

# **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

## **Split Rock V's Allotment #00090**

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

2011



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## TABLE OF CONTENTS

<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 STANDARDS .....	1
<b>2.0 AFFECTED ENVIRONMENT-ALLOTMENT DESCRIPTION, RESOURCE VALUES, AND USES.....</b>	<b>2</b>
2.1 LOCATION AND LAND OWNERSHIP .....	2
2.2 HYDROLOGY .....	2
2.3 AIR QUALITY/CLIMATE .....	2
2.4 SOILS .....	3
2.5 UPLAND VEGETATION .....	4
2.6 INVASIVE SPECIES.....	4
2.7 RANGE .....	4
2.8 WILDLIFE.....	5
2.9 THREATENED OR ENDANGERED SPECIES .....	5
2.9.1 <i>Threatened, Endangered, Candidate, and BLM Sensitive -- Plant Species</i> .....	5
2.9.2 <i>Threatened, Endangered, Candidate, and BLM Sensitive – Wildlife Species</i> .....	5
<b>3.0 SUMMARY OF MONITORING DATA &amp; ASSESSMENT .....</b>	<b>5</b>
3.1 UPLAND VEGETATION .....	6
3.2 HYDROLOGY .....	6
3.3 SOIL AND SITE STABILITY .....	7
3.4 WILDLIFE .....	7
<b>4.0 CONCLUSIONS.....</b>	<b>8</b>
4.1 STANDARD 1 .....	10
4.2 STANDARD 2 .....	11
4.3 STANDARD 3 .....	11
4.4 STANDARD 4 .....	11
4.5 STANDARD 5 .....	12
4.6 STANDARD 6 .....	12
<b>5.0 RESOURCE SPECIALIST SIGNATURES.....</b>	<b>13</b>
<b>6.0 DETERMINATION .....</b>	<b>14</b>
<b>7.0 REFERENCES .....</b>	<b>15</b>

## TABLES, MAPS, PHOTOS

TABLE 1. WATERSHEDS.....	2
TABLE 2. RIPARIAN AREAS .....	3
TABLE 3. GRAZING OPERATOR AND SCHEDULE .....	5
TABLE 4. RANGELAND HEALTH SUMMARY .....	6
TABLE 5. SUMMARY OF MONITORING DATA .....	7
TABLE 6. DEQ USE CLASS .....	8
TABLE 7. RIPARIAN SEGMENT SUMMARY .....	9
TABLE 8. HABITAT ASSESSMENT DATA .....	10
MAP 1: ALLOTMENT MAP .....	15
MAP 2: WATERSHED MAP .....	17
MAP 3: SOILS/RANGE SITES .....	18
MAP 4: WILDLIFE.....	19
PHOTOS. ....	20+

## **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 Split Rock Vs Allotment. 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 Split Rock Vs Allotment is located in T42N, R88W which is approximately 42 miles south of Ten Sleep, WY in Washakie County. The allotment consists of 4,280 acres as described on the grazing permit; 2,680 acres is public land according to the Rangeland Administration Database. Elevations within the allotment range from 5,300 feet to 6,500 feet above sea level.

### 2.2 Hydrology

#### 2.2.1 Surface Water

Within the Split Rock V's allotment there are three different level #6 sub-watersheds that are identified by the United States Geological Survey (USGS) by name and Hydrologic Units Codes or (HUC) (Table 1). All of the sub-watersheds are tributary to the Nowood River. In total 59.7% of the allotment is located in the Deep Creek-Nowood River sub-watershed consisting of 14.8% of the total sub-watershed. The remaining 35.0% of the allotment is located in the Nowood River-Bear Creek sub-watershed and consists of 11.2 % of the total sub-watershed. The smallest sub-watershed is in the south eastern corner of the allotment is the Box Elder Creek sub-watershed which consists of 5.3% of that allotment and is a very minor portion (1.8%) of the sub-watershed.

Sub-watershed Name-Level #6 (HUC #)	Total (Mi <sup>2</sup> )	(Mi <sup>2</sup> )within allotment	(%) Mi <sup>2</sup> of sub-watershed in the allotment
Nowood River-Bear Creek (100800080102)	53.9	6.05	11.2
Deep Creek-Nowood River (100800080103)	69.5	10.3	14.8
Box Elder Creek (100800080104)	50.0	0.9	1.8

The allotment is situated in the southeast corner of the Bighorn Basin with the Owl Creek Mountains to the south and the Big Horn mountain range located to the east. The surface water flow regime consists of drainages of and that flow in an eastern and northern direction through the allotment. Deep Creek is the main creek that forms the eastern edge of the allotment. The access into Deep Creek is very difficult due to the steep outcrops of the Pennsylvanian age Ten Sleep and Amsden Formations that form prominent cliff walls on the sides of the creek. These drainages drain the upper reaches of the Bighorn Mountains to the east. The majority of Lost Creek (segment P0162A and P0163X) on the allotment is on public land. There is also a small section of the Nowood River in the northwestern edge of the allotment near the county road that supports a small riparian area. Other springs and water sources in the allotment are located on private or state land.

#### 2.2.2 Groundwater

The Ten Sleep and Amsden formations have a medium high to a high sensitivity to groundwater contamination due to relatively high water transmission rates (Hamerlinck and Arnerson,1998). The areas within proximity to Deep Creek have a high sensitivity rating to contamination due to high amounts of fractures and high porosity of the bedrock. Other upland areas in the lower sections on the western edge of the allotment have a medium-low rating. The allotment is within a groundwater recharge area with higher amounts of precipitation and lower amounts of evaporation compared with the rest of the Bighorn Basin.

### 2.2.3 Riparian

The riparian areas in the allotment consist of segments of Deep Creek, Deep Creek tributary, and one small segment of the Nowood River (Table 2). In the allotment there is a total of 6.16 miles of perennial water segments. The amount of acres was estimated using aerial photography along with average width calculations and therefore is variable due to the topography of the area.

ID#	Riparian area	TWN	RNG	SEC	QTR	(mi)	Acres	Width	DEQ Class	Gradient
P0162A	DEEP CK	042N	088W	1	SESW	5.06	30.7	50	2AB	3.00
P0163X	DEEP CK TR	042N	088W	25	NENW	0.38	1.5	50	2AB	12
P0169X	DEEP CK TR	041N	087W	6	NENE	0.42	5	55	2AB	1.00
P0315X	NOWOOD R	042N	088W	15	SWNW	0.09	0.1	100	2AB	1.00
P0342A	DEEP CK	042N	087W	19	SWSE	0.21	2	0	2AB	2.00
						6.16	39.3			

### 2.3 Air Quality/Climate

An air quality monitoring station was recently established in the Bighorn Basin, but no monitoring data is available at this time.

The Split Rock BLM RAWS station is located within the allotment shows the average annual precipitation to range from 14-16 inches per year. The Natural Resources Conservation Service (NRCS) based its site guide for this area on the from the “Crandall Creek” climate station. The following information was taken from the NRCS Loamy (Ly) 15-19”East P.Z. R043BY322WY Ecological site Description:

Annual precipitation ranges from 15-19 inches per year. June is generally the wettest month. July, August, and September are somewhat less with daily amounts rarely exceeding one inch.

Snowfall is quite heavy in the area. Annual snowfall averages about 150 inches.

Because of the varied topography, the wind will vary considerably for different parts of the area. The wind is usually much lighter at the lower elevations and in the valleys as compared with the higher terrain. The average winter wind velocity is 8.5 mph while the summer wind velocity averages 7.5 mph. Winds during storms and on ridges may exceed 45 mph.

Growth of native cool-season plants begins about May 1 to May 15 and continues to about October 10.

The following information is from the “Crandall Creek” climate station, at the lower end of this precipitation zone:

	<u>Minimum</u>	<u>Maximum</u>	<u>5 yrs. out of 10 between</u>
<b>Frost-free period (days):</b>	16	80	July 8 – August 20
<b>Freeze-free period (days):</b>	37	120	June 17 – September 5
<b>Mean Annual Precipitation (in):</b>	10.24	21.23	

**Mean annual precipitation:** 14.90 inches

**Mean annual air temperature:** 38.16 °F (21.88°F Avg. Min. to 54.66°F Avg. Max.)

For detailed information visit the NRCS National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. (United States Department of Agriculture (USDA) NRCS Technical Guide Section IIE Rev. 02/22/06).

## 2.4 Soils

The soils reflect the piedmont environment in which they formed. They are highly variable, reflecting differences in parent material (sandstone, siltstone and/or mixed alluvium), position on the landscape, slope and aspect. Soil depth ranges from a 10 to over 60 inches. Having formed over the Chugwater formation, many of the soils are typified by reddish hues, while the soils formed over limestone have light brown colors. Surface textures can broadly be described as loamy consisting of loams and fine sandy loams and are often modified with cobbles. The subsoil often reflects an increase in clay being expressed as an argillic horizon. Slopes range from 0 to 60 percent.

The Split Rock VS Allotment is situated in the in the 15 to 19 inch precipitation zones as depicted by NRSC spacial data. Soil survey data supports this determination.

Based on the soil survey data for Washakie County the dominant ecological sites found in the in the allotment are listed below:

Loamy 15-19 in. pz.	R043BY322WY
Shallow Loamy 15-19 in. pz.	R043BY362WY
Sandy 15-19 in. pz.	R043BY350WY
Shallow Sandy 15-19 in. pz	R043BY366WY
Course Upland 15-19 in. pz.	R043BY308WY
Subirrigated 15-19 in. pz.	R043BY374WY

Two rangeland health assessments utilizing the methodology described in *Interpreting Indicators of Rangeland Health, Technical Reference 1734-6* were relied upon in the analysis of the Split Rock VS Allotment. Both locations were selected at locations representative of the public land portions of the allotment.

The first assessment was conducted in the southwest corner of the allotment in map unit 78 Woosley-Starley-Rock Outcrop Association. Based on the presence of a nutrient rich mollic epipedon and an argillic horizon in the subsoil, the soils are very similar to the Woosley loam soil series. These soils supported a Loamy 15-19 in. pz. ecological site.

The second assessment was 2 miles to the northeast in map unit 49 Nathrop-Starley-Rock Outcrop Association. The soils at this location have characteristics similar to the Starley very cobbly loam, except they are lacking the cobble component and lack a calcic horizon.

Refer to the *Map 2 - Soil and Ecological Sites* that follows this discussion.

## 2.5 Upland Vegetation

The uplands mainly consist of Loamy and Shallow Loamy range sites with the Loamy sites making up the majority of the allotment acres.

The Idaho Fescue/Big Sagebrush Plant Community is the predominant state associated within the above mentioned sites. The NRCS Loamy (Ly) 15-19" East P.Z. R043BY322WY Ecological site Description places this plant community in close association with the Historic Climax Plant Community (HCPC), Columbia Needlegrass /Spikefescue. The Idaho Fescue/Big Sagebrush Plant Community can move to the HCPC since important plant species remain present in the community.

Plant composition within the allotment observed on July 2011 included Mountain Big sagebrush (*Artemisia tridentata ssp. vaseyana*) with understory and interspaces filled with Idaho Fescue (*Festuca idahoensis*), Columbia needlegrass (*Achnatherum nelsonii*), Prairie Junegrass (*Koeleria macrantha*), Western wheatgrass (*Pascopyrum smithii*), Sandberg bluegrass (*Poa secunda*), Muttongrass (*Poa Fendleriana*), Cheatgrass (*Bromus tectorum*), Field Brome (*Bromus arvensis*), Threadleaf sedge (*Carex filifolia*), Lupine (*Lupinus L spp.*) Balsamorhiza (*Balsamorhiza Nutt*), Littleleaf pussytoes (*Antennaria microphylla*), Hood's Plox (*Phlox hoodii*), Birdsfoot sage (*Artemisia pedatifida*) and Scarlet globemallow

(*Sphaeralcea coccinea*). Juniper (*Juniperus spp.*) tended to dominate the steeper slopes and ridges around the allotment. This list is not all inclusive; however the vegetation noted are those that are quite evident and readily found.

## 2.6 Invasive Species

Noxious weed species documented within the allotment include Canada, musk and bull thistle, spotted knapweed, and houndstongue. Infested areas are confined to small patches within dry reservoir beds, along roads and irrigation ditches, and along Split Rock Creek. The stock driveway area contains the majority of known infestations, and has received the most treatment. This allotment lies within the Ten Sleep Weed Management Area, which is intensively managed and monitored for noxious and invasive weed species using a cooperative, integrated pest management strategy. BLM and Washakie County Weed and Pest district personnel treated noxious weeds within the allotment in the summers of 2010 and 2011. The permittee has also performed some weed control work.

## 2.7 Range

For management priorities the Split Rock Vs Allotment is categorized as an “I” (Improve) in the Washakie RMP and consists of five separate pastures: Berger Spring, Split Rock, V’s, School Section, and Irrigated Pasture. Refer to Map 2 at the end of this document to see the allotment’s pastures. Holland operates within the V’s, School Section and Irrigated Pastures and Wiechmann operates in the Split Rock and Berger Spring pastures. Authorization schedules for the two operators are shown below in Table 3.

<b>Operator</b>	<b>Livestock Number</b>	<b>Livestock Kind</b>	<b>Begin</b>	<b>End</b>	<b>PL %</b>	<b>AUMS</b>
LOUIS N. HOLLAND REV. TRUST	56	Cattle	5/16	6/30	54	46
	84		9/16	10/15		45
	56		11/01	12/15		45
	350		12/16	1/15		335
	3	Horse	11/01	2/28		6
WIECHMANN INC.	268	Cattle	05/16	06/30	54	219
	216		09/16	10/15		115
	394		11/01	12/15		315
	6	Horse	11/01	02/28		13

The NRCS’s Ecological Site Description for a 15-19 inch Loamy site, Idaho Fescue/Big Sagebrush community recommends a carrying capacity of .5 AUMs/acre. This rate is based on assuming continuous season long grazing and sets the stocking rate as a conservative suggestion. The allotment as a whole is stocked at .3 AUMs/acres which is well under the suggested rate and is applicable since the area is within the lower end of the 15-19 inch precipitation zone.

## 2.8 Wildlife

The allotment contains habitat for big game species, as well as other non-game wildlife species. The variety of habitats in this area are characterized by deep canyons with sheer cliffs, rolling sagebrush covered hills, irrigated native grass pastures, and riparian areas along Split Rock Creek, Deep Creek and their tributaries.

The allotment provides yearlong habitat for elk with two different migratory elk route crossings that run from the higher ranges in the upper reaches of the Middle Fork of the Powder River to the winter range area around Battle Mountain and the upper reaches of Nowater Creek.

Antelope can use the allotment year round but typically migrate to lower elevations as snow becomes deeper at higher elevations in late fall and winter. The allotment also provides yearlong mule deer habitat, with the northwest part classed as Crucial Winter Range.

There are five sage grouse leks clustered in the middle part of the allotment. Except for the canyon areas, the majority of the allotment appears to be suitable nesting and brood rearing habitat. This habitat also provides breeding, nesting and foraging opportunities for sagebrush obligate bird species like the sage thrasher, Brewer’s sparrow and loggerhead shrike.

BLM raptor surveys have inventoried 12 golden eagle nests in the cliffs along Deep Creek. There were also six red tail hawk nests and one prairie falcon nest found on the allotment.

## 2.9 Threatened or Endangered Species

### 2.9.1 Threatened, Endangered, Candidate, and BLM Sensitive -- Plant Species

No threatened and endangered or sensitive plant species have been found in the Split Rock Vs Allotment.

### 2.9.2 Threatened, Endangered, Candidate, and BLM Sensitive – Wildlife Species

Besides the sage grouse, no other BLM sensitive species have been documented in or around the allotment.

## 3.0 Summary of Monitoring Data & Assessment

In the summer of 2011, two key management areas (Sites) were selected on the allotment for the purpose of observing and recording multiple indicators of rangeland health. The two sites are indicator areas that are able to reflect what is happening on a larger area as a result of on-the-ground management actions. 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 selected sites. These sites were designated as Site #1, and Site #2. A map showing the monitoring sites and photographs of each area, are located at the end of this document. Rangeland Health Assessments were conducted at both sites by an interdisciplinary team on 8/3/2011 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 transect location below in Table 4. The degree of departure from expected levels for each indicator per the Reference Sheet range from: Extreme to Total, Moderate to Extreme, Moderate, Slight to Moderate, and None to Slight.

Indicator	Departure from Reference	
	Site #1	Site #2
1. Rills	<i>None to Slight</i>	<i>None to Slight</i>
2. Water Flow Patterns	<i>Slight to Moderate</i>	<i>None to Slight</i>
3. Pedestals and/or Terracettes	<i>Slight to Moderate</i>	<i>None to Slight</i>
4. Bare Ground %	<i>None to Slight</i>	<i>None to Slight</i>
5. Gullies	<i>None to Slight</i>	<i>None to Slight</i>
6. Wind- Scoured, Blowouts, and /or Deposition Areas	<i>None to Slight</i>	<i>None to Slight</i>
7. Litter Movement	<i>None to Slight</i>	<i>None to Slight</i>
8. Soil Surface Resistance to Erosion	<i>None to Slight</i>	<i>None to Slight</i>
9. Soil Surface Loss or Degradation	<i>None to Slight</i>	<i>None to Slight</i>
10. Plant Community Composition and Distribution	<i>None to Slight</i>	<i>None to Slight</i>
11. Compaction Layer	<i>None to Slight</i>	<i>None to Slight</i>
12. Functional/Structural Groups	<i>Slight to Moderate</i>	<i>None to Slight</i>
13. Plant Mortality/Decadence	<i>None to Slight</i>	<i>None to Slight</i>
14. Litter Amount	<i>None to Slight</i>	<i>None to Slight</i>
15. Annual Production	<i>None to Slight</i>	<i>None to Slight</i>

<i>16. Invasive Plants</i>	<i>None to Slight</i>	<i>None to Slight</i>
<i>17. Reproductive Capability of Perennial Plants</i>	<i>None to Slight</i>	<i>None to Slight</i>
<b>Overall Attribute Rating</b>		
<i>Soil &amp; Site Stability</i>	<i>Slight to Moderate</i>	<i>None to Slight</i>
<i>Hydrologic Function</i>	<i>Slight to Moderate</i>	<i>None to Slight</i>
<i>Biotic Integrity</i>	<i>None to Slight</i>	<i>None to Slight</i>

### 3.1 Upland Vegetation

Very little historical vegetation monitoring data has been collected on the Split Rock Vs Allotment. Some photo points and a few periodic allotment inspections over the years have not identified any significant management problems on the allotment. To aid in determining the above ratings for Biotic Integrity, Line-Point Intercept transects were ran at both sites to estimate cover and basic species composition. Also, two wildlife habitat assessment transects were established near the same vegetation monitoring sites. A summary of the cover data collected from each site is shown below in Table 5:

<b>Site Name</b>	<b>Range Site</b>	<b>Method</b>	<b>Date</b>	<b>Foliar Cover %</b>	<b>Basal Cover %</b>	<b>Total Litter %</b>	<b>Bare Ground %</b>
Site 1	Loamy 15-19	Line-Point Intercept	July 2011	90	23	67	3
Site 2	Loamy 15-19	Line-Point Intercept	July 2011	90	20	68	4

The Biotic Integrity attribute is determined by using indicators 8, 9, and 11 through 17. The Reference Sheet describes the highest potential each indicator. To use as a comparison to what was found in each site, the major vegetation indicators are summarized from the reference sheet as follows.

- The expected potential composition for this site is about 75% grasses, 15% forbs and 10% woody plants (at HCPC). Within this composition Functional/Structural Groups (listed in descending order from dominance) should be: Mid-size, cool season bunchgrasses; perennial shrubs and forbs; tall, cool season bunchgrasses; cool season rhizomatous grasses and short cool season bunchgrasses.
- Amount of plant mortality and decadence is expected to be minimal and more so associated with shrubs.
- Litter cover should typically range from 5-40% of total canopy measurement with total litter (including beneath the plant canopy) from 50-90% is the expected potential.
- Annual production should range from 1100-1600 lb/ac, which includes all above ground production.
- Potential invasive noxious, native and introduced should be minimally present depending on past disturbance and fire activity. Bare ground greater than 30% is the most common indicator that invasive species will cause a threshold state to be crossed.
- Perennial plant species should be cable of reproducing, unless in extreme drought years.

#### Site #1

All of the indicators evaluated were found to be within the normal range of variability expected for both sites and the Biotic Integrity for the site was rated as a “None to Slight” departure from the Reference Sheet. The plant composition groups for this site consisted of 31% grasses, 41% forbs and 28% woody plants. The percentage of Big Sagebrush is higher than expected, due to the lack of fire frequency. Forbs also showed higher percentages due to above average precipitation over the last several years. Plant mortality/decadence, Litter cover, Annual production, Invasive plants, and reproductive capability all matched what was expected for the site potential and weather.

## Site #2

All of the indicators evaluated were found to be within the normal range of variability expected for both sites and the Biotic Integrity for the site was rated as a “None to Slight” departure from the Reference Sheet. The plant composition groups for this site consisted of 47% grasses, 38% forbs and 4% woody plants. Forbs also showed higher percentages due to above average precipitation over the last several years. Plant mortality/ decadence, Litter cover, Annual production, Invasive plants, and reproductive capability all matched what was expected for the site potential and weather.

### 3.2 Hydrology

#### 3.2.1 Surface Water/Water Quality

Hydrologic indicators were evaluated and discussed in detail in section 3.1 and section 3.3. The overall hydrologic indicators were analyzed in detail from two transect locations that were evaluated in 2011. Transect 1 was an upland site in the Bear Creek sub-watershed and was given a overall slight to moderate departure from reference conditions. Transect 2 was an upland site in the Deep Creek sub-watershed and was given a none to slight to departure from reference conditions. The overall rating was given based on the weighting of key hydrologic indicators of rills, gullies, amount and dispersal of bare ground, pedestals, litter movement, and litter amounts from key areas in the watershed. Other indicators are the channel morphology and channel conditions of main drainages that indicate rapid movement of soil and water from the landscape.

Deep Creek is classified by the Wyoming Department of Environmental Quality as a Class 2AB stream. *“Class 2AB waters are those waters, and all their perennial tributaries and adjacent wetlands, that are known to support game fish populations or spawning and nursery areas at least seasonally and where a game fishery and drinking water use is otherwise attainable. Unless it is shown otherwise, these waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use.”*

Water Quality samples were taken as one time samples on 6/4/1981 and 9/8/1981. The discharge measurements were 53.2 cfs during runoff conditions and 1.04 cfs during late summer base flow conditions. The turbidity was 70 NTU and 30 NTU’s with PH values of 7.2 and 6.6 that are consistent with fresh water streams. Fecal Coliform counts were also very low on both occasions. Deep Creek also received a shock treatment by the Wyoming Game and Fish in the summer on 1995 to improve the fishing populations.

Table 6- DEQ Use Classification Table

WY DEQ Use Designations										
Surface Water Classes	Drinking Water	Game Fish	Non-Game Fish	Fish Consumption	Other Aquatic Life	Recreation	Wildlife	Agriculture	Industry	Scenic Value
2AB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2C	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3B	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

#### 3.2.2 Riparian

There are four riparian areas discussed in Chapter 2 were assessed according to the BLM Manual 1737 *Proper Functioning Condition of Riparian Areas* (BLM,1997) in , 2006 and most recently during the field evaluation on 9/7/2011. Table 5 below is a summary of the most recent assessments for each segment. Overall the segment was rated to be in proper functioning condition (PFC) due to limited use, extensive amounts of riparian vegetation. Steep topography and limited access points into Deep Creek allow the riparian areas to function properly (Photos 1-3). There was a new segment that was found that is a tributary to Deep Creek (P0163X). This segment was a very steep Rosgen A type stream with a waterfall

and a riparian area with various woody species of Alders, Willows, and Cottonwood species (Photos 4-5). Other riparian shrubs and perennial grasses were present near the confluence of Deep Creek where the gradient was lower. Segment P0315X was rated non-functioning due to excessive use because it is a small segment near the road with corrals that has functions as a holding facility. The majority of the riparian vegetation has been removed by grazing (Photos 6-7). There is also excessive hoof action and bank shear stress from livestock. In response to disturbance the stream morphology has widened and not functioning as a riparian area. This segment would likely benefit from a riparian enclosure or water gap fence project to protect the majority of the segment and allow the banks to recover.

BLM ID#	Riparian Area	(mi)	Water Type	Date Monitored	Rosgen Class	Function	Trend	Rating Scale
P0162A	Deep Creek	5.06	Perennial	9/7/2011	A&B	PFC	N/A	13
P0163X	Deep Creek TR	0.38	Perennial	9/7/2011	A	PFC	N/A	15
P0342A	Deep Creek	0.21	Perennial	9/7/2011	A	PFC	N/A	13
P0315X	Nowood R	0.1	Perennial	9/7/2011	B	NF	N/A	0
E0378X	Split Rock Ck		Intermittent					
Total:				% PFC/0% 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.

### 3.3 Soil and Site Stability

Two (2) rangeland health determinations were utilized as a part of this investigation. Both were conducted on August 3, 2011. 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. The rangeland health assessment conducted compared to the Reference Sheet for the Loamy 14-19 in. pz. (R043BY322WY) ecological site dated 5/1/2008 to determine departures from normal.

#### Monitoring Site 1

This assessment was conducted on 6 to 8 percent slopes. Rills were not observed. Where present, waterflow patterns are associated with areas of rock outcrop where they are 3 to 5 feet long with little connectivity. The soil surface in these flow patterns does not have the rich organic matter characteristic of the adjacent soils. There are 1 to 2 inch pedestals below the sagebrush. These are stabilized with grasses. The presence of grass species stabilizing the pedestals would indicate that these are historical remnants. Where pedestals are adjacent to the flow patterns, roots located near the surface can be occasionally observed. Transect data determined bare ground to be 3 percent. This is within that described in the reference, which ranges bare ground from 0 to 20 percent. Litter cover expressed as ‘total canopy’ was determined to be 67 percent; the reference sheet describes ‘total canopy litter’ as ranging from 5 and 30 percent. Litter movement is minimal, being restricted to waterflow patterns. Gullies are not an issue in this allotment. No wind-scour areas were observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 4.7; the reference sheet places the average SSI at 4.0 or greater. The extent of organic matter, including thick root masses in the surface horizon, contributes further to the soils ability to resist erosion. The composition and distribution of the plant communities, particularly with respect to the herbaceous component is minimizing runoff allowing for maximum infiltration. The small soil pit that was dug as part of the investigation revealed 10 to 12 inch A horizon indicating that there has been little historic soil loss. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic Function* were rated as “none to slight”.

#### Monitoring Site 2

This assessment was conducted on slopes of 2 to 4 percent. There were no rills or waterflow patterns observed. Some of the grass species were observed to be sitting on pedestals less than 1 inch in height. Transect data determined bare ground to be 4 percent. This is within that described in the reference,

which ranges bare ground from 0 to 20 percent. Litter cover expressed as ‘total canopy’ was determined to be 68 percent; the reference sheet describes ‘total canopy litter’ as ranging from 5 and 30 percent. There was no litter movement observed. Gullies are not an issue in this allotment. No wind-scour areas were observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion is 5; the reference sheet places the average SSI at 4.0 or greater. The extent of organic matter, including thick root masses in the surface horizon, contributes further to the soils ability to resist erosion. The composition and distribution of the plant communities, particularly with respect to the herbaceous component is minimizing runoff allowing for maximum infiltration. The small soil pit that was dug as part of the investigation revealed 10 to 12 inch A horizon indicating that there has been little historic soil loss. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* and *Hydrologic Function* were rated as “none to slight”.

### 3.4 Wildlife Habitat

In July of 2011 two transects, were ran to determine habitat suitability for Sage Grouse. Line-Intercept with height, Belt Transect, and Daubenmire plots were the methods used in data collection. The data indicates that all the sites are highly suitable for Sage Grouse Nesting, Early Brood-rearing and Wintering habitat. Table 8 summarizes the data found from each site.

Allotment/Site Name	Sagebrush* Canopy Cover (Percent)		Average Height (Inches)			Sagebrush* Age Class (Percent)			
	Live	Dead	Sagebrush*	New Herbaceous	Residual Herbaceous	Young	Mature	Decadent	Dead
Site 001	26	7	14	11	3	0	65	27	8
Site 002	22	6	27	22	11	0	64	25	11

\* *Artemisia tridentata ssp. vaseyana*

## 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.

### 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 “None to Slight” at both assessment locations. Throughout the allotment, the soils are stable. Erosion indicators (rills and water flow patterns) are minimal, only being present in association with areas of rock outcrops. Gullies have not developed in the allotment. The soil structure combined with a surface layers that are rich in organic matter and root masses protect the soil from rain drop impact and the erosive forces of overland flow. The vegetative communities

supported by the soils are capable of minimizing runoff and allow for maximum infiltration. There is no indication of historic soil loss.

#### **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*

In total there are 5.75 miles of riparian habitat in the allotment. Of the 5.75 miles, 5.65 miles were rated at PFC these were all riparian segments located along Deep Creek. Due to the topography of the allotment and limited access, Deep Creek has remained in a very natural condition and has not received excessive use or other potential disturbance that would cause a decrease in functionality. Deep Creek is currently meeting the definition as outlined above.

One small segment of the Nowood River (P0315X), which is not managed as part of the allotment but allocated for trailing, has been degraded and is not functioning properly. This is in part due to the area being used as a holding facility for livestock trailing and received excessive overuse in the riparian area. It is recommended that a riparian fence be constructed to protect and enhance this segment. Overall the allotment is currently meeting the standard as outlined above.

#### **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: Rangeland health indicators 8, 9, and 11 through 17 were found to be within the normal range of variability expected for both sites and the Biotic Integrity for the site was rated as a “None to Slight” departure from the Reference Sheet.

Most of the allotment is represented well by the 15-19” loamy ecological sites. These sites were characterized as currently representing the Idaho Fescue/Big Sagebrush state in the State and Transition Model in the NRCS Tech Reference. These sites are in a dynamic equilibrium with the Historic Climax Plant Community for these sites. This means that at this time these sites have appropriate pathways available to them to respond to proper grazing strategies, favorable environmental conditions, and environmental events such as wildfires. Currently permitted grazing use would allow this to occur. According to the NRCS Tech Reference, this situation lends further credence to the current plant communities being “resilient, diverse, and able to recover from natural and human disturbance”. Wildfire could reduce/eliminate the sagebrush component in affected areas.

This qualitative analysis of the allotment shows that the rating variance of the indicators (vegetative cover, plant composition, diversity and vigor, bare ground & litter, and erosion) are appropriate for the ecological sites found on the allotment. Overall, the biotic community is stable, intact, and well adapted to grazing.

#### **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:

Data that pertains to this standard include: apparent trend, percent ground point cover, line intercept shrub canopy cover, presence of sage-grouse leks, and ocular surveys.

Two representative key area transect locations were chosen in the allotment to monitor and measure soil and vegetative parameters, and to conduct the evaluation of the 17 indicators of rangeland health. The transect locations were in areas likely to be grazed by livestock due to topography, distance to water and desirable forage composition. Both locations are within antelope, elk, and mule deer ranges. For the Standards and Guides field evaluations, plant community composition and distribution as well as the functional structural groups (indicator #s 10 and 12) were found to be None to Slight deviation from those anticipated at both locations. The Biotic Integrity ratings were also None to Slight at both locations. The allotment is in excellent condition. The Split Rock Allotment is providing wildlife forage and cover needs; and is capable of sustaining viable populations of a diverse guild of native plant and animal species.

#### **4.5 Standard 5**

*Water quality meets State standards. MET*

Wyoming's water quality laws are administered by the Wyoming Department of Environmental Quality (DEQ), Water Quality Division (WQD). The water quality is administered by the DEQ Non-Point Source program that oversees section 303d of the federal Clean Water Act. The DEQ publishes an annual 305 (b) using assessment methodology to determine surface water quality standards and associated uses of different waters as approved by the US Environmental Protection Agency.

Deep Creek is not listed as impaired by the DEQ on the 2010 305 (b) annual report to the EPA Integrated State Water Quality Assessment Report (DEQ,2010) and therefore is meeting the standards for a class 2AB stream.

The historic water quality samples taken from Deep Creek confirm that the water quality standard is being met.

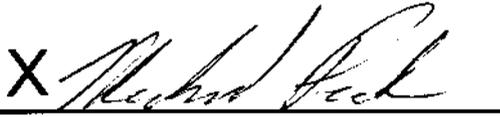
Many studies have documented the effects of heavy grazing on riparian vegetation and soil erosion rates, but few studies have directly assessed impacts on water quality. Potential management impacts to water quality from rangelands as outlined in (Binkley, 1993) such as: excessive livestock waste production, resource extraction, stream channel modification, bank erosion from floods, erosion following wildfires, or erosion from overgrazing are elements to consider as possible non-point source impacts to water quality. The allotment was reviewed for these potential impacts and none were found to be present in the allotment.

#### **4.6 Standard 6**

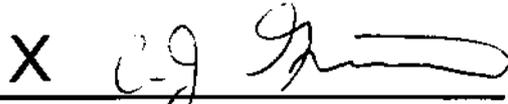
*Air quality meets State standards. UNKNOWN*

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.

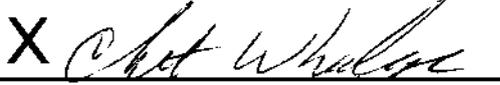
**5.0 Resource Specialist Signatures**

X 

Michael Peck  
Range Management Specialist

X 

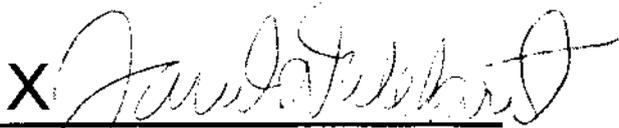
C.J. Grimes  
Natural Resource Specialist, Weeds

X 

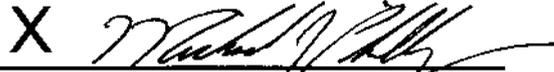
Chester Wheelless  
Wildlife Biologist

X 

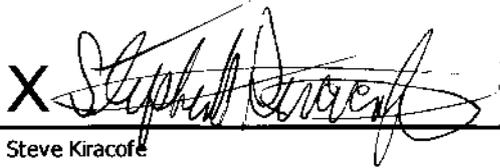
John Elliott  
Supervisory Rangeland Management Specialist

X 

Jared Dajebout  
Hydrologist

X 

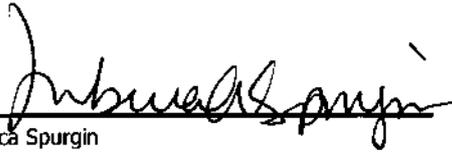
Michael Phillips  
Assistant Field Manager, Resources

X 

Steve Kiracofe  
Natural Resource Specialist, Soils

**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 6, Air Quality, which is determined to be UNKNOWN (per direction from the BLM Wyoming State Office). Current livestock grazing IS in conformance with the standards.*

X 

Rebecca Spurgin  
Field Manager, Worland Field Office

12/19/12

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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

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Rebecca Spurgin  
Field Manager, Worland Field Office

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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

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Rebecca Spurgin  
Field Manager, Worland Field Office

## 7.0 References

Anderson Consulting Engineers, 2009. Nowood River Storage/Watershed Study. Wyoming Water Development Commission Report pp 3.100.

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.

DEQ, 2010. Wyoming's 2010 305(b) Integrated State Water Quality Assessment Report .p 28.  
**Integrated State Water Quality Assessment Report**

Hamerlinck, J.D. and C.S. Arneson, editors. 1998. Wyoming Ground Water Vulnerability Assessment Handbook. Spatial Data and Visualization Center Publication Report SDVC 98-01. University of Wyoming. Laramie, Wyoming. Volume 1.

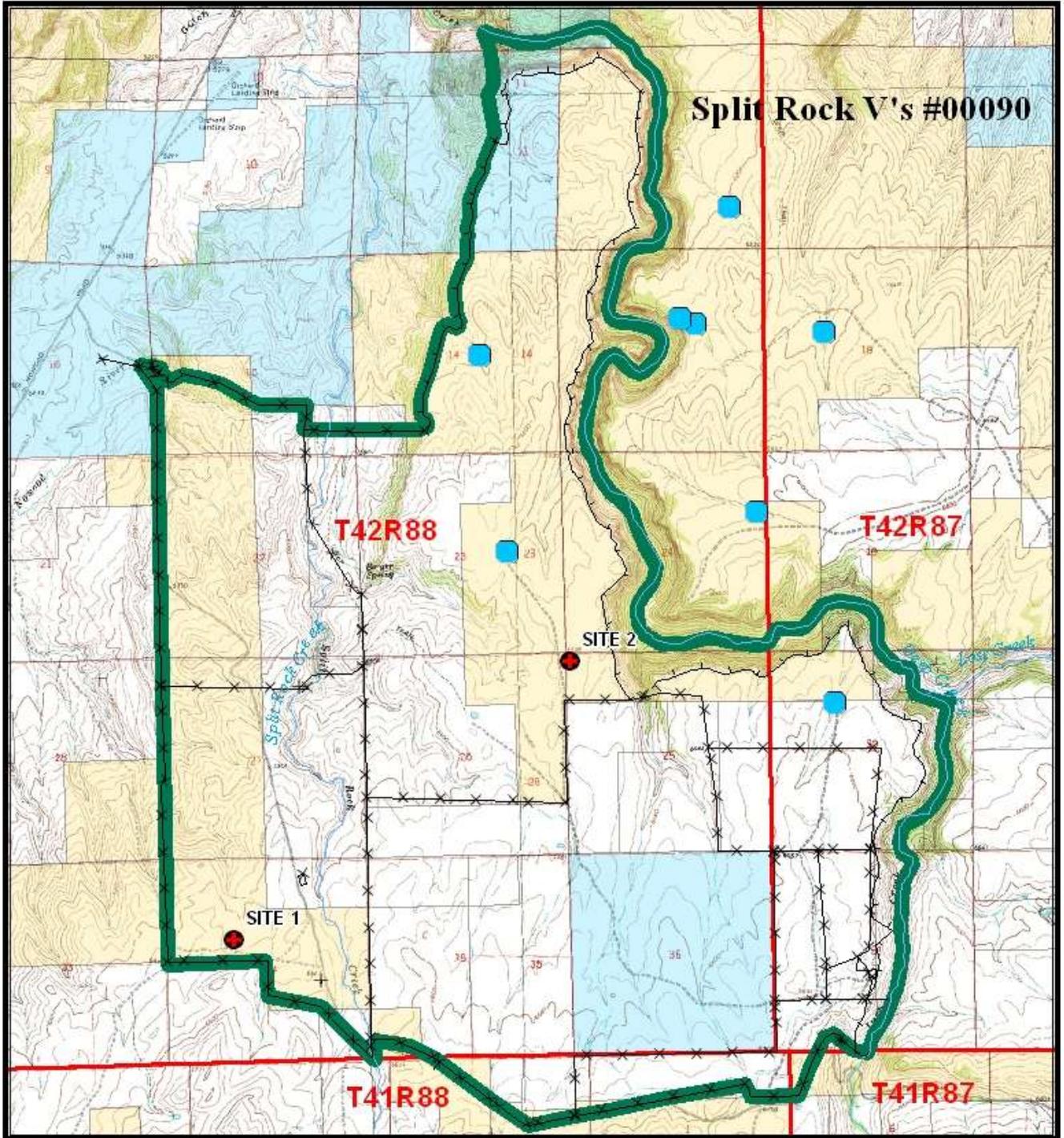
SamplePoint: USDA Agricultural Research Service, Rangeland Resources Research Unit in Cheyenne, WY, USDI BLM Wyoming State Office; 2009; Software code, Robert Berryman; Installation file, Nullsoft Install System v 2.11.

USDA Natural Resources Conservation Service, Technical Guide for Ecological Site Descriptions, Northern Intermountain Desertic Basins, Loamy (Ly) 10-14" Foothills and Basins East Precipitation Zone; R032XY322WY.

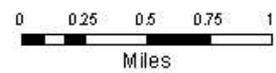
USDI - BLM. 1998. Implementation Plan, Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming.

USDI-BLM. 1988. Washakie Area Resource Management Plan (RMP), Record of Decision and Approved Resource Management Plan for the Washakie Resource Area, Worland, WY.

Map 1 Assessment Areas



- Allotment Boundary
- Assessment Sites
- Fence
- Natural Barrier
- BLM
- State
- Private



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# Map 2 Watershed Map



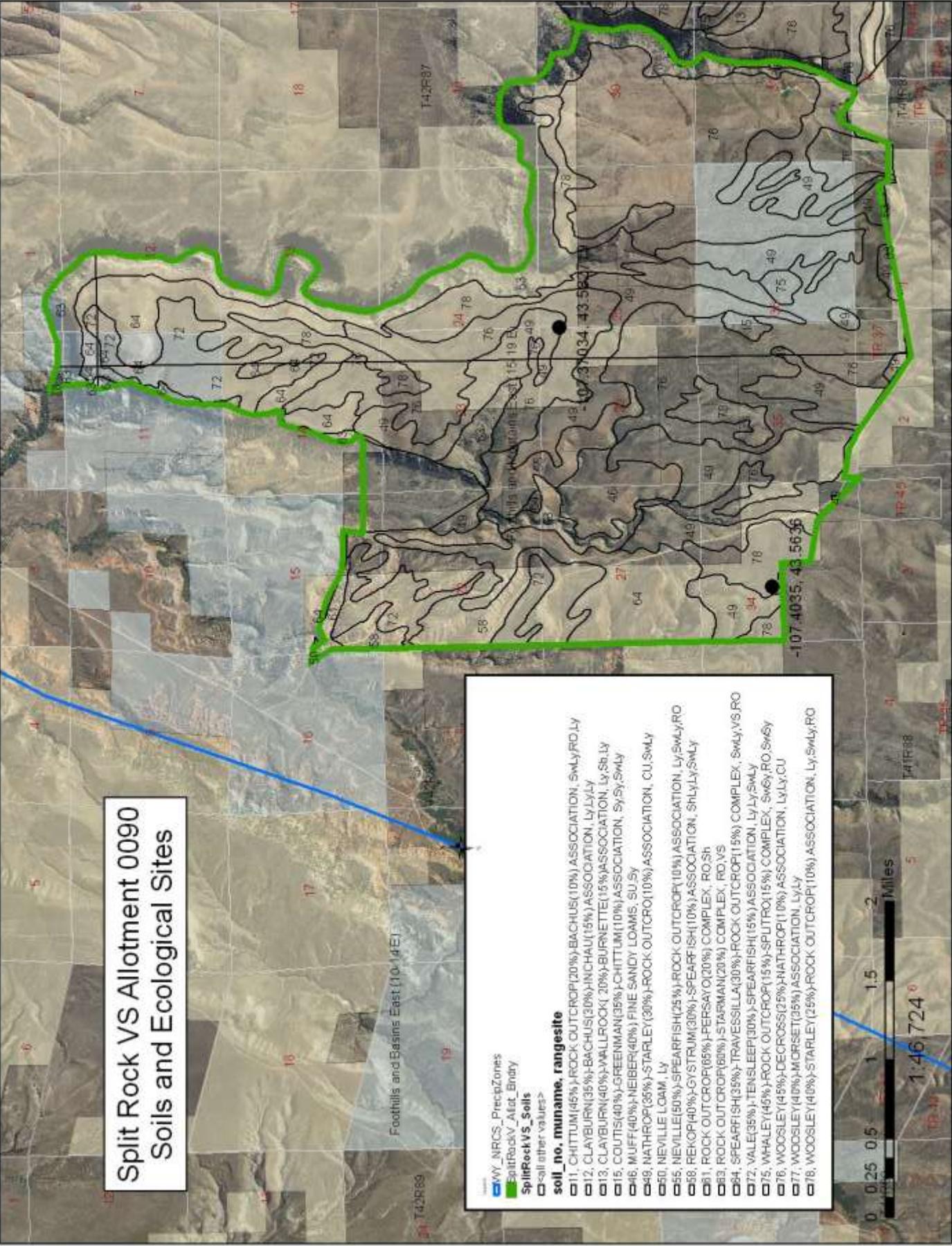
## Split Rock V's Allotment #00090 Watershed Map

- RAIDS**
- Flow Type**
- Perennial
  - Intermittent
  - Produced
- Flow Type**
- Stream-River
- RESERVOIRS
- USGS NWIS Data Site
- USGS HUC 12 Watersheds
- HUC\_12\_HU\_12\_NAME**
- 100800080102, Nowood River-Bear Creek
  - 100800080103, Deep Creek-Nowood River
  - 100800080104, Box Elder Creek
  - WFQ\_Current\_Roads

No Warranty is made by the BLM as to the accuracy, reliability, or completeness of this data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.



# Split Rock VS Allotment 0090 Soils and Ecological Sites



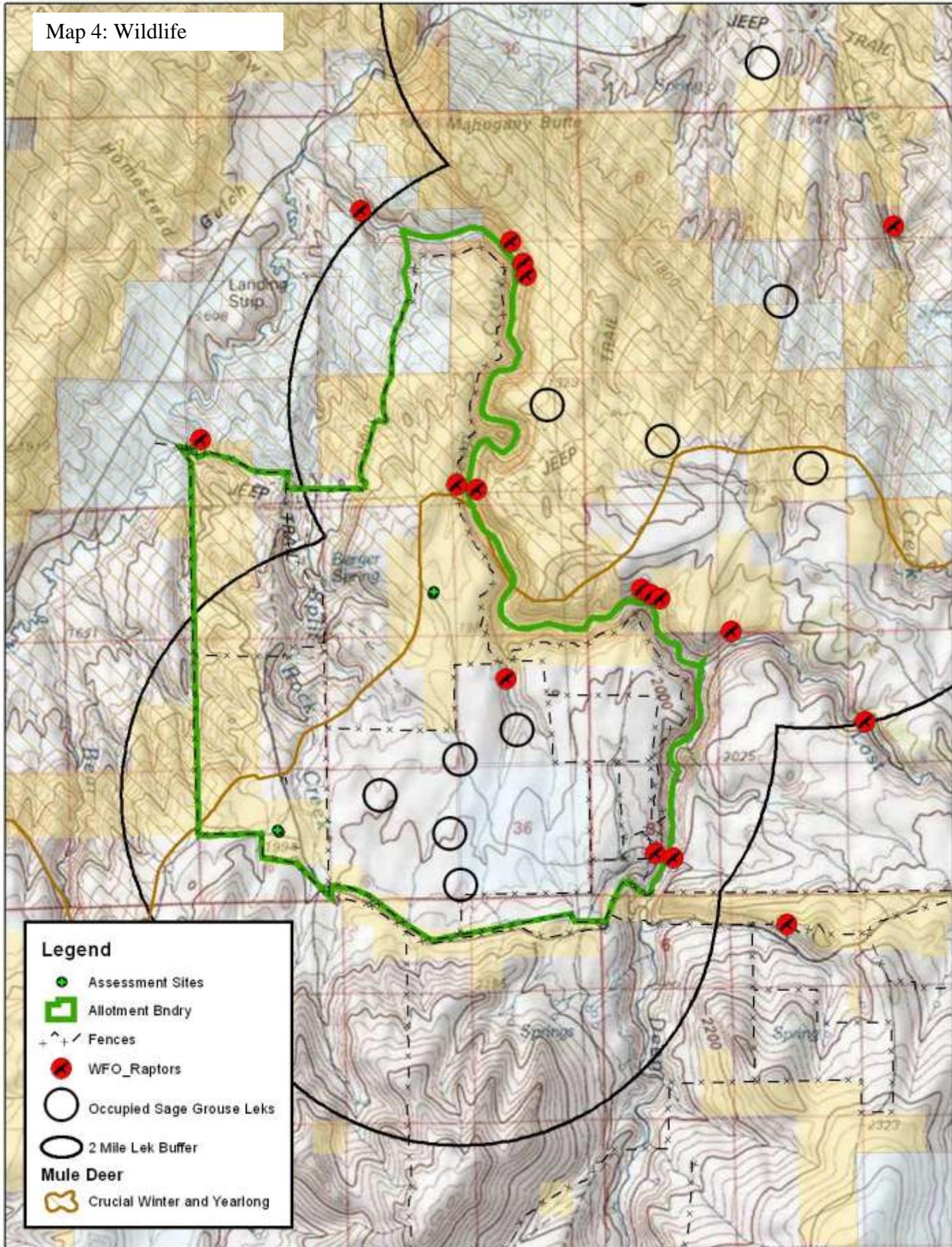
■ SWY\_NRCS\_PrecipZones  
■ SplitRock\_VS\_Allot\_Bndry  
■ SplitRock\_VS\_Soils  
■ call other values>

**soil\_no, muname, rangesite**  
 011, CHITTUM(45%),ROCK OUTCROP(20%),BACHUS(10%)ASSOCIATION, SwLy,RO,LY  
 012, CLAYBURN(35%),BACHUS(30%),NICHAL(15%)ASSOCIATION, Ly,LY,LY  
 013, CLAYBURN(40%),WALLROCK( 20%),BURNETTE(15%)ASSOCIATION, Ly,Sb,LY  
 015, COUTS(40%),GREENMAN(35%),CHITTUM(10%)ASSOCIATION, Sy,Sy,SwLy  
 046, MUFF(40%),NEIBER(40%) FINE SANDY LOAMS, SU,Sy  
 048, NATHROP(35%),STARLEY(30%),ROCK OUTCROP(10%)ASSOCIATION, CU,SwLy  
 050, NEVILLE LOAM, LY  
 055, NEVILLE(50%),SPEARFISH(25%),ROCK OUTCROP(10%)ASSOCIATION, Ly,SwLy,RO  
 058, REKOP(40%),GYSTRUM(30%),SPEARFISH(10%)ASSOCIATION, Sh,LY,LY,SwLy  
 081, ROCK OUTCROP(95%),PERSAYO(20%) COMPLEX, RO,Sh  
 083, ROCK OUTCROP(60%),STARMAN(20%) COMPLEX, RO,VS  
 084, SPEARFISH(35%),TRAVESSILLA(30%),ROCK OUTCROP(15%) COMPLEX, SwLy,VS,RO  
 072, VALE(35%),TENSLEEP(30%),SPEARFISH(15%)ASSOCIATION, Ly,LY,SwLy  
 075, WHALEY(45%),ROCK OUTCROP(15%),SPUTRO(15%) COMPLEX, SwLy,RO,SwLy  
 076, WOOSLEY(45%),DECROSS(25%),NATHROP(10%)ASSOCIATION, Ly,LY,CU  
 077, WOOSLEY(40%),MORSET(35%)ASSOCIATION, Ly,LY  
 078, WOOSLEY(40%),STARLEY(25%),ROCK OUTCROP(10%)ASSOCIATION, Ly,SwLy,RO



1:46,724

Map 4: Wildlife







Split Rock V's #00090  
Assessment Site #1  
SENE, SEC.34, T42R88  
43.564170, -107.404347  
July 11, 2011



Split Rock V's #00090  
Assessment Site #2  
NWNW, SEC.25, T42R88  
43.583897, -107.370547  
July 11, 2011

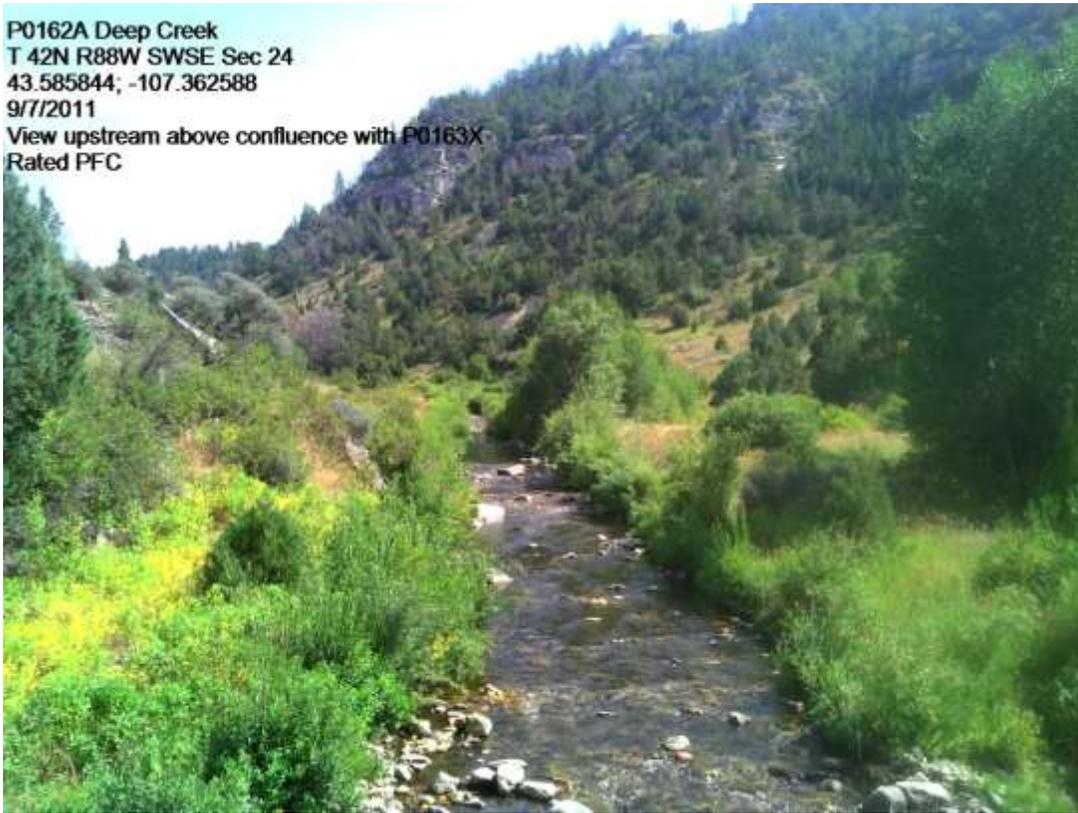


Split Rock V's #00090  
Assessment Site #2  
NWNW, SEC.25, T42R88  
43.583897, -107.370547  
July 11, 2011



Split Rock V's #00090  
Assessment Site #2  
NWNW, SEC.25, T42R88  
43.583897, -107.370547  
July 11, 2011

P0162A Deep Creek  
T 42N R88W SWSE Sec 24  
43.585844; -107.362588  
9/7/2011  
View upstream above confluence with P0163X  
Rated PFC



P0162A Deep Creek  
T 42N R 88W SESEW Sec 24  
43.585844; -107.362588  
9/7/2011  
View downstream from confluence of  
P0163X from top of large rock  
Rated PFC

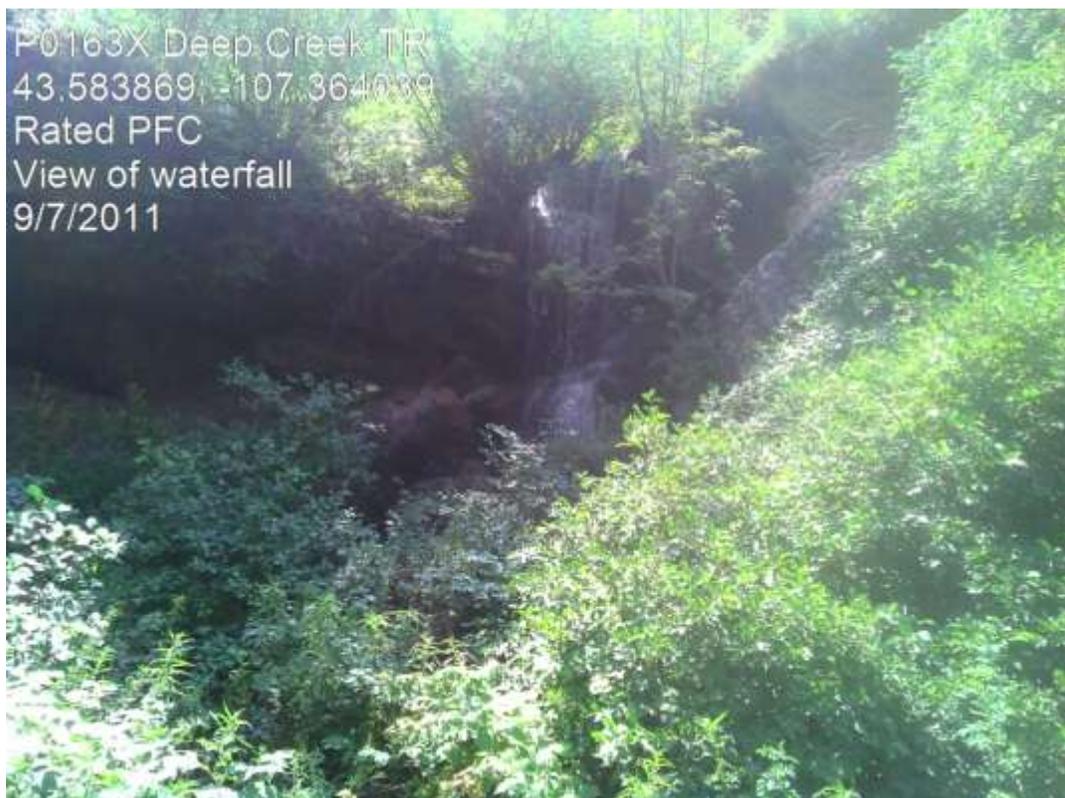


P0162A- Deep Creek

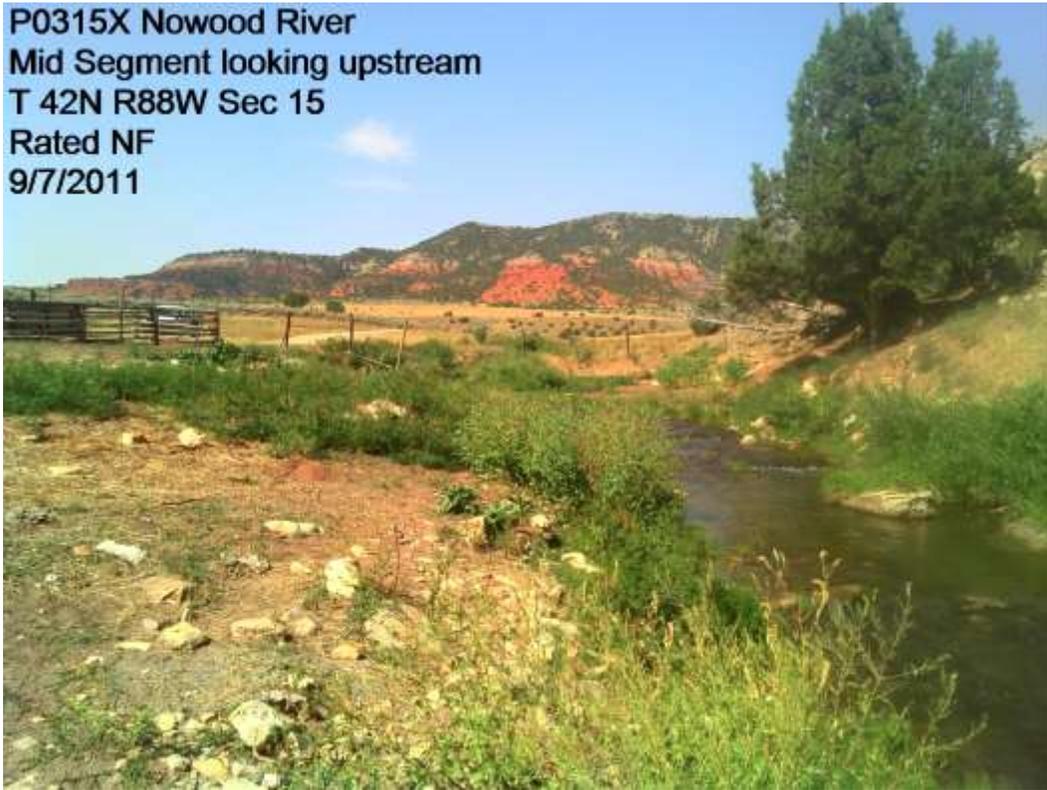
9/13/2006

Overview of Deep Creek- Note steep valley side slopes





P0315X Nowood River  
Mid Segment looking upstream  
T 42N R88W Sec 15  
Rated NF  
9/7/2011



P0315X Nowood River  
T 42N R88W Sec 15  
Top of segment looking down  
Rated NF  
9/7/2011  
Extensive use on south bank

