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

Kimball Allotment No. 00009

March 2011

BLM

Worland 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 Kimball Allotment No. 00009. 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 Kimball Allotment is located approximately 3 miles south-west of Tensleep, WY. The allotment encompasses approximately 9,700 acres, with approximately 6,400 acres of public land, and 3,300 acres of uncontrolled private and state lands (Map 1). The uncontrolled private lands are patented bentonite mining claims. 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.

Table 1 – Watersheds

Watershed (HUC) Level #6	Acres (mi^2)	Acres (mi^2) Within Allotment	% of Acres of Watershed in the Allotment
Nowood River-Joe Emge Creek-100800080305	33,627 (52.5)	7744 (12.1)	23.0
Nowood River-Bud Kimball Creek 100800080304	27,535 (43.0)	2048 (3.2)	7.4

These watersheds are located in the Nowood River watershed and are located west of the Nowood River. The drainages trend in a northeastern direction through the allotment to confluence with the Nowood River just east of the allotment (Map 2). The allotment contains 23 percent of the Joe Emge watershed, and a minor portion, 7.4 percent, of the Bud Kimball Creek watershed. These watersheds are located over a complex sequence of Cretaceous aged outcrops that contain extractable amounts of Bentonite clay minerals. The area is located in a highly erosive area with high amounts of runoff and very low permeability due to very fine grained geologic outcrops along with steeper slopes. The watersheds in the allotment have varying degrees of slope with steep sections throughout the allotment. These watersheds have a high drainage density that is indicative in low precipitation areas that are common throughout Wyoming and in the Bighorn Basin.

Joe Emge and Bud Kimball Creek have ephemeral and intermittent flow regimes, depending on climatic precipitation received during the year, with flow in the channel 10-80% of the year. Other larger sub-watersheds west of the Nowood River have intermittent flow regimes with flow in the channel 10-80% of the year. Many smaller drainages are considered ephemeral with flow in the channel <10% of the year, as determined from a thirty year average (Hedman, 1982).

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 runoff with minor amounts of base flow most likely occurring during the wetter spring months. There are approximately 8 old reservoir impoundments as estimated from BLM GIS data coverage, along ephemeral drainages as shown in Map 2. These reservoirs generally capture marginal amounts of runoff in the spring, and from summer thunderstorm events. Of the eight reservoirs, three were found to be viable water sources and had water during the summer of 2009 as estimated from digital aerial photography.

2.3 Climate/Air Quality

Elevation in the allotment ranges from 4,500 feet to 4,900 feet above sea level. The allotment is considered to be in the transition area between the 5-9 inch precipitation zone, and the 10-14 inch precipitation zone. The average annual precipitation collected at the BLM Bud Kimball rain gauge, located 4 miles west of the allotment, is approximately 9 inches. The average annual precipitation collected at the BLM Spring Creek rain gauge, located 6 miles south-east 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:

	Minimum	Maximum	5 yrs. out of 10 between
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, shale and/or mixed alluvium), position on the landscape, slope and aspect. Soil depth ranges from a few inches to over 60 inches. These soils are typified by a light brown surface layer. Surface textures are very fine sandy loams, fine sandy loams, clay loams, loams, sandy clay loams, and silty clay loams. 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, but are generally less than 40 percent.

The Kimball Allotment sits on the break between the 5 to 9 inch precipitation zone (pz) and the 10 to 14 inch precipitation zone. This is reflected in the soil mapping and the ecological sites assigned to the various soil map units. The ecological sites found in the in the allotment are listed below:

Loamy 10-14 in. pz.	R032XY322WY
Clayey 10-14in. pz.	R032XY304WY
Shallow Clayey 10-14 in. pz.	R032XY358WY
Lowland 10-14 in. pz.	R032XY328WY

Sandy 10-14 in. pz.	R032XY350WY
Saline Upland 10-14 pz	R032XY344WY
Saline Lowland 10-14 in. pz.	R032XY338WY
Shale 5-9 in. pz.	R032XY154WY
Loamy 5-9 in. pz	R032XY122WY
Saline Upland 5-9 in. pz.	R032XY144WY
Sandy 5-9 in. pz.	R032XY150WY
Lowland 5-9 in. pz.	R032XY128WY

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 22 – Forkwood-Haverdad-Arvada Association. Soils at this location are very similar to the Forkwood loam soil series. The second assessment was also conducted in Map Unit 22 – Forkwood-Haverdad-Arvada Association. The soils at this location again are very similar to the Forkwood loam soil. The ecological site at both locations is a Loamy 10-14 in. pz. Refer to Map 3 - Soils 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. Salt Desert Shrub and Salt Bottom Communities are predominately found on saline upland and saline lowland sites. These sites are dominated by Gardner's saltbush *(Atriplex gardneri)*, bottlebrush squirreltail *(Sitanion hystrix)*, Sandberg bluegrass *(Poa secunda)*, and Indian ricegrass. Cheatgrass *(Bromus tectorum)* is common on all range sites throughout the allotment. No known threatened or endangered plant species have been documented in the allotment.

2.6 Invasive Species

The primary noxious weed species documented to exist within the allotment is saltcedar. Russian olive also occurs but to a lesser degree. Infestations are primarily occurring around existing reservoirs and streams. Five of the eight mapped reservoirs are on BLM-managed land, one is on private land and two are on state land. The current level of infestation of these species is not significantly impacting native vegetation; however the potential for their rapid spread exists. The Washakie County Weed and Pest District has been consulted and is willing to participate in a control program for saltcedar in the area. Cheatgrass occurs across the allotment in varying abundances. In areas that have recently burned, it is the dominant herbaceous vegetation, but it is a minor component in relatively undisturbed areas. The winter grazing strategy being currently utilized may be helping the native perennial grasses and forbs compete with the cheatgrass.

2.7 Range

The Kimball Allotment is a common use allotment with 2 livestock grazing permits. A total of 812 animal unit months (AUMs) of livestock grazing use are permitted on the public land, during the fall and winter months. Livestock grazing use is permitted as shown below in Table 2:

Table 2 – Permitted Livestock Grazing

Permittee	No. & Kind of Livestock	Permitted Use Period	Percent Public Land	AUMs
Anderson Ranch Co. (ls. Clay)	904 Sheep*	11/01-02/28	100%	713
Dale & Cynthia Bodtke	25 Cattle	11/01-02/28	100%	99

* Livestock grazing use on the Anderson Ranch Co. permit may be made by sheep, cattle, or a combination of sheep and cattle, as long as the permitted AUMs are not exceeded.

Livestock Grazing History

Historically, the Kimball Allotment was grazed during the growing season. The grazing permit held by Dale and Cynthia Bodtke permitted sheep grazing during the month of May. It was changed to fall-winter sheep grazing in

1988, and then to fall-winter cattle grazing in 1999. The grazing permit currently held by Anderson Ranch Co. (this permit was acquired by Anderson Ranch Co. in 2002) historically permitted 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 Kimball Allotment were not meeting Standard 1 (Soils), Standard 3 (Upland Vegetation), and Standard 4 (Wildlife Habitat). Long-term historic growing season livestock use was cited as the reason why the Standards were not being met.

In 2001, in response to the Rangeland Standards Conformance Review, one-half of the livestock grazing use on the permit currently held by Anderson Ranch Co. 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. In 2007, the permit was changed to allow grazing by a combination of sheep or cattle in the fall and winter.

2.8 Wildlife

Habitat within the allotment is suitable for a wide variety of wildlife species (Map 4). The eastern fringe of the allotment, which roughly parallels Nowood Creek, is designated as crucial big game winter habitat for muledeer. The majority of the allotment is designated as winter yearlong habitat for pronghorn antelope. Sagebrush and cool season grasses dominate the vegetative community with a significant component of cheatgrass understory. The habitat is characteristic of that which is capable of sustaining large ungulate species such as elk, muledeer, and pronghorn, as well as a variety of small mammals, predators, passerines, and raptors.

2.9 Threatened, Endangered, Candidate, or Sensitive Species

No threatened or endangered wildlife species are known to utilize the habitat on the Kimball allotment. Sage-grouse, a candidate species, are known to inhabit the allotment. One occupied sage-grouse lek (Joe Emge Creek 4) exists within the allotment boundary. A small portion of the allotment lies within a designated sage-grouse core habitat area. More than half of the allotment lies within the two-mile buffer zone of occupied sage-grouse leks within the allotment or nearby. 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.

3.0 Summary of Monitoring Data / Assessments

3.1 Hydrology

3.1.1 Riparian

The drainages on public land were assigned BLM RAIDS ID # (E0320X) for monitoring of watershed function and riparian habitat. The segments within the allotment are shown on Map 2. The segment totaling 2.05 miles located on public land along Bud Kimball Creek (2007E0320X) was evaluated in the field by an interdisciplinary team for this assessment on September 13, 2010. It was 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.

One other segment, I0704X, was previously evaluated in 2000, and classified as intermittent. The classification of this segment was changed to ephemeral from this evaluation, with sagebrush in the channel and no other free water available with minimal pockets of facultative wetland species present. Drier climatic conditions and other impacts from bentonite mining in the Joe Emge watershed may have caused a change to an ephemeral flow regime in the last ten years. This has likely created higher amounts of runoff from disturbance associated with haul roads and open pit surface mining that has occurred on mostly private and minor amounts of BLM land within the watershed. There have also been numerous wildfires in the allotment that have caused areas surrounding the fires to be temporarily degraded due to loss of canopy and other cover immediately following the fires along with a change in vegetative

cover with cheatgrass becoming a significant component, as identified in the monitoring transects. The overall rating for the upland hydrologic indicators was a slight to moderate departure from reference state conditions.

The flow from these segments originates as surface flow from runoff with minor amounts of base flow most likely occurring during the wetter spring months. There are eight old reservoir impoundments as estimated from BLM GIS data coverage, along ephemeral drainages as shown in Map 2. These reservoirs generally capture marginal amounts of runoff in the spring, and in response to summer thunderstorm events. Of the eight reservoirs, three were found to be viable water sources and had water during the summer of 2009 as estimated from digital aerial photography (Map 2). Of the three reservoirs, one is located on private land, one on BLM land, and one on State land; all were in good ecological condition with a healthy canopy of Cottonwood trees along with other obligate wetland rushes and sedges around the perimeter of the reservoirs. There are no water wells or other oil and gas wells present in the allotment.

Table 3 – PFC Evaluation Summary

BLM ID#	Riparian Area	(mi)	Water Type	Date Monitored	Gradient (%)	Rosgen Class	Function	Trend	Rating Scale
E0320X	Bud Kimball Creek	2.05	Intermittent	9/13/2007	2.0	G&C	PFC	N/A	10
I0704X	Joe Emge Creek	0.68	Ephemeral	9/10/2007	2.0	G	Not rated	N/A	N/A
Total:		2.73		100% PFC					

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
E0320X	3. Segment switches between defined channel in upper reaches where it is confined by landform.. to broad swale where bed load is deposited. 3. Lower portion again has defined swale with riparian species 6-7. Lower portion of segment only. 8-9.Lower portion of segment only. 15. Upper part confined by land form. 16. Head cuts and base pool areas sharp 90 degree meanders.	All observations reflect 6 years of drought, system exhibits a very flashy nature with multiple tributaries, mud ripples and debris piles. Ruts in center of segment intercept flow. If not for riparian wetland species at lower end would be classified as ephemeral. Lower elevation Badland segment rated PFC due to its capability, functioning rather well.

3.1.2 Water Quality

There has been no BLM or other agency water quality data taken from the allotment. 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). Potential management impacts to water quality from rangelands as outlined in Binkley, 1993 are: excessive livestock waste production, resource extraction, stream channel modification, bank erosion from floods, erosion following wildfires, or erosion from overgrazing in uplands. Of these potential impacts the greatest impact occurring in the allotment that would likely cause degradation of water quality is the extensive bentonite mining that occurs in the area. This would likely cause increased turbidity in the Nowood River downstream during or following times of runoff. The exact amounts are not known at this time.

3.2 Upland Vegetation

Very little historical vegetation monitoring data has been collected on the Kimball 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 vegetation 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. Map 1, which illustrates 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:

Table 5 – Vegetation Monitoring Data						
Monitoring Site	Ecological Site	Basal Vegetative Cover	Litter	Bare Ground	Vegetative Canopy Cover	
					Sagebrush	Cheatgrass
1	Loamy 10-14"	21%	62%	14%	16%	19%
2	Loamy 10-14"	19%	64%	13%	22%	23%

In addition to the cover data illustrated above, a Rangeland Health Assessment was conducted in each monitoring site by an interdisciplinary team on 8/18/2010 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.

Table 6 – Rangeland Health Indicators		
Indicator	Departure from Reference Sheet	
	Site 1	Site 2
1. Rills	N-S	N-S
2. Water-flow patterns	N-S	S-M
3. Pedestals and/or terracettes	S-M	S-M
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	N-S
8. Soil surface resistance to erosion	N-S	N-S
9. Soil surface loss or degradation	N-S	S-M
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	S-M
14. Litter amount	S-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 Kimball 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 transition 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, transitioning the site to a *Big Sagebrush/Bare Ground Plant Community*. If fire is present to remove the sagebrush, the site can transition to a *Blue Grama Sod Plant Community*. In areas with more saline soils, the plant community can transition 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 Kimball Allotment. In Monitoring Site 1, cool season perennial grasses comprise 29% of the basal vegetative cover. In Monitoring Site 2, these species comprise 26% of the basal

vegetative cover. While areas of blue grama and Sandberg bluegrass can be found in parts of the allotment, particularly in close proximity to water sources and historic sheep bedground areas, they are not the dominant species. The cool season perennial grasses in both monitoring locations exhibit good vigor and seed production.

The primary vegetative component affecting rangelands in the Kimball Allotment is the presence and abundance of cheatgrass. Cheatgrass accounted for 19% of the total ground cover at Monitoring Site 1, and 23% of the total ground cover at Monitoring Site 2. The high percentage of cheatgrass also contributes significantly to the high amount of litter 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

Date collected at the monitoring sites during the Rangeland Health Assessment was also used to evaluate soil and site stability on the 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.

<u>Monitoring Site 1</u>

Rill formation was not observed. Water-flow patterns were few in number and were less than 3 feet in length and disconnected. One inch pedestals were common, particularly beneath the biological soil crusts. Transect data determined bare ground to be 14 percent and litter cover to be 62 percent, due in part to the presence of cheatgrass. Bare ground is evenly distributed and does not exceed 3 feet in diameter. Both bare ground and litter are within the guidelines described in the reference sheet. No gullies or active headcuts were observed. No wind scour or blows-out areas were observed. Litter movement is restricted to well defined drainages. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 5.3. Biological soil crusts made up 3% of the observed cover. 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 A horizon is 6 inches deep; this could be due to the swale position where the soil was examined thus reflecting that this is a depositional environment. The plant community composition is lacking in mid-stature grasses, with 19% of the vegetative cover made up of cheatgrass. However, it is adequate to facilitate infiltration and reduce runoff. No soil compaction was observed.

<u>Monitoring Site 2</u>

Rill formation was not observed. Water-flow patterns were disconnected, extending 8 to 10 feet in length and terminating at deposition areas. Three to four inch pedestals are common at the base of sagebrush while the biological soil crusts have 3 inch pedestals. All indications are that pedastalling is not an active process. Transect data determined bare ground to be 13 percent and litter cover to be 64 percent, due in part to the presence of cheatgrass. Bare ground is evenly distributed and does not exceed 3 feet in diameter. Both bare ground and litter are within the guidelines described in the reference sheet and are adequate to maintain hydrologic function, although the amount of litter is at the high end of the guidelines, primarily due to the amount of cheatgrass present. No gullies or active headcuts were observed. No wind scour or blows-out areas were observed. Nominal litter movement was observed, with some accumulation where water flow patterns terminated. The soil stability index (SSI), an indicator of the soil surface resistance to erosion, was 5.5. Biological soil crusts made up 1% of the observed cover. 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 shallow A horizon was observed, indicative of some historic soil loss, although currently stable. The plant community composition is lacking in mid-stature grasses, with 23% of the vegetative cover made up of cheatgrass. However, it is adequate to facilitate infiltration and reduce runoff. No soil compaction was observed.

Based on the observations made at the two monitoring sites, the attribute rating for *Soil and Site Stability* 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 Kimball Allotment were not meeting Standard 1 (Soils), Standard 3 (Upland Vegetation), and Standard 4 (Wildlife Habitat). It was noted that perennial grasses on the allotment were low in vigor and production, the amount of cheatgrass was excessive, soils were unstable, and erosion was excessive. Long-term historic growing season livestock use was cited as the reason why the Standards were 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* and *Hydrologic Function* were rated as "Slight to Moderate" at both monitoring sites. Overall 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 minor levels of active erosion. Where they are present, erosion indicators are minimally developed and stable. No gullies were observed. The shallow soil pits indicates that there could have been some historic soil loss. Soil loss at this magnitude is no longer occurring. 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:

Bud Kimball Creek (E0320X) – *MET*

The creek was rated to be in proper functioning condition (PFC) according to the BLM assessment that was performed during the field visit. The segment is providing for forage and cover and has been resilient to

withstand human and livestock impacts. There has been a previous problem with invasive plants such as salt cedar in the watershed that has been problematic but not extensive throughout the riparian area. The segment was sprayed for salt cedar in the summer of 2007. This riparian area and upland watershed has not received the impacts from bentonite mining and wildfires like the Joe Emge watershed in the allotment.

Joe Emge Creek – *Not Applicable*
Drier climatic conditions and other impacts from bentonite mining in the Joe Emge watershed may have caused a change to an ephemeral flow regime in the last ten years. This has likely created higher amounts of runoff from disturbance associated with haul roads and open pit surface mining that primarily has occurred on mostly private and minor amounts of BLM land within the watershed. There have also been numerous wildfires in the allotment that have caused areas surrounding the fires to be temporarily degraded due to loss of canopy and other cover immediately following the fires along with a change in vegetative cover with cheatgrass becoming a significant component, as identified in the monitoring transects. The overall rating for the upland hydrologic indicators was a slight to moderate departure from reference state conditions.

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:
Despite encroaching cheatgrass understory within the allotment, the sagebrush and perennial grass dominated wildlife habitat remains capable of sustaining diverse wildlife species on a year round basis, with wildlife population concentrations likely during breeding and wintering seasons of utilization. Muledeer are known to be abundant in the allotment during the winter months, and sage-grouse have been regularly observed and recorded during breeding activity over a period of years. From three to fifteen male birds have been recorded per day on the Joe Emge Creek 4 lek in the last four to five years during the spring breeding season. Sage-grouse sign present during summer season monitoring transects indicated winter season of use as well as those that were observed during performance of the transects. The allotment is likely providing nesting and early brood rearing habitat for sage-grouse as well. Additional wildlife species present were pronghorn, muledeer, lark bunting, numerous grassland passerines, and raptors.

Live sagebrush canopy cover transects performed during the growing season of 2010 indicated a percent cover from 10% to 15% at wildlife transect locations, and a range of height from 5 to 25 inches. Additional vegetation species observed were needle-and-thread, slender wheatgrass, bluebunch wheatgrass, snakeweed, sand wort, toad flax, allysum, prickly pear cactus, hawks beard, bottlebrush squirreltail, and salsify. Ongoing observations of numerous plant and wildlife species recorded within the allotment, in addition to recent livestock grazing management changes, support its capability to sustain viable populations of diverse wildlife species appropriate for the habitat.

4.5 Standard 5

Water quality meets State standards. ***UNKNOWN***

Rationale:

The only drainage large enough for a use classification by the Wyoming Department of Environmental Quality is Bud Kimball Creek. Bud Kimball Creek is classified as a Class 3B water in the State of Wyoming, defined below as:

> *Class 3B waters are tributary waters, including adjacent wetlands that are not known to support fish populations or drinking water supplies and where those uses are not attainable. Class 3B waters are intermittent and ephemeral streams with sufficient hydrology to normally support and sustain communities of aquatic life, including invertebrates, amphibians, or other flora and fauna that inhabit waters of the State at some stage of their life cycles.*

There is no BLM, USGS, or other state agency water quality data available for these segments. Therefore compliance with Wyoming State Water Quality Standards is unknown, but nothing within available data indicates Standard Number 5 is not being met.

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

X

Cameron Henrichsen
Rangeland Management Specialist

X

Mike Tietmeyer
Supervisory Rangeland Management Specialist

X

Ted Igleheart
Wildlife Biologist

X

CJ Grimes
Natural Resource Specialist, Weed Coordinator

X

Jared Dalebout
Hydrologist

X

Michael J. Phillips
Assistant Field Manager - Resources

X

Steve Kiracofe
Natural Resource Specialist, Soils

X

Other_____

6.0 DETERMINATION

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

X

Michael J. Phillips
Acting Field Manager, Worland Field Office

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

X

Michael J. Phillips
Acting Field Manager, Worland Field Office

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

X

Michael J. Phillips
Acting Field Manager, Worland Field Office

7.0 REFERENCES

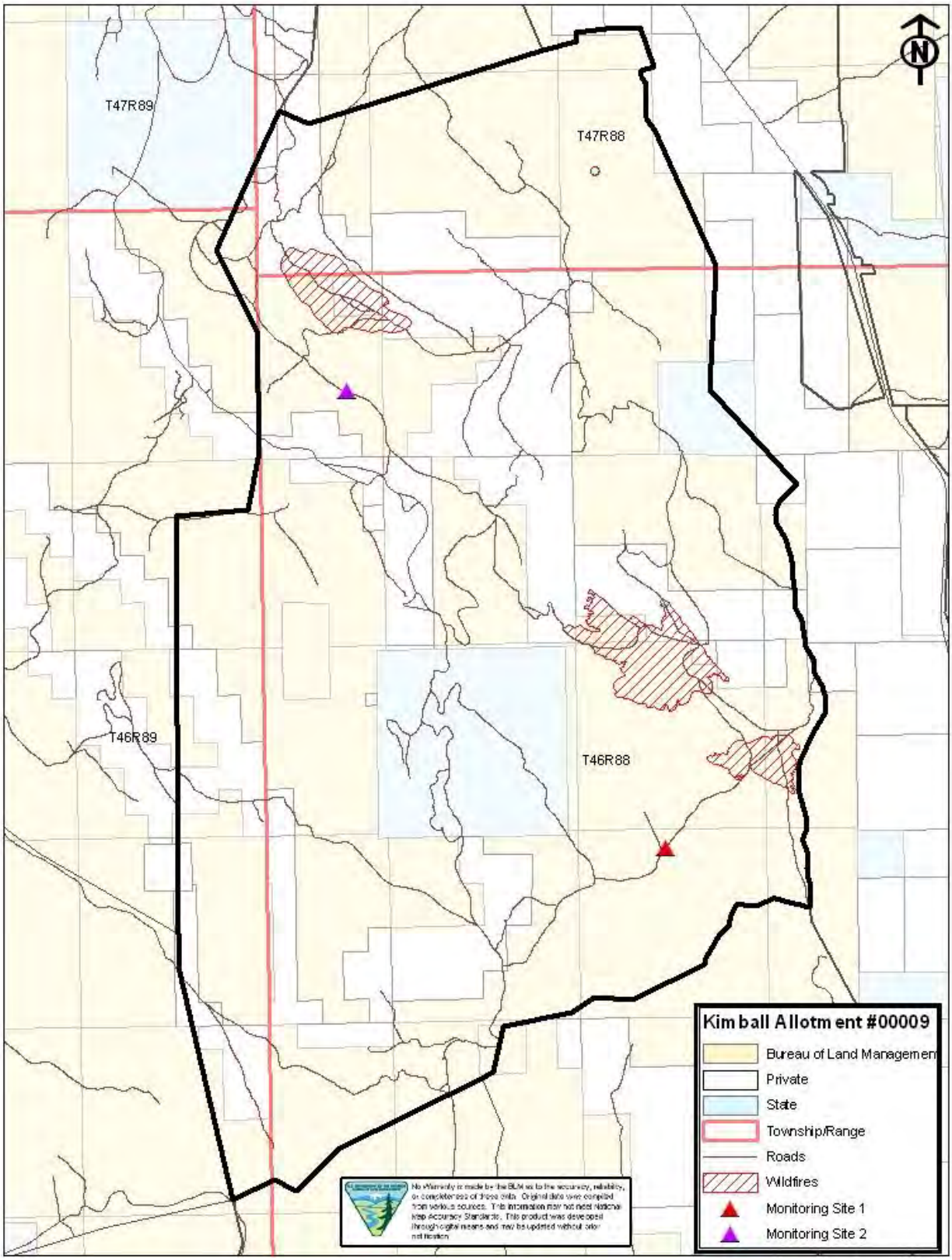
Binkley, D., Brown, T. 1993. Management Impacts on Water Quality of Forests and Rangelands. USDA Forest Service. General Technical Report RM-239, pp 5-6.

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

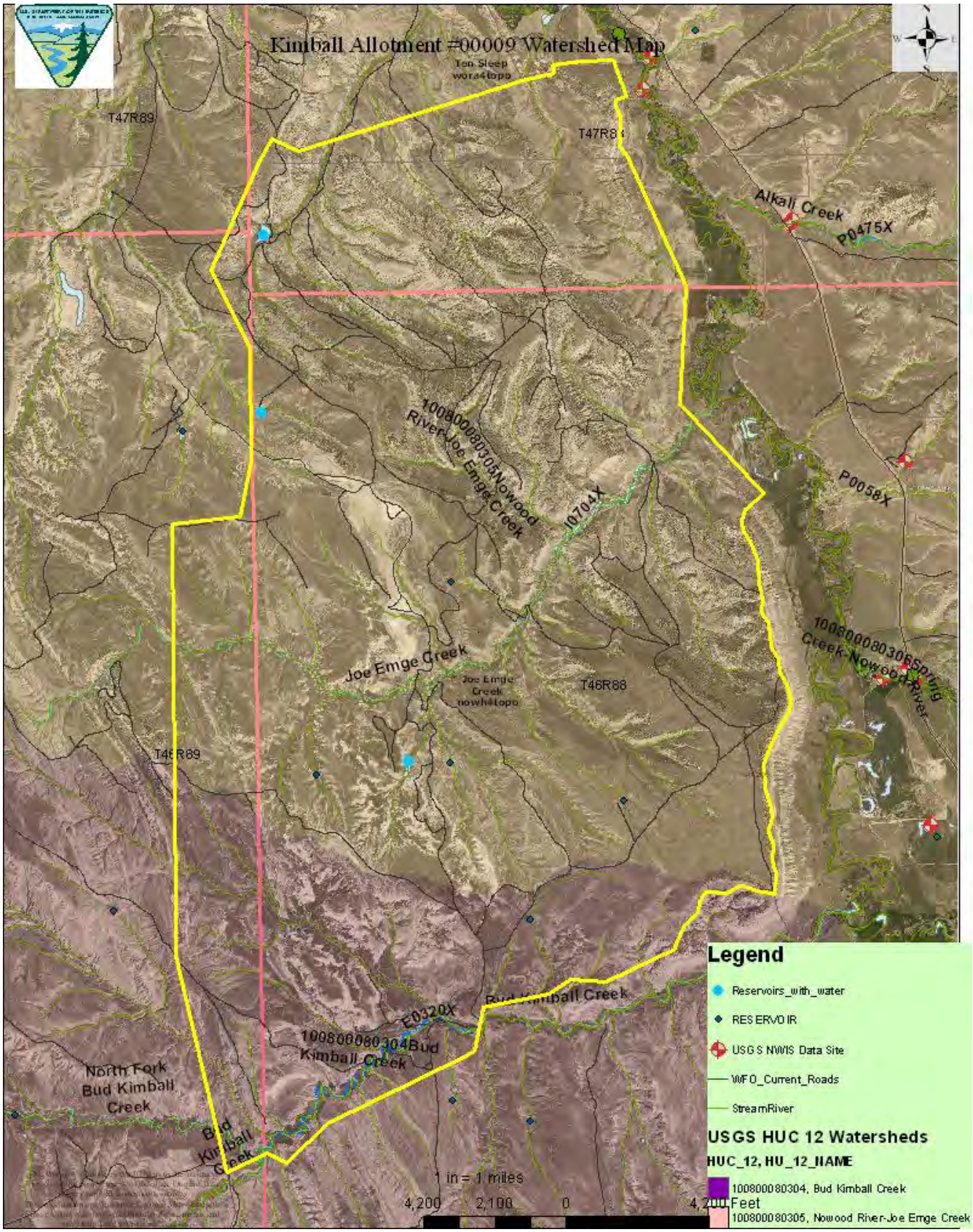
Hedman, E.R. Osterkamp, W.R. 1982. Streamflow Characteristics Related to Channel Geometry of Streams in Western United States. U.S Geological Survey Water Supply Paper 2193, pp12-13.

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

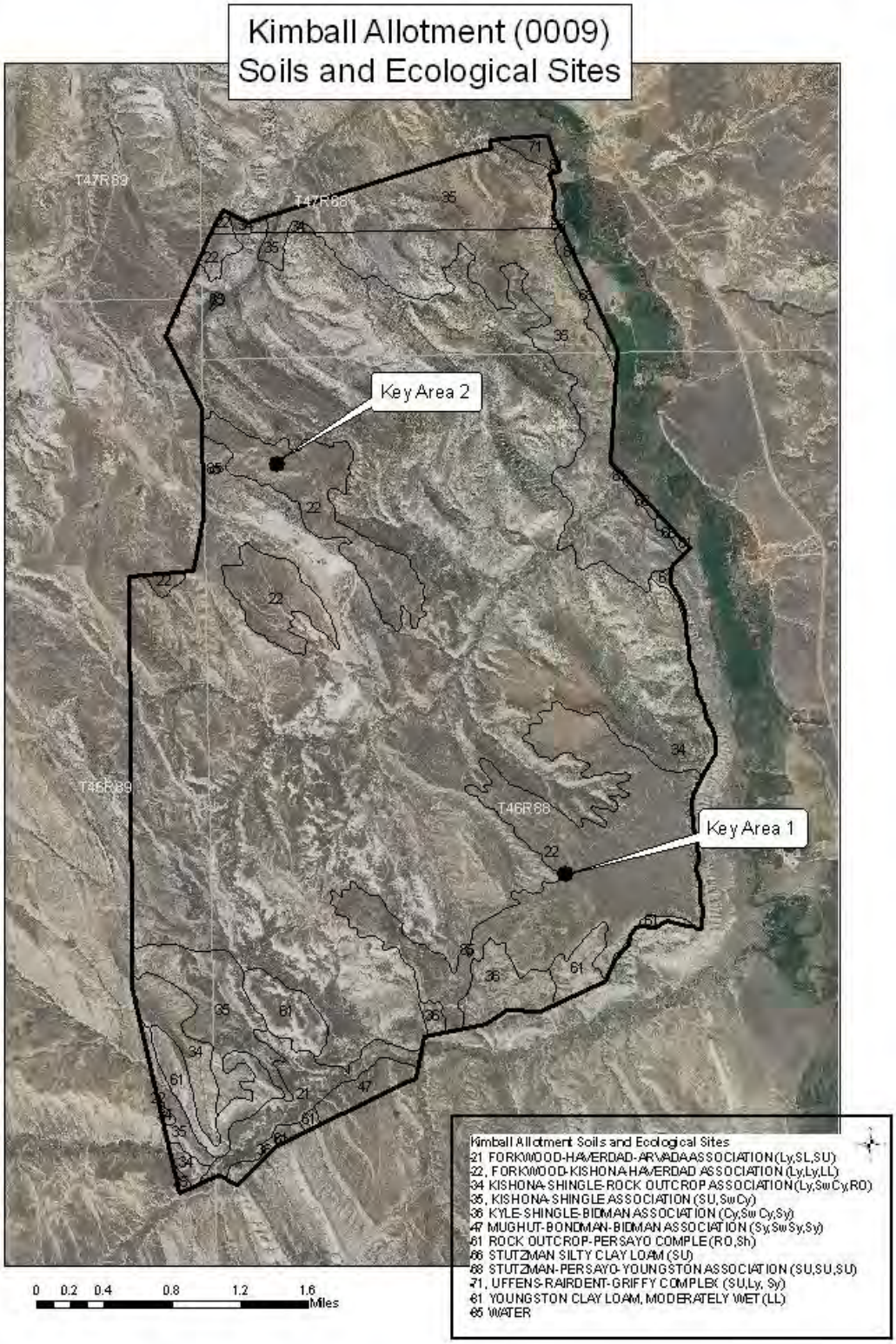
Map 1: Allotment Map



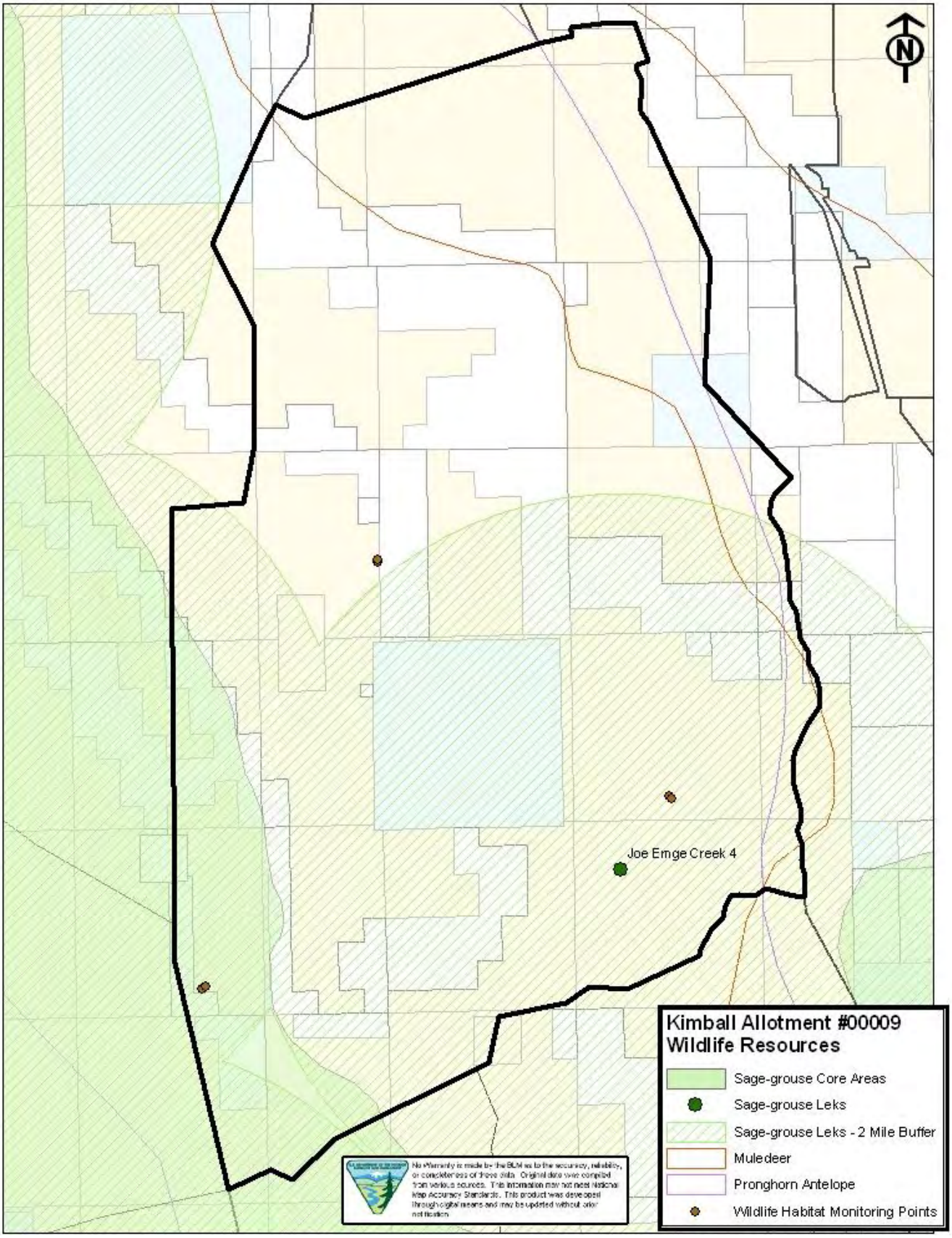
Map 2: Hydrology / Riparian / Watershed (Not to Scale)



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



Map 4: Wildlife Habitat Areas



PHOTOS

Kimball Allotment #00009
Monitoring Site 1
08/04/10

Kimball Allotment #00009
Monitoring Site 2
08/05/10

E0320X Overview Up
09/13/2007
Bug Kimball CK
Kimball/9

E0320X Meandering
09/13/2007
Bud Kimball CK
Kimball/9

I0704X Downstream
09/10/2007
Joe Emge Creek
Kimball/9

I0704X Upstream
09/10/2007
Joe Emge Creek
Kimball/9