

Rangeland Health Assessment
Standards for Healthy Rangelands
And
Guidelines for Livestock Grazing Management
for
Public Lands Administered by the
Bureau of Land Management
in the
State of Wyoming

Rim Allotment No. 00186

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BLM

Worldland Field Office, Wind River/Bighorn Basin District, Wyoming



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1.0 INTRODUCTION

The Bureau of Land Management (BLM) grazing regulations at 43 CFR 4130.3-1(c) require that grazing permits issued by the BLM contain terms and conditions that ensure conformance with BLM regulations at 43 CFR 4180, which are the regulations under which the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Land Administered by the Bureau of Land Management in the State of Wyoming were developed. Recently, the Worland Field Office completed an assessment of the achievement of these standards on the Rim Allotment No. 00186. The results of this assessment are presented in this report. This assessment will serve to inform the BLM's determination as to whether these standards are being met, and, if they are not met, whether existing grazing management practices contribute to their lack of attainment.

1.1 Standards

The approved standards for rangeland health are as follows:

- Standard #1: Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.
- Standard #2: Riparian and wetland vegetation has structural, age and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide ground water recharge.
- Standard #3: Upland vegetation on ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.
- Standard #4: Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.
- Standard #5: Water quality meets State standards
- Standard #6: Air quality meets State standards

2.0 Affected Environment – Allotment Description, Resource Values, and Uses

2.1 Location and Land Ownership

The Rim Allotment is located approximately 4 miles south-east of Tensleep, WY. The allotment encompasses approximately 2,400 acres, with approximately 2,100 acres of public land, and 300 acres of state lands (Map 1). The allotment is divided into two pastures by Wyoming Highway 436, which runs through the center of the allotment. The eastern part of the allotment also contains several acres of uncontrolled private lands which are part of the Canyon Creek Subdivision. For management priorities, the allotment is classified in the “I” (Improve) category.

2.2 Hydrology / Riparian

The allotment is located in two different watersheds, known by the US Geologic Survey as a Level #6 Hydrologic Unit, or by (HUC #) as listed below in Table 1.

Watershed (HUC) Level #6	Acres (mi²)	Acres (mi²) Within Allotment	% of Acres of Watershed in the Allotment
Nowood River-Alkali Creek #100800080305	33,627 (52.5)	2381 (3.72)	7.1
Lower Canyon Creek-#100800080406	33,541 (52.4)	1410 (2.2)	4.2

These watersheds are located in the Nowood River Level #5 watershed and are both located east of the Nowood River. The drainages trend in a northwesterly direction through the allotment to the point where Alkali Creek confluences with the Nowood River west of the allotment (Map 2). The allotment contains 7.1 percent of the Alkali Creek watershed and a minor 4.2 percent portion of the Lower Canyon Creek watershed. The western pasture is located in the Alkali Creek watershed that is a highly erosive area with high amounts of runoff and very low permeability due to very fine grained geologic outcrops of the Chugwater and Goose Egg Formations along moderate slopes. The majority of the drainages are Rosgen B type streams with moderate sinuosity and 2-4 percent gradients, with a single thread channel and a floodplain width of 20-30 feet. The east pasture is located primarily in the Lower Canyon Creek watershed that is located over the Ten Sleep Formation, which consists of sandstone with numerous spring outcrops that occur due to high hydrologic permeability and fractures in the TenSleep Formation, producing good quality water that is the local source of many drinking water wells in the area. There is base flow year round in both watersheds due to higher elevations and greater amounts of precipitation, and subsurface water returns from irrigation in the west pasture.

The drainages on public land were assigned a BLM RAIDS ID# for monitoring of watershed function and riparian habitat. The segments within the allotment are shown on Map 2. The flow from these segments originates as surface flow from spring discharge in Old Maid Gulch year round. Canyon Creek is also a perennial tributary to Tensleep Creek that flows through private, state land, and BLM land primarily in the narrow Canyon Creek Canyon. Alkali Creek is a perennial tributary to the Nowood River and originates south of the western pasture.

2.3 Climate/Air Quality

Elevation ranges from 4,800 feet to 5,200 feet above sea level. The allotment is considered to be within the 10-14 inch precipitation zone. The average precipitation collected at the BLM Spring Creek rain gauge, located 6 miles south of the allotment, is approximately 13 inches. Approximately one-half of the annual precipitation falls during the critical growing season of April through June.

The following general climate description is provided by the US Department of Agriculture, Natural Resources Conservation Service (NRCS), Ecological Site Description, Loamy Range Site, 10-14” Big Horn Basin Precipitation Zone (Site ID R032XY322WY):

Annual precipitation ranges from 10-14 inches per year. The normal precipitation pattern shows the least amount of precipitation in December, January, and February, increasing to a peak during the latter part of May. Amounts decrease through June, July, and August and then increase some in September. Much of

the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall exceeds 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Winds are generally not strong as compared to the rest of the state. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 75 mph.

Growth of native cool-season plants begins about April 15 and continues to about July 15. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the “Thermopolis 2” climate station:

	<u>Minimum</u>	<u>Maximum</u>	<u>5 yrs. out of 10 between</u>
Frost-free period (days):	74	149	May 23 – September 16
Freeze-free period (days):	112	180	May 8 – October 1
Annual Precipitation (inches):	7.6	21.9	

Mean annual precipitation: 12.35 inches

Mean annual air temperature: 46.2 °F (30.1°F Avg. Min. to 62.3°F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include “Grass Creek 1E”, “Thermopolis”, “Thermopolis 25NW”, “Buffalo Bill Dam” and “Black Mountain”.

2.4 Soils

The soils reflect the desert-like environment in which they formed. They are highly variable reflecting differences in parent material (sandstone, siltstone, shale and/or mixed alluvium), aspect and elevation, and precipitation zone. Many of the soils are typified by the reddish hue that is characteristic of soils developed from Chugwater parent materials. Surface textures are, fine sandy loams, very fine sandy loams, loams, and clay loams. Due to the Chugwater influence these soils are strongly influenced by gypsum. In many places the subsoil reflects an increase in clay and calcium carbonate, being expressed argillic or calcic horizons. Slopes range from 0 to 70 percent.

The ecological sites found in the in the allotment are listed below:

Shallow Loamy 10-14 in. pz.	R032XY362WY
Loamy 10-14 in. pz.	R032XY322WY
Very Shallow 10-14 in. pz.	R032XY376WY
Sandy 10-14 in. pz.	R032XY350WY
Shallow Sandy 10-14 in. pz	R032XY366WY
Lowland 10-14 in. pz.	R032XY328WY
Shale 5-9 in. pz.	R032XY154WY

Two rangeland health assessments were conducted at monitoring sites selected within the allotment. The first assessment was conducted at Monitoring Site 1 in soil Map Unit 34 – Kishona-Shingle-Rock Outcrop Association. Soils at this location are similar to the Kishona soil series, differing in that the argillic horizon is weakly developed. The second assessment was conducted in Map Unit 64 – Spearfish-Travessilla-Rock Outcrop Association. The soils at this location are too deep to be either the Spearfish or the Travessilla soil series; however they are similar to the

deeper Neville soil series. The ecological site at both locations is a Loamy 10-14 in. pz. Refer to Map 3 - Soil and Ecological Sites, located at the end of this document.

2.5 Upland Vegetation

Vegetative communities within the allotment are highly variable. Basin Grassland / Shrub Communities are predominately found on sandy and loamy sites. These sites are dominated by Wyoming big sagebrush (*Artemisia tridentata*), with an under story of bluebunch wheatgrass (*Agropyron spicatum*), western wheatgrass (*Agropyron smithii*), needle-and-thread (*Stipa comata*), and Indian ricegrass (*Oryzopsis hymenoides*). These sites provide the majority of the livestock forage in the allotment. Downy brome (*Bromus tectorum*) and Japanese brome (*Bromus japonicus*) are common on all range sites throughout the allotment. For the purpose of this Rangeland Health Assessment, downy brome and Japanese brome are collectively referred to as cheatgrass. Approximately 625 acres of the allotment was burned by prescribed fire in 2001 to remove juniper invasion. No known threatened or endangered plant species have been documented in the allotment.

2.6 Invasive Species

The majority of the noxious weeds in the Rim Allotment occur along the watercourses. Old Maid Gulch and Canyon Creek contain populations of Canada and musk thistle, as well as houndstongue. Alkali Creek, which flows almost entirely through state lands, has documented populations of saltcedar and Canada thistle. This allotment lies within the Ten Sleep Weed Management Area and is intensively managed and monitored for noxious and invasive weed species using a cooperative, integrated pest management strategy. County and BLM personnel treated all known noxious weeds within the allotment in July of 2010. Cheatgrass occurs across the allotment in varying abundances. However, visual observations indicate that perennial grasses are present with adequate densities and cheatgrass densities are not presently limiting perennial grass productivity or diversity. The winter grazing strategy being currently utilized may be helping the native perennial grasses and forbs compete with the cheatgrass.

2.7 Range

A total of 278 animal unit months (AUMs) of livestock grazing use are permitted in the Rim Allotment during the fall and winter months. Livestock grazing use is permitted as shown below in Table 2:

Permittee	No. & Kind of Livestock	Permitted Use Period	Percent Public Land	AUMs
Anderson Ranch Co. (ls. Clay)	410 Sheep	11/01-02/28	86%	278

The Rim Allotment is essentially divided into 2 pastures by the Rome Hill Road. The public lands in the East Pasture are nearly inaccessible to livestock, and receive little to no livestock grazing. Livestock grazing primarily occurs in the West Pasture. The only water source is Alkali Creek, which flows on State of Wyoming land, and snow in the winter months. The allotment is usually only grazed when snow is available for sheep.

Livestock Grazing History

Prior to 2001, the Rim Allotment was permitted for cattle grazing during May and June. A Wyoming Rangeland Standards Conformance Review was completed on the allotment in 2000. During this review, it was determined that the rangeland resources in the Rim Allotment were not meeting Standard 3 (Upland Vegetation). Poor suitability due to lack of water and continuous growing season livestock use were cited as the primary reasons why Standard 3 was not being met. In 2001, in response to the Rangeland Standards Conformance Review, one-half of the livestock grazing use on the allotment was changed to fall-winter grazing use. When Anderson Ranch Co. acquired the permit in 2002, all of the livestock grazing use was converted to fall-winter sheep use.

2.8 Wildlife

The Rim Allotment provides habitat for multiple wildlife species during all seasons of the year. Due to terrain and geology, this habitat is tremendously varied. The allotment is split into two pastures separated by Wyoming Highway 436 and a strip of unallocated public land.

The East Pasture includes private lands that contain a private housing development, a golf course, irrigated hay fields, juniper woodlands, and Canyon Creek. The public land portion of the east pasture is mostly woodlands, steep

rocky slopes, and sagebrush grasslands. Aside from some small amounts of trespass cattle use, this portion of the allotment has little or no grazing use on the public lands. The lack of grazing combined with some semi-wet meadows in the far north-west corner or along Old Maid Gulch produces excellent habitat for deer and elk. The private lands and lower slopes of the public lands in the east pasture are considered crucial winter range for mule deer. The private lands along Canyon Creek provide habitat for whitetail deer. The creek itself contains brown trout, mountain whitefish, other non-game fish such as suckers, and the usual aquatic mammals such as raccoon, muskrat, beaver and mink, at least as occasional visitors.

The West Pasture of the allotment provides the majority of the permitted livestock grazing for the allotment. This pasture is highly variable in slopes, soils, aspects and vegetation. The interactions of these variables produce a highly variable mix of habitats. Due to the aspect, the westward sloping part of the pasture just west of the highway is crucial winter range for mule deer. It is mostly sagebrush grasslands interspersed with shallow soil areas that grow only annual grasses or forbs. This area provides yearlong habitat for antelope and winter elk use. The only sign of sagegrouse use in the entire allotment was one old pile of droppings in the sagebrush area here.

The West Pasture has one source of water, Alkali Creek. There are no fish in the creek, but beaver sign is common. The stream is deeply incised with very narrow or no floodplains, so contains few aquatic woody species such as cottonwood or willow. Establishing enough woody species to provide beavers with building material to change the stream character would be impossible. The stream is almost entirely on private or State of Wyoming lands. The perennial flows promote a variety of riparian vegetation such as cattails, rushes and other moist soil grasses, forbs and shrubs. This provides habitat for waterfowl, aquatic mammals, and passerines.

The portion of the West Pasture south of Alkali Creek is rolling sagebrush habitat. Winter elk use, yearlong deer, and seasonal pronghorn use are moderate in the area. Sheep graze the area moderately. Although they have not been documented through formal inventory efforts, the sage thrasher, Brewer's sparrow and loggerhead shrike are three BLM sensitive species that are common residents of other similar sagebrush communities. The only other BLM sensitive species likely to occur within this allotment is the ferruginous hawk. An inventory of the allotment for nesting raptors found only a single red tail hawk nest on a rocky cliff face along Alkali Creek. No other raptor nests were found in the allotment.

Sage-grouse use of the allotment is virtually non-existent. Most of the allotment is within a four-mile radius of a historical lek that occasionally has a few birds, but the terrain and vegetation makes the entire allotment unsuitable for sage-grouse.

The remaining portion of the West Pasture north of Alkali Creek is a mix of juniper woodlands, burned areas, shallow soils, and sagebrush. Here, pronghorn use is low, winter elk use is moderate, and deer use is yearlong with winter use dependent upon snow depth.

With the two streams, varied terrain, vegetation, and habitats, numerous other species of wildlife like badger, coyote, bobcat, fox, waterfowl, passerines, and a variety of small mammals inhabit this allotment at least seasonally.

3.0 Summary of Monitoring Data / Assessments

3.1 Hydrology / Riparian/Water Quality

There are a total of four different riparian segments totaling 1.27 miles located on public land within the allotment. The riparian segments in the allotment were evaluated in the field by an interdisciplinary team for this assessment on various dates during the 2010 field season. The segments were evaluated for Proper Functioning Condition using BLM Technical Reference 1737-15 (BLM, 1998). Some of the segments were also rated using the Rosgen Stream Classification System (Rosgen 1994), in order to better understand the riparian potential and classification of the flow regime and flow conditions. Table 3 contains a summary of the ratings of the segments along with the Rosgen Classification of the streams. Table 4 contains a summary of the riparian comments and responses to questions answered "no" according to the BLM 1737-15 manual along with a brief explanation of the rating of the segment.

For all of the riparian segments except P0333X there was a previous PFC assessment along with photo points that were established in 1998. These sites were revisited in the field in 2010 to observe changes in the condition of the

riparian habitat. Canyon Creek (P0515X) and Old Maid Gulch (P0125X) did appear to have improved hydrologic and vegetative components compared to the 1998 photos and assessment. In 2007 and 2009 the Wyoming Department of Environmental Quality performed a use classification study for Canyon Creek (WYDEQ 2010). This was done in order to determine if Canyon Creek was meeting EPA and state requirements for beneficial uses. According to the designated use support determination the following was summarized according to the final report.

- Indeterminate of cold water fisheries and aquatic life other than fish.
- Water temperatures of 20°C appeared to exceed the maximum cold-water criterion.
- Excess sediment load linked to bank and channel stability at all sites.
- Morphological parameters improved at all sites from 2007-2009 with upward trend.
- Indeterminate ratings for wildlife, drinking water, industrial, and agricultural use support.
- Indeterminate for contact recreation.
- Scenic value and fish consumption were not assessed.

The Old Maid Gulch Spring (I0001X) did appear to have had a reduction in flow with no measureable flow from the spring during the field visit. There are no historic flow records for the spring. There was a previous BLM project to develop the spring for water in 1965, consisting of a pipe and tank that has fallen into disrepair. The reduction in flow could be due to the seasonal flow from the spring or an overall reduction in the output from the Tensleep Aquifer that has occurred regionally in the past 50 years due to increased water use from the aquifer. Photos of Alkali Creek (P0333X) show a minor invasion of tamarisk along the floodplain and within the bank-full channel. The majority of Alkali Creek within the allotment is located on state land except for two meander bends that are a total of 0.20 miles in length. The overall health of the riparian area is at PFC, however with the invasion of Tamarisk and Salt Cedar the segment may be at risk in the future. The current grazing regime does not appear to be having a negative impact on Alkali Creek. The BLM plans to provide future weed treatment in riparian areas along tributaries to the Nowood River and has been actively working with Washakie County Weed & Pest to treat invasive species in the area in conjunction with all affected land owners along a particular drainage.

Table 3 – Riparian Segments

BLM ID#	Riparian Area	(mi)	Water Type	Date Monitored	Gradient (%)	Rosgen Class	Function	Trend	Rating Scale
P0333X	Alkali Ck(Nowood R)	0.20	Perennial	10/20/2010	4	B	PFC	N/A	10
P0515X	Canyon Creek	0.04	Perennial	8/31/2010	2	C	FAR	UP	9
P0125X	Old Maid Gulch	0.40	Perennial	9/1/2010	6	A	PFC	N/A	11
I0001X	Old Maid Gulch Spring	0.63	Intermittent	9/9/2010	5	C	PFC	N/A	12
Total:		1.27			PFC/ FAR/ NF				
		PFC=Proper Functioning Condition FAR=Functioning at Risk N/A= Not Apparent U=Unknown Rating Scale= 0- Non Functioning, 1-9 Functioning at Risk, 10-19-PFC, 20=Potential Natural Community.							

Table 4 – Riparian Summary

RAIDS ID#	Riparian Comments	PFC Functioning Remarks
P0333X	Stream is relatively stable, with adequate cover and access to the floodplain. Base flow year around from irrigation and natural flow above. Digitized by Anderson Consulting as part of 2009 watershed study and is a Rosgen B type stream. The concern is the tamarisk invasion on the floodplain, almost enough to put FAR due to weed encroachment. The Hydrologic and Erosion deposition are in PFC. New segment 10/20/2010. There are two reaches, the lower segment was not assessed but assumed to be in similar condition.	
P0515X	This is part of the stream where willows were poisoned out years ago. Meadow stream, sandy soil, no willows. Stream has down-cut. Fence taken out by high flows. Terraces look used but no cattle signs weeds have been treated. Lots of cheatgrass above on private. Bank modifications with evidence of bank instability on DEQ sites upstream. Rated FAR due to upstream conditions and noted improvement as evidenced in 2009 use support determination. Improvement from previous assessment in 1998 when was rated NF.	#1 Rosgen C type Channel with sinuosity and low gradient <2%. Rosgen E type upstream on private land. Type II valley bottom, with fault controlled steep sides. #4 Appears stable, could widen a little. #14 Photo of new grasses on a point bar behind large woody debris. #13 1-2 foot to access floodplain, historically not connected very well. Upstream conditions appear to be causing gradient to decrease.
P0125X	Accessed via bottom up, rocky, spring area at top of segment with minimal livestock impacts. 3 photo points 5 photos noted some use from people with mixed weeds near cabin at lower end of segment. Overall Rated at PFC.	#1 Narrow Channel, Steep Rosgen A type gradient. #3 Bedrock Controlled. #13 Healthy over-story of trees and lots of debris in the channel. Changed items #9 and #10 from previous assessment to yes, due to nice vigor and appropriate plant communities. #16 Waterfall controlled by bedrock/geology.
I0001X	Enough seep/flow to support perimeter of area just below spring area. Photo points taken at top view down and below spring area. GPS of perimeter in RAIDS. Swale below juniper appears to have dried out and is no longer supporting wetland obligate species. Possibly due to reduction in spring flow. Below is single thread ephemeral channel on 8% gradient with no riparian vegetation and sagebrush in the channel. Moved the lower segment to ephemeral, and reclassified smaller upper segment around the spring as lentic/intermittent.	Reduced flow, but plants look good. No apparent excessive use or hoof action. Old tanks and BLM project 00192 is no longer functional. No measurable flow at the time of visit. Trailing along channel as it narrows has a minor effect during ephemeral flow.

Current water quality data for this allotment is from the USGS that was taken in 1976 as initial samples at two different locations on or downstream of the allotment. There is one sample (NWIS# 440057107195000) taken on Canyon Creek just below the Old Maid Gulch confluence in 1976 that shows a low level of conductance. The other sample (#435940107240500) was taken on Alkali Creek west of the allotment downstream at the intersection of the State Highway 436. For full results see the following links.

http://waterdata.usgs.gov/wy/nwis/inventory/?site_no=440057107195000

[http://nwis.waterdata.usgs.gov/wy/nwis/qwdata/?site_no=435940107240500;](http://nwis.waterdata.usgs.gov/wy/nwis/qwdata/?site_no=435940107240500)

3.2 Upland Vegetation

Very little historical vegetation monitoring data has been collected on the Rim Allotment. The collection of monitoring data has been a low priority, particularly since livestock grazing use on the allotment has been changed to fall and winter use. In the summer of 2010, two monitoring sites were selected on the allotment as part of the

Rangeland Health Assessment process. Ecological site, soil type, vegetative community, topography, location of water sources, and livestock grazing history are some of the factors that were considered in the selection of these monitoring sites. Monitoring Site 2 is located within the area that was prescribed burned in 2001. Monitoring Site 1 is located in an unburned area. A map showing the monitoring site locations, and photographs of each monitoring site, are located at the end of this document.

Step point cover transects (approximately 200 points per transect) were run in each monitoring site. A summary of the cover data collected from each monitoring site is shown below in Table 5:

Monitoring Site	Ecological Site	Basal Vegetative Cover	Litter	Bare Ground	Cheatgrass Cover
1	Loamy 10-14"	23%	64%	13%	17%
2	Loamy 10-14"	26%	69%	4%	19%

In addition to the cover data illustrated above, a Rangeland Health Assessment was conducted in each monitoring site by an interdisciplinary team on 8/17/2010 using the 17 Indicators of Rangeland Health as described in BLM Technical Reference 1734-6. Individual ratings for the *Rangeland Health Indicators* are displayed for each monitoring site below in Table 6.

Indicator	Departure from Reference Sheet	
	Site 1	Site 2
1. Rills	N-S	N-S
2. Water-flow patterns	N-S	N-S
3. Pedestals and/or terracettes	N-S	N-S
4. Bare ground	N-S	N-S
5. Gullies	N-S	N-S
6. Wind-scoured, blowouts, and/or deposition areas	N-S	N-S
7. Litter movement	N-S	S-M
8. Soil surface resistance to erosion	N-S	N-S
9. Soil surface loss or degradation	S-M	N-S
10. Plant community composition and distribution relative to infiltration	N-S	N-S
11. Compaction layer	N-S	N-S
12. Functional / structural groups	M	M
13. Plant mortality / decadence	N-S	N-S
14. Litter amount	M	S-M
15. Annual production	N-S	N-S
16. Invasive plants	M-E	M-E
17. Reproductive capability of perennial plants	N-S	N-S
N-S None to Slight S-M Slight to Moderate M Moderate M-E Moderate to Extreme E-T Extreme to Total		

The monitoring sites were selected to be representative of the range sites and resource conditions over the majority of the Rim Allotment. According to the range site guides locally developed by the NRCS, the Historic Climax Plant Community for these range sites is a *Bluebunch Wheatgrass/Rhizomatous Wheatgrass Plant Community*. This plant community is dominated by cool-season grasses, with a variety of forbs and woody species. Over time, with moderate, continuous season-long grazing, and/or prolonged drought, the plant community can shift to a *Perennial Grass/Big Sagebrush Plant Community*. In this plant community, the sites are still dominated largely by cool-season grasses, but short statured warm-season grasses and forbs are more common, and big sagebrush is more prevalent.

With frequent and severe grazing, and protection from fire, the preferred cool-season grasses can be significantly reduced or eliminated, converting the site to a *Big Sagebrush/Bare Ground Plant Community*. If fire is present to remove the sagebrush, the site can be converted to a *Blue Grama Sod Plant Community*. In areas with more saline soils, the plant community can be converted to a *Salt Tolerant Shrub/Bare Ground Plant Community*.

Based upon the data collected at the monitoring sites, as well as allotment-wide observations, cool season perennial grasses are found in abundance throughout the Rim Allotment. In Monitoring Site 1, cool season perennial grasses comprise 47% of the basal vegetative cover. In Monitoring Site 2, these species comprise 38% of the basal vegetative cover. The cool season perennial grasses in all key areas exhibit good vigor and seed production.

The primary vegetative component affecting rangelands in the Rim Allotment is the presence and abundance of cheatgrass. Cheatgrass accounted for 17% of the total ground cover at Monitoring Site 1, and 19% of the total ground cover at Monitoring Site 2. The amount of cheatgrass is also largely responsible for the high litter values found throughout the allotment. While some areas of near cheatgrass monoculture can be found, such as on disturbed areas, or previously burned areas, cheatgrass is primarily found as an understory component of the native perennial grasses and big sagebrush. Most plant communities found on the allotment represent the *Perennial Grass/Big Sagebrush Plant Community* type, even with the high amount of cheatgrass present on the allotment.

During the rangeland health assessment, the vegetative community observed at each monitoring site was compared to the reference sheet for the corresponding ecological site, developed by the NRCS. The *Biotic Integrity* at each site was rated as a “Moderate” departure from the reference sheet, primarily due to the high amount of cheatgrass throughout the allotment. These determinations were made using rangeland health indicators 8 and 9, as well as 11 through 17. Bare ground and litter were within the guidelines described in the reference sheets.

3.3 Soils and Site Stability

Data from the Rangeland Health Assessment was also used to evaluate soils and site stability on the Rim Allotment. Standard 1 for Healthy Rangelands was evaluated based on the attribute ratings for *Soil and Site Stability* and *Hydrologic-Function* using rangeland health indicators 1 through 11 and 14. Field observations were compared to the Reference Sheet for the Loamy 10-14” pz. (R032XY322WY) dated 5/1/2008 to determine departures from normal.

Monitoring Site 1

Rill formation was not observed. Water-flow patterns extending 6-10 feet in length were observed only on slopes of 6% or greater and were disconnected. A few pedestals were observed, only on slopes greater than 6 percent. There are a few broad terracettes. Transect data determined bare ground to be 13 percent and litter cover to be 64 percent; this is in part due to the presence of cheatgrass. Few large bare areas were observed. The amount of bare ground is within the guidelines described in the reference sheet. The amount of litter is also within the guidelines described in the reference sheet, although it is at the high end of the guidelines, primarily due to the amount of cheatgrass present. No gullies or active headcuts were observed. Some minor wind-scour was observed along a two-track trails; this was not extensive. Slight litter movement was observed on slopes over 6%. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 4.2. Biological soil crusts did not show up as hits along the transect, but were observed on the site. When the SSI is combined with vegetation and litter cover, the soil is stable and resistant to rain drop impact and to the erosive force of overland flow. The excessive amount of litter attributed to cheatgrass is reducing the infiltration somewhat. A shallow A horizon was observed, indicative of some historic soil loss. Good vigor, composition, and production of perennial grasses were observed, although the amount of cheatgrass is excessive. The plant community composition is adequate to facilitate infiltration and reduce runoff. No soil compaction was observed.

Monitoring Site 2

Rill formation was not observed. Water-flow patterns were short and disconnected, extending less than 3 feet in length. Pedestals up to 3 inches, and 6 to 8 inch terracettes were observed; both of these erosion indicators are stable. Transect data determined bare ground to be 4 percent and litter cover to be 69 percent. Despite the presence of cheatgrass, much of the litter is composed of perennial grass species. The amount of bare ground is less than described in the reference sheet. The amount of litter is within the guidelines described in the reference sheet, although it is at the high end of the guidelines. Some broad,

narrow swales were observed in the “very shallow” ecological sites. No wind scour or blows-out areas were observed. A few litter dams were observed on slopes greater than 8 percent. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 4.5. Biological soil crusts did not show up as hits along the transect, but were observed on the site. When the SSI is combined with vegetation and litter cover, the soil is stable and resistant to rain drop impact and to the erosive force of overland flow. A 2-4 inch A horizon was observed, with no indication of soil surface loss or degradation. Good vigor, composition, and production of perennial grasses were observed, although the amount of cheatgrass is excessive. The plant community composition is adequate to facilitate infiltration and reduce runoff, though cheatgrass could be reducing infiltration. No soil compaction was observed.

Based on the observations made at the two monitoring sites, the attribute rating for *Soil and Site Stability* was rated as “None to Slight” and *Hydrologic Function* were rated as “Slight to Moderate”.

4.0 Conclusions

This section draws conclusions and makes determinations regarding:

- A. Progress towards or attainment of the standards for rangeland health, and
- B. Whether livestock management is in conformance with the guidelines, and
- C. Whether existing grazing management or levels of grazing use are significant factors in failing to achieve the standards or conform to the guidelines.

Background

A Wyoming Rangeland Standards Conformance Review was completed on the allotment in 2000. During this review, it was determined that the rangeland resources in the Rim Allotment were not meeting Standard 3 (Upland Vegetation). Poor suitability due to lack of water and continuous growing season livestock use were cited as the primary reasons why Standard 3 was not being met. In response to this Conformance Review, changes in the permitted livestock grazing on the allotment were made. Livestock grazing use during the growing season was eliminated, and now occurs only during the fall and winter months when rangeland plants are dormant. Monitoring data and allotment observations indicate that resource conditions on the allotment have improved significantly since that time. Current observations indicate that while the amount of cheatgrass present on the allotment is still excessive, perennial grasses exhibit high vigor and good seed production. Soils are stable, and erosion indicators are minimal.

4.1 Standard 1

Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff. MET

Rationale:

The attribute ratings for *Soil and Site Stability* were rated as “None to Slight” at both monitoring sites. The attribute rating for *Hydrologic Function* was rated as “Slight to Moderate” at both monitoring sites. The departure between the two attribute ratings was due to the presence of cheatgrass potentially limiting the amount of infiltration. The soil surface is stable and does not readily slake or disperse in water. Vegetative and litter cover are adequate to protect the soil from rain drop impact and the erosive forces of overland flow. Water erosion indicators (waterflow patterns, pedestals, terracettes, and litter movement) indicate minimal active erosion; where such indicators are present they are stable. No gullies were observed. The shallow soil pits indicates that there could have been some historic soil loss. Current observations are that the soils are stable and the cover components of the vegetative communities are continuing to improve. These same excavations did not reveal evidence of soil compaction.

4.2 Standard 2

Riparian and wetland vegetation has structural, age and species diversity characteristic of the state of channel succession and is resilient and capable of recovering from natural and human

disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide ground water recharge. MET

Rationale:

In total there are 1.27 miles of perennial and intermittent stream segments in the allotment. The segments all were rated either functioning at risk with an upward trend, or at proper functioning condition.

Alkali Creek – There has been a minor infestation of Tamarisk and Hounds Tongue specifically along Alkali Creek. The majority of the creek has adequate cover with stable banks and sufficient riparian vegetation in place for stability. The riparian segments are all providing for the benefits as outlined in Standard 2.

Old Maid Gulch/Canyon Creek – Old Maid Gulch and Old Maid Gulch Spring contain topography with steep gradients, bedrock outcrops, and narrow canyons that provide shelter for the riparian habitat and are unlikely to be significantly impacted from grazing. There is past evidence of minor livestock and wildlife trails along the creek, however the riparian segments are all providing for the benefits as outlined in Standard 2.

4.3 Standard 3

Upland vegetation on ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance. MET

Rationale:

Data collected at the two monitoring sites in the allotment included vegetative cover transects and a Rangeland Health Assessment using the 17 Indicators of Rangeland Health. This data shows that while the amount of cheatgrass present contributes to a reduction in the overall *Biotic Integrity* of the sites, the indicators (vegetative cover, plant composition, diversity and vigor, bare ground & litter, and erosion indicators) are appropriate for the ecological sites found on the allotment. Overall, the biotic community is stable and intact.

4.4 Standard 4

Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced. MET

Rationale:

As documented in the above Section 3.2 – Upland Vegetation, and Section 3.3 – Soils and Site Stability, the soils and vegetation of the Rim Allotment are adequate to provide forage and cover needs of native wildlife species. There are some areas with an excessive amount of cheatgrass, and the broken terrain is not suitable for some species, but overall the allotment is very productive of numbers and variety of wildlife species.

There are no active sage-grouse leks identified in this allotment. The terrain is simply unsuitable. Sage-grouse use is limited to the occasional “lost” or strayed bird passing through. There are no prairie dog towns, and except for a small area in the south-west corner of the allotment, soils/geology are unsuitable for any prairie dog colonization. As stated earlier, although they have not been documented, the sage thrasher, Brewer’s sparrow and loggerhead shrike are three BLM sensitive species that are common residents of other similar sagebrush communities. The only other BLM sensitive species likely to occur within this allotment is the ferruginous hawk. An inventory of the allotment for nesting raptors found only a single red tail hawk nest on a rocky cliff face along Alkali Creek. No other raptor nests were found in the allotment.

Other wildlife species; deer, elk, pronghorn, passerines, raptors, predators, rodents, and riparian/aquatic species are apparently sustaining their populations to the limits imposed by the available habitats.

4.5 Standard 5

Water quality meets State standards. UNKNOWN

Rationale:

The available data from the USGS does give some baseline general water quality data directly downstream or in the allotment. The Wyoming Department of Environmental Quality (WYDEQ) has not listed any of these segments as impaired on the *DEQ 2010 305b Water Quality Assessment Report*. Alkali Creek is not rated by the WYDEQ for any specific use classification, due to the small size and limited extent and is therefore unknown.

Big Canyon Creek and its tributary Old Maid Gulch are considered by the WYDEQ as a Class 2AB stream that is defined as “*those known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries adjacent wetlands and where a game fishery and drinking water use in otherwise attainable.*” These can be either cold or warm water fisheries. The designated use support determination study completed by the WYDEQ listed Canyon Creek as indeterminate for meeting the use classification as explained in Section 3.1.

Many studies have documented the effects of livestock grazing on riparian vegetation and soil erosion rates, but few studies have directly assessed impacts on water quality (Binkley, 1993). The streams are currently appearing to be in balance with the watershed and any water quality indicators would be within state limits. Potential management impacts to water quality from rangelands as outlined in Binkley, 1993 such as: excessive livestock waste production, resource extraction, stream channel modification, bank erosion from floods, accelerated erosion following wildfires, or erosion from overgrazing in uplands are not apparent in this allotment.

4.6 Standard 6

Air quality meets State standards. UNKNOWN

Rationale:

No information is currently available to indicate that this standard is or is not being met. An air quality monitoring station was recently established in the Bighorn Basin, but no monitoring data is available at this time. Until specific data becomes available, the determination for this standard is UNKNOWN, per direction from the BLM Wyoming State Office.

5.0 Resource Specialist Signatures

4/19/2011

4/19/2011

X Cam Henrichsen

Cameron Henrichsen
Rangeland Management Specialist

4/19/2011

X Mike Tietmeyer

Mike Tietmeyer
Supervisory Rangeland Management Specialist

4/19/2011

X Chet Wheelless

Chet Wheelless
Wildlife Biologist

4/19/2011

X C. J. Grimes

C. J. Grimes
Natural Resource Specialist, Weed Coordinator

4/19/2011

X Jared Dalebout

Jared Dalebout
Hydrologist

4/19/2011

X Mike Phillips

Michael J. Phillips
Assistant Field Manager - Resources

X Steve Kiracofe

Steve Kiracofe
Natural Resource Specialist, Soils

X

Other _____

6.0 DETERMINATION

Based on the information provided in this assessment, ***I have determined that all standards ARE being met, with the exception of Standard 5, Water Quality, and Standard 6, Air Quality, which are determined to be UNKNOWN. Current livestock grazing IS in conformance with the standards.***

4/19/2011

X Mike Valle

Michael Valle
Acting Field Manager, Worland Field Office

Based on the information provided in this assessment, ***I have determined that all of the standards ARE NOT being met but that livestock grazing IS in conformance with the standards.***

X

Michael Valle
Acting Field Manager, Worland Field Office

Based on the information provided in this assessment, ***I have determined that all of the standards ARE NOT being met and that livestock grazing IS NOT in conformance with the standards.***

X

Michael Valle
Acting Field Manager, Worland Field Office

7.0 REFERENCES

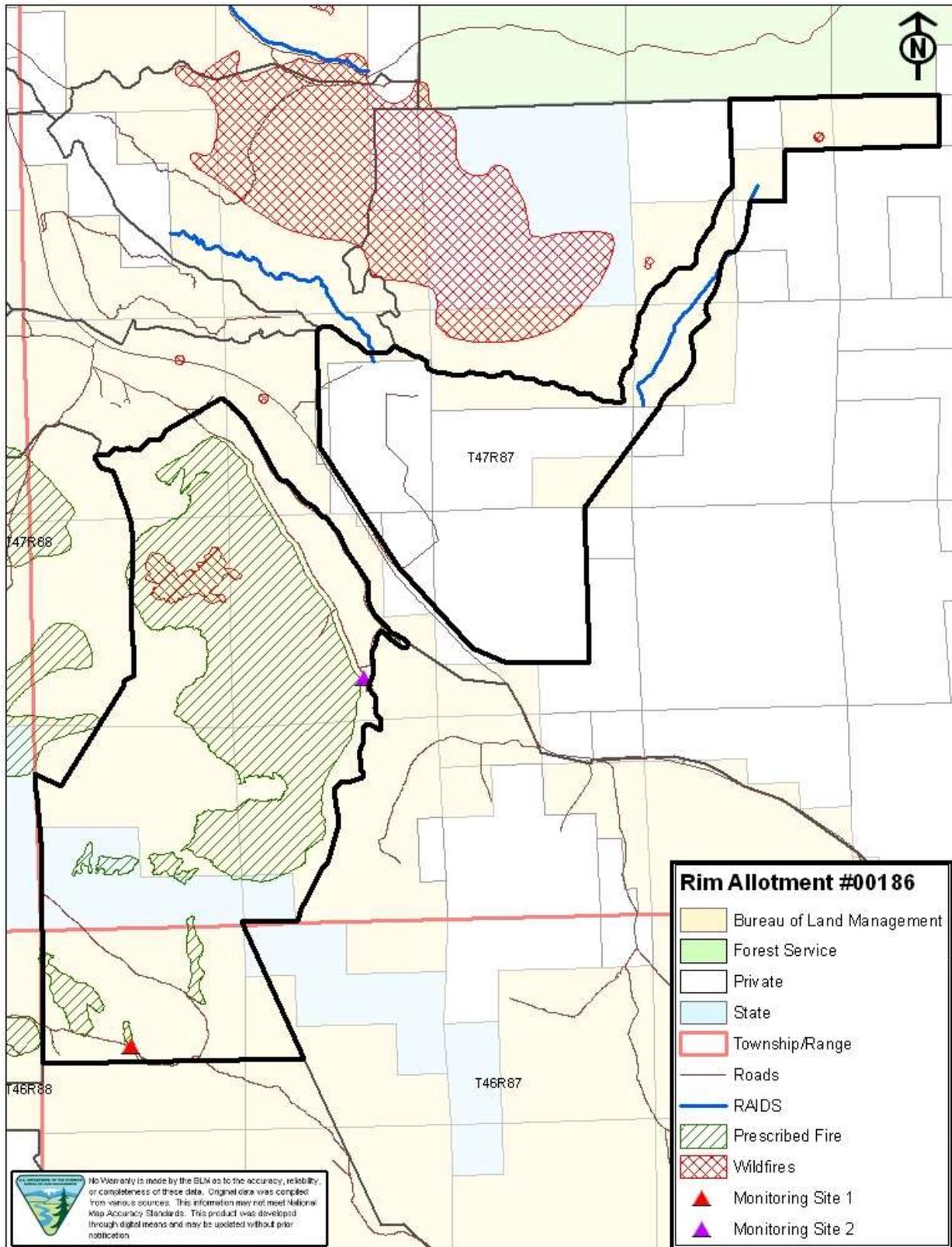
Binkley, D., Brown, T. 1993. Management Impacts on Water Quality of Forests and Rangelands. USDA Forest Service. General Technical Report RM-239, pp 5-6.

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

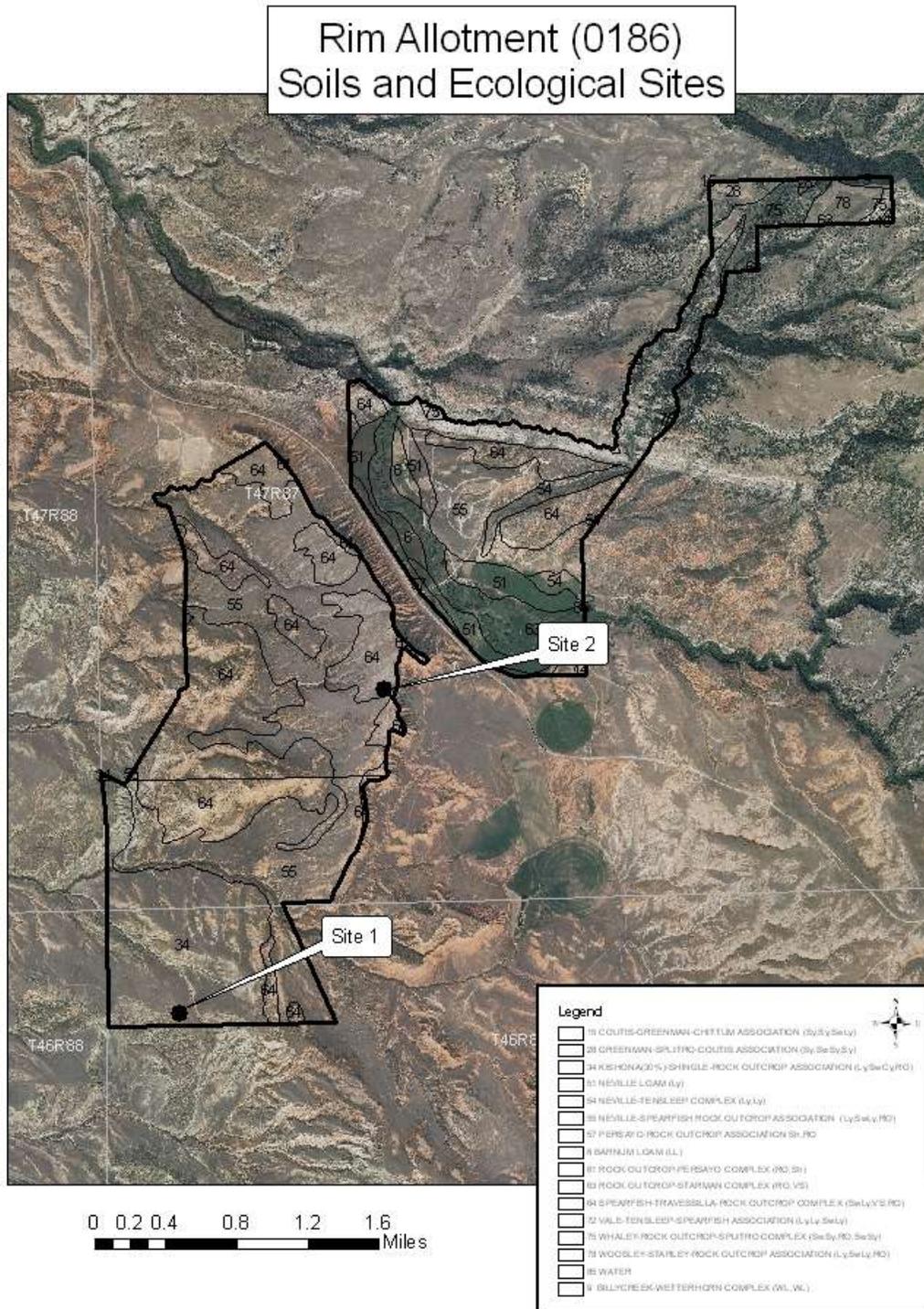
Rosgen, D.L. 1994. A classification of natural rivers. Catena, Vol. 22. pp 169-199.

WYDEQ, 2010. Water Quality Condition and Designated Use-Support Determination for Canyon Creek, Big Horn River Basin, 2007 and 2009.

Map 1: Allotment Map



Map 3: Soils and Ecological Sites (Not to Scale)



PHOTOS

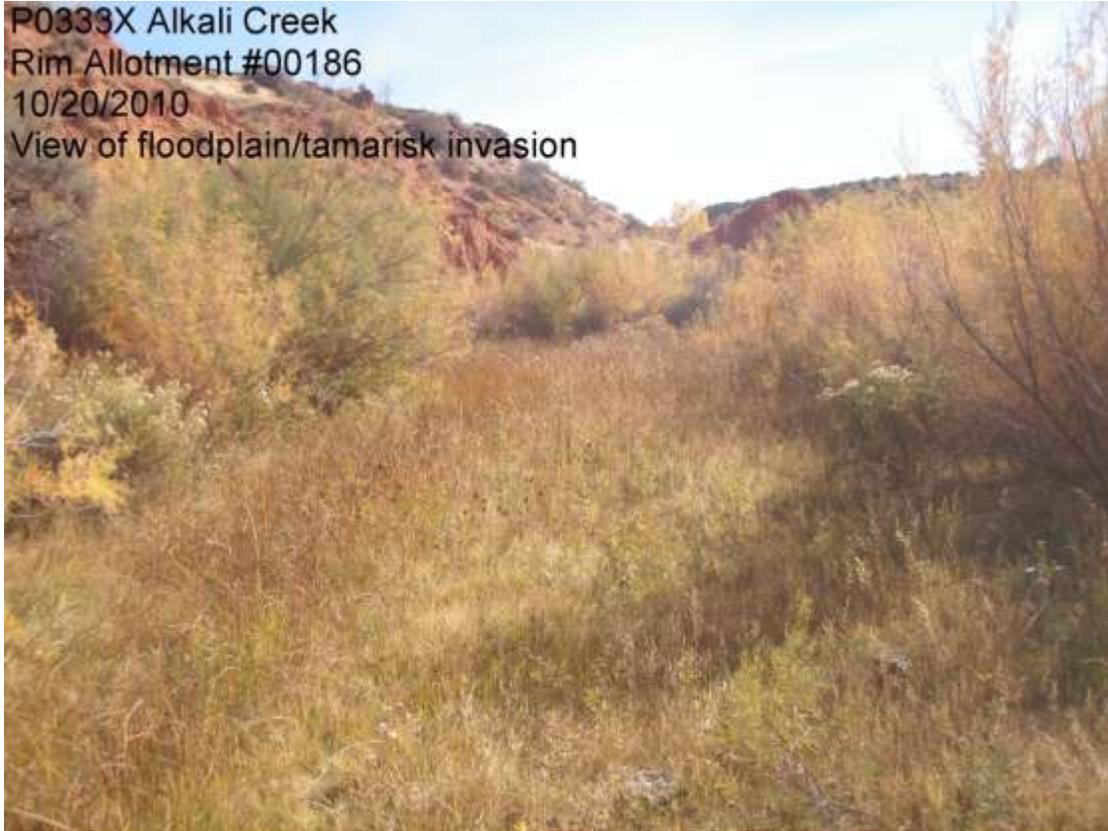
Rim Allotment #00186
Monitoring Site 1
08/05/10



Rim Allotment #00186
Monitoring Site 2
08/05/10

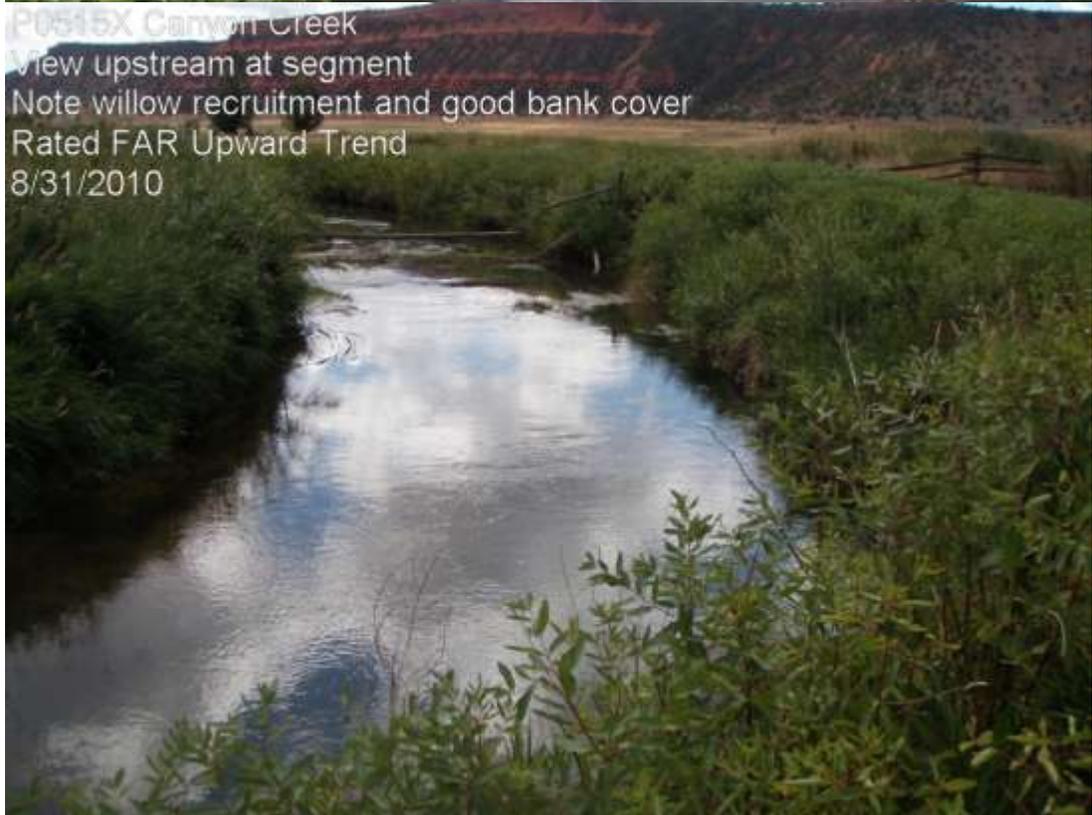


P0333X Alkali Creek
Rim Allotment #00186
10/20/2010
View of floodplain/tamarisk invasion



P0333X Alakii Creek
10/20/2010
Overview of segment looking north







I0001X
Old Maid Spring- Below Spring looking up@ cabin
44.040613-107.298486
9/9/2010
Rated_PFC



I0001X Old Maid Spring
View from top of spring
9/9/2010
Rated PFC

