GG, which was established in 1993. Ratings for each attribute and photographs are presented in Appendix D. The reference condition was taken from the Ecological Site Description.

Table 8. Summary Rating of Rangeland Health Assessments – Pasture 8BIII.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**
	07S02E32GG
	Sandy Loam 8-12"
Soil and Site Stability	M-E
Hydrologic Function	M-E

The reseeded site evaluated in Pasture 8BIII in 2007 had a moderate to extreme departure from expected for attributes associated with Standard 1. The dominant visual aspect of this site was gravel and bare ground, closely grazed crested wheatgrass, patchy litter, and an open stand of small shrubs. Some perennial grasses at the site lacked vigor, with limited regrowth at the time

of examination. There was extensive sagebrush reestablishment; but seeded fourwing saltbush was also prominent. Bare areas were large and occasionally connected. Water flow patterns were occasionally connected and deposition was common. Some rocks and seeded plants were pedestalling with occasional exposed roots.

However, compared to adjacent untreated Wyoming big sagebrush communities (0702E32GF), the (seeded) decreaser grass components were more abundant and evenly distributed, and the shrub component was reduced. Many of the soil surface characteristics (crusting, lack of structure, absence of surface gravel) and lack of biological soil crust on the sample site itself are largely the consequence of plowing in 1992. The site was closely grazed in 2007, with little regrowth to provide for litter accumulation.

Poison Creek Exclosure

No rangeland health evaluations were conducted in the Poison Creek Exclosure.

Long-Term Cover Studies (NPFT)

Pasture 8B

BLM has established four long-term trend studies within Pasture 8B. Three (06S02E33, 07S02E07, and 07S02E22) are located on the lakebeds portion of the pasture; while one (07S01E24) is located within the foothills portion of the pasture. A rangeland health evaluation was conducted near 07S02E22. The lakebeds studies are located in shadscale/bud sagebrush communities. Interspatial perennial grasses are scarce at all three studies; and the amount of cheatgrass fluctuates with climatic events, ranging from continuous to nonexistent. The foothills study is located in a transition zone between Wyoming big sagebrush on basin bottoms and black sagebrush on steep slopes and ridges. Both shrub species are represented. Decreaser grasses, such as Thurber needlegrass, are scarce, but the understory has a continuous layer of Sandberg bluegrass, an increaser species.

During the period of evaluation (1998-2007), cover data were collected in 2000, 2006 and 2007 (Appendix E). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figures 1 and 2). At the lakebeds trend sites, trend in increaser grass and decreaser grass basal cover was static during 1997 through 2007, as was basal cover of perennial species as a whole (live vegetation). Biological soil crust cover was greater than in 2000 at 07S02E07 and 07S02E22. At 07S02E07, which has been monitored the longest, biological soil crust cover was also greater in 2007 than in the dry period during the early 1990's (1993). Bare ground and non-persistent litter showed an inverse relationship, with lower bare ground and higher non-persistent litter in 2007 than was measured in 2000 or during the early 1990's. 2005 and 2006 had exceptional spring precipitation, and cheatgrass, which is the primary component of non-persistent litter, showed a major increase in cover.

At lakebeds trend sites, bare ground cover likely did not exceed 50% during 1998-2007 except at 07S02E22, although no measurements were made in the driest years. These basal cover measurements also represent a maximum value. The overlapping canopy cover was not measured, but increases protection from raindrop impact above the amount indicated by these basal cover measurements of bare ground. The other basal cover categories provide protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of perennial grasses is very low, and contributes little to watershed function. However, other cover categories can partially compensate for loss of the original understory.

At the foothills trend site (07S01E24), trend in increaser grass basal cover was static during 1997 through 2007, as was basal cover of perennial species as a whole. Decreaser grasses were not detected. Biological soil crust cover was the same as in 1997, but greater than in 2000. Bare ground and non-persistent litter showed an inverse relationship, with lower bare ground and higher non-persistent litter in 2007 than in previous years. Biological soil crusts were lumped with persistent litter in 1990; the apparent decline in persistent litter may reflect a different grouping of observations. Biological soil crusts have higher basal cover at this site than at any lakebeds trend sites in the winter and spring pastures, reflecting less degradation and higher site potential. Basal cover of perennial grasses is about 6%, and contributes to watershed function. Bare ground was generally 25% or less during 1997 through 2007, although no measurements were made in the driest years.

Pasture 8BI

BLM established a temporary trend study within the West Castle Creek portion of the Phase I Seeding in September, 1992 (06S01E35GB or CAC-2). Frequency and density data were collected from 1993 through 1997, and the results of the frequency study were reported in the AIE. No trends in basal cover were reported in the AIE. No additional data have been collected at 06S01E35GB, and no long-term trend study has been established within the East Castle Creek portion of the Phase I Seeding.

Pasture 8BIII

BLM established two temporary trend studies within Pasture 8BIII in October, 1993. Two were actually within the Phase III Seeding (07S02E28GE or CAC-5, and 07S02E32GG or CAC-7), and one was in an untreated or control area (07S02E32GF or CAC-6). These studies are located in Wyoming big sagebrush communities. Interspatial perennial grasses were scarce at all three studies prior to treatment; and the amount of cheatgrass fluctuates with climatic events, ranging from continuous to nonexistent. 07S02E28GE provided a comparison with untreated shadscale communities within the Poison Creek Exclosure that had not been grazed for 27 years. 07S02E32GG is co-located with an RHE site.

During the period of evaluation (1998-2007), basal cover data were collected at all three sites in 2000 and at 07S02E28GE in 2006 (Appendix E). The stakes had been removed at the other two study sites, and the studies could not be reread in 2006. No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figures 1 and 2).

At 07S02E28GE, trend in seeded (decreaser) grass basal cover was static during 2000 through 2006, as was basal cover of perennial species as a whole (live vegetation). Increaser grasses (native) have not been detected at this site following the plowing and reseeding treatments. No biological soil crust cover has been detected after plowing either. Bare ground and non-persistent litter showed an inverse relationship, with lower bare ground and higher non-persistent litter in 2006 than in 2000. 2005 and 2006 had exceptional spring precipitation, and cheatgrass, which is the primary component of non-persistent litter, showed a major increase in cover.

At 07S02E28GE, bare ground basal cover exceeded 50% during 1998-2007. In 2000, basal cover at 07S02E32GG was similar to measurements at 07S02E28GE. The overlapping canopy cover was not measured, but increases protection from raindrop impact above the amount indicated by these basal cover measurements of bare ground. The other basal cover categories

provide protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of perennial grasses is still low, and contributes minimal protection.

Compared to an untreated big sagebrush community (07S02E32GF), bare ground and nonpersistent litter were somewhat higher, and biological soil crust, remnant increaser grass and gravel cover were lower at the two seeded studies in 2000. Decreaser grass and persistent litter basal cover was markedly higher on the seeded studies in 2000. The persistent litter probably represents the woody residue from the big sagebrush after plowing. The plowing operation buried the surface gravel and biological soil crust, but resulted in greater occupation of shrub interspaces by roots of perennial grasses.

Compared to the Poison Creek Exclosure after 40 years without grazing, the seeded studies have similar basal cover of increaser grasses, higher basal cover of (seeded) decreaser species, lower biological soil crust and higher non-persistent litter. Other values are similar. In 2006, cheatgrass was more prominent on the seeded studies, while gravel, cheatgrass, and shrub leaf litter were the main soil surface components at the study site within the Exclosure (07S02E28).

Birch Creek Exclosure

BLM has not established a long-term trend study within the Birch Creek Exclosure, but photographs have been taken along the fence lines to illustrate differences in plant communities within and outside of the Exclosure (Appendix D).

Poison Creek Exclosure

BLM has established a long-term trend study within the Poison Creek Exclosure. During the period of evaluation (1998-2007), cover data were collected in 2006 (Appendix E). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figures 1 and 2).

At the trend site, trend in increaser grass basal cover was static during 1997 through 2007, as was basal cover of perennial species as a whole (live vegetation). Decreaser grasses have never been detected at this site. Biological soil crust cover was greater in 2006 than in 1997. 2005 and 2006 had exceptional spring precipitation, but no data were available to define fluctuations in cover for years between 1997 and 2006. Bare ground was lower in 2006 than in 1997, while non-persistent litter was the same.

As in most grazed trend studies in Pastures 5B and 8B, basal cover of perennial grasses is very low, and contributes little to watershed function. Basal cover of perennial grasses is lower than at the two grazed trend studies that were plowed and seeded in 1992 (07S02E28GE and 07S02E32GG). Biological soil crust cover is higher within the exclosure than on other lakebeds trend sites within the winter and early spring pastures; but also showed fluctuation among years. However, other cover categories also partially compensate for loss of the original understory and of increaser grasses that were present in 1983.

Pasture 10B

Grazing Management

Pasture 10B is the mid-spring pasture on the East Castle Creek Allotment and is grazed April 1 - May 1 and May 1 to June 1 in alternating years under the 2004 Settlement. In the past Pasture 10B was the mid-spring pasture that was grazed May 1 - June 1.

The 1997 Final Decision proposed use during June 2 - June 24 in alternate years with Pastures 11B, 12, and 44. However, the grazing practices and most of the supporting improvements under the Final Decision were stayed by IBLA and were never implemented. During 1998 to 2004, spring use was not licensed by pasture; and pasture use or move dates are not reported separately in most cases on available actual use reports. However, the overall period of spring use continued as April 1 through June 30, and these pastures were grazed primarily during May as in the previous years since 1986.

Water is provided by Birch Creek, Poison Gulch (early), the Poison Gulch Spring pipeline, and by several developed and undeveloped springs. The Birch Creek Exclosure and a trend study in the adjoining West Castle Creek Allotment were established to evaluate succession on lower slopes and alluvial basins under spring use, but have been excluded from Pasture 10B by later fencing.

AIE Findings

According to the 1997 AIE, three water troughs fed by two miles of pipeline were installed in mid spring pasture 10B in 1977. Eleven springs were developed between 1965 and 1967. The purpose of these water developments was to provide water for livestock and wildlife and redistribute cattle to prevent heavy utilization. Construction of a fence between early and mid spring pastures in 1986 resulted in a later turn out date in mid spring pastures. However, use in mid spring pastures still overlaps the critical growth phase of some perennial grasses. The mid-spring pasture was further divided into Pastures 10A and 10B in 1990 to implement a division of the Castle Creek Allotment among respective groups of permittees.

According to the 1997 AIE, the majority of mid-spring pastures had at least remnant cool season deep rooted and shallow rooted bunchgrass understories. Increaser grass (primarily Sandberg bluegrass) communities dominated, but substantial islands of decreaser communities occurred on steeper slopes and mountaintops. The AIE stated that in this pasture "the historic trend in ecological condition was static to downward in areas with gentle slopes receiving moderate to heavy livestock use and static to upward on steep slopes and mountaintops consistently receiving none to slight use." (pg. 58) In addition, it noted the "downward trend of decreaser grasses and static to upward trend of unpalatable shrubs indicated a static to downward trend in ecological condition in mountain and Wyoming big sagebrush communities between 1983 and 1997." (pg. 58). Small areas that lacked a substantial perennial grass understory occurred in large alluvial basins. No difference was obvious between early and mid spring pastures in 1993.

Bare ground cover increased somewhat during the drought, but trend was static between 1983 and 1997. Bare ground cover exceeded 50% in Wyoming big sagebrush communities, sometimes exceeded 50% in black sagebrush communities, and did not exceed 50% in low sagebrush communities during dry years. The < 50% bare ground cover criteria was not met on lower, flatter slopes in mid spring pastures under drought conditions and current use patterns. Consumption of residual forage when growing conditions are poor can contribute to increased bare ground.

Rangeland Health Evaluation

Two Rangeland Health Evaluation worksheets were completed in this mid-spring pasture in 2007. One (07S01E22) was co-located with a BLM trend site. Ratings for each indicator and photographs are presented in Appendix D. All of Pasture 10B is located within the foothills physiographic unit of the East Castle Creek Allotment. Within the foothills, Wyoming big

sagebrush communities are more typical of deeper soils on toeslopes and in alluvial basins. Basin big sagebrush and willow communities may occur on stream terraces. Shallower soils on ridges and on upper sideslopes typically support black and low sagebrush communities. Black sagebrush communities occur in a lower precipitation zone than low sagebrush communities, and share some species with adjoining shadscale/bud sagebrush communities.

One site had a moderate departure and one site had a slight to moderate departure for attributes associated with Standard 1. This pasture had similar issues to the early-spring pastures but perennial grasses were not as scarce as on the lakebeds of the former. One site was dominated by shrubs and bare ground with a sparse to patchy cover of cheatgrass in shrub interspaces. The second site was at a BLM trend study that was closer to reference condition and was also dominated by low (black) sagebrush but with a more continuous layer of Sandberg bluegrass and remnant decreaser grasses. However, deep rooted cool season bunchgrasses were reduced at both sites and bare ground was increased. Steeper slopes and mountaintops in this pasture are close to reference condition, and have received very little use by livestock, but were not sampled. Results from the 2007 evaluations for this pasture are presented in Table 9.

Table 9. Summary Rating of Rangeland Health Assessments – Pasture 10B.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**	
	07S01E23	**07S01E22**
	Shallow Claypan 11-13”	**Shallow Claypan 11-13” and 12”-16” transition zone**
Soil and Site Stability	M	S-M
Hydrologic Function	M	S-M

The first evaluation site in Pasture 10B (07S01E23) represents the lower slopes in the pasture. The lower slopes and alluvial basins have historically received the bulk of livestock grazing within the pasture, and the original understory has long been lost. Water is provided by Birch Creek, Poison Gulch (early), the Poison Gulch Spring pipeline, and by several developed and undeveloped springs. The Birch Creek Exclosure and a trend study in the adjoining West Castle Creek Allotment were established to evaluate succession on lower slopes and alluvial basins under spring use, but have been excluded from Pasture 10B by later fencing.

This site had a moderate departure from expected for indicators associated with Standard 1. It was dominated by shrubs with cheatgrass dominating the interspaces; interspatial bunch grasses were sparse and many had been closely grazed by livestock at the time of examination. The predominant shrub was low (black) sagebrush, with scattered rabbitbrush, Wyoming big sagebrush, and spiny horsebrush plants. Areas of bare ground were large and occasionally connected. Water flow paths were stable and short, with some evidence of minor erosion. Infiltration was greatly decreased due to adverse changes in plant community composition and distribution; cool season deep rooted bunchgrasses were reduced. Some reduction in soil surface stability and some soil loss has occurred in the plant interspaces.

The second evaluation site in Pasture 10B (07S01E22) was located at the upper end of a basin at the trend site. It had a slight to moderate departure from expected for indicators associated with Standard 1. This area had higher productivity and lower utilization, and represents the upper fringes of areas grazed by cattle in Pasture 10B. The trend site was established here because the alluvial basins typified by RHE worksheet 07S01E23 did not have enough understory for a

measurable response. The visual aspect of this site was low sagebrush with a more continuous layer of Sandberg bluegrass and remnant decreaser grasses.

Bare areas were small and rarely connected. Erosion was minor, with some instability and deposition in water flow patterns. Pedestals were slightly active, occurring primarily in flow paths. Minor changes in the plant community composition and distribution had only a minor effect on infiltration.

Long-Term Cover Studies (NPFT)
BLM established a single trend study within Pasture 10B in July, 1983. The study is located in a low sagebrush community near the upper end of an alluvial basin. Sandberg bluegrass is the most prominent understory species, but the site also has substantial remnants of bluebunch wheatgrass and Thurber needlegrass. Cheatgrass is sparse. Those species give way to a more continuous Idaho fescue understory on steeper slopes above the trend site. 07S01E22 is co-located with an RHE worksheet.

During the period of evaluation (1998-2007), basal cover data were collected in 2000 and in 2007 (Appendix E). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figures 1 and 2).

At 07S01E22, trend in increaser and decreaser grass basal cover was static during 1997 through 2007, as was basal cover of perennial species as a whole (live vegetation). Detection of decreaser grasses was somewhat lower in 2000. Biological soil crust basal cover was also static during 1997 through 2007. Bare ground and non-persistent litter did not show an inverse relationship during 1997 through 2007. Although 2005 and 2006 had exceptional spring precipitation, cheatgrass, which is the primary component of non-persistent litter did not show a change in cover. Instead, an increase in size and prominence of perennial plants was the major effect (photos, Appendix E).

At 07S01E22, bare ground basal cover probably did not exceed 50% during 1998-2007. During that period, measured bare ground was 25% or less. The overlapping canopy cover was not measured, but increases protection from raindrop impact above the amount indicated by basal cover measurements of bare ground. The other basal cover categories provide protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of perennial grasses is about 8%, and contributes substantial protection from raindrop impact and resistance to overland flow.

Pastures 11B, 12, and 44

Grazing Management
Pastures 11B and 12 are the late spring pastures on the East Castle Creek Allotment that are grazed during June 2 - June 17 and rested in alternating years under the 2004 Settlement. The Settlement grants one week flexibility in move dates, extending the allowable period of use through June 24. The adjudicated season of use for Pastures 11B and 12 was June 1 through June 30 from 1970 through 1992. Pasture 11B was effectively rested in 2006 and 2007, and Pasture 12 was rested in 2007.

Pasture 44 has been formally designated as an FFR since 1993, and has retained that status under the 2004 Settlement. In FFRs, livestock numbers, season of use, and permitted use for included public land are at the discretion of the permittee provided that BLM land use plan objectives are

met. Although no specific actual use data are available, spring use in conjunction with or immediately after the licensed use period in pastures 11B and 12 is probably the most typical scenario.

The 1997 Final Decision proposed use in Pastures 11B, 12, and 44 during June 2 - June 24 in alternate years with Pasture 10B. Most of Pasture 11B was to be fenced into a new riparian pasture, 11BR, and rested until MFP objectives for Birch Creek were met. Additional springs and a pipeline were also proposed. However, the grazing practices and most of the supporting improvements under the Final Decision were stayed by IBLA and were never implemented. During 1998 through 2004, spring use was not licensed by pasture; and pasture use or move dates are not reported separately in most cases on available actual use reports. However, the overall period of spring use continued to be April 1 through June 30, and these pastures were grazed primarily during June, as in the past.

Although the implementation of the 1997 Final Decision was stayed by IBLA, the stubble height term and condition (T&C) for Birch Creek that was imposed on the permits in February 1997 remained in effect. That T&C required that a minimum 4 inch stubble height be left on Birch Creek within Pastures 10B and 11B at the end of the growing season. Compliance with that T&C was monitored annually. No stubble height requirement was imposed on Poison Creek, which flows through Pasture 12.

The T&C was met once, in 1998. Following non-compliance in 1999, additional fence maintenance and additional fencing were undertaken to prevent cattle drift into Pasture 11B. These were not successful, and BLM issued Proposed and Final Decisions in spring, 2001 suspending part of the permitted spring use and limiting the amount and length of the grazing period in Pasture 11B to one week for 2001 only in order to insure compliance with the T&C. Consequently, more of the late spring use occurred in Pasture 12. The Final Decision was appealed and a petition for stay was denied by IBLA. The appeal was dismissed by mutual consent in 2003. In 2002, 19 days of use were made in Pasture 11B, and the livestock split between the two pastures was again adjusted to make more of the late spring use in Pasture 12.

An important action was the construction of the Rough Mountain Drift Fence in 1948 to hinder and delay livestock access to the present-day summer pastures. The strong response to the change in season of use on the summer side of the fence accounts for much of the fenceline contrast at the upper end of the late spring pastures that is still visible today. The Double L Fence was constructed in Pasture 12 in 1969 to provide protection to the critical watershed at the head of the Poison Creek drainage which was in critical condition at that time. Construction of the fences separating early and late spring pastures was completed in 1971 to implement the Castle Creek AMP. One of the two late-spring pastures was further divided into Pastures 11A and 11B in 1990 to implement a division of the Castle Creek Allotment among respective groups of permittees. Fences around the State section and around the private land in Gamble Gulch were completed in April, 2007. These fences allow independent management of the enclosed lands from public lands within Pasture 11B.

AIE Findings

According to the AIE, six springs were developed in late spring pastures between 1967 and 1986. The purpose of those developments was to provide water for livestock and wildlife and redistribute cattle to prevent heavy utilization.

According to the AIE, condition ratings in late spring pastures were generally associated with steepness of slope, elevation, proximity to water, and historic uses. An historic livestock access corridor followed Poison Creek through Pasture 12. Lower portions of the corridor were dominated by increaser grass understories; while upper portions of the corridor had primarily remnant increaser/decreaser grass understories. Less accessible areas adjacent to the corridor had decreaser grass understories. North-facing slopes had relatively more decreaser grasses than south-facing slopes. There were strong fenceline contrasts in places between adjoining late spring and early spring pastures. Bluebunch wheatgrass was abundant in pasture 12 (late spring) and almost absent in pasture 8B (early spring).

According to the AIE, lower elevation portions of pasture 11B were rated in poor condition. Condition was generally fair or good at higher elevations on steep north-facing slopes. Pasture 11B, dominated by rugged topography, had remnant increaser/decreaser grass understories.

According to the AIE, abundance of decreaser grasses was greater in late spring than in early and mid spring pastures. Trend in perennial grass abundance was static or upward in late spring pastures, except in heavy use areas, since the construction of the fence separating early and late spring pastures in 1971. The trend in ecological condition was static in areas receiving moderate or greater livestock use and static to upward on steeper slopes away from major fencelines in late spring pastures. Perennial grass abundance was greater in summer than late spring pastures, suggesting that annual summer use is even more favorable for perennial grass vigor and recruitment than is annual late spring use.

According to the AIE, decreaser and increaser grass cover was static between 1983 and 1997. Bare ground cover was low, relatively stable, and did not exceed 50% during the drought. The increase in bare ground cover in 1993 reflected the influence of the 1992 fire on one of the transects (BLM trend site 08S01E20).

Rangeland Health Evaluations

These pastures, 11B, 12, and 44, are all located within the foothills physiographic unit of the East Castle Creek Allotment. Rangeland Health Evaluation worksheets were completed in 2007. One (08S01E20) was co-located with a BLM trend site. Ratings for each indicator and photographs are presented in Appendix D. Within this portion of the foothills, mountain big sagebrush replaces Wyoming big sagebrush communities on deeper soils on lower sideslopes and in alluvial basins. Basin big sagebrush and willow communities still occur on stream terraces. Low sagebrush replaces black sagebrush communities on shallower soils located on ridges and upper sideslopes. Sandberg bluegrass, Idaho fescue, and bluebunch wheatgrass are the predominant understory species, depending upon slope exposure and level of past disturbance. Results from the 2007 evaluations for these pastures are presented in Tables 10, 11 and 12 below.

One site was evaluated in Pasture 11B in 2007 and had a slight to moderate departure from expected with respect to indicators for Standard 1 (07S01W35). It was located adjacent to an east facing drainage leading down to Birch Creek and was about 1 mile below the Rough Mountain Drift Fence. The dominant visual aspect of this site was a dense stand of mountain big sagebrush and rabbitbrush with a nearly continuous understory of Sandberg bluegrass and scattered remnants of bluebunch wheatgrass and Idaho fescue. Scattered western juniper trees are also present.

Table 10. Summary Rating of Rangeland Health Assessments – Pasture 11B.

Attribute	Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)
	07S01W35
	Loamy 13-16"
Soil and Site Stability	S-M
Hydrologic Function	S-M

The site evaluated in Pasture 11B in 2007 had a slight to moderate departure from expected with respect to indicators associated with Standard 1 for both the Soil and Site Stability and Hydrologic Function attributes. Bare areas were small and rarely connected and the presence of a compaction layer was associated only with livestock trailing areas. Water flow patterns were present at this location but because of abundant sagebrush they were short and stable. Minor changes in plant community distribution had only a minor effect on infiltration.

Three sites were evaluated in Pasture 12 in 2007. The low sagebrush site (08S01E21) that was located on steep cool exposures near the upper end of the pasture had a none to slight departure from expected for indicators associated with Standard 1; and was considered to be in reference condition. That site had a good bunchgrass component. The other two sites (both mountain big sagebrush communities) had a slight to moderate departure from expected; but shrubs were higher than expected and bunchgrasses were reduced. Cheatgrass was common on the site that had burned in 1992 (08S01E20). That site was co-located with a BLM trend study.

Table 11. Summary Rating of Rangeland Health Assessments – Pasture 12.

Attribute	Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)		
	08S01E10	**08S01E20**	**08S01E21**
	Loamy 12-16" to Loamy 13-16"	**Loamy 13-16" (burned)**	**Shallow Claypan 12-16" and Mountain Ridge**
Soil and Site Stability	N-S	N-S	N-S
Hydrologic Function	S-M	S-M	N-S

The first evaluation site in Pasture 12 (08S01E10) represents the upper slope mountain big sagebrush communities on cool exposures in the lower portion of the pasture. It is located very close to the former Double L fenceline and represents less accessible areas adjacent to the historic livestock access corridor. The dominant visual aspect of this site was a more open stand of mountain big sagebrush and rabbitbrush with a nearly continuous understory of Sandberg bluegrass and scattered remnants of bluebunch wheatgrass and Idaho fescue. Sparsely scattered western juniper trees are also present.

Worksheet 08S01E10 had a slight to moderate departure for attributes associated with Standard 1. Infiltration was moderately reduced due to adverse changes in plant community composition; due to a decrease in the deep rooted cool season grass group and an increase in shrubs and bluegrass. Bare areas were small and rarely connected. Active pedestalling was rare, and there was minimal evidence of past or current soil deposition or erosion.

The second evaluation site in Pasture 12 (08S01E20) was at the BLM trend site. This area burned in 1992, but was not reseeded or protected from grazing during the recovery period. The

dominant visual aspect of this site was very thick mountain big sagebrush with patches of cheatgrass in openings and sparse remnants of perennial grasses across most of the area.

Worksheet 08S01E20 had a slight to moderate departure for indicators associated with Standard 1. The shrub component on the site was high and there were areas that lacked deep rooted cool season bunchgrasses. However, the dense shrub cover and patches of cheatgrass tended to compensate for the lack of desirable understory. Therefore, observed plant cover changes have only a minor effect on infiltration. Bare areas were small and rarely connected, water flow patterns were stable and short, and active pedestalling was rare.

The third evaluation site in Pasture 12 (08S01E21) had a none to slight departure for attributes associated with Standard 1 and typifies reference condition for low sagebrush/Idaho fescue communities. That site was on steep north-facing side slopes east of Poison Creek and represents the less accessible areas outside of the historic livestock access corridor in the upper end of the pasture. The dominant visual aspect of this site was dense, vigorous Idaho fescue and lupine with an open stand of low sagebrush.

All indicators at 08S01E21 had none to a slight departure from expected. The site had good soil structure with ample organic matter. The amount and size of bare areas matched that expected for the site. There was a vigorous cool season deep rooted bunchgrass component with the proper density of shrubs and a good mix of forbs.

Pasture 44 is an FFR pasture that includes primarily public and State lands. This pasture is located upon the southern exposure below the summits of Rough Mountain. Since it is an FFR, it is grazed when needed by the permittee, and season of use and stocking rates can vary from year to year. Although no specific actual use data are available, spring use in conjunction with or immediately after the licensed use period in pastures 11B and 12 is probably the most typical scenario. The site evaluated in Pasture 44 had a slight to moderate departure from expected for Standard 1.

Table 12. Summary Rating of Rangeland Health Assessments – Pasture 44.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**
	08S01W05
	Loamy 13-16”
Soil and Site Stability	S-M
Hydrologic Function	S-M

The site evaluated in Pasture 44 in 2007 had a slight to moderate departure from expected for Standard 1. Water flow patterns were short, somewhat connected and more frequent than expected, resulting in slight to moderate departure from expected. There were few bunchgrasses in the interspaces but they were pedestalled, representing a slight to moderate departure from expected for pedestals and terracettes. Evidence of historic soil loss was present resulting in a slight to moderate departure from expected. There was a moderate departure from expected for plant community composition and distribution relative to infiltration and runoff. There was increased sagebrush and decreased bunchgrasses and cheatgrass dominated the interspaces.

Long-Term Cover Studies (NPFT)

No long-term BLM trend studies have been established in pastures 11B or 44. There are two BLM study sites in pasture 12. Site 08S01E02 is located in the lower portion of the historic

livestock access corridor in Pasture 12, while trend study 08S01E20 is located on a southeasterly slope in the upper portions of that corridor. During the period of evaluation (1998-2007), basal cover data were collected in 2006 (Appendix E). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figures 1 and 2).

Trend study 08S01E02 was established in 1990, and is located in a low sagebrush community on a northerly toe slope above Poison Creek. Mountain big sagebrush occurs as a minor component. Sandberg bluegrass is the most prominent understory species, but the site also has remnants of bluebunch wheatgrass and Thurber needlegrass. Cheatgrass is sparse.

At 08S01E02, trend in basal cover of increaser and decreaser grasses was static during 1997 through 2006, as was basal cover of perennial species as a whole (live vegetation). Biological soil crust basal cover was also static during 1997 through 2006. Bare ground and non-persistent litter did not show an inverse relationship during 1997 through 2006. Although 2005 and 2006 had exceptional spring precipitation, cheatgrass, which is the primary component of non-persistent litter did not show a change in cover. As was also observed at the trend site in Pasture 10B, an increase in size and prominence of perennial plants was the major effect (photos, Appendix E). Bare ground basal cover was markedly lower at 08S01E02 in 2006 than in 1997.

Trend study 08S01E20 burned in 1992, and trend responses reflect burning and recovery from the fire without benefit of closure to livestock use or reseeding. It is co-located with an RHE worksheet. A very dense stand of mountain big sagebrush dominated the site by 1997. Sandberg bluegrass and cheatgrass are now the primary understory species, with scattered remnants of decreaser grasses.

At 08S01E20, trend in basal cover of increaser and decreaser grasses could not be evaluated during 1997 through 2006 because the data were not recorded by species. The basal cover of perennial species as a whole (live vegetation) was static during 1997 through 2006 ($p=0.05$). Biological soil crust basal cover was not detected in any year. Bare ground and non-persistent litter showed an inverse relationship during 1997 through 2006. Although 2005 and 2006 had exceptional spring precipitation; cheatgrass, which is the primary component of non-persistent litter was lower in 2006 than in 1997, while bare ground increased.

At both BLM trend studies, bare ground basal cover may have exceeded 50% during 1998-2007. However, the overlapping canopy cover was not measured, but increases protection from raindrop impact above the amount indicated by that basal cover measurements of bare ground; markedly so at 08S01E20 with its dense overstory of mountain big sagebrush, which was already in place in 1997. The other basal cover categories provide protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of perennial grasses is about 6% at 08S01E02, and contributes substantial protection from raindrop impact and resistance to overland flow. At 08S01E20, the shrub canopy and cheatgrass understory provide the primary protection from raindrop impact and resistance to overland flow at the present time.

Pastures 28, 28A, and 29A

Grazing Management

Pastures 28, 28A, and 29A are the summer pastures on the East Castle Creek Allotment and are grazed after the critical growth stage for most perennial grasses since the Castle Creek Allotment

Management Plan was adopted in 1969. A deferred-rotation system was adopted at that time that has been retained with modifications through the present time. Under the 2004 Settlement, Pastures 28 and 28A are grazed solely by Gordon King, and Pastures 29A, 29B, 29C, and 29D are grazed solely by John Anchustegui; continuing the same division of the summer pastures that was initiated by Grazing Agreement in 1993. Under the Settlement, grazing in Pastures 29A and 29B (which are open to use concurrently), alternates between June 18 to August 31 and July 15 to August 31 in successive years. Grazing in riparian Pasture 29C during June 15 to 30 alternates with rest in successive years. Grazing in riparian Pasture 29D during June 15 to 30 was licensed in 2006 and 2007. Grazing in Pastures 28 and 28A alternates between June 25 to July 28 and July 29 to August 31 in successive years. No change to the amount of permitted use occurred in the summer pastures under the Settlement.

The 1997 Final Decision proposed grazing use during June 25 to August 31 in Pastures 28 and 28A in alternate years as ultimately implemented under the 2004 Settlement. Under the Final Decision, grazing use in Pasture 29A (including 29B) was during June 25 - September 30 with use deferred until after seed ripe in alternate years. No change to the permitted use was imposed in the summer pastures. Since the implementation of the Final Decision was stayed by IBLA in March 1998, grazing management during 1998 to 2004 reverted to previous management under the February 1997 grazing permits.

An important BLM action was the construction of the Rough Mountain Drift Fence in 1948 to hinder and delay livestock access to the present-day summer pastures. The strong response to the change in season of use on the summer side of the fence accounts for much of the fenceline contrast at the upper end of the late spring pastures that is still visible today. Spring use was eliminated from the present-day summer pastures of both East and West Castle Creek allotments by Decision in 1969.

Prior to 1971, the entire summer use area of both East and West Castle Creek allotments was part of a single pasture. In November 1971, the fences between pastures 28, 28A, and between pastures 28 and 24 of the West Castle Creek Allotment were installed, “to provide the necessary rest and rehabilitation for the vegetative cover on the summer portions of the allotment.” In 1972, the Anthill Pipeline was constructed to troughs in present-day pastures 28, 28A, and in Pasture 30 of West Castle Creek Allotment. According to the AIE, eleven water troughs fed by 6.9 miles of pipeline were placed in summer pastures between 1972 and 1992. Ten springs were developed between 1940 and 1986 in summer pastures. Additional fencing was constructed in 1989 dividing pastures 28 and 32B and 28A, 29A, and 30 among permittees. Station Spring Exclosure was installed in 1983 and expanded in 1989; Rat Spring Exclosure was constructed in 1970 in conjunction with the spring development.

As a part of the Settlement for the Idaho Watersheds Project appeal of the permit reissuance in February 1997; the segment of Magpie Creek, a South Fork Castle Creek tributary, that was formerly within Pasture 28A was included in the 228 acre Magpie Creek Temporary Exclosure. Under the 1997 Final Decision, Pasture 29B was separated from 29A by construction of the Corner Pocket Fence. Riparian pastures 29C and 29D along upper Battle Creek were also created by new fences in 1998. The construction of fencing to create Pasture 29N, which emphasized recovery of wet meadows along the South Fork Castle road in Pasture 29A, was appealed by the permittees and a stay request was granted by IBLA, and was not completed.

AIE Findings

According to the 1997 AIE, the majority of summer pastures were rated in good condition by successive inventories since 1966. Site write-ups from the 1979 survey indicated that low sagebrush communities with deeper soils were in better condition than mountain big sagebrush communities, however, the level of mapping detail obscured those differences. Low sagebrush communities with soils too shallow to support Idaho fescue were rated in fair ecological condition by the 1974, 1979, 1980 surveys. However, gentle slopes along permanent water sources and an old burn along the South Fork of Castle Creek were rated in poor condition in 1979. Forage production was greater and ecological condition was better in summer pastures than in adjoining late spring pastures at that time. Summer pastures were generally dominated by decreaser grass understories, with uplands adjacent to South Fork Castle Creek dominated by increaser grass understories.

According to the 1997 AIE, trend in perennial grasses between 1983 and 1993 was generally static to upward in both photo plots and view photos for low and mountain big sagebrush communities. Western juniper appeared to increase in view photos at a mountain big sagebrush plot (08S01W32A) and in uplands surrounding semi-wet meadows (08S01W04, 08S01W32A, 08S01W32B) within Pasture 28B. Increased cover of grasses and palatable shrubs indicated an upward trend in ecological condition at these sites, but juniper may be encroaching into these communities and replacing an adjacent grove of mountain mahogany. Perennial grass cover fluctuated during the drought, but was static between 1983 and 1997. Cover of microbiotic crusts was static. Bare ground cover was relatively low and showed less marked fluctuation with climate than in the lower precipitation winter and spring pastures.

Rangeland Health Evaluations

Most of the area within these summer pastures is located within the plateau physiographic unit of the East Castle Creek Allotment. Rangeland Health Evaluation worksheets were completed in these pastures in 2006. One was co-located with a BLM trend study. The plant communities consist of a mosaic of mountain big sagebrush and low sagebrush communities alternating on deeper and shallower soils, respectively. The mountain big sagebrush communities occur primarily along drainages and on the bottoms of low basins that predominate in this portion of the plateau physiographic unit. The low sagebrush communities are located on rock outcrops and foothill ridgetops. Mountain mahogany and climax western juniper communities also occur on ridgetops and rock outcrops; and juniper is expanding into other communities. The mountain big sagebrush communities sampled were characterized by reduced interspatial bunchgrasses and an increased shrub component at some of the sites at the time of examination. Ratings for each indicator and photographs are presented in Appendix D. Results from the 2006 and 2007 evaluations for these pastures are presented in Tables 13, 14 and 15 below.

Table 13. Summary Rating of Rangeland Health Assessments – Pasture 28.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**	
	08S01W28	**08S01W20**
	Loamy 13-16	**Shallow Claypan 12-16" with minor Shallow Claypan 8-12"**
Soil and Site Stability	M-E	S-M
Hydrologic Function	M-E	S-M

Two Rangeland Health Evaluation worksheets were completed in summer Pasture 28 in 2006. Site 08S01W28 was near a trend site. One had a moderate to extreme departure from expected for indicators associated with Standard 1 and one had a slight to moderate departure from expected. Some soil surface degradation was evident, particularly at 08S01W28; and there was some reduction in diversity and composition of large cool season grasses at both sites.

The first site evaluated in Pasture 28 (08S01W28) had a moderate to extreme departure from expected for Standard 1 in 2006. The dominant visual aspect of this site was a somewhat thickened stand of mountain big sagebrush and rabbitbrush with an understory of Sandberg bluegrass and several species of decreaser grasses. Water flow patterns rated moderate to extreme, with numerous deposition and cut areas. Water flow paths common and occasionally connected. Bare ground was slightly to moderately higher than expected with small, rarely connected bare areas with a prominent gravel cover attributed to surface erosion. Pedestals rated moderate with slight active pedestaling in flow paths and interspaces. Litter movement rated moderate to extreme, with small to moderate sizes displaced. Soil surface stability was significantly reduced in at least half of the plant canopy interspaces; and there was moderate soil surface degradation in plant interspaces. Plant community composition and distribution relative to infiltration and runoff was moderate to extreme due to adverse changes in plant community composition and distribution.

The second site evaluated in Pasture 28 (08S01W20) had a slight to moderate departure from expected for indicators associated with Standard 1. The dominant visual aspect of that site was an even stand of low sagebrush with a nearly continuous understory of Sandberg bluegrass and a well-distributed component of decreaser grasses. Portions of shrub interspaces that lacked perennial grasses also had a nearly continuous gravel cover. Bare areas were small and rarely connected. Minor changes in plant community composition and distribution had only a minor effect on infiltration due to a slight shift in dominance toward increaser grasses.

Pasture 28A

Two mountain big sagebrush Rangeland Health Evaluation worksheets were also completed in summer Pasture 28A in 2006. Neither was co-located with a BLM trend site, as there is only a photo point in this pasture. One (09S01W04) was evaluated in early May as plant growth was just beginning, the other (08S01W27) was evaluated in late July, near the end of the growth period for the year. Temporal variation was a factor in the respective ratings. The location sampled in May was also near a basin along the Antelope Ridge road that is preferred by cattle. It is about ¼ mile to each of two equally spaced water troughs that were installed in 1973. The other location is about the same distance from a single water trough that was installed in 1986, but had more broken topography, and typically receives less use. Both sites had increased shrubs and decreased interspatial grasses.

Table 14. Summary Rating of Rangeland Health Assessments – Pasture 28A.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**	
	08S01W27	**09S01W04**
	Loamy 13-16”	**Loamy 13-16”**
Soil and Site Stability	S-M	S-M
Hydrologic Function	S-M	M

The dominant visual aspect of the first evaluation site in Pasture 28A (08S01W27) was a somewhat thickened stand of mountain big sagebrush with a nearly continuous understory of bluebunch wheatgrass, Idaho fescue, and other decreaser grasses and of Sandberg bluegrass. Bare ground was more prominent and gravel was far less prominent on portions of shrub interspaces that lacked perennial grasses at the time of the examination than at the other two mountain big sagebrush locations in Pastures 28 and 28A. There was a slight to moderate departure from expected for indicators associated with Standard 1.

Bare areas were small and rarely connected; and minor changes in plant community composition and distribution had only a minor effect on infiltration. There was a reduction in interspatial large cool season bunchgrasses and an increase in the amount of shrubs. Soil surface structure showed degradation in interspatial areas, with a slight physical crust. Water flow patterns were stable and short, and pedestals were slightly active, with most pedestals in interspaces.

The second evaluation site in Pasture 28A (09S01W04) was located on rolling hills and benches and had a moderate departure from expected for Standard 1. The dominant visual aspect at the time of the examination was a thickened stand of mountain big sagebrush with an understory of perennial grasses. Pedestals received a slight to moderate departure from expected and active pedestaling was rare. Bare ground was large and occasionally connected and higher than expected for the site. Soil surface loss and degradation was slight to moderate with some signs of degradation especially in the plant interspaces. Plant community composition and distribution relative to infiltration and runoff had a moderate departure from expected. Infiltration was moderately reduced due to adverse changes in the plant community. Litter was greatly reduced relative to site potential and weather.

Pasture 29A

One Rangeland Health Evaluation worksheet was completed in summer Pasture 29A (08S01W26) in 2006. It was co-located with a BLM trend study within a mountain big sagebrush community on the bottom of a low basin. The site was adjacent to the fence dividing Pasture 29A from Pasture 28A, and was also about 0.1 mile from the nearest water trough supplied by the Ant Hill Pipeline. It had a moderate departure from expected for attributes associated with Standard 1. This location had adverse changes in plant community composition and distribution due to decreased interspatial grasses.

Table 15. Summary Rating of Rangeland Health Assessments– Pasture 29A.

Attribute	**Attribute Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)**
	08S01W26
	Loamy 13-16”
Soil and Site Stability	S-M
Hydrologic Function	M

The dominant visual aspect at the time of the examination was a very dense stand of mountain big sagebrush, a generally continuous understory of perennial grasses and forbs, and small patches of bare ground. A few scattered western juniper trees were also present. The evaluation site in Pasture 29A had a moderate departure from expected for attributes associated with Standard 1. Bare areas were small and rarely connected. Infiltration was moderately reduced due to adverse changes in plant community composition and distribution. Erosion associated

with water flow patterns was minor, with some instability and deposition. Slight active pedestalling was observed in the flow paths.

Long-Term Cover Studies (NPFT)

Pasture 28

BLM trend studies 08S01W28 and 08S02W24, both located in pasture 28, were established in 1983. All permitted cattle belonging to the predecessors of both the East and West Castle Creek permittees used Pasture 28 (Juniper, later Anthill) every summer at that time. The Rangeline Agreement accompanying the construction of pasture division fences in 1989 eliminated use of Pasture 28 by several West Castle Creek permittees after that time, including the areas around these trend studies. Trend study site 08S01W28 is co-located with an RHE worksheet. During the period of evaluation (1998-2007), basal cover data were collected in 2006 (Appendix E). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figure 3).

Trend study 08S01W28 was established in a fine-soiled low sagebrush community on a ridgetop. The Anthill Pipeline had been extended to troughs located about 0.8 miles southeast of trend study 08S01W28 in 1972. Prior to that time, the only reliable summer water was Rat Spring and another spring that were both located at least ½ mile from 08S01W28. Idaho fescue and Sandberg bluegrass are the most prominent understory species. Cheatgrass is non-existent, and scattered mountain mahogany occur on the site.

At 08S01W28, trend in basal cover of increaser and decreaser grasses could not be evaluated during 1997 through 2006 because the data were not recorded by species in 2006. However, basal cover of perennial species as a whole (live vegetation) increased during 1997 through 2006. Biological soil crust basal cover was static during 1997 through 2006. Bare ground and non-persistent litter did not show an inverse relationship during 1997 through 2006. Although 2005 and 2006 had exceptional spring precipitation; both non-persistent litter and bare ground were static compared to 1997, which also had occurred during another wet period (Appendix F, Figure 3).

Trend study 08S02W24 is about 1 mile south of the 32B fence on a ridge above Station Spring, which is a preferred livestock use area. While both the preferred area and the location of 08S02W24 support low sagebrush/Idaho fescue communities, the trend site is primarily gravel and rock while the preferred area has fine-textured soils. The study was in place prior to construction of the fence dividing pastures 28 and 32B among permittees in 1989 and was established concurrently with construction of the Station Spring Exclosure.

At 08S02W24, trend in basal cover of increaser and decreaser grasses could not be evaluated during 1997 through 2006 because the data were not recorded by species in 2006. However, basal cover of perennial species as a whole (live vegetation) increased substantially during 1997 through 2006. Biological soil crust basal cover was static at a very low level during 1997 through 2006. Bare ground and non-persistent litter did not show an inverse relationship during 1997 through 2006. Although 2005 and 2006 had exceptional spring precipitation; both non-persistent litter and bare ground were also static at low levels. At 08S02W24, gravel and rock provide most of the site protection to finer-textured soil particles, and biological components are minor.

At both studies, it is highly unlikely that bare ground basal cover exceeded 50% during 1998-2007; even though no data were collected during the driest part of the period from 2002 through 2004. Further, the overlapping canopy cover was not measured that increases protection from raindrop impact at 08S01W28 above the nominal amount indicated by the reported bare ground basal cover values. The other basal cover categories provide additional protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of perennial grasses was about 6% at 08S01W28 in 1997, and contributes substantial protection from raindrop impact and resistance to overland flow. Trend study 08S02W24 has a high cover of gravel and rock to provide protection from raindrop impact and resist overland flow. Basal cover of perennial grasses was only about 2.5% at 08S02W24 in 1997.

Pasture 28A

No long-term quantitative BLM trend studies have been established in Pasture 28A. A photo point was established in 1970, and the photos were presented in the September 1997 Castle Creek AIE and are updated in Appendix E.

Pasture 29A

Pasture 29A has one BLM trend study at 08S01W26 and a rangeland health evaluation was also co-located. The trend site was established prior to construction of the fence dividing pastures 28A and 29A in 1989, and also prior to the construction of the Anthill Pipeline Extension into the area in 1986. Both ended up being located near the trend study. All permitted cattle belonging to the predecessors of both the East and West Castle Creek permittees used public land within Pasture 29A (Mahogany) every summer at that time. The Rangeline Agreement accompanying the construction of pasture division fences in 1989 eliminated use by all West Castle Creek permittees after that time, including the area around this trend study.

Trend study 08S01W26 was established in 1983, and was established in a dense mountain big sagebrush community on the bottom of a shallow basin. No live water was available prior to construction of the pipeline. Green rabbitbrush and bitterbrush occur as minor components. Idaho fescue is the most prominent understory species, with substantial Sandberg bluegrass and Junegrass (another decreaser) components. Cheatgrass is basically non-existent. Trend study 08S01W26 is co-located with an RHE worksheet. During the period of evaluation (1998-2007), basal cover data were collected in 2006 (Appendix E). No data were collected during the driest part of the period from 2002 through 2004 (Appendix F, Figure 3).

At 08S01W26, trend in basal cover of increaser and decreaser grasses could not be evaluated during 1997 through 2006 because the data were not recorded by species in 2006. However, basal cover of perennial species as a whole (live vegetation) increased during 1997 through 2006. Biological soil crust basal cover was static during 1997 through 2006. Bare ground and non-persistent litter did not show an inverse relationship during 1997 through 2006. Although 2005 and 2006 had exceptional spring precipitation; non-persistent litter was lower in 2006 than in 1997, while bare ground was static ($p=0.05$).

At 08S01W26, it is highly unlikely that bare ground basal cover exceeded 50% during 1998-2007; even though no data were collected during the driest part of the period from 2002 through 2004. Further, the overlapping dense canopy cover was not measured that increases protection from raindrop impact markedly above the nominal amount indicated by the reported bare ground basal cover values. The other basal cover categories provide additional protection from raindrop impact and also provide the primary resistance to overland flow of water. Basal cover of

perennial grasses was about 7% at 08S01W26 in 1997, and contributes substantial protection from raindrop impact and resistance to overland flow. At 08S01W26, the shrub canopy and perennial grass and forb understory provide the primary protection from raindrop impact and resistance to overland flow at the present time.

Standard 2: Riparian Areas and Wetlands

Stream Inventories/Assessments
This assessment is based on evaluations of riparian and aquatic habitat conditions and stream and wetland health (functioning condition assessments) conducted during 1998 through 2007, including examinations of utilization of riparian herbaceous vegetation and woody shrubs, streambank alteration, and riparian trend monitoring (photos and transects). Bitteroot Restoration Inc. (2002), and Portage and Tetra-Tech Inc. assessed the health of spring wetlands in 2002 and 2006. Information from the 1997 Castle Creek AIE is discussed where relevant, including evaluations of Bruneau MFP objectives for riparian and wetland areas.

Within the East Castle Allotment, five perennial or intermittent streams support riparian and wetland habitats, including Battle, Birch, Poison, Rock, Sheep, and West Fork of Shoofly creeks. Additionally, a very short segment (0.07 mile long) of public land on South Fork Castle Creek is fenced to provide water to livestock grazing in pasture 28. Two intermittent streams, Fall and Lone Juniper Tree creeks, are tributaries to Poison Creek in pasture 12. See Maps 5 and 6 for locations of riparian, spring and water quality monitoring sites.

Battle Creek
Battle Creek (1.6 miles on public land) in pastures 29C and 29D is in functional at risk condition with an upward trend. Bank-stabilizing riparian vegetation is strongly colonizing streambanks within this reach. Riparian areas are predominantly vegetated with Nebraska sedge and baltic rush community types (*Carex nebrascensis* and *Juncus balticus* community types; Jankovsky-Jones et al. 2001), and willows (primarily *Salix geyeriana*) are being recruited into these communities (Appendix G). These reaches are impacted by historical channel incision. However, the stream is progressing towards an E-channel type appropriate for the land form (Rosgen 1996) with the development of strongly vegetated banks and floodplains (see Standard 3). Median stubble heights of herbaceous riparian vegetation exceeded 4 inches during 1998 through 2000 (Table 16).

A total of 1.6 miles of Battle Creek in the East Castle Creek Allotment was identified for improvement in riparian habitat conditions in the 1983 Land Use Plan (Bruneau MFP, WL-AQ Objective 2.1; USDI 1983). These stream segments are making substantial progress towards the Bruneau MFP objective.

Table 16. Median stubble height, shrub utilization, and bank alteration for Battle Creek in Pastures 29C and 29D, East Castle Creek Allotment.

Stream (Segment)	Site	Date	Median Stubble Height (inches)	Percent Shrub Utilization[a]	Percent Bank Alteration[a]
Above Battle Creek Well Exc.	Pasture 29C #1	11/4/98	7.5	-	-
		10/29/99	10	-	-
		6/15/00	7	-	-
Battle Creek upstream of Mudflat Rd.	Pasture 29D #2	11/4/98	5.5	-	-
		10/29/99	10	-	-
		10/16/00	5.5	-	-

- [a] No data collected for percent shrub utilization or percent bank alteration.

Birch Creek

A short segment of Birch Creek (0.2 mile long) is located in pasture 8B upstream of the private land at the Doyle homestead. This segment is functioning at risk with an upward trend. Shrub cover is increasing on historically incised streambanks. The functioning condition of Birch Creek in pasture 10B was assessed in 1999 using low-altitude aerial photographs. Birch Creek (totaling 1.2 miles) on public land in pasture 10B was rated as nonfunctional. Streambanks were inadequately vegetated with bank-stabilizing vegetation, riparian areas were not at their potential extent, and stream channel shape and form was impacted by both historical impacts and lack of bank vegetation (see Standard 3). In 2003, Birch Creek was rated functional at risk with a static trend, based on field monitoring and observations made during 1998 to 2003. Streambanks were inadequately vegetated with bank stabilizing vegetation. In 2006, Birch Creek in pasture 10B was assessed as functional at risk with an upward trend. Riparian wetland areas were widening with good shrub recruitment and growth. Riparian areas were generally vegetated with willow plant community types (*Salix exigua*/mesic forb; *S. lutea*/mesic grass; *S. lasiandra*/bench; *Betula occidentalis*/*Scirpus microcarpus*). Riparian trend monitoring also showed upward trends in plant cover and diversity (Appendix G). In 2006, pasture 10B was grazed in accordance with the 2004 Settlement in April when soils on a 0.2 mile long spring wetland portion of Birch Creek were saturated and as a result received high levels of pugging and shearing.

Birch Creek (2.9 miles) in pasture 11B was also assessed in 1999 with the use of low-altitude aerial photographs, and was rated in non functioning condition. Streambanks were inadequately vegetated with riparian vegetation. Riparian plant vigor was poor, few willows were present, and almost none of the riparian understory was comprised of bank-stabilizing species. Stream health was assessed again in 2003, based on field observations and monitoring conducted during 1998 to 2003. Most of the stream was rated as functional at risk with a static trend (2.5 miles). Streambanks were inadequately vegetated with bank-stabilizing species. About 0.2 mile of Birch Creek in a cobble-alluvial fill reach was rated as nonfunctional. Obligate riparian vegetation was almost entirely absent on the nonfunctional reach. Most streambanks were bare with some vegetated with upland vegetation types. A short rock-armored reach (0.2 mile long) in a steep rocky canyon was rated in proper functioning condition. Streambanks were stable and vegetated with aspen and willows on this canyon reach.

Riparian trend monitoring conducted in 2006, showed the lower 1.7 miles of Birch Creek in pasture 11B (segments 10.6, 11.7, and 12.2) were functioning at risk with an upward trend since 1999 to 2003 (Appendix G). Most riparian areas are vegetated with early-seral plant communities dominated by grasses and forbs. Cover of bank-stabilizing vegetation (willows and rushes) was increasing with less bare soil and eroding streambanks. However, changes in plant cover were slow particularly in deeply incised channel areas (G-channel types, Rosgen 1996;

Appendix G). The upper portion of Birch Creek in pasture 11B (segment 13.0) is predominantly vegetated with Geyer's willow/mesic forb (*S. geyeriana*/mesic forb), *Salix*/mesic grass, and mesic grass C.T.'s. Stream flows are intermittent on part of this reach with the channel often dry by July or August. Streambanks are predominantly composed of easily erodible silt-clay soils. Trend in condition of riparian areas on upper Birch Creek (Segment 13.0) is upward with willow cover increasing on the trend transect (Appendix G). Recruitment of willows and increased cover of late-seral sedges and rushes is apparent elsewhere on segment 13.0.

Median stubble heights of herbaceous riparian vegetation on Birch Creek in pasture 10B have generally exceeded 4 inches (Table 17). From 1998 through 2000, median stubble heights in pasture 11B were < 2 inches, and were associated with high levels of bank alteration and riparian shrub utilization (Table 18). In 2001 a small gap in the rimrock forming a portion of the pasture boundary was fenced to prevent reentry of livestock into pasture 11B and median stubble heights increased in subsequent years, particularly after 2002 (Table 18).

Table 17. Median stubble height, shrub utilization, and bank alteration for Birch Creek in Pasture 10B, East Castle Creek Allotment.

Stream (Segment)	Site	Date	Median Stubble Height (inches)	Percent Shrub Utilization	Percent Bank Alteration
Birch Creek 6.0A	6.0 Greenline	11/17/98	7.0	-	-
	6.0	11/19/99	3.0	-	-
	6.0A	11/2/00	11	-	-
	6.0A	11/7/01	6-8	-	-
	6.0A	10/26/04	>10	6	-
	6.0A	11/21/06	5.0	-	-
Birch Creek 6.0B	6.0B Greenline	11/17/01	8-10	-	-
	#2	11/17/98	10	-	-
	6.0S	10/13/04	5	30.4	-
	6.0S	11/21/06	2.5	-	-

- No data collected

Table 18. Median stubble height, shrub utilization, and bank alteration for Birch Creek in Pasture 11B, East Castle Creek Allotment, 1998-2006.

Stream (Segment)	Site	Date	Median Stubble Height (inches)	Percent Shrub Utilization	Percent Bank Alteration
Birch Creek 10.6	10.6A	7/28/99	1.5[a]	100	54
	10.6A	7/28/00	1.5[a]	97	61
	10.6A	11/2/00	1.5	-	-
	10.6A	8/29/01	4	-	40
	10.6A	11/07/01	4	-	-
	10.6A	10/26/04	10	20	-
	10.6A	11/21/06	10	-	-
Birch Creek 10.6	10.6B	11/17/98	4.0	-	-
	10.6B	7/28/99	-	-	60
	10.6B	11/19/99	2.0	-	-
	10.6B	7/28/00	1.5[a]	97	67
	10.6B	11/2/00	1.5	-	-
	10.6B	8/29/01	3	-	26
	10.6B	11/07/01	2.5	-	-
	10.6B	10/09/02	5.0	-	-
	10.6B	11/21/06	>12	-	-

Stream (Segment)	Site	Date	Median Stubble Height (inches)	Percent Shrub Utilization	Percent Bank Alteration
Birch Creek 12.2 (upstream of State Section)	T8S R1W Sec 1 NWNE	6/21/01	2.5	-	-
	T8S R1W Sec 1 NWNE	11/2/02	3.0	-	-
Birch Creek 13.0 (above canyon)	10.6C	7/29/99	-	-	46

[a]Occular estimate (USBLM 1999).
- No data collected

About 1.4 miles of Birch Creek in pastures 8B and 10B was identified for improvement in riparian habitat condition in the 1983 Land Use Plan (Bruneau MFP, WL-AQ Objective 2.2; USDI 1983). These stream segments are functioning at risk with upward trends and are making slow progress towards the Bruneau MFP objective. Another 2.9 miles of Birch Creek in pasture 11B was also identified for improvement (WL-AQ Objective 2.2; USDI 1983). About 2.7 miles is functioning at risk with an upward trend and is making slow progress towards the Bruneau MFP objective, and for 0.2 mile trend in condition is static due to historical dewatering of a cobble-dominated reach. Rates of improvement in pastures 10B and 11B are slow because riparian areas were dominated by early-seral plant species in the 1990's and have rarely been rested from grazing.

Poison Creek and tributaries

Approximately 3.7 miles of Poison Creek, an intermittent stream, are located on BLM land within pasture 8B. Most of the lower portion of Poison Creek (2.5 miles) is vegetated with a skunkbush sumac (*Rhus trilobata*/bench) plant community. Streambanks are weakly vegetated as the channel is deeply incised (4 to 8 feet deep) and most of the skunkbush sumac is growing on the upper banks and edge of the stream terrace. Recruitment of skunkbush sumac on streambanks in the incised channel is almost entirely lacking. These stream segments were rated as nonfunctioning in both 2007 and 1993 because of impacts to the channel and bank storage capability (loss of water) of the stream resulting from the historic incision of the stream channel (see Standard 3). Another 1.2 miles of Poison Creek in pasture 8B was rated as functional at risk with a static trend in 2007. These segments were vegetated with plant communities dominated by willows (predominantly sandbar willow [*S. exigua*/mesic grass-forb] and mesic forb types). Most streambanks are inadequately vegetated to protect streambanks and dissipate stream energy during high flows. Vigor and cover of bank-stabilizing herbaceous species (sedges and rushes) is lacking. Some willow stands are composed only of dead or decadent old-aged plants. Channels are incised an average of 5 feet and riparian areas are not widening. Riparian trend monitoring showed a static to downward trend in health of willow-vegetated stream segments in pasture 8B (Appendix G). High levels of bank alteration were observed on the upper portions of Poison Creek in pasture 8B in 1999 and 2007 (photographs on file).

Most of Poison Creek (4 miles) in pasture 12 is functioning at risk. Streambanks are inadequately vegetated with bank-stabilizing plants or at risk of erosion because banks are unstable due to historic channel incision. About 3.2 miles of stream are predominantly vegetated with early-seral plant communities with scattered willows present, and receive high levels of bank alteration (Table 19) that is negatively impacting riparian plant cover and vigor. Another 0.8 mile is vegetated with willow plant communities (primarily *S. lutea*/bench types), but channels and banks are unstable due to the historic incision of the channel (2 to 5 feet deep; see Standard 3). Stream segments that were rated as functional at risk with a static or downward

trends in 2003 have remained at risk of erosion as cover of bank-stabilizing plants has not increased (trend monitoring; Appendix G). About 0.4 mile of Poison Creek in the central portion of pasture 12 is in proper functioning condition. Streambanks are densely vegetated with late-seral plant communities dominated by old-aged willows (*S. lutea*/*C. sericea*, *S. lasiandra*/bench community types) that armor streambanks and prevent streambank alteration and erosion. Additionally, 0.2 mile of Poison Creek in the Summit Springs and Poison Creek Recreation Site grazing exclosures is in proper functioning condition. Streambanks are stable and strongly-vegetated with plant communities dominated by bank-stabilizing species.

Riparian herbaceous stubble height data was collected in 1999, 2004, and 2006 for segments of Poison Creek between stream mile 6.5 and 12.1 (Table 19). Residual herbaceous stubble heights increased between 1999 and 2006. High levels of streambank alteration were measured in 2006 (Table 19) and photographed in 1999, 2001, and 2002 (photographs on file). Utilization of young shrubs was moderate to high (Table 19).

Table 19. Median stubble height, shrub utilization, and bank alteration for Poison Creek in Pastures 12, East Castle Creek Allotment.

Stream	Site	Date	Median Stubble Height (inches)	Percent Shrub Utilization	Percent Bank Alteration
Poison Creek	Lower utilization cage	10/29/99	2[a]	75	-
Poison 12L	UTM 556415 4732117	10/13/04	7	35	-
Poison 11.8S	UTM 557840 4734058	10/13/04	5	39	-
	5577895 4734086	7/10/06	-	-	67
Poison Creek	11.8 Greenline site	7/10/06	-	-	41
Poison Creek	Mid-Stubble Site (just below LL cow camp road)	7/10/06	-	91	56
Poison Creek	Mid-Stubble Site (just below LL cow camp road)	12/19/06	13	-	-
Poison Creek	Upper utilization cage	10/29/99	3[a]	-	-
Poison Creek	Upper stubble site; 552342 4729076	10/13/04	4.5	-	-
Poison Creek	Upper stubble site	12/19/06	8	-	-

[a]Ocular estimate (USBLM 1999).
- No data collected

About 2.8 miles of Poison Creek in pasture 8B was identified for improvement in riparian habitat condition in the 1983 Land Use Plan (Bruneau MFP, WL-AQ Objective 2.2; USDI 1983). These stream segments are in functional at risk or nonfunctioning condition with static trends, and are not meeting or making progress towards the MFP objective.

Fall Creek

About 0.7 mile of Fall Creek (a tributary to Poison Creek) supports riparian plant communities dominated by old-aged shrubs. This stream is in PFC, as about 90% of streambanks are stable and densely vegetated with shrub community types, including aspen (*Populus tremuloides/Cornus sericea*), and willow (*Salix geyerian*/bench; *S. lutea*/bench) types. However, the ecotone area between the riparian shrub communities and upland plant communities is

severely disturbed by trampling and trailing. The ecotone area is largely composed of bare ground or vegetated with disturbance-induced plant communities dominated by burr buttercup, mullen, and Kentucky bluegrass.

Lone Juniper Creek

Lone Juniper Creek is another tributary to Poison Creek in pasture 12. About 0.5 mile of this stream supports riparian areas, but flows are ephemeral to intermittent, and as a result riparian plants are intermittent in their distribution along the stream. In general, the amount of streambank vegetated with obligate hydric plants increases going up the drainage. Lone Juniper Creek is in functional at risk condition because of the presence of 3 active headcuts (see Standard 3). Trend in condition appears static; about 15-20% of banks are bare or unstable because of tramping and pugging of streambank soils. This stream is predominantly vegetated with shrub communities including aspen and willow (*S. lutea*/bench and *S. exigua*/bench) types. Areas with less bank storage of water are dominated by Baltic rush (*Juncus balticus*) and Elk sedge (*Carex douglasii*) community types.

Rock Creek

About 0.3 mile of Rock Creek located downstream of pasture 33 was fenced into a grazing exclosure in 1997. This segment is functioning at risk with a strong upward trend. Riparian areas are vegetated with a Geyer's willow type (*Salix geyeriana/Carex nebrascensis* community type). Young willows are abundant and sedge and willow cover is increasing on banks and floodplains. A short segment of Rock Creek (0.2 mile) is located in pasture 33 and is in functioning at risk condition with a slow upward trend. Channels of both segments are historically incised 4 to 6 feet in depth. Most streambanks of Rock Creek in pasture 33 are vegetated with bank stabilizing sedges and willows, and sedge and willow cover appears to be slowly increasing.

Sheep Creek

The lower 0.45 mile of Sheep Creek is located in pasture 33. About 0.2 mile of Sheep Creek from the confluence upstream to the road crossing at the BLM/private land boundary is in PFC. Streambanks are stable and well vegetated with plant communities dominated by bank-stabilizing species. The predominant plant community is a Geyer's willow type (*S. geyeriana/C. nebrascensis* community type). The next BLM segment upstream (0.25 mile long) is also well vegetated with plant communities dominated by bank-stabilizing species. Plant communities are predominantly Geyer's and Booth willow types (*S. geyeriana*/*C. nebrascensis* and *S. boothi*/C. *nebrascesis* community types). However, 3 active headcuts are present, and the segment is functioning at risk with a downward trend as channels continue to erode at the headcuts. Channel instability is due to the erosion of inactive beaver dams.

About 0.8 mile of Sheep Creek is located in pasture 28A, between Sheep Creek Pond spring (located on State land) and the west edge of the pasture. The downstream segment is 0.5 mile long and is in PFC. Streambanks are adequately vegetated with bank-stabilizing species. About 20% of streambanks are unstable due to bank alteration (trailing). Streamflows are intermittent with no surface flows on most of the reach by July. Much of the lower one-quarter of this segment is vegetated with facultative species (Silver sage [*Artemisia cana*], Juniper [*Juniperus occidentalis*], and grasses) due to the limited availability of water. The upper end of the segment is predominantly vegetated with herbaceous plant communities dominated by sedges (*Carex* spp), rushes (*Juncus* spp.), and facultative grasses. The upper BLM segment on Sheep Creek in pasture 28A is 0.3 mile long. This segment has perennial surface flows and was rated in

functional at risk condition with no apparent trend in 2006. Streambanks are vegetated with facultative grasses, with small areas of sedges present. Streambanks and channels are actively eroding at the downstream end of the segment. This segment was also assessed in 2002, and was rated in functional at risk condition. Streambanks were vegetated with facultative grasses, and were extensively hummucked from hoof shearing and pugging.

West Fork Shoofly Creek

West Fork Shoofly Creek is located in pastures 8B and 14. Three segments of West Fork Shoofly Creek were assessed for functioning condition in 2006 and 2007. The downstream-most segment in pasture 8B (0.5 mile) was rated in functional at risk condition with a static trend. Streambanks are inadequately vegetated with bank-stabilizing plants on the upper one-third of the segment and plants exhibited low vigor as a result of high use and high levels of bank alteration. Shrub recruitment is also lacking. The channel on the lower portion of the segment is incised 2-3 feet, and is weakly vegetated with wild rose and sagebrush due to the loss of bank storage of water resulting from the historic incision of the channel. Photo-trend monitoring showed no increase in willow cover.

West Fork Shoofly Creek (1.6 miles) in the canyon reach in pasture 8B and the lower end of pasture 14 is in functional at risk condition with an upward trend. Streambanks are largely vegetated with bank stabilizing plant communities dominated by willows (*S. lutea, S. lasiandra, S. lemmonii*), red-twig dogwood (*Cornus sericea*), with some black cottonwood (*Populus trichocarpa*) trees present. About 20% of the reach is vegetated with early seral plant communities, which are being colonized by late-seral rushes (*Scirpus microcarpus*).

In pasture 14, upstream of the private land parcel, 0.6 mile of West Fork Shoofly Creek is in PFC. Streambanks and floodplains are well vegetated with bank stabilizing plant communities dominated by willows (*S. lasiandra, S. lutea, S. lasiolepsis, and S. scouleriana*) and quaking aspen (*P. tremuloides*). Shrubs armor and stabilize 90-95% of streambanks. Floodplains are vegetated with 25-75 m wide areas of woody shrubs.

Wetland Inventories/Assessments

In June 2006, the functioning condition of 41 wetlands at springs on the East Castle Creek Allotment was assessed. No surface water was found at two additional springs at the time of the inventory and their condition was not assessed. Twenty-three springs are located in pastures grazed in late spring and twenty in summer-use or FFR pastures (Table 20, Map 5).

Thirteen springs have been developed to provide water for livestock; ten springs had short pipelines from the spring source to a watering trough, and three springs had ponds excavated in the wetland down-slope of the spring (Table 20). All or most of the wetland at five developed springs was fenced to exclude livestock grazing. Nine wetlands at developed springs were functioning at risk or non-functional, and 5 wetlands were in PFC. Impacts observed at developed springs with wetlands in functional at risk or non functioning condition included dewatering of all or a portion of the wetland, compaction or pugging of wetland soils, lack of or absence of wetland vegetation (Table 20).

Of the 28 undeveloped springs, the wetland at Summit Spring was fenced to exclude livestock use, but livestock can access the wetlands at the remainder of the undeveloped springs in the allotment. Six wetlands at undeveloped springs are in PFC, 18 are functional at risk, and four are non functional (Table 20). Additionally, two wetlands located at seeps or spring areas that are not mapped on USGS topographic maps in pasture 11B were assessed by Bitteroot Restoration

Inc., in 2002. One wetland was functioning at risk and one wetland was in non functioning condition (Table 20). Two wetlands (at mapped springs) in the upper end of Birch Creek in pasture 11B were assessed in 2002 and 2006. Trend in condition was static to downward (Appendix G).

Table 20. Functioning condition of wetland-riparian areas at springs located in the East Castle Creek Allotment, 2006.

Pasture	Spring Name	Location	Functioning Condition*	Comments on impacts
Areas grazed in late spring				
10B	89310B2A	7S1E29 NENW	FAR	Area is dry and appears to be dry the majority of the year, may sometimes be fed by snowmelt. There are some willows present, but no other riparian species.
	89310B3A	7S1E29 NWSE	FAR	No water flowing, riparian vegetation is present with upland species encroaching.
	89310B4A	7S1E30 SESE	FAR	Diverse riparian vegetation, impacted by pugging and shearing of soils.
	89310B10A	7S1E23 NWNW	FAR	Channel is incised and eroding.
	Half Moon Spring	7S1E32 SWSE	FAR	No hydric understory vegetation. Incised channel. Bare channel sides increasing sedimentation. *Developed spring* with a trough.
	Little Half Moon Spring	7S1E34 NESW	PFC	Adequate vegetative cover, no significant encroachment of upland species, no severe erosion or deposition areas. *Developed spring* with flows piped to a trough outside the wetland exclosure
	Poison Gulch	7S1E34 SENW	FAR	Upland vegetation is encroaching. No significant recruitment of wetland associated species. *Developed spring* with flows piped to a trough outside the wetland exclosure.
11B	89311B6A	7S1E31 NWNW	PFC	Riparian vegetation is diverse; all age classes present. Soil is moist throughout, no serious erosion and no obstructions to flow. *Developed spring* with a pond.
	89311B18A	8S1W01 SWSW	PFC	Despite the PFC rating, area has experienced some major disturbance in recent history. This is evident by the large population of stinging nettle and the incisement of the channel directly below the seep area. In addition, upland areas directly adjacent to the seep are in the process of regenerating areas of bare ground.
	89311B19A	8S1W02 SESW	FAR	There is some regeneration of willows and sedge species, but also there is encroachment into disturbed areas by nettle and rose.
	89311B20A	8S1W02 SESE	NF	There is insufficient vegetation on site to protect soils. Hummocks are present from hoof action restricting natural flow patterns. Erosion from shearing of soils at top of seep.
	2020038	8S1W02 NESW	NF[a]	Large areas of bare ground, hummocking and pugging of wetland soils. Disturbance facilitating spread of the noxious weed Canada thistle.
	2020039	8S1W02 NESW	FAR[a]	Edges of wetland are pugged and hummocked, facilitating spread of Canada thistle.
	Eagle Spring	8S1W06 NENE	PFC	Adequate hydric vegetation. No significant erosion observed. *Developed spring* with a trough.
12	893127A	7S1E29 NWNW	NF	There is a lack of wetland vegetation within and around the spring. There is also extreme erosion due to trampling, shearing.
	8931216B	8S1E15 NWSE	PFC	No risk of erosion, maintenance of wetland plants, regeneration of woody species, adequate vegetation types to stabilize shorelines. Wild rose intermixed in woody zone. Average stubble height in drier area is about 3". Heavy trampling seen throughout complex. No recruitment of woody species beyond current extent.
	8931217B	8S1E20 NENW	FAR	Erosion capability, no woody recruitment outside small population present. Heavy utilization of sedges/rushes which increases potential for invasive species to dominate.
	8931218B	8S1E17 SENW	FAR	Potential for erosion in lower portion of zone from bare ground and trampling. Trending downward due to infiltration of wild rose in understory out competing willow preventing recruitment.
	Bald Mountain Spring	8S1E21 SWSW	NF	Site is dominated by upland species. *Developed spring* with all of the water from the spring diverted to and contained in two troughs with minimal overflow.
	Summit Spring	8S1E20 SWNW	FAR	Encroachment of upland vegetation. Spring is protected by being located within an enclosure.
44	8934429B	8S1E08 NENW	PFC	There is a strong willow population at the site with good recruitment and regeneration. The rush population at the site appears to stabilize the body of the seep. *Developed spring* with flows piped to a trough adjacent to the wetland. Low end of PFC rating.
	8934430B	8S1E08	FAR	The spring has an insufficient understory of vegetation. There is

Pasture	Spring Name	Location	Functioning Condition*	Comments on impacts
		NWNE		undesirable invasive species such as stinging nettle encroaching on the site as well as upland shrub species.
	8934431B	8S1E05 SESE	-	No definable seep located at or near location.
	8934432B	8S1E05 NESE	FAR	Hydric plants show good vigor but there is little recruitment, however there is a dirt road crosses the seep.
Areas grazed in summer or as FFR.				
15	8931526B	8S1E07 NWSE	FAR	Low vigor of plants on site; alteration of flow pattern by hoof action.
17	8931727B	8S1E08 SWNW	FAR	There is a lack of vigor in wetland associated plant species and there is also encroachment of sagebrush and other upland species.
	8931728B	8S1E08 NESW	FAR	There is a lack of vegetation in understory. Few herbaceous hydric species to protect soil and to provide for recovery.
19	8931923B	8S1E12 NESE	NF	Inadequate vegetative cover. Upland erosion into seep area. No outlet of water from seep area. *Developed spring* with flows contained in a pond by man-made dam.
20	8932033B	8S1E18 NESW	NF[a]	>50% bare ground; wetland with hummocks; severe pugging
22	8932213A	8S1W22 NWNW	FAR	Encroachment of undesirable species and lack of vigor or recruitment of preferred shrubs and trees.
	8932220B	8S1W14 SESW	FAR	Widening of seep. Slight sloughing of soil into seep area. There is also no recruitment of willow due to encroachment of wild rose into willow understory.
	8932221B	8S1W15 NESE	NF	There is excessive hoof action in spring overflow area that is disrupting flows. There are also very few wetland plants that remain within the seep. *Developed spring* with flows piped to a trough; small exclosure at spring source is in disrepair.
	8932222B	8S1W14 SENW	NF	The majority of the willow regeneration has been browsed, and there is limited understory wetland plants on site to stabilize soils.
	8932225B	8S1W15 NENE	FAR	There is poor vigor of shrubs and trees within the wetland area, and there has been heavy browse on shrubs. The seep has been impacted by hoof action resulting in significant erosional areas.
22A	89322A24B	8S1W12 NWSW	FAR	There is a high hoof action through seep area. There is no willow recruitment and few hydric herbaceous plants in the area.
28	8932814A	8S2W24 SWSW	NF	There is headcutting occurring in the lower portion of the seep area. There is also no willow recruitment to provide shade or woody debris. *Developed spring* with flows piped to a trough.
	8932815A	8S2W25 NENE	FAR	There is extensive hoof action throughout the spring. High use of wetland plants and shrubs is impacting vigor. There is no woody species recruitment and there is encroachment of wild rose and rumex species.
	8932824A	8S1W21 SWNW	PFC	Riparian vegetation is in good condition. However, the site lacks potential for herbaceous communities in wet seep areas due to complete canopy cover. Heavy hoof action throughout the channel but also signs of disturbance from spring run-off. The spring and associated channel are deeply incised, but channel sides are stabilized by shrubs. If the trees and shrubs were allowed to recruit and regenerate, then channel areas would aggrade and slow spring run-off.
	8932826A	8S1W21 NWSE	PFC[a]	Red-twig dogwood stand at a seep at the top of a steep-walled, rocky canyon.
	Rat Spring	8S1W29 NWNE	FAR	The site is dominated by bare ground with little sign of significant sedge recruitment. *Developed spring* with flows piped to a trough outside the wetland exclosure.
	Station Spring	8S1W30 NWNW	PFC	Riparian plants show good vigor and there is a good diversity of wetland plants. No erosion or significant sedimentation. *Developed spring* with flows piped to a trough outside the wetland exclosure
28A	89328A17A	8S1W31 NESE	-	No water or strong wetland features observed. Sage and juniper growing throughout drainage; interspersed with aspen and some currant and wild rose. No definite wetland delineation or historic wetland demarcation boundaries observed.
29A	89329A8A	8S1W24 NENW	PFC	The soils are saturated with suitable riparian vegetation.
	89329A9A	8S1W24 SESE	FAR	Mostly grasses present; obligate riparian species are not abundant. Upland vegetation is encroaching upon the spring. *Developed spring* with a dam situated down slope of the seep that collects water for livestock use.
	89329A19B	8S1W25 SENE	PFC	The site has no risk of erosion, due to the lack of bare ground. There are no hummocks. Wetland plants are well established.

*From 2005 assessment: NF = Non-functional, FAR = Functioning at risk, PFC = Proper Functioning Condition, - = not assessed.

[a]From 2002 assessment.

Standard 3: Stream channels and floodplains

Stream Inventories/Assessments

This assessment is based on evaluations of stream channel and floodplain conditions and assessments of stream health conducted during 1998 through 2007, including examinations of streambank alteration and trend monitoring of stream and channel conditions. Information from the 1997 Castle Creek AIE is discussed where relevant, including evaluations of Bruneau MFP objectives for riparian and fisheries habitats.

Battle Creek

Channels and floodplains in pastures 29C and 29D are in functional at risk condition with an upward trend. Riparian vegetation is strongly colonized streambanks within these reaches. Channel shape and form is not yet in balance with the landscape setting because of impacts from the historical incision of the channel. However, the stream is progressing towards an E-channel type that is appropriate for the landscape setting (Rosgen 1996). Trend monitoring shows a strong upward trend in channel and floodplain health since 1993 (Appendix G).

Birch Creek

The short segment of Birch Creek (0.2 mile long) in pasture 8B is functioning at risk with an upward trend. Channels on this segment are historically incised about 5 feet deep (G-channel type; Rosgen 1996). Birch Creek in pasture 10B was rated as nonfunctional in 1999. Much of the stream is historically incised, with straightened channels, bare banks, and high width to depth ratios. In 2003, Birch Creek in pasture 10B was rated functional at risk with a static trend, based on field monitoring and observations made during 1998 to 2003. Channels were incised and straightened, and inadequately vegetated with bank stabilizing vegetation. In 2006, Birch Creek in pasture 10B was evaluated as functional at risk with an upward trend. Channels were altered due to historical impacts, but channel and bank stability was improving due to increased recruitment and growth of riparian shrubs, and presence of active beaver dams. An exception was the channel on a spring-influenced reach, which has an active headcut, and continued to incise during 1993 to 2006 (Appendix G).

In 1999, all of Birch Creek in pasture 11B (2.9 miles) was rated in non functioning condition (using low-altitude aerial photos). Many stream segments were historically incised 5 to 10 feet into gullied channels (G-channel type; Rosgen 1996), and streambanks and channels were unstable due to lack of bank-stabilizing riparian vegetation. In 2003, most of Birch Creek in pasture 11B (2.5 miles) was assessed as functional at risk. Channels were straightened and widened due to impacts from the historical incision of the stream, and streambanks were inadequately vegetated with bank-stabilizing species. About 0.2 mile of Birch Creek in a cobble-alluvial fill reach was rated as nonfunctional. Obligate riparian vegetation was almost entirely absent along the incised channel. Bank storage of water was non-existent in this reach. A short rock-armored reach (0.2 mile long) in a steep, rocky canyon was rated in proper functioning condition. Streambanks and channels were stable in the canyon reach. Trend monitoring conducted in 2006, showed the lower 1.7 miles of Birch Creek in pasture 11B (segments 10.6, 11.7, and 12.2) were functioning at risk with an upward trend. Streambanks and channel stability was increasing due increases in cover of bank stabilizing vegetation (willows and rushes; Appendix G). Most of the upper portion of Birch Creek in pasture 11B that has intermittent stream flows (segment 13.0) was functioning at risk due to incised, straightened channels and unstable streambanks that were inadequately vegetated with bank-stabilizing

species. Trend was upward with willow cover increasing on streambanks (Appendix G). However, an active headcut (about 5 feet deep) is present on the lower end of segment 13.0. The headcut has eroded 10 to 15 feet upstream since 1993, and recently has cut past a large willow and is poised to move rapidly upstream into an area vegetated primarily with herbaceous species.

Poison Creek and tributaries

Most of the lower portion of Poison Creek (2.5 miles) in pasture 8B is nonfunctioning because the channel has incised 5 to 8 deep into a gullied channel (G-channel type; Rosgen 1996). Another 1.2 miles is functioning a risk with a static trend. Channels are straightened, overwidened, and steeper than that appropriate for the landscape setting. Vigor and cover of riparian vegetation has been impacted by the loss of bank storage of water resulting from the historic incision of the channel, particularly on segments that are non-functioning.

Four miles of Poison Creek in pasture 12 are functioning at risk. Channels on these segments are historically incised into G-channels (Rosgen 1996) that are 2 to 5 feet deep. Channels are straightened and steeper than that appropriate for the landscape setting. Channels are unstable because of unstable streambanks resulting from the historic incision of the channel or lack of bank-stabilizing vegetation. High levels of bank alteration (Table 19; see also Standard 2) are continuing to impact channel shape and form. Old-aged willows armor streambanks and prevent channel alteration and erosion on about 0.4 mile of Poison Creek in the central portion of pasture 12 that is in proper functioning condition. Additionally, 0.2 mile of channels and floodplains in the Summit Springs and Poison Creek Recreation Site grazing exclosures are in proper functioning condition. Banks and floodplains are strongly vegetated with bank-stabilizing species.

About 0.7 mile of Fall Creek is in PFC; about 90% of streambanks are armored by old-aged riparian shrubs. As a result stream channels and floodplains are stable and protected from disturbance. About 85% of the segment is comprised of B-channels (Rosgen 1996) that are appropriate for the landscape setting. Some areas vegetated with aspens are historically incised (2 to 5 feet) into G-channels.

Lone Juniper Creek in pasture 12 is in functional at risk condition because of the presence of 3 active headcuts. The largest headcut is cutting into a fill area associated with an unimproved road crossing. Two headcuts, 0.5 to 1 foot in depth, are present in the upper end of the reach. The majority of the channel is a B-channel type (Rosgen 1996), but is at risk of gullying (forming an incised G-channel; Rosgen 1996), due to the presence of the headcuts.

Rock Creek

The 0.3 mile of Rock Creek that was fenced into a grazing exclosure in 1997 is functioning at risk with a strong upward trend. Channel shape and form are impacted by the historic incision (4 to 6 feet deep) of the channel. However, channels are narrowing and channel sinuosity is improving as streambanks and floodplains are increasingly becoming vegetated with bank-stabilizing vegetation. A short segment of Rock Creek (0.2 mile) is located in pasture 33 and is functioning at risk with a slow upward trend. This channel is also historically incised 4 to 6 feet deep. Channel shape and form are slowly improving as sedges and willows appear to be colonizing streambanks and floodplains. A few terrace banks (at the height of the former floodplain prior to the channel downcutting) are actively eroding.

Sheep Creek

About 0.2 mile of Sheep Creek from the confluence upstream to the road crossing at the BLM/private land boundary in pasture 33 is in PFC. Stream channel shape and form are appropriate for the landscape setting (predominantly B and E stream types; Rosgen 1996). Streambanks and floodplains are stable and well vegetated with plant communities dominated by bank-stabilizing species. The next BLM segment upstream (0.25 mile long) is functioning at risk with a downward trend. Three active headcuts are present where the channel is actively eroding due in large part to the loss of active beaver dams. Presently, 90% of the segment has a channel shape and form appropriate for the landform (E stream type; Rosgen 1996).

About 0.8 mile of Sheep Creek is located in pasture 28A, between Sheep Creek Pond spring (located on State land) and the west edge of the pasture. The downstream segment of Sheep Creek (0.5 mile) in pasture 28A is in PFC. Stream channel shape and form is appropriate for the landscape setting (90% B stream type; Rosgen 1996). The upper BLM segment on Sheep Creek in pasture 28A is in functional at risk condition with no apparent trend in 2006. Streambanks and channels are actively eroding at the downstream end of the segment, with the channel altered to a degraded G channel type (Rosgen 1996).

West Fork Shoofly Creek

The downstream-most segment of West Fork Shoofly Creek in pasture 8B (0.5 mile) is in functional at risk condition with a static trend. Most of the channel is incised 2 to 3 feet from historical impacts. The incised channel is straightened and steeper that that expected from the landscape setting. Most of the segment is weakly vegetated with wild rose and sagebrush due to the loss of bank storage of water resulting from the historic incision of the channel.

West Fork Shoofly Creek (1.6 miles) in the canyon reach in pasture 8B and the lower end of pasture 14 is in functional at risk condition with an upward trend. The lower end of West Fork Shoofly Creek in pasture 14 is historically incised 4 to 5 feet into a G-channel type (Rosgen 1996). Streambanks of these reaches are well vegetated with bank-stabilizing plants, or where lacking, plant cover on streambanks and floodplains is increasing. Recent trailing along the canyon reach in 8B has impacted the floodplain resulting in bare soil areas and trails (nick points) that are susceptible to erosion during high flows.

In pasture 14, upstream of the private land parcel, 0.6 mile of West Fork Shoofly Creek is in PFC. Channel shape and form are appropriate for the landscape setting. Floodplains are well vegetated with 25-75 m wide areas of woody shrubs.

Standard 4: Native Plant Communities

Indicators of Rangeland Health

Interpreting indicators of rangeland health field assessment data were collected in the East Castle Creek Allotment in 2005, 2006, and 2007 at 24 sites (Map 3). These field assessments used the biotic integrity indicators to determine the degree of departure from reference conditions for Standard 4. Table 21 shows the degree of departure from expected for Standard 4 for evaluation sites in the East Castle Creek Allotment. Pastures which had more than one evaluation site are indicated by multiple marks within the table for the individual site ratings. The legal location (T. 6 S., R. 4 E., Section 32, abbreviated as 06S04E32), the ecological site description, and the Native Plant Community ratings for each rangeland health field assessment

site are shown in Tables 21 through 32. Ratings of individual indicators for all pastures are shown in Appendix D.

Table 21: Rangeland Health Evaluation Summary for Standard 4.

Standard 4-Native Plant Communities	Degree of Departure				
	None to Slight	Slight to Moderate	Moderate	Moderate to Extreme	Extreme
Pasture 5B		XXX			
5BEX		X			
Pasture 8B		XX	XX		
Pasture 8BI	X			X	
Pasture 8BIII				X	
Pasture 10B		X		X	
Pasture 11B		X			
Pasture 12	X	X	X		
Pasture 28		X	X		
Pasture 28A		X	X		
Pasture 29A		X			
Pasture 44		X			

Long-Term Upland Vegetation Studies

Long term trend on the upland vegetation on East Castle Creek Allotment is based on data gathered at key areas across the allotment using photos and Nested Plot Frequency Transect methods (Map 4). The Society for Range Management (1983) defines measured trend as a "quantitative assessment of change based on repeated measurements over time, of the kind, proportion and, or amount of plant species and soil surface properties." Additionally, the Code of Federal Regulations (43 CFR) 4100.0-5 defines trend as "the direction of change over time, either toward or away from desired management objectives." This section of Standard 4 will discuss the repeated measurements over time of the kind, proportion and amount of plant species measured at the fourteen nested plot frequency transects key areas and direction of trend, where apparent.

Linear regression repeated measures tests were used to determine if there was a significant linear trend in plant frequency over time: do the repeated responses increase, or decrease, along a line with a significant slope? If a linear relationship was not represented, then the data was examined to determine if the frequencies fall along a curve. A graphed plot of the linear regression results were used to determine direction of change. A statistically significant change in plant frequencies is indicated by a probability (P) value of less than 10% ($P<0.10$).

<u>Pastures 5B and 5BEX</u>

Rangeland Health Evaluations

Three sites were evaluated in Pasture 5B – the winter pasture – and one site was evaluated in Pasture 5BEX, the exclosure within Pasture 5B; all sites had slight to moderate departures for the Biotic Integrity. Interspatial vegetation, meaning vegetation between established shrubs, was decreased at all of the sites. Cheatgrass was dominant at two of the sites in Pasture 5B, where annual grasses comprised 51-75 percent of the canopy cover. Native perennial grasses represented less than 5 percent of the canopy cover at three of the sites. Cool season deep rooted and shallow rooted bunch grasses were reduced in Pasture 5BEX but there was a good variety of shrubs and cheatgrass was not as common as outside the exclosure. Results from the 2005 evaluations for Pastures 5B and 5BEX are presented in Table 22.

Table 22. Summary Rating of Rangeland Health Evaluations Pastures 5B and 5BEX.

Biotic Integrity Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)			
05S02E34	**06S02E25**	**06S03E21**	**07S03E05 (5BEX)**
Silty 7-10”	**Calcareous Loam 7-10” mosaic with Sandy Loam 8-12”**	**Calcareous Loam 7-10”**	**Saline Bottoms 8-12”**
S-M	S-M	S-M	S-M

The first evaluation site in Pasture 5B (05S02E34) in the northwest of the pasture, had a slight to moderate departure from expected for Biotic Integrity. There were decreased interspatial cool season deep rooted bunch grasses. Shrubs, shadscale, bud sagebrush, are the dominant visual aspect of the site, with Sandberg bluegrass and cheatgrass in the understory. The indicator for Functional/Structural groups exhibited a slight to moderate departure from expected: all the groups were present, but the cool season deep rooted bunch grasses and cool season shallow rooted bunch grasses were scarce. Ricegrass and Thurber needlegrass, which should represent a subdominant component of the site, were present in trace amounts and Sandberg bluegrass and bottlebrush squirreltail were also reduced. Cheatgrass and halogeton were present primarily on disturbed areas resulting in a slight to moderate departure from expected for invasive plants.

The second evaluation site in Pasture 5B (06S02E25) in the center of the pasture had a slight to moderate departure from expected for indicators related to Biotic Integrity. The dominant visual aspect of the site is shadscale saltbush and cheatgrass. The indicator for Functional/Structural groups exhibited a moderate departure from expected, due to lack of cool season deep rooted bunch grasses. Ricegrass and Thurber needlegrass, which should have made up a subdominant component, were not immediately present on this site; however, ricegrass was scattered throughout these Calcareous Loam 7-10” sites in the pasture. The site rated Extreme for the indicator for Invasive Plants: cheatgrass dominates the understory, making up 51-75 percent of the canopy cover, and knapweed was observed near water troughs.

The third evaluation site (06S03E21) in the northeast corner of the pasture had a slight to moderate departure for indicators related to Biotic Integrity. The dominant visual aspect of the site is cheatgrass and shadscale saltbush. The indicator for Functional/Structural Groups exhibited a moderate departure from expected. There was only a trace of cool season deep rooted and cool season shallow rooted bunch grasses. Cheatgrass dominated the site and Russian thistle and halogeton were common, representing an extreme departure from expected for invasive plants. There was a slight to moderate departure from expected for reproductive capability of perennial plants. There was no recruitment of rice grass and shadscale saltbush was all one age class.

The evaluation (07S03E05) in Pasture 5BEX had a slight to moderate departure from expected for indicators related to Biotic Integrity. The dominant visual aspect of this Saline Bottom 8-12" site is a mixture of shrubs, greasewood, spiny hopsage, Wyoming big sagebrush, and saltbush, with scattered cool season deep rooted bunch grasses. The indicator for Functional/Structural Groups exhibited a slight to moderate departure from expected. The groups were all present on the site with the cool season deep rooted bunch grasses (basin wild rye and ricegrass) present, but reduced from site guide, and a good variety and distribution of shrubs. Cheatgrass was common representing a moderate departure from expected for invasive plants.

Long-Term Upland Vegetation Studies

There are three nested plot frequency transect (NPFT) study sites located in pasture 5B. From 1988 to 1991 livestock were removed early from the pasture 5B and in 1992, a Full Force and Effect Decision resulted in no livestock use in 5B. From 1990 to 1993 frequency of the grasses and shrubs increased, except for squirreltail which declined during that time at one site.

Site T06S, R02E, Section 04, was established in 1983 and re-read in 1987, 1990, 1993, 1997, and 2006 (see also Appendix H, Trend). The repeated measures test show that there has been a significant linear decrease in squirreltail frequencies since 1983 (P=0.076). Winterfat and ricegrass frequencies, although they have fluctuated over time, remain static. Shadscale frequencies have fluctuated over the years and trend for this species is static. Tests show that shadscale frequencies fall along a curved line- with increases over a few years in a row followed by decreases. Shadscale is sensitive to both periods of drought and heavy precipitation (USDA, RMRS GTR-136, Vol. 1 p. 247). Bud sage frequencies have also fluctuated and have a near significant linear decrease in frequencies (P=0.136). Sandberg bluegrass frequencies exhibit a significant linear increase since 1983 (P=0.070). Tables 23, 24, and 25 show overall percent frequencies at the trend site based on the largest plot size in the sampling frame (plot size 4).

Table 23: Percent frequencies of selected plant species at NPFT site T06S, R01W, Section 04

Year	Squirreltail	Ricegrass	Bluegrass	Shadscale	Budsage	Winterfat
2006	0	11	79	15	11	8
1997	18	5	63	20	26	6
1993	12	8	74	34	32	5
1990	10	1	68	11	9	4
1987	25	16	60	13	14	6
1983	24	9	61	22	24	6

Site T06S, R03E, Section 21 was established in 1988 and re-read in 1990, 1993, 1997, and 2006. Squirreltail declined precipitously between 1988 and 1990 and has not recovered. Shadscale frequency had a significant linear increase since 1988 (P=0.023). Budsage has decreased significantly (P=0.026) during the same time period.

Table 24: Percent frequencies of selected plant species at NPFT site T06S, R03E, Section 21

Year	Squirreltail	Shadscale	Budsage
2006	0	18	6
1997	2	28	36
1993	4	36	53
1990	3	9	17
1988	22	8	10

Site T06S, R02E, Section 35 was established in 1988 and re-read in 1990, 1993, 1997 and 2006. Squirreltail frequency exhibited a significant linear decrease since 1988 (P=0.034), but is still present in the key area. Shadscale, budsage and ricegrass frequencies were static during this same time period.

Table 25: Percent frequencies of selected plant species at NPFT site T06S, R02E, Section 35

Year	Squirreltail	Ricegrass	Shadscale	Budsage
2006	11	3	15	3
1997	22	3	22	4
1993	12	5	24	5
1990	15	3	17	2
1988	29	3	15	2

Pastures 8B, 8BI, and 8BIII

Rangeland Health Evaluations

Similar to pasture 5B, the main biotic concerns in these pastures are the reduced numbers of cool season deep rooted bunch grasses appropriate for the sites, changes in litter amount and composition, and invasive plants. Results from the evaluations for Pastures 8B, 8BI, and 8BIII are presented in Tables 26, 27, and 28.

Pasture 8B

Four sites were evaluated in Pasture 8B: two sites had slight to moderate departures from expected for attributes associated with Standard 4 and two sites had moderate departures. Wyoming big sagebrush was the dominant species in Pasture 8B with cheatgrass the second dominant species at two of the sites, horsebrush second dominant at another site, and shadscale the second dominant at the remaining site. Litter amount was significantly reduced with shrubs and cheatgrass often compensated for lack of litter from perennial grasses. Invasive plants, cheatgrass, halogeton and tumble mustard were common in this pasture. Similar to changes in litter amount and invasive plants, annual production was reduced at two sites in Pasture 8B.

Table 26. Pasture 8B Rangeland Health Evaluations

Biotic Integrity Rating-departure from the expected is one of the following: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)			
06S02E29	**07S01E01**	**07S02E22**	**07S02E09**
Loamy 7-10”	**Loamy 7-10”**	**Sandy Loam 8-12”**	**Calcareous Loam 7-10”**
S-M	M	M	S-M

The first evaluation site in Pasture 8B (06S02E29) had a slight to moderate departure from expected for Biotic Integrity attribute. The general visual aspect of the site was shrubs, Wyoming big sagebrush and horsebrush, with a primarily annual understory. The site has a good biological soil crust component that limits cheatgrass to disturbed areas and results in a slight to moderate departure for invasive plants. The Functional/Structural group cool season deep rooted bunch grasses had a moderate departure, for this indicator. Annual production on the site was reduced at 60 to 80 percent of what would be expected. Litter amount was reduced, with a slight to moderate departure.

The second evaluation site in Pasture 8B (07S01E01) had a moderate departure from expected for attributes associated with Standard 4. The visual aspect of the site is Wyoming big sagebrush with a cheatgrass understory. Functional/structural groups exhibited a moderate to extreme departure from expected: not all functional/structural groups were present during the assessment and shrubs were more common than expected. The cool season deep rooted perennial bunch grasses, particularly Thurber needlegrass and rice grass, were missing from the site, although they should have been a subdominant component. Squirrel tail and Sandberg bluegrass were scattered in trace amounts at best. The indicator for Invasive Plants had a moderate to extreme departure due to the dominance of cheatgrass. Litter amount was at 60 to 80 percent for the site with cheatgrass compensating for lack of litter from the missing functional/structural groups.

The third evaluation site in Pasture 8B (07S02E22) had a moderate departure from expected for attributes associated with Standard 4. Shrubs and annual grasses represented the site; the dominant species were Wyoming big sagebrush and cheatgrass. The indicator for Functional/Structural Groups exhibited a moderate departure from expected: there was a trace of ricegrass and no needlegrass, although their potential was as a subdominant component. Squirreltail was scattered but was expected to be a minor to subdominant component. The indicator for Invasive Plants was moderate departure due to the dominance of cheatgrass. There was a slight to moderate departure from expected for reproductive capability of perennial plants. Multiple age classes of Wyoming big sagebrush were present but there was low vigor on perennial grasses. The indicator for Soil Surface Resistance to Erosion had a moderate departure from expected due to the significantly reduced perennial vegetation and high bare ground.

The fourth evaluation site in Pasture 8B (07S02E09) had a slight to moderate departure from expected for attributes associated with Standard 4. The dominant visual aspect of the site was a mixed shrub community of Wyoming big sagebrush, bud sagebrush, shadscale, and horsebrush. Perennial grasses and forbs were very scarce on the site. The indicator for Functional/Structural Groups exhibited a moderate to extreme departure from expected due to the lack of cool season deep rooted bunch grasses and the scarcity of cool season shallow rooted bunch grasses. The indicator for Litter Amount had a moderate to extreme departure from expected due to scarcity of litter. Annual production was reduced to 60 to 80 percent of expected with shrubs compensating somewhat for lack of perennial grass production. The indicator for Invasive Plants was moderate due to cheatgrass, tumble mustard (*Descurainia Sophia)*, and halogeton.

Pasture 8BI

Two sites were evaluated in Pasture 8BI; one site exhibited a moderate to extreme departure from expected for indicators associated with Standard 4 and one site, within an exclosure, had a none to slight departure from expected. Cool season deep rooted bunch grasses were not as high as expected at this site and cheatgrass was scattered, although perennial grasses were higher in this pasture than in Pasture 8B.

Table 27. Pasture 8BI Rangeland Health Assessments.

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)	
07S01E03	**07S01E03**
Sandy Loam 8”-12”	**Sandy Loam 8-12” Birch Creek Exclosure**
M -E	N-S

The first site evaluated in Pasture 8BI (07S01E03) had a moderate to extreme departure from expected for attributes associated with Standard 4. The indicators for Soil Surface Resistance to Erosion and Soil Surface Loss or Degradation both had moderate to extreme departures at this site. The indicator for Functional/Structural Groups exhibited a moderate departure from expected due to the changes in plant communities and the reduced component of cool season deep rooted bunch grasses. Rice grass was greatly reduced on the site and the crested wheatgrass were very small and exhibited poor vigor. The indicator for Litter Amount had a moderate to extreme departure from expected due to reduced perennial plant production. Cheatgrass was scattered throughout the site resulting in a moderate to extreme departure from expected for invasive plants. Most seed heads were restricted to protection of the shrubs and most of the interspatial plants exhibited low vigor, resulting in a moderate departure for the Indicator Reproductive Capability of Perennial Plants. Annual production is less than half of potential, resulting in a moderate departure for this indicator.

The second site evaluated in Pasture 8BI (07S01E03) was within the Birch Creek exclosure and had a none to slight departure from expected for attributes associated with Standard 4. The primary difference between this site and the site outside the exclosure is the occurrence of cool season deep rooted bunch grasses (Thurber needlegrass and rice grass), which are co- dominant with Wyoming big sagebrush within the exclosure. There was very little bare ground cover within the exclosure and there was a good biological soil crust component. Bare ground made up 1-5 percent of the ground cover at this site. Native perennial grasses were 16-30 percent of the canopy cover and annual grasses comprised 0-1 percent. A dry year had resulted in a lack of seed heads but the site contained a variety of age classes. Most of the indicators related to biotic integrity were rated in the none to slight category.

Pasture 8BIII

Table 28. Pasture 8BIII Rangeland Health Assessments.

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)
07S02E32
Sandy Loam 8-12”
M-E

The site evaluated in Pasture 8BIII had a moderate to extreme departure from expected for indicators associated with Standard 4. All indicators associated with Biotic Integrity rated moderate to extreme. The soil surface had weak structure, high amounts of physical crusting and low organic matter. There was evidence of soil loss and degradation. Functional/Structural Groups, although present, were greatly reduced and cool season deep rooted and shallow rooted bunch grasses occurred mostly in the protection of shrubs. Mortality and decadence was high on crested wheatgrass. Most litter was from cheatgrass and trampled dead plants. Annual production from cool season deep rooted bunch grasses was at approximately 20 to 40 percent of what it should be for the site. There was a moderate to extreme departure from expected for invasive plants. Cheatgrass occurred in patches and halogeton was scattered throughout the site. Reproductive capability of perennial plants had a moderate to extreme departure from expected. Plants protected by shrubs were producing seed heads but all exposed plants lacked vigor. Sagebrush was reproducing with lots of young plants on site.

Long-Term Upland Vegetation Studies
There are four nested plot frequency transect (NPFT) study sites located in pasture 8B, one site located within the Poison Creek Exclosure located in 8B, and one site in 8BIII.

Pasture 8B
Site T06S, R02E, Section 33 was established in 1990 and re-read in 1993, 1997, 2000 and 2007. During this time, the repeated measures test show there has been a significant linear increase in squirreltail frequencies (P=0.093), although the increase over time more closely resembles a curved line (P=0.000), which takes into account the fluctuations over this time period. Similarly, shadscale showed an increase in frequency along a curved line during this time (P=0.011). Budsage has fluctuated as well, mirroring that of shadscale, but at this time, trend appears static at this location. Ricegrass, bluegrass and Wyoming big sagebrush frequencies were too low to analyze. Tables 29 through 34 show overall percent frequencies at trend sites based on the largest plot size in the sampling frame (plot size 4).

Table 29: Percent frequencies of selected plant species at NPFT site T06S, R02E, Section 33

Year	Squirreltail	Bluegrass	Ricegrass	Shadscale	Budsage	Wyoming big Sagebrush
2007	12	0	0	47	34	1
2000	26	5	3	50	38	2
1997	24	0	0	54	47	0
1993	10	0	0	63	56	1
1990	6	1	0	24	19	1

Site T07S, R02E, Section 7 was established in 1983, and re-read in 1987, 1990, 1993, 1997, 2000 and 2007. Squirreltail frequencies exhibited a significant linear decrease (P=0.014) during this time. Bluegrass trend is static at this location. Shadscale decreased significantly (P=0.048) while at the same time budsage increased. Wyoming big sagebrush and ricegrass frequencies were too low to analyze.

Table 30: Percent frequencies of selected plant species at NPFT site T07S, R02E, Section 7

Year	Squirreltail	Bluegrass	Ricegrass	Shadscale	Budsage	Wyoming big sagebrush
2007	16	5	0	38	38	0
2000	41	11	4	46	37	1
1997	50	4	0	40	40	0
1993	16	5	0	62	49	0
1990	28	3	0	43	21	0
1987	45	11	0	40	25	0
1983	61	4	0	56	25	0

Site T07S, R02E, Section 22 was established in 1990 and re-read in 1993, 1997, 2000 and 2007. Like the other sites in 8B, squirreltail frequencies showed a significant linear decrease (P=0.095). Shadscale frequencies exhibited a significant linear decrease (P=0.029) while budsage, although it appears to have decreased by the percentages, the changes are not significant and so the trend on budsage is static. Ricegrass frequencies overall were static, although it did increase from 1990 to 2000, it then subsequently decreased by 2007.

Table 31: Percent frequencies of selected plant species at NPFT site T07S, R02E, Section 22

Year	Squirreltail	Ricegrass	Shadscale	Budsage
2007	3	5	10	5
2000	10	15	14	9
1997	15	9	18	11
1993	8	7	24	12
1990	17	4	17	10

Site T07S, R01E Section 24 was established in 1990 and re-read in 1993, 1997, 2000 and 2007. Squirreltail frequencies present a significant linear decrease (P=0.098) during this period. Bluegrass has a high frequency of occurrence and has a static trend, even when considering smaller plot sizes of the sampling frame. During this time, low sagebrush and Wyoming big sagebrush frequencies have fluctuated and trend is not apparent at this time.

Table 32: Percent frequencies of selected plant species at NPFT site T07S, R01E, Section 24

Year	Squirreltail	Bluegrass	Low Sage	Wyoming big Sage
2007	10	98	24	14
2000	9	99	37	15
1997	24	99	30	29
1993	25	99	36	20
1990	23	98	29	21

There is one trend site, T07S, R02E, Section 28 located within the Poison Creek Exclosure. Like the surrounding Pasture 8, squirreltail frequencies show a significant linear decrease (P=0.023) although frequency did increase from 1997 to 2006, whereas elsewhere in pasture 8B and in pasture 5B it declined from 1997 to 2006. Shadscale frequency is static and budsage frequency showed a significant linear increase (P=0.073).

Table 33: Percent frequencies of selected plant species at NPFT site T07S, R02E, Section 28

Year	Squirreltail	Shadscale	Budsage
2006	26	31	35
1997	17	30	42
1993	16	37	39
1990	27	32	25
1987	46	26	19
1983	51	38	26

8BIII

There is one trend site, T02S, R02E Section 28 located in Pasture 8BIII. It was established in 2000 and reread in 2006. Crested wheatgrass and Sandberg bluegrass have decreased substantially between the two years.

Table 34: Percent frequencies of selected plant species at NPFT site T07S, R02E, Section 28

Year	Crested Wheatgrass	Bluegrass	Shadscale	Wyoming Big Sagebrush
2006	46	0	2	2
2000	84	10	6	0

Pasture 10B

Rangeland Health Evaluations

Pasture 10B was grazed during May and June every year till 2005. Beginning in 2005, after the court settlement, it was to be grazed May 1 to May 23, followed by April 1 to April 30, and then in 2007 it was to be grazed May 1 to June 1. Conditions between the early spring pastures and 10B were similar where shrubs were increased and grasses were decreased. Some cheatgrass was present in the late-spring pastures but it was not as dominant as in the early-spring pastures. Two sites were evaluated in Pasture 10B; one site had a moderate to extreme departure from expected for attributes associated with Standard 4 and one site had a slight to moderate departure from expected. Shrubs were increased in this pasture and interspaces lacked bunchgrasses. One of the sites had high bare ground and invasive plants but the second site had low bare ground and low invasives. Results from the evaluations for Pasture 10B are presented in Table 35.

Table 35. Pasture 10B Rangeland Health Assessments.

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)	
07S01E23	**07S01E22**
Shallow Claypan 11-13”	**Shallow Claypan 12-16” and Shallow Claypan 11-13” transition zone**
M- E	S-M

The first evaluation site in Pasture 10B (07S01E23), a Shallow Claypan 11-13” site, had a moderate to extreme departure from expected for indicators associated with Standard 4. The dominant visual aspect of the site was low sage brush and rabbit brush with very sparse interspatial bunch grasses. Rabbit brush appeared to be increasing on the site. Soil surface resistance to erosion had a slight to moderate departure due to decreased organic matter in the soil surface. The indicator for functional/structural groups had a moderate to extreme departure from expected, with cool season deep rooted and shallow rooted bunch grasses missing. Consequently, the amount of bare ground was very high for this evaluation area. Litter amount was greatly reduced on the site relative to site potential and weather. Cheatgrass provided most of the litter present. Annual production rated slight to moderate with annual production occurring primarily from shrubs and cheatgrass. The indicator Invasive Plants rated moderate to extreme for the site based on the dominance of cheatgrass and rabbitbrush. There was a moderate departure from expected for reproductive capability of perennial plants. Shrubs were producing seed heads and grasses were producing seed heads where they were protected by shrubs. Vigor appeared poor on vegetation in the interspaces. This area was representative of Shallow Claypan 11-13” sites in the pasture.

The second evaluation site in Pasture 10B (07S01E22) had a slight to moderate departure from expected for attributes associated with Standard 4. The indicator Soil Surface Loss or Degradation had a moderate departure from expected due to some soil loss from water flow paths and plant pedestals. Functional/structural groups exhibited a slight to moderate departure from expected due to the decrease of cool season deep rooted bunchgrasses and an increase in shrubs on the site. Plant mortality and decadence had a slight to moderate departure due to the slight plant mortality and decadence and crown die out of cool season deep rooted and shallow rooted bunch grasses. The reduction of these large bunch grasses and the increased Sandberg bluegrass resulted in reduced litter on the site and reduced annual production, for a slight to

moderate departure for both those indicators. Invasive plants were rarely present on the site representing a none to slight departure from expected for invasive plants.

Long-Term Upland Vegetation Studies

There is one nested plot frequency transect (NPFT) study site located in pasture 10B at T07S, R01E, Section 22. It was established in 1983 and re-read in 1987, 1990, 1993, 1997, 2000 and 2007. Bluegrass is well represented at this site and frequencies have remained high throughout the years. Bluebunch wheatgrass has fluctuated over the time period, and has increased since 1997, but over the entire period reflects a linear decrease (P=0.091). Thurber needlegrass and low sage are static.

Table 36: Percent frequencies of selected plant species at NPFT site T07S, R01E, Section 22

Year	Bluegrass	Bluebunch Wheatgrass	Thurber Needlegrass	Low Sage
2007	99	42	24	58
2000	98	37	16	64
1997	99	23	19	72
1993	100	45	16	70
1990	100	55	8	77
1987	96	35	34	65
1983	96	59	24	70

Pastures 11B and 12

Rangeland Health Evaluations

Pastures 11B was grazed after 10B generally in May or June each year until the court settlement took effect in 2005. In 2005 it was grazed May 24 to June 17, then rested in 2006, and grazed June 2 to June 17 in 2007. Likewise Pasture 12 was grazed after 11B in May or June, until 2005 when it was grazed May 24 to June 17, followed by June 2 to June 17 in 2006, and then rested in 2007. One site was evaluated in Pasture 11B and had a slight to moderate departure from expected with respect to indicators for Standard 4. Three sites were evaluated in Pasture 12; two sites had a slight to moderate departure from expected for indicators associated with Standard 4 and one site had a none to slight departure from expected. The site with the none to slight departure had a good cool season deep rooted bunchgrass component and the functional/structural groups were present in the proper proportion. The other sites had increased shrubs and slightly reduced deep rooted bunchgrasses. Juniper was scattered and cheatgrass was common on both sites. Results from the evaluations for Pastures 11B and 12 are presented in Tables 37 and 38.

Pasture 11B

Table 37. Summary Rating of Rangeland Health Evaluations Pasture 11B

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)
07S01W32
Loamy 13-16”
S-M

The site evaluated in Pasture 11B had a slight to moderate departure from expected with respect to indicators for Standard 4. The dominant visual aspect of the site is sagebrush with bare ground slightly to moderately higher than expected and some cool season shallow rooted bunch grasses in the interspaces, primarily Sandberg bluegrass. There were some remnant cool season deep rooted bunch grasses on the site in the protective canopy of sagebrush, resulting in a slight to moderate departure from expected for functional/structural groups. Shrubs were high for the site and bunch grasses were lacking, particularly near water locations. Juniper and cheatgrass were common on the site resulting in a moderate to extreme departure from expected for invasive plants. Vigor of plants was poor and there was little reproduction on bunchgrasses.

Pasture 12

Table 38. Summary Rating of Rangeland Health Evaluations Pastures 12

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)		
08S01E21	**08S01E20**	**08S01E10**
Shallow Claypan 12-16" and Mountain Ridge	**Loamy 13-16"**	**Loamy 12-16" to Loamy 13-16"**
N-S	S-M	M

The first evaluation site in Pasture 12 (08S01E21) had a none to slight departure from expected for indicators associated with Standard 4. This area was in reference condition, located on steep side slopes with dominant north and east aspect. Functional/structural groups were present and in the proper proportion for the site. The cool season deep rooted bunch grass component was in very good condition, had robust vigor and production. There were some scattered juniper and cheatgrass, but these were primarily located near the Mud Flat Road.

The second evaluation site in Pasture 12 (08S01E20) was a Loamy 13-16" with inclusions of Loamy 16" in the bottoms and Shallow Claypan 12-16" near ridge tops. It is located near the trend site and had a slight to moderate departure for indicators associated with Standard 4. A portion of the evaluation area burned in 1992 and currently has a thick sagebrush shrub component with a cheatgrass understory. The visual aspect of the site was mountain big sagebrush in the deeper soils with low sage on the shallower soils. Cool season deep rooted bunch grasses are generally present in slightly reduced proportions. Litter amount was reduced on the site. Juniper was scattered and cheatgrass was common throughout the site representing a moderate to extreme departure from expected for invasive plants.

The third evaluation site in Pasture 12 (08S01E10), a Loamy 12-16" with inclusions of Loamy 13-16", represents the upper sloping sagebrush sites in the pasture and had moderate departure for attributes associated with Standard 4. The visual aspect of this site was basin big sagebrush with a bluegrass and cheatgrass understory. Functional/structural groups exhibited a moderate departure from expected due to decreases in cool season deep rooted bunch grasses and increased shrubs (estimated 31 to 50 percent canopy cover) and shallow rooted bunch grasses on the site. Rabbitbrush was abundant, juniper was present, and cheatgrass was scattered on the site representing a moderate departure from expected for invasive plants.

Long-Term Upland Vegetation Studies

There are no long term trend studies in pasture 11B.

There are two nested plot frequency transect (NPFT) study sites located in pasture 12. The first site, T08S, R01E Section 20 was established in 1983 and was re-read in 1990, 1993, 1997, and 2006. This transect burned in 1992. Bluegrass has recovered to near the same frequency as prior to the fire. Idaho fescue, bluebunch wheatgrass, Thurber needlegrass and bitterbrush have not recovered. Mountain big sagebrush has recovered to 1983 levels while snowberry has recovered also.

Table 39: Percent frequencies of selected plant species at NPFT site T08S, R01E, Section 20

Year	Bluegrass	Idaho fescue	Bluebunch wheatgrass	Thurber needlegrass	Mountain big sagebrush	Bitterbrush	Snowberry
2006	82	5	2	0	54	2	9
1997	41	0	10	0	27	1	9
1993	40	0	1	0	16	1	2
1990	90	20	37	15	37	6	14
1983	45	13	30	6	54	13	11

The second trend site located in pasture 12 is at T08S, R01E, Section 02, established in 1990 and re-read in 1993, 1997, and 2006. Squirreltail frequencies showed a significant linear decrease over this time period (P=0.055), which could be due to drought intolerance. Other grasses (bluegrass, bluebunch wheatgrass, needle-and-thread, and Thurber needlegrass) were static, although needle-and-thread did increase from 1997 and 1993. Ricegrass was too low to analyze. Mountain big sagebrush showed a significant linear decrease (P=0.095) while low sage has increased.

Table 40: Percent frequencies of selected plant species at NPFT site T08S, R01E, Section 2

Year	Squirreltail	Bluegrass	Bluebunch wheatgrass	Needle-and-thread	Thurber needlegrass	Ricegrass	Low sage	Mountain big sage
2006	8	94	9	9	7	0	17	17
1997	13	84	10	1	6	4	7	27
1993	12	87	6	1	7	0	2	27
1990	17	93	12	8	8	5	0	36

Pasture 44

Rangeland Health Evaluations

Pasture 44 is grazed at the discretion of the permittees. One rangeland health evaluation was conducted in this pasture. Summary of the evaluation is presented in Table 41.

Table 41. Summary Rating of Rangeland Health Evaluations Pastures 44

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)
08S01E05
Loamy 13-16”
S-M

The evaluation site in Pasture 44 had a slight to moderate departure from expected for Standard 4. Soil surface loss or degradation had a slight to moderate departure from expected due to evidence of historic loss. There was a moderate departure from expected for functional/structural groups. Sagebrush was increased and cheatgrass dominated the interspaces; there were few bunchgrasses present. There was a moderate to extreme departure from expected for invasive plants because of the cheatgrass on the site.

Long-Term Upland Vegetation Studies
There are no long term trend studies in pasture 44.

Pastures 28, 28A and 29A

Rangeland Health Evaluations
Pastures 28, 28A, and 29A are the summer pastures on the East Castle Creek Allotment. Juniper occurs in all of the summer pastures and the heavy shrub component is reducing the perennial grass component. Results from the evaluations for Pastures 28, 28A and 29A are presented in Tables 42, 43, and 44.

Pasture 28
Two sites were evaluated in Pasture 28; one site had a slight to moderate departure from expected for indicators associated with Standard 4 and one site had a moderate departure from expected. Both sites had an imbalance in the grass component. Juniper was present in the pasture as were cheatgrass and rabbitbrush.

Table 42. Summary Rating of Rangeland Health Evaluations Pasture 28

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)	
08S01W28	**08S01W20**
Loamy 13-16”	**Shallow Claypan 12-16” with minor Shallow Claypan 8-12”**
M	S-M

The first evaluation site in Pasture 28 (08S01W28) had a moderate departure from expected for indicators associated with Standard 4. The indicators for soil surface resistance to erosion and soil surface loss or degradation both had a moderate departure from expected, with pedastalling of plants and distinct flow paths, sparse litter and weak soil structure. The indicator for functional/structural groups exhibited a moderate departure from expected due to a large imbalance between cool season deep rooted and shallow rooted bunch grasses. Some plants exhibited crown die out, resulting in a moderate departure for the Plant Mortality/Decadence indicator. Reproductive capability of cool season deep rooted bunch grasses had a moderate departure. Litter was moderately reduced, and made up mostly of trampled sagebrush. In general, the vigor on decreaser grasses appeared low while vigor on increaser grasses and sagebrush was adequate. Vigor on bitterbrush was poor due to the plants being severely hedged throughout the site. The indicator for invasive plants had a slight to moderate departure, based on presence of Juniper, cheatgrass, and rabbitbrush which were present primarily in disturbed areas.

The second evaluation site in Pasture 28 (08S01W20) had a slight to moderate departure from expected for indicators associated with Standard 4. The indicator Soil Surface Loss or Degradation had a slight to moderate departure based on soil loss indicated by pedestalled plants. There was an increase of cool season shallow rooted bunch grasses, mainly bluegrass, and a decrease in the cool season deep rooted bunch grasses resulting in slight to moderate departure from expected for Functional/Structural Groups. There was crown die out still evident in this part of the pasture, giving a moderate departure for Plant Mortality/Decadence. Litter amount was reduced and primarily from bluegrass and a small amount from fescue, resulting in slight to moderate departure.

Pasture 28A

Two sites were evaluated in Pasture 28A; one site had a slight to moderate departure from expected for indicators associated with Standard 4 and one had a moderate departure from expected. Large structure grasses were decreased in this pasture and juniper and rabbitbrush were present.

Table 43. Summary Rating of Rangeland Health Evaluations 28A

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)	
08S01W27	**09S01W04**
Loamy 13-16”	**Loamy 13-16”**
S-M	M

The first evaluation site in Pasture 28A (08S01W27) had a slight to moderate departure from expected for indicators associated with Standard 4. The dominant visual aspect of the site was mountain big sagebrush, antelope bitterbrush, rabbitbrush and fescue. Indicators 8 and 9 relating to Soil Surface Resistance to Erosion and Soil Surface Loss or Degradation were both slight to moderate due to the amount of bare areas with physical crusting, flow paths and soil movement. The interspaces between shrubs generally lacked the cool season deep rooted bunch grasses expected for this site. The indicator Functional/Structural Groups exhibited a slight to moderate departure from expected due to the scarcity of the cool season deep rooted bunch grasses and the increase in the non-resprouting shrub group, mainly mountain big sagebrush. Litter amount was reduced in the shrub interspaces resulting in a moderate departure from expected for this indicator. Invasive plants had a slight to moderate departure from expected based on the presence of juniper and rabbitbrush.

The second evaluation site in Pasture 28A (09S01W04) had a moderate departure from expected for indicators associated with Standard 4. Functional/structural groups exhibited a moderate departure from expected. Cool season deep rooted bunch grasses were present but at a reduced density and shrubs were above normal compared to the site guide. Mountain big sagebrush was increased on the site. Crown die out was common, as were standing dead plants, resulting in a moderate to extreme departure for Plant Mortality/Decadence. Litter amount was moderately to extremely reduced. There was a moderate departure from expected for invasive plants. Juniper was scattered across the site but at a low percentage. There was little reproduction or recruitment of perennial plants, and what were present exhibited poor vigor, resulting in a moderate departure for indicator #17.

Pasture 29A

The evaluation site in Pasture 29A had a slight to moderate departure from expected for indicators associated with Standard 4. Perennial grasses were reduced and the amount of sagebrush was high, rabbitbrush was common, and juniper was scattered within the pasture.

Table 44. Summary Rating of Rangeland Health Evaluation Pasture 29A

Biotic Integrity Attribute Rating-departure from the expected is one of the following ratings: None to Slight (N-S), Slight to Moderate (S-M), Moderate (M), Moderate to Extreme (M-E), Extreme to Total (E-T)
08S01W26
Loamy 13-16"
S-M

The evaluation site near the trend site in Pasture 29A had a slight to moderate departure from expected for indicators associated with Standard 4. Dominant species were mountain big sagebrush, antelope bitterbrush, and rabbitbrush. The indicator Soil Surface Loss or Degradation had a moderate departure due to soil loss as indicated by pedastalling of perennial grasses and rocks within the interspatial areas. Functional/structural groups exhibited a slight to moderate departure from expected: sagebrush cover was high on this site, rabbitbrush was common and the cool season deep rooted bunch grasses component was reduced. Plant Mortality/Decadence was slight to moderate due to some mortality of sagebrush and crown die off common on the pedestalled fescue plants. Litter Amount was lacking on the site with very little litter left and most litter occurring from shrubs. There was a slight to moderate departure from expected for invasive plants. Rabbitbrush was higher than expected and juniper was scattered in the area. Reproductive capability of perennial plants had a slight to moderate departure from expected. Fescue plants had low stature with approximately 50 percent of the plants not producing seed heads, especially in the interspaces. Most mountain big sagebrush and bluebunch wheatgrass plants were producing seed heads; however, most seed heads were not filled this year.

Long-Term Upland Vegetation Studies

Pasture 28

There are two long term trend sites in pasture 28. The first site, located at T08S, R01W, Section 28 was established in 1983 and re-read in 1987, 1990, 1993, 1997, and 2006. Bluebunch wheatgrass shows a significant linear increase (P=0.080). Frequencies of bluebunch at this site were low and absent in 1987 and 1990, but have increased since that time. During the same time squirreltail frequencies were substantially higher than expected, which may indicate the two species, bluebunch and squirreltail, were mis-identified in 1987 and 1990. Idaho fescue is well represented at this site with a static trend, as is low sage.

Table 45: Percent frequencies of selected plant species at NPFT site T08S, R01W, Section 28

Year	Bluegrass	Idaho fescue	Bluebunch Wheatgrass	Squirreltail	Low sage	Thurber Needlegrass
2006	91	94	24	23	60	0
1997	96	93	25	29	45	0
1993	76	89	24	25	45	0
1990	95	97	0	57	46	0
1987	81	97	5	34	51	4
1983	94	90	13	26	58	0

The second trend location is T08S, R02W, Section 24. This site was established in 1983 and re-read in 1987, 1990, 1993, 1997, and 2006. Bluegrass has a significant linear decrease at this site (P=0.058), but is still well represented. Idaho fescue has increased significantly (P=0.022) and squirreltail is static, although it increased substantially from 1997 to 2006. Low sage has increased significantly (P=0.051) although it was lower in the 1990s. Overall trend based on increases in Idaho fescue, squirreltail and low sage is upward.

Table 46: Percent frequencies of selected plant species at NPFT site T08S, R02W, Section 24

Year	Bluegrass	Idaho fescue	Squirreltail	Low sage
2006	62	15	45	53
1997	78	4	27	14
1993	71	6	44	16
1990	77	2	10	26
1987	48	4	56	28
1983	91	0	39	28

Pasture 28A

There are no long term trend studies in pasture 28A.

Pasture 29A

There is one trend site in pasture 29A, located at T08S, R01W Section 26. It was established in 1983 and re-read in 1987, 1990, 1993, 1997 and 2006. Junegrass, bluebunch wheatgrass, and bitterbrush showed significant linear increases (P=0.009, P=0.008, P=009). Squirreltail had a downward trend while fescue fluctuated over the time period. Mountain big sagebrush frequency exhibited a significant linear decrease (P=0.036) and bitterbrush had a significant linear increase (P=0.009). Apparent trend at this site overall is upward.

Table 47: Percent frequencies of selected plant species at NPFT site T08S, R01W, Section 26

Year	Idaho Fescue	Bluebunch Wheatgrass	June-grass	Blue-grass	Squirreltail	Needle-grass	Carex	Mountain big sage	Bitterbrush
2006	75	41	33	53	45	10	10	54	24
1997	73	50	47	26	43	0	25	62	11
1993	82	46	16	16	71	2	0	64	7
1990	89	3	0	24	93	0	0	75	11
1987	79	3	14	13	85	0	0	70	6
1983	78	26	11	39	68	1	0	68	0

Summary of Utilization for all pastures

The Bruneau MFP limits allocation of vegetation to consumptive use up to 50% to maintain stable watersheds. Under that decision, perennial grass utilization is also limited to 50% (maximum) over the long term for the landscape as a whole. However, vegetation consists of more than the perennial grass component, particularly on lower elevation areas where cheatgrass provides most of the biomass when it is present. Watershed cover is also provided by other plant species that receive little utilization by permitted livestock. Utilization studies in the form of use pattern mapping are particularly well suited to estimating carrying capacity as a basis for

adjudicating grazing (Smith et. al. 2005), and relate well to the objective of the Bruneau MFP decision.

Up to 50% utilization has also been used as a proper use factor under the assumption that use levels of 50% or less generally assure that the physiological needs of perennial grasses are being met (Smith et al. 1975). This concept of utilization relates more to the response of individual plants to defoliation and projects them to whole populations (Smith et al. 2005). It was also embodied in the estimates of forage production presented in the Bruneau/Kuna Grazing Environmental Impact Statement. The use of one-point-in-time forage surveys and allocation scenarios based on proper use factors was set aside as the sole basis for adjustments in permitted use by BLM directive in 1983. Grazing intensity (which is estimated by utilization studies) interacts with timing, duration and frequency of defoliation; and condition or trend responses of perennial plants are not a simple function of grazing intensity alone, particularly at a pasture or allotment level (Smith et al. 2005).

Utilization varied between species and between pastures and sites within a pasture over the evaluation period. Photos of sites where utilization was measured during 1998 to 2007 are in Appendix L and levels of actual or licensed use that were imposed are compiled in Appendix C. Utilization transects reflect the level of use within a relatively small area, and should not be assumed to characterize the pasture as a whole, particularly where substantial differences in vegetation and topography exist (Smith et al. 2005). Some are located at key areas, while others were selected to sample various portions of the pastures. Key areas and key species are selected because they are believed to reflect progress toward management plan objectives and because utilization measurements there are believed to be indicative of the overall use of a management unit and of the quantity of forage removed from that unit (Smith et al. 2005). Specific reasons for selection of other sample locations are usually not explicitly documented. Key Areas in East Castle Creek Allotment are listed in Table 48.

Table 48. East Castle Creek Key Areas (NPFT and PP monitoring).

Pasture	Location	Type
8B	07S02E22	NPFT
8B	07S02E07	NPFT
8B	07S01E24	NPFT
8B	06S02E33	NPFT
8BIII	07S02E28, GE	NPFT (temp)
8BIII	07S02E32, GG	NPFT (temp)
8BIII	07S02E32, GF	NPFT (temp)
5B	06S03E21	NPFT
5B	06S02E04	NPFT
5B	06S02E35	NPFT
12	08S01E02	NPFT
12	08S01E20	NPFT
10B	07S01E22	NPFT
28	08S02W24	NPFT
28	08S01W28	NPFT
28 Rock Spring Exclosure	08S01W31	PP, not found
28A	08S01W32	PP
29A	08S01W26	NPFT

In general, utilization was lighter in 2006-2007 in the winter pasture 5B and in early spring pasture 8B than it was in earlier years, particularly during 1999-2001. These observations probably reflect both changes in authorized use under the 2004 Settlement (Appendix C) as well as differences in growing conditions among years (Appendix F). Utilization in 1999-2001 was above 50% on most sites for most species in those pastures except at key area 07S01E24, which is located within the foothills portion of Pasture 8B (Table 36). The highest utilization values for those pastures were 81% on squirreltail in Pasture 5B in 1999 and 97% on Sandberg's bluegrass in Pasture 8B in 2000. Although up to 88% utilization was observed on crested wheatgrass in Pastures 8BI and 8BIII in 2001; these seeding pastures were rested in 2002 (8BIII only), 2005, and 2006. The Idaho Bird Hunters, et. al., who contributed data for Pasture 8BIII in 2003, believed that livestock use had been minimal in that year.

In the other spring and summer pastures, utilization levels were generally similar over the evaluation period; with no obvious relationship to BLM administrative actions or to climatic events. The highest utilization values for those pastures during 1999-2001 were 71% on Idaho fescue in Pasture 12 in 2001; 61% on Sandberg's bluegrass in Pasture 28 in 1999; and 62% on Idaho fescue in Pasture 29A in 1999. However, average utilization values in 2006 were 50 to 60% and 30 to 40% on key species even in preferred areas of pastures 28 and 28A, respectively; which compares favorably with values reported in the 1997 AIE. All of the late spring use occurred in Pasture 12 in 2006, and even then, utilization varied substantially among portions of the landscape.

Grazing in Pasture 5B, the winter pasture, was light when utilization was read in 2007 (2006 grazing year) compared to the heavy utilization measured in 1999 and 2000. In those years utilization on Indian ricegrass and squirreltail ranged from 60 to 80% and heavy use was observed throughout the area. In 2007 utilization in this winter use pasture was light overall throughout the pasture.

A similar trend was observed in the early-spring Pastures 8B, where use was heavier in 1999, 2000, and 2001 and lighter in more recent years on remnant native perennial grasses. In Pasture 8B grazing utilization ranged from 58 to 72% on squirreltail and Indian ricegrass in 1999, 2000, and 2001, and was 27% in 2006. Use varied with location in 1998 where Indian ricegrass had almost all heavy use at one site and the majority of the use occurred to the south away from the road. A contrast was seen again in 2000 where one site had heavy to severe use on Indian ricegrass and there was evidence of repeated use and even the protected plants and shrub species (including rabbitbrush) had been utilized and another site had some plants that had been grazed heavily but there did not appear to have been a lot of cow use. Another key area also had heavy use on squirreltail. Squirreltail protected by shadscale was clipped. Cheatgrass was prevalent and had been utilized at this site and some shrubs (budsage and shadscale) exhibited cattle use. In 2006 utilization was performed at the key areas, and some limited use pattern mapping was completed. The foothills had some areas of heavy use on perennial grasses near Poison Creek, but overall dispersion of use was good throughout the pasture. The tendency to selectively graze remnant perennial grasses that was reported in the 1997 AIE was not as pronounced, and cheatgrass was comparatively abundant at many locations (trend photos, Appendix E).

Some stubble (plant) height data were also collected at key areas in Pasture 8B during 1999 through 2001. Stubble height is primarily a measure of plant residue, and while useful in evaluating soil protection (in the context of the MFP Watershed objective), is not necessarily a substitute for utilization measurements (Smith et al. 2005). The average stubble height on Sandberg bluegrass was 1.7" at one key area and at another key area where squirreltail had been

heavily used, (including squirreltail that was protected by shrubs, and some squirreltail plants had been plucked out of the ground) the average stubble height in January 2000 was <1" and in April 2000 it was 4". Average height of squirreltail was 2-3" and cheatgrass was approximately 4". In 2001 average height of grazed squirreltail was 2" and for ungrazed was 4". Average for Sandberg's bluegrass was <1". Average for grazed Thurber's needlegrass was between 1.4" and 2.0". Average height of grazed Indian ricegrass was 2" and for ungrazed was 6". The average for Thurber needlegrass in the protection of a utilization cage ranged from 6-7".

Pasture 8BI had heavy use in 2001 and 2002 when utilization was 64-78% on Sandberg's bluegrass and 71-88% on crested wheatgrass. Utilization on crested wheatgrass in 1999 had been 53-58%. In 2001 most use occurred on the flat area along the fence and pipeline, with less use of the seeding where it extends up into the foothills. In 2006 use was light overall throughout the seeding; however, very few crested wheatgrass plants were observed and slight use was observed on Sandberg's bluegrass.

Pasture 8BIII also had heavy use in the earlier years of this assessment; use on crested wheatgrass was 65% in 1998, between 50 and 82% in 1999, and between ~~65~~ 82 and 88% in 2001. In 1999 all plants were heavily used at two locations, with some plants severely used at one location. In 2000, heavy use had occurred throughout the pasture and the only ungrazed plants were those protected by shrubs. In 2001 even the plants protected by shrubs had been grazed and all edible shrubs (4-wing and shadscale) had been utilized to some extent. Many young plants had been pulled out by the roots. The heavy utilization and adverse growing conditions in 2001 prompted an agreement with the permittees to close 8BIII to use in 2002; and adverse growing conditions in 2002 through 2004 prompted near-complete rest of this pasture in 2005 and 2006.

Stubble (plant) height data were also collected at the two seeded key areas in Pasture 8BIII. The average height of crested wheatgrass was 3.3" at one location and 2.4" at the second location in 2000. In 2001, the average height of grazed plants was 3.0". Plant heights within the utilization cage ranged from an average of 6.0" on squirreltail to 18" on crested wheatgrass; the average of all plants in the cage was 13".

Use was lighter in Pasture 10B, one of the late mid-spring pastures, than in the early-spring pastures. Topographic influences and lack of water in the uplands have been the major influences in the level and pattern of use, both historically and currently. Slight to light use was seen in 1998, 1999, and 2000. In 2001 there was selective grazing of decreasers; less use was observed on Sandberg's bluegrass due to later spring use. In 2006 use was moderate in the bottom of drainages and upslope use gradated to light quickly. The majority of the pasture (the upper slopes and ridges), as is usual, received no use. At one site, needlegrass was almost universally heavily grazed and use on Sandberg's bluegrass was moderate to heavy. Heavy use was recorded at one site approximately 1/3 mile upslope from a stream but use quickly gradated to moderate to light as distance from the water increased.

The late-spring pastures – 11B and 12 – had heavier use than Pasture 10B. Pasture 12 had heavy to severe use in 1999, 2000, 2001, and 2006. In 1999 all plants observed at one of the key areas in Pasture 12 had been grazed to some extent and most had been grazed heavily. In 2001 there was heavy to severe use on a stream terrace and a few level areas in Pasture 12, with strong selective grazing of decreasers. In 2006 use varied, with some locations in Pasture 12 having

severe use, areas with moderate slopes having heavy use, and steep side slopes at the upper end of the pasture having moderate use.

Use in summer pastures varied based on plant community, species, and location in a manner similar to that reported in the 1997 AIE. Generally light to moderate use was observed in Pasture 28 in 1998 and 1999 and in Pasture 28A in 1998. Key area 08S02W24 has shallow soils, and decreaser grasses such as Idaho fescue are naturally scarce. That key area generally received slight use. In 2006 utilization in Pasture 28 was higher and was concentrated at Juniper Station and Station Springs due to their mild topography, fine soils, wet meadows, and easy access to water. Throughout the pasture in 2006, low sagebrush ridge tops received little to no use while mountain big sagebrush bottoms had 50 to 60% utilization on Idaho fescue and bluebunch wheatgrass. Riparian areas outside of exclosures in the Juniper Station area had mechanical damage and heavy utilization (<1" stubble height). Browse on antelope bitterbrush was heavy to severe throughout the pasture based on Landscape Appearance Method criteria. The 1997 AIE documented greater incidence of use on browse species in pastures grazed by cattle after curing of grasses.

Patchy use was observed in 1998 in Pasture 29A. In 1999 use on Idaho fescue plants not protected by shrubs ranged from light to heavy and use on antelope bitterbrush was heavy to severe. In 2000 the meadow in Pasture 29A that was proposed for inclusion in Pasture 29N in the 1997 Final Decision was heavily to severely grazed throughout and the average stubble height was 2.1".

Table 49. BLM, Intermountain Range Consultants([IRC]) and Idaho Bird Hunters ([IBH])Utilization Studies in the East Castle Creek Allotment (in percentages).

Pasture	Site location in pasture	Year	Bluebunch wheatgrass	Indian ricegrass	Idaho fescue	Sandberg bluegrass	Squirrel-tail	Winter-fat	Thurber needlegrass	Crested wheatgrass
5B	06S02E20	2006		22						
	06S03E29	2006		19						
	06S02E03	2006		24		7				
	06S03E21	2000		66			23			
	06S03E21	1999		80			81			
	06S02E35	2000		66			71			
	06S02E35	1999		73			74			
	06S02E04	2000		68			63	66		
	06S02E04	1999					70	55	70	
8B	06S02E29[IRC]	1999					48			
	06S02E33	2006		27			27			
	06S02E33	2001		47		2.5	15			
	06S02E33	2000				97	58			
	06S02E33	1999					58			
	06S02E33	1998	4				28			
	07S02E	2002		69			70			
	07S02E03[IRC]	1999					45			
	07S02E05[IRC]	1999					36			
	07S02E13[IRC]	1999					36			
	07S02E16[IRC]	1999					47			
	07S02E17[IRC]	1999					41-46			
	07S02E31[IRC]	1999					46-48			
	07S02E22[IBH]	2003		nil		nil	Nil			
	07S02E22	2001		87						
	07S02E22	2000		79			63			
	07S02E22	1999		72			66			
	07S02E22	1998		68		49	49			
	07S02E07	2006				nil	nil			
	07S02E07[IBH]	2003				nil	nil			
	07S02E07	2001				79	46		60	
	07S02E07	2000					66			
	07S02E07	1999				3	67			
	07S02E07[IRC]	1999					38			
	07S02E07	1998					36			

Pasture	Site location in pasture	Year	Bluebunch wheatgrass	Indian ricegrass	Idaho fescue	Sandberg bluegrass	Squirrel-tail	Winter-fat	Thurber needlegrass	Crested wheatgrass
	07S01E24?	2007			35	25				
	07S01E24 IBH	2003				nil	nil			
	07S01E24	2000				30	8			
	07S01E24	1999				27	8			
	07S01E24	1998				55	30			
	06S01E35	2002				78				71
	06S01E35	2001				64				88
	07S01E03	2006				13				very few
8BI	07S01E03 IRC	1999								55
	07S01E01 IRC	1999								53
	07S01E10 IRC	1999								57
	07S01E11 IRC	1999								58
8BIII	07S02E21	1999								57
	07S02E27 IRC	1999								56
	07S02E28GE	2001								82
	07S02E28GE	1999								74
	07S02E28 IBH	2003								nil
	07S02E28	1999								65-69
	07S02E29 IRC	1999								57
	07S02E29	1999								50-69
	07S02E29	1998								65
	07S02E31	1999								66-68
	07S02E31	1998								68
	07S02E	2007					30			
	07S02E32GG	2001								88
	07S02E32 IRC	1999								46
	07S02E33 IRC	1999								57
	07S02E33	1999				70				66-71
10B	07S01E23	2006			50	45				
	07S01E23 IRC	1999	16-23							
	07S01E26 IRC	1999	45							
	07S01E09	2006				52				
	07S01E16	2006				28	29			
	07S01E22	2001	48						50	
	07S01E22	2000	14			3			22	
	07S01E22	1999	28			5			27	
	07S01E22	1998	8						12	

Pasture	Site location in pasture	Year	Bluebunch wheatgrass	Indian ricegrass	Idaho fescue	Sandberg bluegrass	Squirrel-tail	Winter-fat	Thurber needlegrass	Crested wheatgrass
11B	08S01W25 IRC	1999			8					
	08S01W36 IRC	1999			15					
	08S01E30 IRC	1999			12					
	08S01E31 IRC	1999			11					
12	08S01E10	2006				82				
	08S01E10 IBH	2003	80		80					
	08S01E11	2006				82				
	08S01E16 IRC	1999	13							
	08S01E20	2006	66		66	24			66	
	08S01E20	2001	69		71				71	
	08S01E20	2000	60			51			59	
	08S01E20	1999	67			71			67	
	08S01E20	1998	43		33	50			50	
	08S01E20 IRC	1999	10							
	08S01E02	2006	87		87	44				
	08S01E02	2000				11			55	
	08S01E02	1999	50			31	70		60	
	08S01E02	1998	21			45			51	
	08S01E02 IRC	1999	15-17							
44		2007	40							
28	08S01W, Sections 20 21, 29, and 28 (Artrv)	2006	50-60 (UPM)		50-60 (UPM)					
	08S01W, Sections 20 21, 29, and 28 (Arar)	2006	20-30 (UPM)		10-15 (UPM)					
	08S01W31	2007	29		43					
	08S01W31	2006	62-68		39-46					
	08S01W21	2006	30		8					
	08S01W19	2006	58		32					
	08S02W24	2006	50		6					
	08S02W24	1999				20	12			
	08S02W24	1998				47	12			
	08S01W28	1999	17		37	61				
	08S01W28	1998	55		34					

Pasture	Site location in pasture	Year	Bluebunch wheatgrass	Indian ricegrass	Idaho fescue	Sandberg bluegrass	Squirrel-tail	Winter-fat	Thurber needlegrass	Crested wheatgrass
28A	08S01W, Sections 26 27, 33, and 34 (Artrv)	2006	30-40 (UPM)		30-40 (UPM)					
	08S01W, Sections 26 27, 33, and 34 (Arar)	2006	10-20 (UPM)		10-20 (UPM)					
	08S01W26	2007	8		31					
	08S01W32	1998	41		18		36			
29A	08S01W26	1999	43		62					
	08S01W26	1998	46		50					

Note, not all species are located at each site where utilization is completed. For instance, bluebunch wheatgrass is not present in pastures 5B nor much of 8B. This table shows the range of species encountered across the allotment upon which utilization is measured.

Browse Utilization of Bitterbrush and Mountain Mahogany

In September and October of 2006 and 2007, utilization of browse on bitterbrush and mountain mahogany plants was measured in summer pastures of East Castle Creek Allotment, after cattle use. Additionally, the degree of hedging and the age class were determined for each plant. Degree of hedging is an indicator of past use levels. Age class is an indicator of reproduction. In summer range for deer, the MFP places a utilization limit of <50% of leaders browsed, by all species. These pastures are summer range for deer. Both cow and deer scat were observed on the transects. See also Appendix I for location of transects and photos.

Utilization levels were below the MFP limit in pastures 29D and 29A (Table 50). Most of the plants were in the moderately hedged category, and almost 100 % were mature plants, meaning diameter at base was > ½ inch. No seedlings were found, but seedlings would be easy to miss without doing an intensive eyes-near-the-ground survey.

Except for two transects selected specifically for being distant from water (9S1W15 and 8S1W20), all utilization levels were well over 50% in pastures 28 and 28A (Table 50). Additionally, the shrubs were severely hedged and were small-statured compared to less-used pastures (31, 29A, 29D), meaning that the use levels documented in 2006 and 2007 were the norm and that such high use levels occur in many years (Photos 3 and 4). The light use levels in 2007 on the two transects far from water were lighter than the year before, judging from the degree of hedging, which is based on length of 2-year old wood. Use levels in 2006 were in the heavy-to-severe range, judging from old browse sign.

Both bitterbrush and mountain mahogany are very resistant to heavy browsing, as evidenced by the low numbers of dead and decadent plants. Additionally, observations of the growth forms in pasture 29D showed a release from hedged forms since 1998 or so, with the none-to-slight actual use by cattle (photo 6). We also observed bitterbrush sprouting from side buds after being browsed, so that browse use early in the summer was compensated for by later sprouting. However, very heavily hedged shrubs produced shorter sprouts than un-hedged, normal-form shrubs, i.e., 3 inches on hedged versus 6-12 inches on unhedged plants.

Browse measurement use was not recorded before cattle grazing. However, it can be determined whether the browse use was mostly by cattle or deer by looking for differences across fence lines. Deer can jump fences and thus do not create a fenceline contrast from their browsing. Thus, if a difference can be seen and/or measured on either side of a fence, that difference must be due to use by cattle. Pasture 31 shows a reference level of use by deer alone. Judging from visually obvious differences in browse use on either side of the fence between pastures 31 and 30 of West Castle Creek allotment (Photos 1 -3), the browse use in pasture 30 was mainly by cattle. The fence line between pastures 31 and 28A of East Castle Creek does not have bitterbrush and mountain mahogany side by side along it to show the contrast. However, the use levels in pastures 28 and 28A (62-92 %) were similar to that in pasture 30 (76%), and not the light levels seen in pasture 31. Thus one can conclude that the use levels seen in pastures 28 and 28A (photos 5 and 6) were due to cattle.

Table 50. Browse utilization and degree of hedging on mountain mahogany and bitterbrush, in East Castle Creek Allotment, 2006 and 2007.

Pasture	Year	Location: Township Range, Section	Percent utilization	Degree of Hedging (% of plants)			Age Class (% of plants)		
				None	Moderate	Severe	Young	Mature	Decadent
29 D	2006	8S1E29	37	25	61	14		100	
29 A	2006	8S1W25	36	18	56	26	3	97	
28 A	2006	9S1W4	83		11	89		100	
	2007	8S1W27	79	1	14	85	2	97	1
	2007	9S1W15	14	3	33	63		100	
	2007	9S1W5	92		7	93	3	97	
	2007	8S1W32	62		5	95		100	
28	2006	8S1W28	92		2	98		100	
	2007	8S1W29	64	1	5	94		95	5
	2007	8S1W20	5	13	43	46	5	95	

Standard 5: Rangeland Seedings

Crested wheatgrass seedings were planted in the East Castle Creek Allotment in Pastures 8BI and 8BIII in the past. These pastures are considered to be historic seedings because the seeded species are no longer the dominant species present. They are discussed under Standard 4: Native Plant Communities.

Standard 6: Exotic Plant Communities

This standard does not apply to this allotment, although several of the pastures evaluated had a dominant cheatgrass component in the understory.

Standard 7: Water Quality

This assessment examines water quality data collected since the 1997 East Castle Creek AIE and evaluates consistency with current State of Idaho water quality standards and Idaho Department of Environmental Quality (IDEQ) sub-basin assessments and total maximum daily load (TMDL) allocations. See Map 6 for water quality monitoring sites. Changes to IDEQ policies since 1997 include adjustments to water temperature based on the 10% exceedence policy and the temperature exemption (IDEQ 2002 and ID APA 58.01.02) and changes to the way fecal coliform are reported (ID APA 58.01.02).

In addition, Idaho Department of Environmental Quality reports water quality data differently than it has in the past. Prior to 2002, IDEQ prepared and submitted to EPA two separate documents. The first of these was a list (called a "§303(d) list") of all impaired waters in the state, as required under Section 303(d) of the Clean Water Act. The second was a report (called a "§305(b) report") that summarized the status of all of Idaho's waters, as required under Section

305(b) of the Clean Water Act. IDEQ now prepares one report called The Integrated 303(d)/305(b) Report, which is a combination of these two documents.

The Integrated Report identifies water bodies differently than the old §303(d) lists and §305(b) reports. The old lists and reports used "water quality limited segments" to identify streams and portions of streams that were impaired; the Integrated Report uses "assessment units." Assessment units are groups of similar streams within a subbasin that have similar land use practices, ownership, or land management.

Beneficial Use Support and TMDLs

IDEQ found that Battle, Birch, Poison, Rock, Sheep, and West Fork Shoofly creeks within the East Castle Creek Allotment are not supporting the cold water aquatic life beneficial use (Table 35). In addition to the beneficial uses listed in Table 51, all waters are assumed to support agriculture, industrial water supply, wildlife habitats and aesthetics. However, IDEQ has not assessed these waterbodies for those assumed uses. IDEQ has conducted Subbasin Assessments and Total Maximum Daily Load analyses (TMDLs) for 303(d) listed streams in the Upper Owyhee (IDEQ 2003), Jordan Creek (IDEQ 2007), and Middle Snake River/Succor Creek (IDEQ 2004) Subbasins in which the East Castle Creek Allotment is located. Table 52 lists the the 303(d) listed waters in the East Castle Creek Allotment for which IDEQ is requiring a TMDL allocation.

Table 51. Beneficial Use Support Status (IDEQ 2004b).

Name (Assessment Unit)	CWAL	PCR	Comments
Birch Creek – Source to mouth (ID17050103SW021_02)	Not Supporting	---	Segment and all attributes carried forward from 1998 list
Battle Creek – Source to mouth (ID17050104SW023_02)	Not Supporting	Fully	Segment and all attributes carried forward from 1998 list. Added to 303(d) list for temperature in SBA.
Poison Creek-Source to mouth (ID17050103SW024_02)	Not Supporting	---	Segment and all attributes carried forward from 1998 list.
Magpie Creek-as a tributary to South Fork Castle Creek (ID17050103SW020_02)	Not Supporting	Fully	Segment and all attributes carried forward from 1998 list. 2003 bacteria monitoring showed PCR=FS
Rock Creek – 1st and 2nd order segments from Source to Triangle Reservoir (ID17050108SW013_02)	Not Supporting	Fully	Segment and all attributes carried forward from 1998 list.
Sheep Creek – as a tributary to Rock Creek (ID17050108SW013_02)	Not Supporting	---	Segment and all attributes carried forward from 1998 list. This segment was not on the 1998 list and is not assessed
West Fork Shoofly Creek – as a tributary to Shoofly Creek (ID17050103SW024_02)	Not Supporting	---	Segment and all attributes carried forward from 1998 list. This segment was not on the 1998 list and is not assessed

CWAL=Cold Water Aquatic Life; PCR=Primary Contact Recreation; SCR=Secondary Contact Recreation
--- = Not Assessed

Table 52. Impaired Waters that Require TMDLs (IDEQ 2003, 2004, and 2007).

Name (Assessment Unit)	Pollutant

Name (Assessment Unit)	Pollutant
Birch Creek – Source to mouth (ID17050103SW021_02)	Sediment
Battle Creek – Source to mouth (ID17050104SW023_02)	Temperature
Poison Creek – Source to mouth (ID17050103SW024_02)	Sediment
Rock Creek – Source to Triangle Reservoir (ID17050108SW013_02)	Temperature
Sheep Creek – as a tributary to Rock Creek (ID17050108SW013_02)	Temperature
West Fork Shoofly Creek – as a tributary to Shoofly Creek (ID17050103SW024_02)	Sediment

Water Temperature

DEQ's subbasin assessment and TMDL process generally addresses only those streams that had been identified on 303(d) listings. BLM also monitored water temperatures of streams in the East Castle Creek Allotment in 2006 (Table 53). BLM temperature data supports DEQ's findings of non-support of the cold water aquatic life beneficial use for Birch Creek and Poison Creek.

Support of cold water aquatic life beneficial use is largely dependent on maintaining narrow stream channels with stable banks that are well-shaded by streamside vegetation. See Standards 2 and 3 for trends in streamside vegetation and stream channel shape and form relative to current management practices.

Table 53. Stream Temperature Monitoring Summary and Beneficial Use Support Status.

Stream (segment)	Pasture	Dates Sampled	Max T °C	Max Avg T °C	No. Days Max T >22 °C	No. Days Avg. T > 19 °C	CWAL Support
Birch Creek (6.4) (Elev =4,360 ft) 7S1E9NESW	10B	7/2/98 – 10/31/98	25.5	19.0	46	0	NF
Birch Creek (6.4) (Elev =4,360 ft) 7S1E9NESW	10B	7/14/99 – 10/5/99	32.0	21.5	72	28	NF
Birch Creek (8.8) (Elev =4,749 ft) 7S1E29NENE	10B	6/1/06 – 9/30/06	17.0	14.2	0	0	FS
Birch Creek (10.6) (Elev =4,944 ft) 7S1E31NENE	11B	7/2/98 – 10/15/98	22.3	15.3	0	0	FS
Birch Creek (10.6) (Elev =4,944 ft) 7S1E31NENE	11B	7/16/99 – 10/31/99	23.5	16.5	33	0	NF
Birch Creek (10.6) (Elev =4,944 ft) 7S1E31NENE	11B	7/10/00 – 10/31/00	24.0	16.0	23	0	NF
Birch Creek (10.6) (Elev =4,944 ft) 7S1E31NENE	11B	7/18/02 – 10/06/02	25.0	15.8	22	0	NF
Birch Creek (10.6) (Elev =4,944 ft) 7S1E31NENE	11B	6/1/06 – 9/30/06	16.5	13.8	0	0	FS
Poison Creek (9.4) (Elev =4,330 ft) 7S1E36 SWSE	8B	8/1/97 – 10/18/97	24.5	18.9	30	0	NF
Poison Creek (12.6) (Elev =4,554 ft) 8S1E2SWSE	12	7/2/98 – 9/23/98	23.0	19.7	7	0	FS
Poison Creek (12.6) (Elev =4,554 ft) 8S1E2SWSE	12	6/21/06 – 9/30/06	25.6	19.1	24	13	NF

Poison Creek (14.4) (Elev =4,945 ft) 8S1E15NWNE	12	6/01/06 – 9/30/06	18.1	15.1	0	0	FS

CWAL=Cold Water Aquatic Life (water temp. = 22° C or less, with a maximum daily average of < 19°C);
FS=Fully Supports beneficial use; NF=Does Not Fully Support beneficial use; ND=No Data

Bacteria

The current State of Idaho criteria for support of the primary contact recreation beneficial use designation is ≤406 *E. coli* (*Escherichia coli*) organisms/100 ml for a single sample and ≤576 *E. coli* organisms/100 ml for a single sample for secondary recreational contact. A water sample exceeding the *E. coli* single sample maximums above indicates likely exceedance of the geometric mean criterion (see below), but is not alone a violation of State water quality standards. Follow-up sampling is required to establish a violation of standards. For primary and secondary contact recreation, waters are not to exceed a geometric mean of 126 *E. coli* organisms/100 ml, based on a minimum of 5 samples collected every 3-5 days over a 30 day period. In 1998 to 2000, the criterion for full support of the secondary contact recreation beneficial use was ≤800 fecal coliform colonies/100 ml.

BLM sampled bacteria in Birch and Poison creeks in the East Castle Creek Allotment during 1998 to 2006 (Table 54). Birch Creek generally met criteria for full support of primary and secondary contact recreation beneficial uses, except in the late 1990's (Table 54; USBLM 1997). Poison Creek consistently had bacteria levels that exceeded criteria for full support of primary and secondary contact recreation beneficial uses during the time a pasture was being grazed (Table 54). Bacteria levels in Poison Creek in 1995 and 1997 also exceeded State of Idaho criterion for secondary contact recreation (Castle Creek AIE, pp. 93-94; USBLM 1997). Sampling conducted during 2002 to 2006 showed most of the fecal coliform bacteria in the streams was comprised of *E. coli* bacteria (Table 54).

Table 54. Bacteriological sampling (colonies/100 ml water) in the East Castle Creek Allotment.

Stream	Pasture	Segment (miles up from confluence)	Date	Fecal Coliform	*E. coli*	Fully supports primary/secondary recreation contact uses?
Poison Creek	8B	6.5	5/1/1998	270		Yes/Yes
		6.5	5/8/1998	1240		No/No
		6.5	5/7/1999	>2000		No/No
		6.5	5/25/1999	930		No/No
		6.5	6/2/1999	1300		No/No
		6.5	6/26/2006		2000	No/No
		9.4	5/1/1998	220		Yes/Yes
		9.4	5/8/1998	1480		No/No
		9.4	3/25/1999	2		Yes/Yes
		9.4	5/7/1999	760		No/No
		9.4	5/30/2000	4600		No/No
		9.4	6/3/2002	5800	2300	No/No
		9.4	7/17/2002	78	78	Yes/Yes
		9.4	8/6/2002	170	130	Yes/Yes
		9.4	5/8/2006		380	Yes/Yes
		9.4	6/26/2006		8000	No/No
		9.8	5/25/1999	31000		No/No
	12	11.8	6/2/1998	300		Yes/Yes
		11.8	6/16/1998	240		Yes/Yes

Stream	Pasture	Segment (miles up from confluence)	Date	Fecal Coliform	*E. coli*	Fully supports primary/secondary recreation contact uses?
		11.8	6/23/1998	>1600		No/No
		11.8	5/7/1999	14		Yes/Yes
		11.8	6/3/1999	4000		No/No
		11.8	7/1/1999	320		Yes/Yes
		11.8	6/22/2000	5800		No/No
		11.8	6/3/2002	3500	3000	No/No
		11.8	6/21/2002	>10000	>10000	No/No
		11.8	6/26/2006		3900	No/No
		14.2	6/22/2000	27000		No/No
		14.2	6/3/2002	5500	5500	No/No
		14.2	6/21/2002	1550	1550	No/No
		14.4	6/2/1998	330		Yes/Yes
		14.4	6/16/1998	340		Yes/Yes
		14.4	6/23/1998	13000		No/No
		14.4	5/7/1999	18		Yes/Yes
		14.4	7/1/1999	1650		No/No
		17.0	7/1/1999	1150		No/No
Birch Creek	10B	6.0	5/8/1998	10		Yes/Yes
		6.0	6/16/1998	220		Yes/Yes
		6.0	5/7/1999	2		Yes/Yes
		6.0	5/25/1999	1400		No/No
		6.0	6/4/2002	590	550	No/Yes
		6.0	6/21/2002	220	200	Yes/Yes
		6.0	8/7/2002	26	22	Yes/Yes
		6.0	5/16/2006		14	Yes/Yes
		6.0	6/26/2006		160	Yes/Yes
	11B	10.6	6/2/1998	30		Yes/Yes
		10.6	6/23/1998	900		No/No
		10.6	6/4/2002	330	330	Yes/Yes
		10.6	6/21/2002	400	400	Yes/Yes
		10.6	8/6/2002	4	4	Yes/Yes
		12.0	6/23/1998	1700		No/No

Sediment

Water quality criteria for sediment are determined on a case-by-case basis (IDAPA 58.01.02.250.05). In the absence of specific criteria, sediment shall not exceed quantities that impair designated uses. BLM measured substrate on Birch Creek, Poison Creek, and Battle Creek in 2006 (Table 55). The data show that the substrate is dominated by fines (< 2 mm = sand/silt/clay).

Table 55. Stream Bed Substrate Composition (%) for Streams in East Castle Creek Allotment.

Stream	Segment	Pasture	Date	Fines (1)	Gravel	Med. Gravel	Large Gravel	Small Cobble	Large Cobble	Small Boulder	Med. Boulder	Lrg-v. lrg Boulder	Bedrock
Birch Creek	6.0	10B	7/18/06	47	32	2	10	5					5

	6.0A	10B	9/11/06	61	27	8	4						
	10.6	11B	9/6/06	24	26	16	20	7	6	1			
	10.6A	11B	9/6/06	16	19	23	28	10	4				
	10.6B	11B	9/6/06	29	17	18	12	9	8	7			
	10.6C	11B	11/15/07	71	15	5	7	0	2				
Poison Creek	9.4B	8B	8/23/06	58	4	1	4	2	3				28
	11.8	12	8/24/06	65	17	11	3	1					3
	14.4	12	8/7/06	66	4	9	6	3					12
Battle Creek	50.6	29C	7/11/06	90	10								

(1) Fines = sand/silt/clay = < 0.1 inch (< 2 mm)

Water Chemistry

The stream segments located within the East Castle Creek Allotment were not evaluated in the 1997 AIE during previous BLM water chemistry monitoring. Table 56 summarizes BLM water chemistry monitoring conducted in 2006. All parameters were found to meet current water quality standards.

Table 56. Water Chemistry Monitoring in the East Castle Creek Allotment.

Stream ID	Pasture	Date	pH	Cond. (uS/cm)	D.O. (mg/L)	Instant. Temp (°C)
Birch Creek 6.0A	10B	9/11/06	7.51	413	6.41	12.5
Birch Creek 6.0	10B	7/18/06	--	--	--	16.5
Birch Creek 10.6	11B	9/6/06	--	--	--	11.6
Birch Creek 10.6A	11B	9/19/06	7.69	426	6.02	10.5
Birch Creek 10.6B	11B	9/6/06	--	--	--	13.4
Poison Creek (8S1E15NWNE)	12	5/23/06	8.27	281	8.05	9.5
Poison Creek (8S1E2SWSE)	12	5/23/06	8.58	350	8.36	12.7
Water Quality Standard			6.5 – 9.0	---	>6	≤ 22

ND=No data; --- = no standard

Ground Water

BLM has not conducted ground water quality monitoring within the East Castle Creek Allotment.

Data Reviewed

BLM riparian PFC surveys 1998-present; BLM greenline inventory 1998 to 2006; BLM water quality monitoring in 1997, 1998, 1999, 2000, 2002, and 2006; IDEQ TMDLs (2003, 2004, 2007). BLM monitoring of utilization of streamside vegetation and levels of bank alteration conducted during 1998 to 2006. BLM also reviewed the State of Idaho's Beneficial Use Reconnaissance Protocol (BURP) database (IDEQ 2004c; see Literature Cited). IDEQ uses these data, along with other information, to determine beneficial use support status. BURP data have not been analyzed in further detail in this assessment.