Bureau of Land Management

WIND RIVER/BIGHORN BASIN DISTRICT
Worland Field Office

Wild Horse Flats Allotment #01504

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

DRAFT

BLM

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

FY 2013/2014

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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 Wild Horse Flats Allotment No. 01504. 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

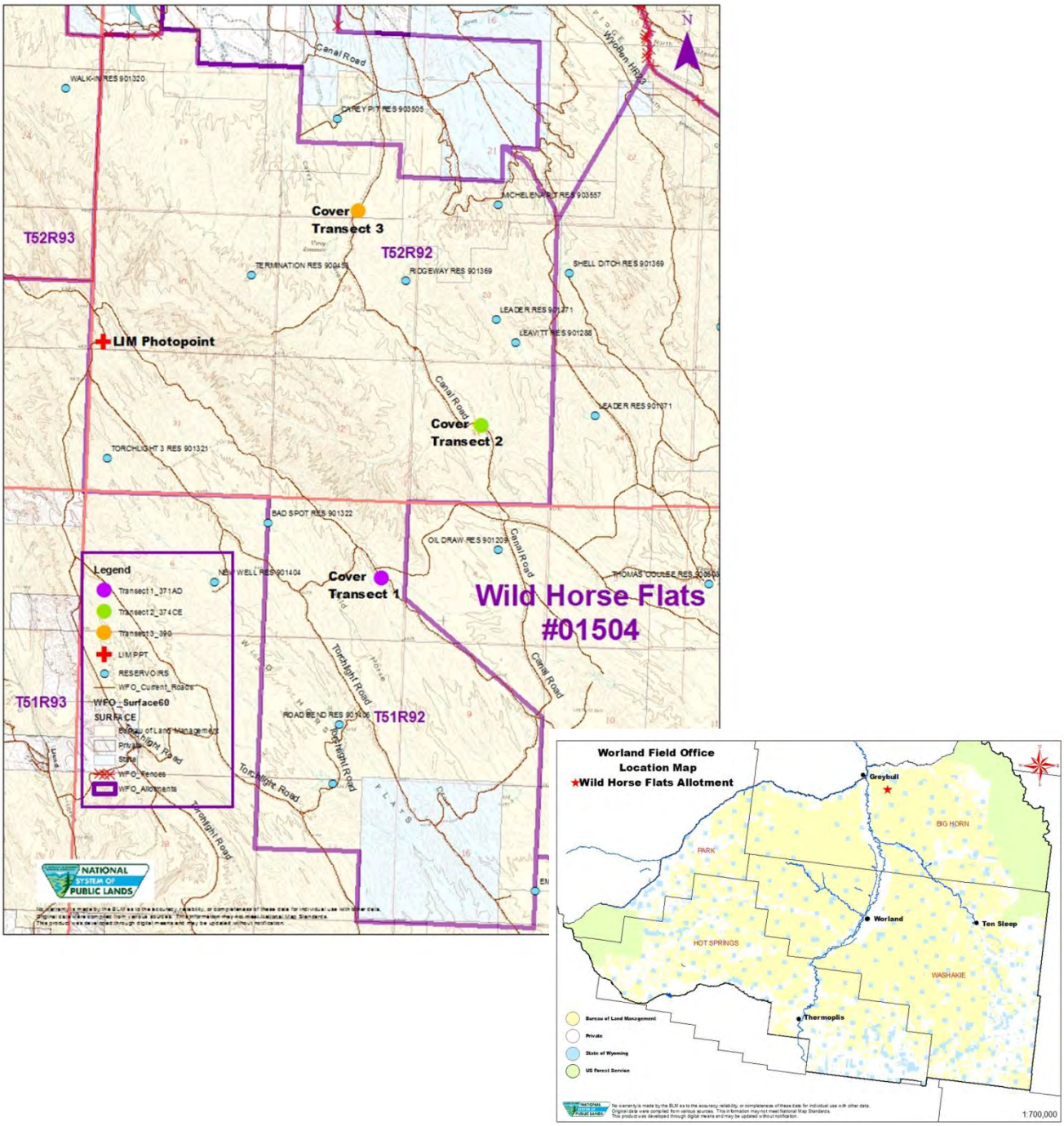
Standard #6: Air quality meets State standards

2.0 AFFECTED ENVIRONMENT – ALLOTMENT DESCRIPTION, RESOURCE VALUES, AND USES

2.1 Location and Land Ownership

The Wild Horse Flats Allotment (Map 1) is located approximately 7 miles southeast of Greybull, Wyoming (Map 2). The average elevation ranges from 4,500 feet to 4,800 feet above sea level. The allotment encompasses approximately 8,816 total acres including 784 acres of State of Wyoming lands (Washakie Resource Management Plan, September 1988). For management priorities, the allotment is classified in the "C" (Custodial) category. There is legal, public access to the allotment via various 2-track roads (Torchlight and Canal).

Allotment Map and Location



2.2 Climate/Air Quality

Annual precipitation ranges from 5-9 inches per year. The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. 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 is about 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.

High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins about April 1 and continues to about July 1. 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 "Emblem" climate station:

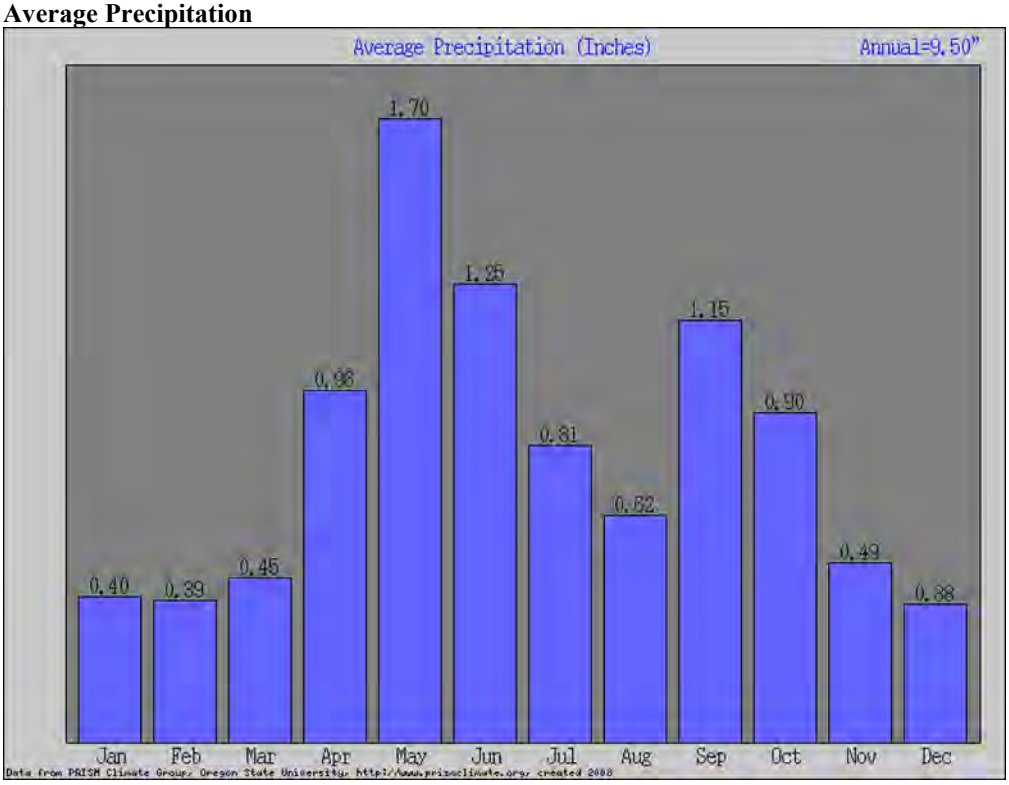
	Minimum	**Maximum**	**5 yrs. Out of 10 between**
Frost-free period (days):	98	171	May 13 – September 19
Freeze-free period (days):	120	184	May 1 – October 5
Mean Annual Precipitation (inches):	3.22	10.97	

Mean annual precipitation: 7.42 inches
Mean annual air temperature: 45.01°F (31.2°F Avg. Min. to 58.7°F Avg. Max.)

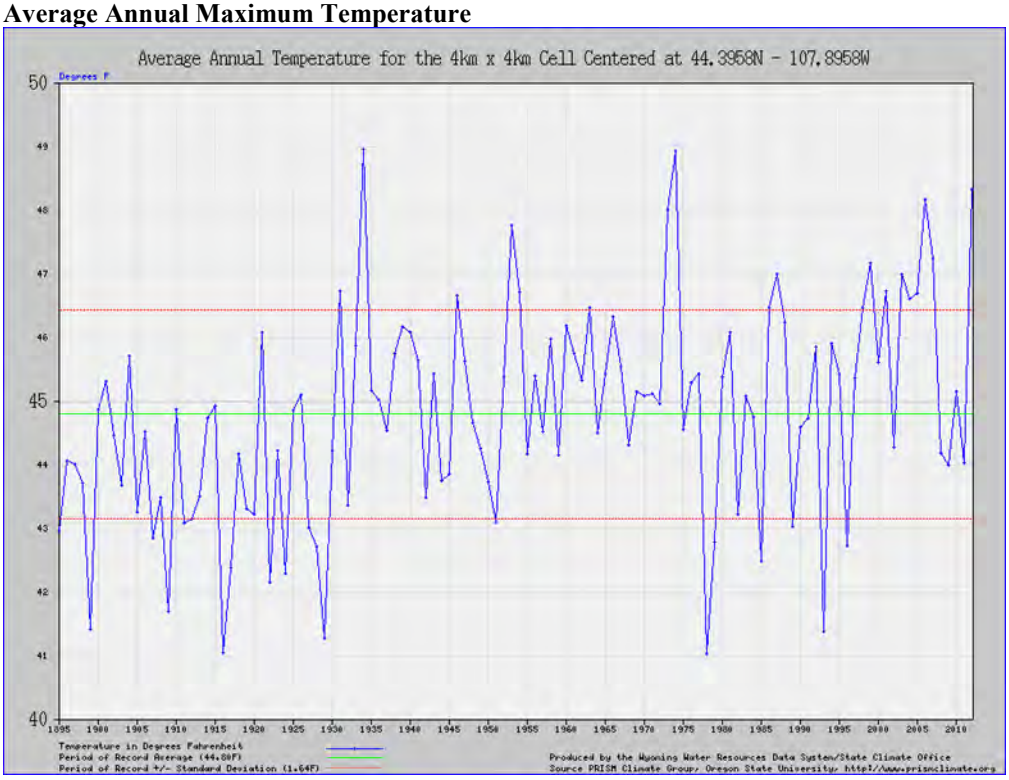
For detailed information visit the Natural Resources Conservation Service (NRCS) National Water and Climate Center at http://www.wcc.nrcs.usda.gov/ website. Other climate station(s) representative of this precipitation zone include "Basin", "Deaver", "Lovell", and "Worland".(United States Department of Agriculture (USDA) NRCS Technical Guide Section IIE Rev. 08/12/05).

An additional climate source is referenced to present overall climate data. According to the PRISM (Parameter-elevation Regressions on Independent Slopes Model), overall averages form monthly precipitation, mean annual precipitation, mean annual air temperature, have been sampled from 4 kilometer x 4 kilometer grid cell selected that is centered in the middle of the allotment. In total, 40 percent of the annual precipitation is during the months of April-June. Additionally the 30 year frost free period for 28 and 32 degree days for the watershed is displayed below along with the 30 year average maximum temperature.

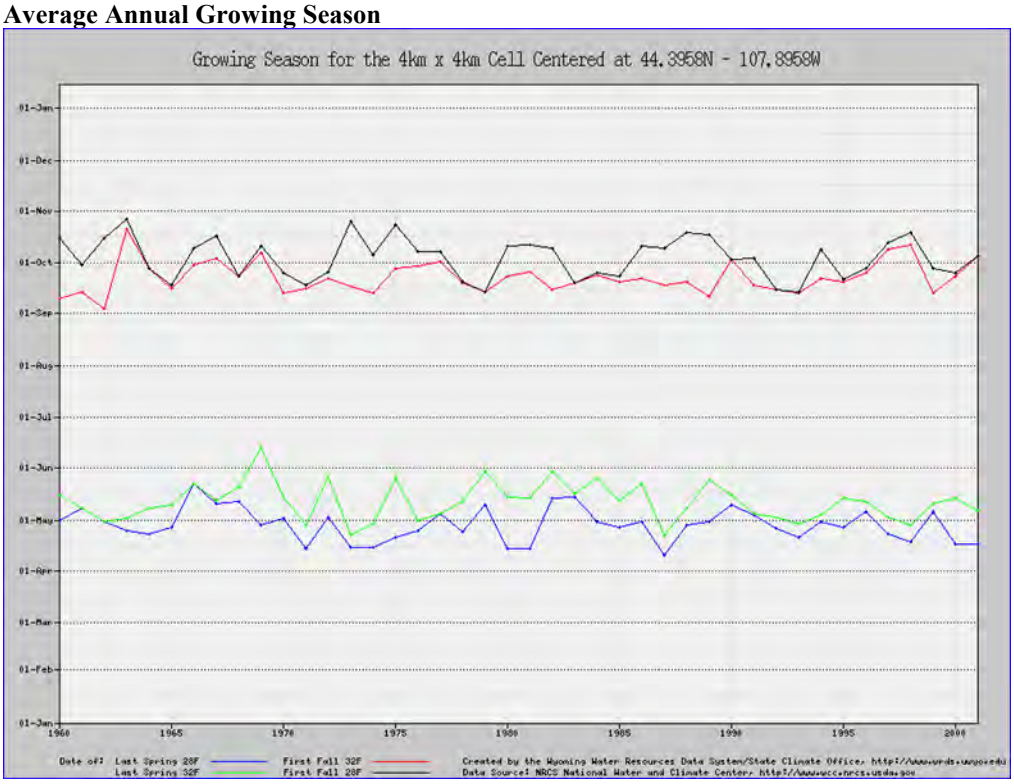
Average Precipitation



Average Annual Maximum Temperature



Average Annual Growing Season



2.3 Soils

The soils reflect the desert environment in which they formed. To the extent that the landform and geology are uniform, there is a noticeable homogeneity to the soils. The soils formed over soft, shale bedrock Soil depths range from very shallow to moderately deep (<10 to 40 inches). Soil textures throughout the profile consist of silty clay loams and clay loams. Soil characteristics vary only in the amount and relative distribution of clay size particles in the profile, the depth to shale bedrock and to a less extent soil reaction. There are several different mapped soils series series throughout the Wild Horse Flats Allotment which consist of the 374CE Chipeta-Persayo-Rock Outcrop, 390 Sayles-Persayo-Youngston, 46AC Kinnear Sandy Loam, 371 Persayo-Greybull Clam Loams, and 102 Badlands outcrops (Soils map).

The Wild Horse Flats Allotment is situated within the 5-9 inch Big Horn Basin Precipitation Zone. Field observations indicate that Saline Upland 5-9 in. precipitation zone (pz) ecological site (R032XY144WY) is the dominant ecological site across the landscape. Also included is the Shale 5-9 in. pz ecological site (R043BY154WY) which occurs on very shallow (<8 inches) soils formed over soft, friable shale bedrock.

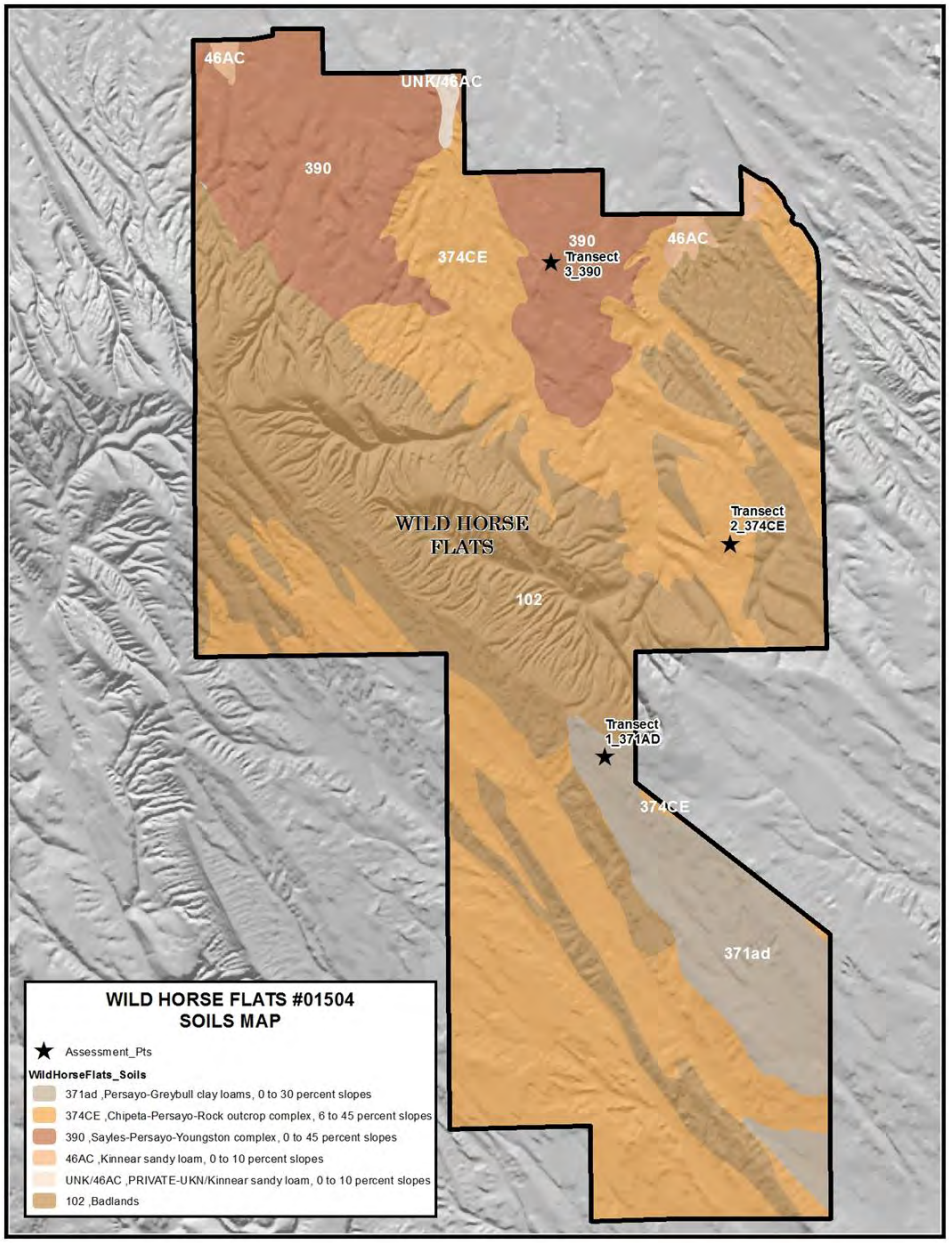
Three rangeland health assessments utilizing the methodology described in *Interpreting Indicators of Rangeland Health, Technical Reference 1734-6* were relied upon in the analysis of the Wild Horse Flats Allotment. The soils at all three locations support a Saline Upland 5-9 inch pz or Shale 5-9 inch pz Ecological site.

The first transect was located in Map Unit 371ad Greybull/Persayo Association. Slope was 0-2 percent. The surface texture was silty clay loam and the A horizon was 2 ½ inches in depth. The B horizon was 5 ½ inches in depth. There was no surface effervescence. The surface pH was 8.4 and electrical conductivity (EC) was 109.

The second transect was located in Map Unit 374CE Chipeta/Persayo/Rock Outcrop Complex. The slope was 0-10 percent. The surface texture was clay loam with shallow depth and the A horizon was 3 inches and the B horizon was at 9 inches and bedrock was at 12 inches in depth. There was very slight surface effervescence. The surface pH was 7.3 and electrical conductivity (EC) was 99.

The third transect was located in Map Unit 390 Sayles/Persayo/Youngston Complex. Slope was 0-2 percent. The surface texture was silty clay loam and the A horizon was 4" and the B horizon was 4-12 inches in depth. There was no surface effervescence. The surface pH was 7.9 and electrical conductivity (EC) was 69.

Soils



2.4 Hydrology

2.4.1 Surface Water/Watershed

The Wild Horse Flats Allotment #01504 is situated along a watershed divide between three different level #5 watersheds (Map 4). This allotment contains areas of the Shell Creek, Lower Nowood Creek, and Bighorn River level #5 watersheds.

Within the Allotment there are four different level #6 sub-watersheds that are identified by the United States Geological Survey (USGS) by name and Hydrologic Units Codes or HUC. In total 60.6 percent of the allotment is located in the Shell Creek-Scharen Gulch sub-watershed with the main drainage of Carey Draw that is an ephemeral drainage that drains the northern half of the allotment that trends in a northern direction toward Shell Creek. The Wild Horse Draw drains 38.7 percent of the allotment with the main ephemeral drainage of Wild Horse Draw that drains in a southern direction toward Nowood Creek. The other sub-watersheds represent less than 1 percent of the allotment and details are given in the table below.

Watersheds in Wild Horse Flats Allotment #01504

HUC 12 Name	HUC 12 Number	HUC 12 Acres	HUC 12 (mi^2)	Allotment Acres	Allotment (mi^2)	% of Allotment	Allotment Contains % of Sub-Watershed
Shell Creek-Scharen Gulch	100800100206	27867.7	43.5	5255.0	8.2	60.6	18.9
Wild Horse Draw	100800080704	28939.2	45.2	3357.0	5.2	38.7	11.6
Sheldon Gulch	100800100205	29063.5	45.4	51.4	0.1	0.6	0.2
Bighorn River-Antelope Creek	100800071208	49561.8	77.4	9.4	0.0	0.1	0.0

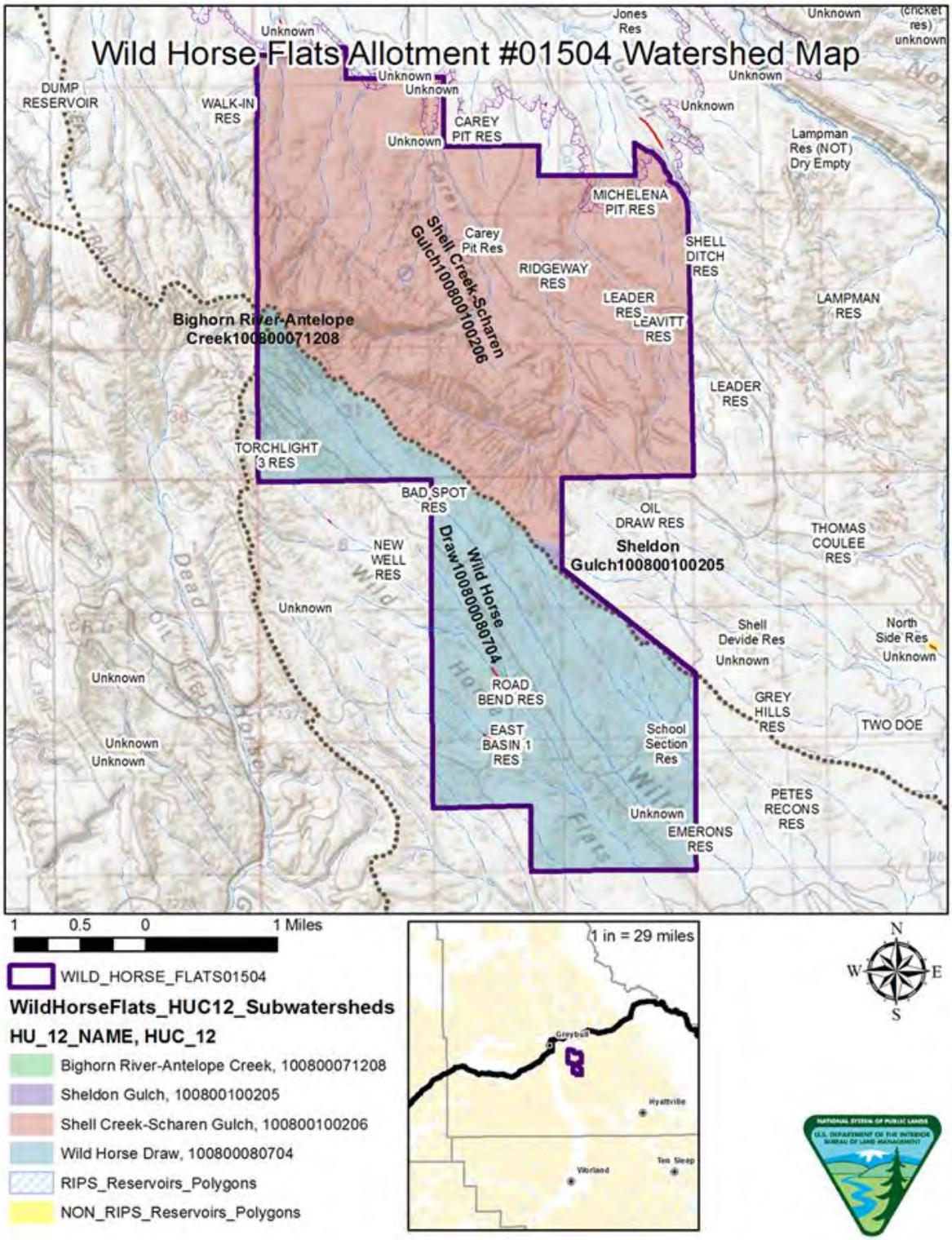
The elevations of the allotment were taken using USGS 10 meter digital elevation models and the maximum elevation for the allotment is 4780 feet above sea level, the minimum is 4028 feet and the average elevation for the allotment is 4311 feet. Typically the middle badland sections of the allotment have the higher amounts of slope.

The total length of ephemeral/intermittent channels for the allotment is 28 miles.

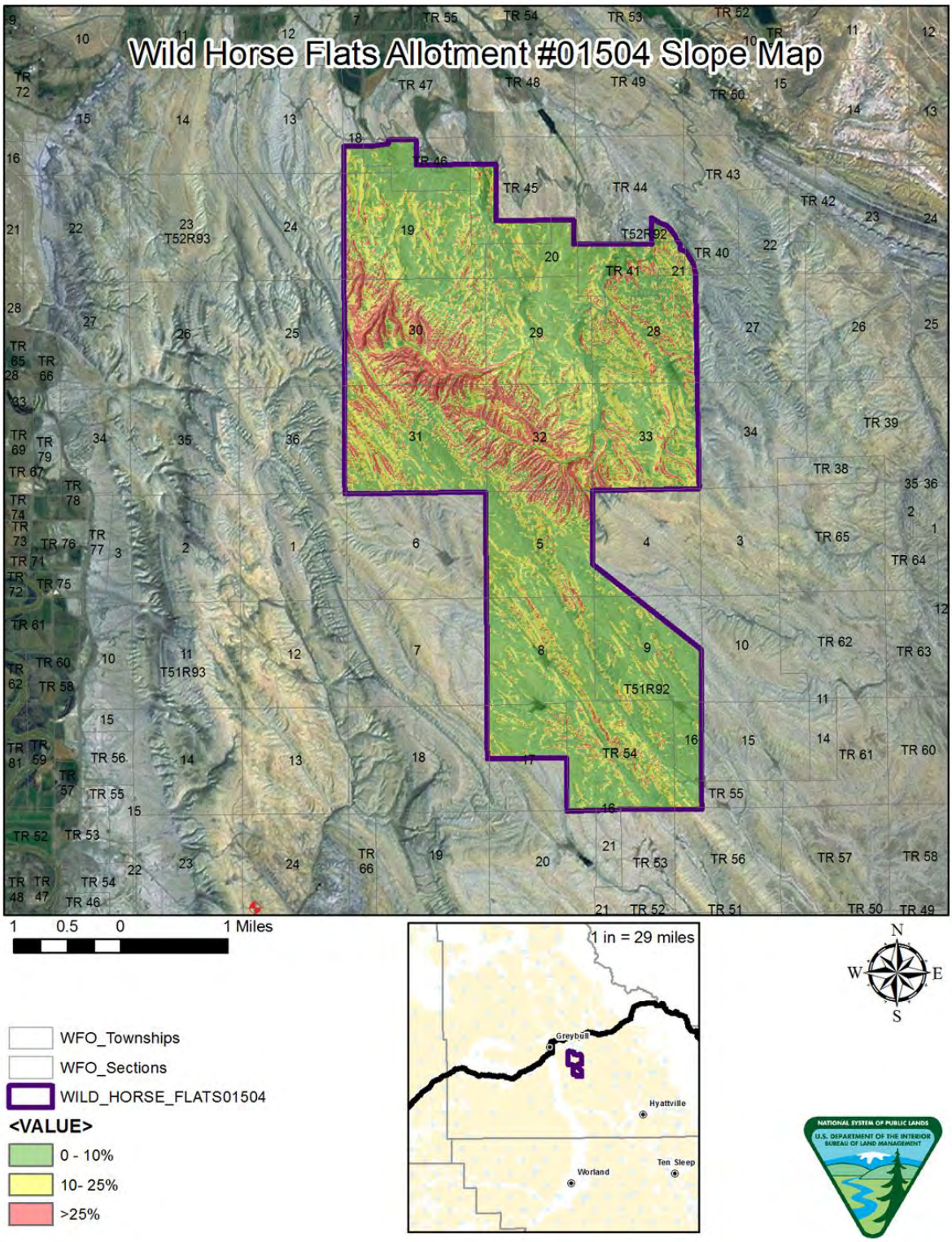
Drainage Pattern

The dominant land forming topographic process is from alluvial forces of erosion. The drainage pattern is a dendritic drainage pattern that reflects horizontal sedimentary bedrock over which it was formed. The drainage density or amount of drainages per square mile is high, and very high along badland on steep rock outcrops of the allotment.

Watershed Map



Allotment Slope Map



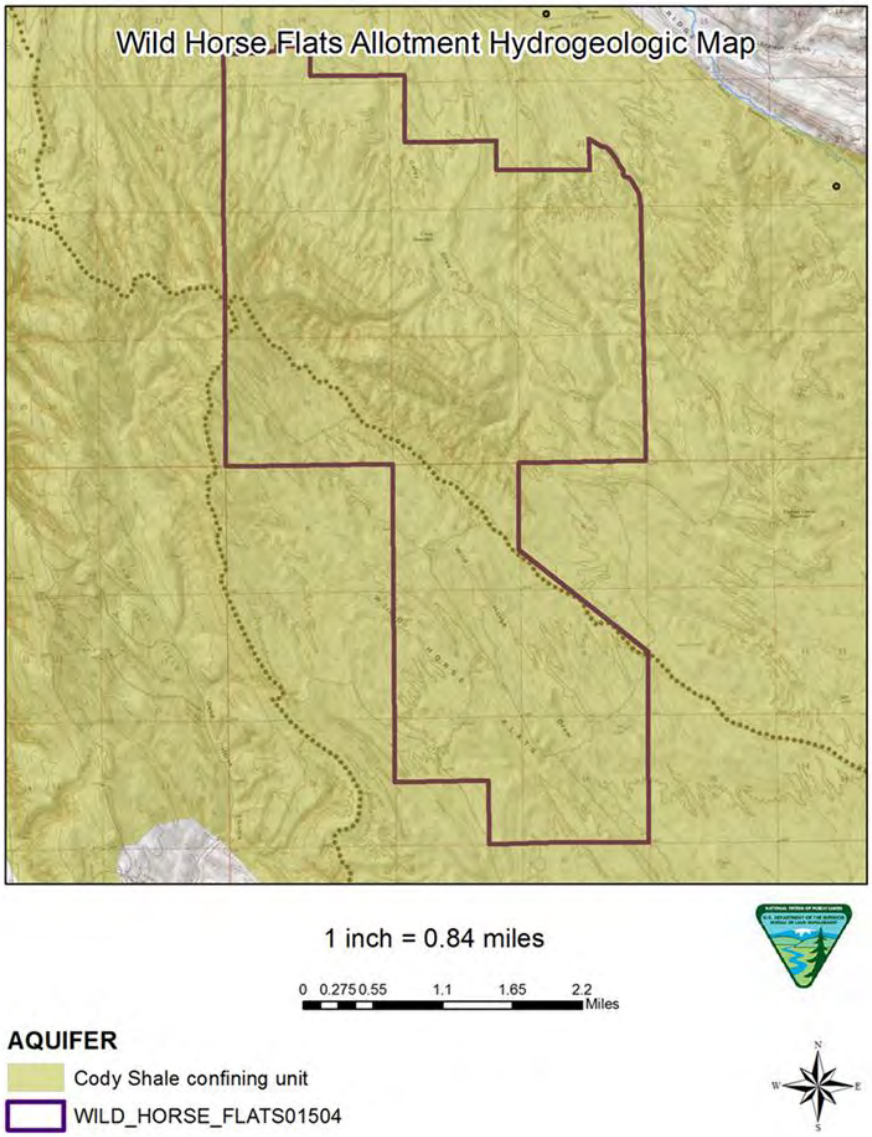
2.4.2 Ground Water

The average depth to ground water is very high in the allotment area. There is no perennial ground water input into surface water sources.

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 of primarily Cretaceous sedimentary rock formations. There is no known springs or seeps in the allotment.

Ground-water recharge in arid and semi-arid regions has generally been viewed as the sum of several different distinct pathways including mountain-block recharge, mountain-front recharge, spatially distributed recharge, and ephemeral stream channel recharge. Recent research has expanded this view to include the mediating role of vegetation (i.e. water use by vegetation), and the greater role of ephemeral stream channel recharge in basin floors (EPA, 2008 p.22). The ground-water recharge for this watershed is likely in the form of ephemeral stream channel recharge.

Wild Horse Flats Hydrogeologic Map



2.4.3 Water Quality
The main drainages of Scharen Gulch and Wild Horse Draw and other tributaries in the allotment are classified by the Wyoming Department of Environmental Quality (DEQ) as class 3B type streams. The associated beneficial uses for class 3B streams are found in the table below. These streams support other aquatic life, recreation, wildlife, agriculture, industry, and provide scenic value throughout portions of the year.

WY DEQ Use Designations

	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

2.4.4 Riparian
There are no naturally occurring wetland/riparian areas.

2.5 Upland Vegetation

The uplands consist of Saline Upland, Shale and Rock Outcrop range sites. Gardner saltbush is the predominate vegetation with minor amounts of Sandberg bluegrass and cactus. Annual wheatgrass has invaded the uplands and occurs in varying degrees across the landscape. Small draws contain sagebrush and minor amounts of bottlebrush squirreltail and Indian ricegrass, as well as cheatgrass. These sites are adjacent to less diverse and productive sites and probably reflect innate soil properties.

Site 1
The plant species identified during the first 2013 assessment (N44° 25’ 250’’ – W107° 55’ 584”) in the south part of the allotment included Gardner’s saltbush *(Atriplex gardneri)*, Sandberg bluegrass *(Poa secunda)*, annual wheatgrass *(Eremopyrum triticeum)*, wild onion *(Allium textile)*, plains pricklypear cactus *(Opuntia polyacantha)*, cheatgrass *(Bromus tectorum)*, Indian ricegrass *(Achnatherum hymenoides)*, and biological crusts. The cheatgrass was rare and located in a shallow draw adjacent to the transect. Indian ricegrass plants were observed in the transect area close to an existing two track road.

Site 2
The plant species identified during the second 2013 assessment (N44° 26’ 221’’ – W107° 54’ 778”) in the middle part of the allotment included Gardner’s saltbush *(Atriplex gardneri)*, Sandberg bluegrass *(Poa secunda)*, annual wheatgrass *(Eremopyrum triticeum)*, plains pricklypear cactus *(Opuntia polyacantha)*, Indian ricegrass *(Achnatherum hymenoides)*, and biological crusts. Indian ricegrass was also identified on the assessment site.

Site 3
The plant species identified during the third 2013 assessment (N44° 27’ 516’’ – W107° 55’ 899”) in the north part of the allotment included Gardner’s saltbush *(Atriplex gardneri)*, biological crusts, annual forb, plains pricklypear cactus *(Opuntia polyacantha)* and Sandberg bluegrass *(Poa secunda)*. Sandberg

bluegrass and cactus plants were observed in the transect area and the area was predominately Gardner's saltbush/bare ground.

2.6 Invasive Species

Noxious weed species inventoried within the allotment include saltcedar (*Tamarix chinensis*) whitetop (*Cardaria draba)* and Canada thistle (*Cirsium arvense.)* Occurrence is primarily near roads and reservoirs or other previously disturbed areas. Other invasive plants found include annual wheatgrass (*Eremopyrum triticeum*) which is abundant in several areas; cheatgrass (*Bromus tectorum)* is only in a few swales with sagebrush. Distribution of cheatgrass is probably limited by the high soil salinity, but annual wheatgrass and halogeton (*Halogeton glomeratus*) are increasing on adjacent allotments with mineral development.

2.7 Livestock Grazing Management

Flitner Limited Partnership has a grazing permit that authorizes livestock use in the Allotment.

Grazing permit GR4901411 authorizes the following use:

Wild Horse Flats #01504
122 Sheep 12/01 to 02/10 100% Public Land 58 AUMs

Terms and Conditions: None

Permitted Use (AUMs): 58 Active 42 Suspended 100 Total

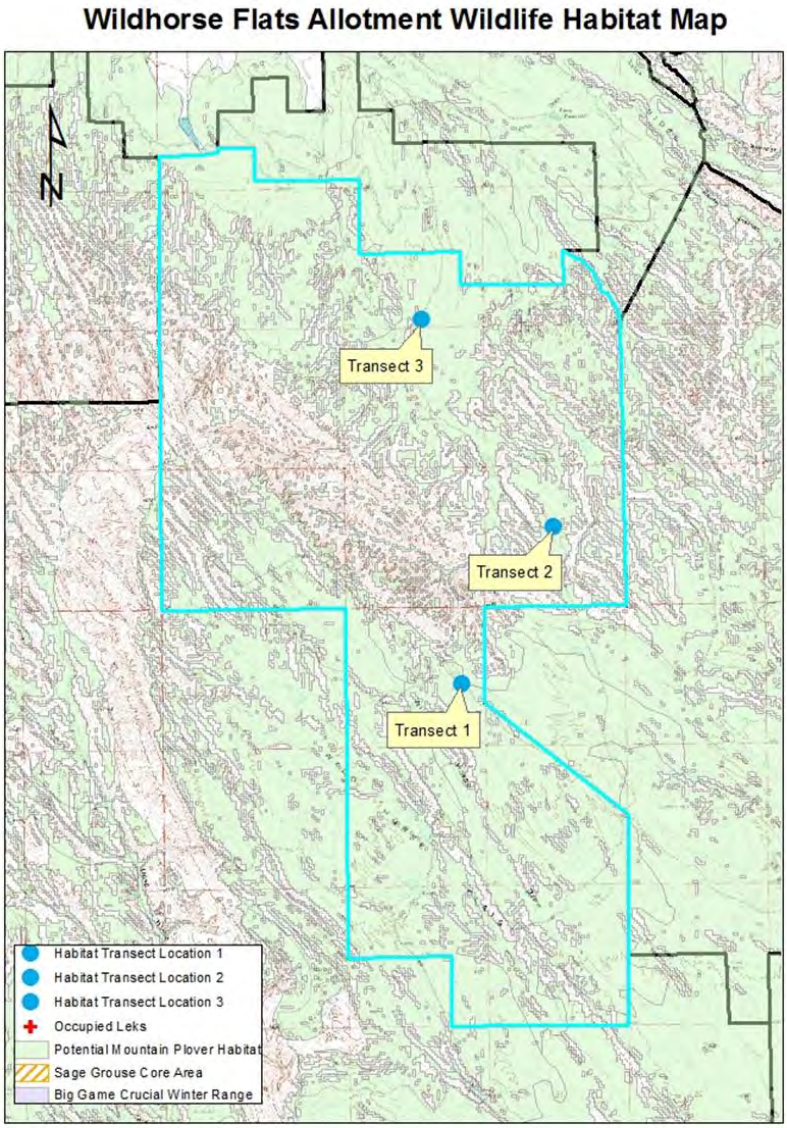
The calculated livestock grazing use since 1998, when Flitner Limited Partnership traded for the preference in this allotment, is shown below. This information was compiled from paid grazing bills, as well as notes and conversation records found in the case file. This allotment had two different grazing permits (Fleming and Flitner Limited Partnership) until 2005, but Flitner Limited Partnership never licensed sheep use in the allotment. Incidental sheep and cattle use have been observed when no grazing use was authorized, primarily occurring in the south half of the allotment, but the amount of use is unknown.

Livestock Grazing Use			
Year	**Estimated Actual Use (AUMs)**		
	Flitner	**Fleming**	**Total**
1998	0	95	95
1999	0	294	294
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	0	0	0
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	0	0	0
2012	0	0	0
2013	0	0	0
Average	**0**	**24**	**24**

2.8 Wildlife

Wildlife habitat on the Wildhorse Flats allotment is characterized by very sparsely vegetated dry rolling hills having large areas of bare ground with scattered Gardner's saltbush, Sandberg bluegrass, and Prickly pear cactus on predominantly upland saline soils. Precipitation characteristics are on the low end of a 5 to 9 inch precipitation zone and productivity is very low. Some Bottlebrush squirreltail and inasive cheat grass can be found in lower areas where moisture is adequate for those species. Without the presence of sage brush, no sage brush obligate wildlife species can reasonably be expected to be found on this allotment. Various raptors seeking prey in the form of rabbits or other small mammals may be observed occasionally traversing the area.

Wildlife Habitat



2.9 Threatened, Endangered, Candidate, or Sensitive Species

No known threatened or endangered wildlife species have been identified on the allotment. Much of the habitat in the area has been identified by Wyoming Department of Game and Fish as suitable for Mountain Plover, a BLM sensitive species, however none of the birds have been observed. Due to the absence of sage brush, no sage brush obligate avian species such as the Sage sparrow, Brewer's sparrow, Sage grouse, or Sage thrasher would be expected to utilize habitat within this allotment.

3.0 Summary of Monitoring Data / Assessments

3.1 Monitoring Data

In the summer of 2013, three vegetation monitoring sites were selected in 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.

Line Intercept Canopy Cover transects (100 points per transect) were completed at each monitoring site in 2013. A summary of the cover data collected from each monitoring site is shown below in Table 8:

Vegetation Monitoring Data						
Monitoring Site	**Ecological Site**	**Basal Vegetative Cover**	**Litter**	**Bare Ground**	**Sagebrush Canopy Cover**	**Brte Presence ((hits/transect pts)*100)**
Site 1	Saline Upland 5-9"	9%	18%	67%	n/a	n/a
Site 2	Saline Upland 5-9" Shale 5-9"	12%	17%	58%	n/a	n/a
Site 3	Saline Upland 5-9"	18%	19%	48%	n/a	n/a

Cheatgrass presence is derived from total "hits" on cheatgrass, canopy or basal, throughout the transect. It is a representation of the amount times the plant was encountered along a transect in relation to the amount of points observed on the transect.

Rangeland Health Assessments were conducted at the monitoring sites by an interdisciplinary team on 08/23/2013 using the 17 Indicators of Rangeland Health as described in BLM Technical Reference 1734-6. Field observations were compared to the Reference Sheet for the Saline Upland 5-9" Precipitation Zone (R032XY144WY) at Site 1 and Site 3, to determine departures from normal.

However at Site 2, soils mapping indicated this was a Shale 5-9" Precip Zone (R032XY154WY), but after field checking soils at this assessment site soils were 12" to bedrock, while the Ecological Site Description for the Shale 5-9" Precip Zone states soils are shallow and less than 8" to bedrock. Site 2 was compared to both the Saline Upland 5-9" and Shale 5-9" Precip Zones to determine departures from normal.

Individual ratings for the *Rangeland Health Indicators* are displayed for each monitoring site in Table 9 on the following page.

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

3.2 Soils and Site Stability

Data collected for the Rangeland Health Assessments were 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.

Site 1

The rangeland health assessment conducted in the south part of the allotment was compared to the Reference Sheet for Saline Upland RO32XY144WY ecological site to determine departures from normal.

Rills were sporadic on bare areas and midslopes. Waterflow patterns were present on slopes 0-2% and interconnected bare areas were observed. Active pedestalling was occurring on sagebrush plants 2-4" on slopes less than 2%. Exposed roots were observed and litter dams were occurring in depressions. According to cover transect data, bare ground was determined to be 67% which is higher than expected (30-40% described in reference sheet) with large, patchy bare areas present. Litter cover was determined

to be 18% while the reference sheet range was 10-15%. Litter movement was up to 2" in distance and accumulating in depressions. Gullies active on slopes, slightly active on slopes less than 2%, and beginning along adjacent 2-track road. No wind-scour areas were observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion was 2.5; the reference sheet places the average SSI at 4.0 or greater. Based on the transect data, biological soil crusts account for 2 percent of the total cover or 11% of the basal cover; the presence of which adds additional protection to the soil surface. The small soil pit that was dug as part of the investigation revealed 2 ½ inch A horizon which could be indicative of 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 ***"Moderate"***.

<u>Site 2</u>
The rangeland health assessment conducted in the middle of the allotment was compared to the Reference Sheet for Shale R032XY154WY and the Saline Upland RO32XY144WY ecological sites dated 5/2/2008 to determine departures from normal.

Rills were active on slopes 4-10%. Waterflow patterns were not observed on flat ground. Pedestals were 1-2" on sagebrush plants but no terracettes were observed. According to cover transect data, bare ground was determined to be 58% which was lower than expected for a Shale range site (75-80% described in reference sheet). Litter cover was determined to be 17 percent while the reference sheet was 10-15%. Slight litter movement was observed. Gullies were active on steeper slopes but this is expected. There was no wind–scour observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion was 3.4; the reference sheet places the average SSI at 3.0 or greater. Based on the transect data, biological soil crusts account for 4 percent of the total cover or 33% of the basal cover; the presence of which adds additional protection to the soil surface. The small soil pit that was dug as part of the investigation revealed 3 inch A horizon but the soils were shallow with 12 inches to bedrock. No soil compaction was observed.

Based on the observations discussed above for a Shale 5-9 pz range site the attribute rating for *Soil and Site Stability* was ***"None to Slight"*** and *Hydrologic-Function* were rated as ***"Slight to Moderate"***.

If the transect was compared to a Saline Upland 5-9" pz range site rills were active on slopes 4-10%, waterflow patterns were not observed on flat ground. Pedestals were 1-2" on sagebrush plants but no terracettes were observed. According to cover transect data, bare ground was determined to be 58% which is higher than expected for a Saline Upland range site (30-40% described in the reference sheet). Slight litter movement was observed. Gullies are active on steeper slopes. No wind-scour areas were observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion was 3.4; the reference sheet places the average SSI at 4.0 or greater. Based on the transect data, biological soil crusts account for 4 percent of total cover or 33% of basal cover; the presence which adds additional protection to the soil surface, but the amount of bare ground was higher than expected. The soil pit that was dug as part of the investigation revealed a 3 inch A horizon which could be indicative of minor historic soil loss, but soils were shallow with only 12 inches to bedrock. No soil compaction was observed.

Based on the observations discussed above for a Saline Upland 5-9 pz range site the attribute rating for *Soil and Site Stability* was ***"Moderate"*** and *Hydrologic-Function* were rated as ***"Moderate"***.

Site 3
The rangeland health assessments conducted in the north part of the allotment was compared to the Reference Sheet for Saline Upland RO32XY144WY ecological site dated 5/2/2008 to determine departures from normal.

No rills or waterflow patterns were observed on flat ground. Pedestals were 1-2" on sagebrush plants but no terracettes were observed. According to cover transect data, bare ground was determined to be 48% which is higher than expected (30-40% described in reference sheet) with large, patchy bare areas 2-3 feet in diameter present but they were not connected. Litter cover was determined to be 19% while the reference sheet range was 10-15%. No litter movement was observed. No gullies or wind-scoured areas observed. The soil stability index (SSI), an indicator of soil surface resistance to erosion was 4.1; the reference sheet places the average SSI at 4.0 or greater. Based on the transect data, biological soil crusts account for 11 percent of the total cover or 61% of the basal cover; the presence of which adds additional protection to the soil surface. The small soil pit that was dug as part of the investigation revealed 4 inch A horizon which could be indicative of minor historic soil loss. No soil compaction was observed.

Based on the observations discussed above the attribute rating for *Soil and Site Stability* was ***"None to Slight"*** and *Hydrologic-Function* was rated as ***"Slight to Moderate"***.

3.3 Hydrology

3.3.1 Surface Water

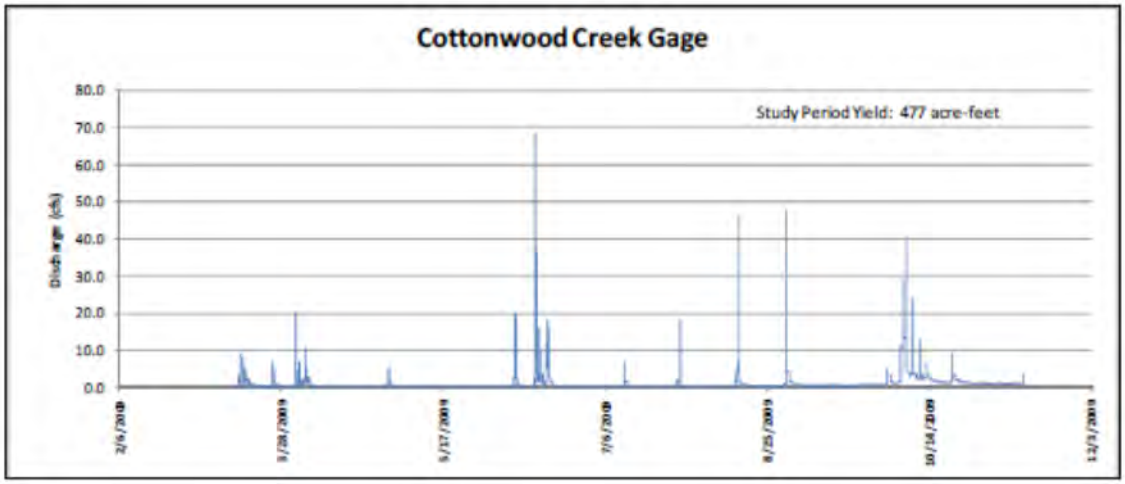
The amount of surface water data from Scharen Gulch and Wild Horse Draw is limited due to the ephemeral flow regime of the drainages however,. The drainage flows in response to snow melt runoff and following storm events that primarily occur from the months of April-June. The Wild Horse segment received a level I Rosgen Classification (Rosgen,1996) and was classified as a Rosgen G type (Anderson,2009). **G-Type Channels** are narrow, steep entrenched gullies. GType channels typically have high bank erosion rates and a high sediment supply. Channel degradation and side slope rejuvenation processes are typical.

The channels within the watershed are dominantly Rosgen G5 type streams that are defined as (Rosgen, 1996) entrenched, narrow, and deep channels with a low to moderate sinuosity. These types have high bank erosion rates and a high sediment supply. The main channel material or d50 for Scharen Gulch and Wild Horse Draw is a classified as sand/silt material size. These channel types generate naturally high bed-load and sediment transport rates and flow only in response to precipitation events between 2-5 percent of the total days in the average year (Hedman, 1983). They contain highly weathered rock and erodible materials, and high lateral extension rates and bar deposition following infrequent storm events.

The nearest comparable watershed with recent data was collected from Big Cottonwood Creek by the Wyoming Water Development Commission (Anderson,2009); this data gives an understanding of the typical hydrograph and associated runoff in the Big Cottonwood Creek watershed.

Several high flows in Big Cottonwood during the 2009 field season occurred and created a scour line at the bank full stage. Due to the instability of the channel major sloughing of side banks were observed during the field investigation. During a study by the Wyoming Water Development Commission (Anderson, 2009) there was a pressure transducer installed and a typical hydrograph for the creek was established. The channel is mostly dry throughout the summer months with flows reaching 40-60 cfs during a 24-48 hour period following an event and returning to an essentially dry channel.

Hydrograph Big Cottonwood Creek (Anderson, 2009)



BLM- Range Hydrologic Condition

The current conditions of runoff specific to the allotment are tied to the upland health hydrologic indicators. The overall hydrologic indicators measured for these 3 monitoring sites of the monitoring sites, a moderate overall departure from reference conditions. Low amounts of infiltration and high amount of water flow patterns in the form of pedestals and terracettes with active shift in plant community and low soil surface resistance to erosion were noted to have a moderate and moderate to extreme departure at Transect 1. Although semi-arid ecological sites naturally have these features, they were expressed beyond normal reference conditions and rated accordingly as moderate.

Human Influence

Anthropogenic uses and activities on the landscape can have impacts – both adverse and beneficial– on water quality and the health of a watershed. Human-related disturbances are numerous and include livestock grazing, land clearing, mining, timber harvesting, ground- water withdrawal, stream flow diversion, channelization, urbanization, agriculture, roads and road construction, off-road vehicle use, camping, hiking, and vegetation conversion. Biological stressors include habitat loss, alteration, effluent discharge, and degradation from decline in water quality, and changes in channel and flow characteristics (EPA, 2008 p.65).

Many of the first order tributaries in the basin can be classified as G-Type channels, or gullies. These channels are highly erosive, generate high sediment volumes, and can result in the loss of productive lands and destabilize upland conditions. Observation of many of these channels indicates that while the major stream channels appear to have achieved a level of stability, the upper reaches of the watershed are still suffering a level of destabilization. These channels could be forming in response to one or more of numerous stimuli including but not necessarily limited to: channel realignment (straightening), road and culvert construction, rangeland management practices, or base-level lowering associated with main channel incision (Anderson, 2009 p.3.100).

The nearest population center is Greybull Wyoming that is located 7 miles to the northwest of the allotment. There is permitted grazing that occurs throughout the watershed and is discussed in greater detail in other sections of this document. There are numerous historic prospecting wells (oil and gas), active, and abandoned wells that were drilled throughout 1950's- through 1970's and there is an active

Torchlight Oil Field in the southwestern sections of the allotment. Human activity has created demand for existing roads in the watershed. The majority of the reservoirs were constructed from the 1950's-1970 and these impoundments have altered the runoff volume and sediment transmission rates from impounded drainages.

There is an estimated 17 miles of two track and 5 miles of BLM improved roads. From the miles of road, the total disturbance was 50 acres. This was derived from digitized roads using a 30 foot width for improved roads and 15 foot width for primitive roads.

3.3.2 Ground Water

The surficial geologic outcrop is mapped in the 2010 Wyoming Geologic Survey as the Cretaceous Cody Shale. The formation is a regional aquitard and is considered a thick confining unit that is present throughout much of the entire Bighorn Basin. The amount of groundwater infiltration to groundwater is likely minimal.

Ground-water recharge in arid and semi-arid regions has generally been viewed as the sum of several different distinct pathways including mountain-block recharge, mountain-front recharge, spatially distributed recharge, and ephemeral stream channel recharge. Recent research has expanded this view to include the mediating role of vegetation (i.e. water use by vegetation), and the greater role of ephemeral stream channel recharge in basin floors (EPA, 2008 p.22). The ground-water recharge for this watershed is likely in the form of ephemeral stream channel recharge.

3.3.3 Water Quality

BLM Observations

The tributaries contain active head-cuts that appear to be migrating upstream. These areas are where new sediment is delivered into the drainage system. The watershed transmits large amounts of in-channel sediment into the system during primary snowmelt, and other storm events that are large enough to trigger overland flow.

Wyoming DEQ

The drainages are classified by the WYDEQ as class 3B streams by default. Wild Horse Draw and Scharen Gulch are not on the WYDEQ 2012 305b as impaired.

USGS Data

There were no USGS sites found for surface or ground water data in the allotment. Groundwater depths at deep formations could be found upon investigation of oil and gas wells in the allotment.

3.4 Upland Vegetation

Data from the line intercept cover transects, the 17 Indicators of Rangeland Health, and other field observations were used to evaluate the vegetative community on the allotment. Standard 3 for Healthy Rangelands was evaluated based on the attribute ratings for Biotic Integrity using rangeland health indicators 8 through 9, and 11 through 17.

Site 1

The vegetative community, ground cover, and soil surface attributes for the assessment sites were noted, measured and compared to the ecological site description (ESD) and corresponding reference sheet for the Saline Upland RO32XY144WY ecological site.

The Historic Climax Plant Community for this site is *Gardner's Saltbush/Indian Ricegrass/Bottlebrush Squirreltail Plant Community*. Gardner's saltbush dominates this state. Other salt tolerant shrubs include greasewood and birdfoot sage. The major grasses include Indian ricegrass, bottlebrush squirreltail,

Sandberg bluegrass, and rhizomatous wheatgrass. A variety of forbs also occurs in this state and plant diversity is high. This state is fragile, but well adapted to the Northern Intermountain Desertic Basins climate conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community, but is difficult to reestablish when damaged. Moderate, continuous season-long grazing will convert this plant community to the *Gardner's Saltbush/Bottlebrush Squirreltail Plant Community*. Frequent and severe grazing can transition this community to a *Gardner's Saltbush/Bare Ground Plant Community* while severe ground disturbance will convert this plant community to the *Halogeton Plant Community*.

According to the ecological site descriptions developed by the Natural Resources Conservation Service, this site has the vegetative components expected for the Gardner's ***Saltbush/Bare Ground Plant Community.*** The attribute rating justification for the *Biotic Integrity* at this site was Moderate to Extreme. The dominant functional / structural groups at this monitoring site are half-shrubs (Gardner's Saltbush), followed by short stature grasses (Sandberg bluegrass), and then annual grasses (annual wheatgrass). The percent litter (18%) was slightly more than expected (10-15%) and bare ground (67%) was more than expected (30-40%) for this site. None of the expected native, cool season perennial grasses were found on the transect and the majority of vegetation was composed of Gardner's saltbush, Sandberg bluegrass, wild onion, annual wheatgrass, plains pricklypear cactus, biological crusts, and a small patch of Indian ricegrass adjacent to the two-track road. Cheatgrass occurred in a small draw west of the transect site but was not common in the assessment area. Mortality and decadence was what was expected for the site. Annual production was somewhat reduced but reproductive capability of the plants present was what was expected for the site.

This plant community is resistant to change as the stand becomes more decadent. Plant diversity is extremely low. The plant vigor is diminished and replacement capabilities are severely reduced due to the decrease in the number of cool-season grasses.

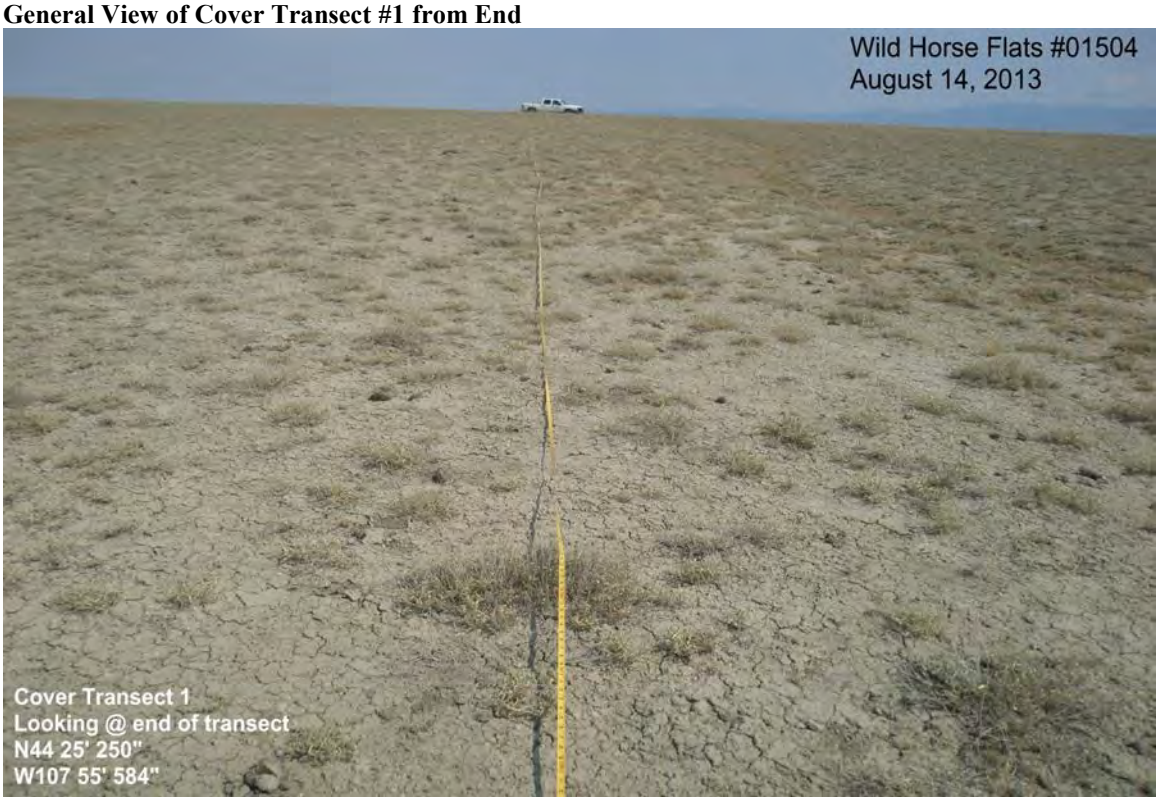
Transitional pathways leading to other plant communities are as follows:

- Very long term prescribed grazing may eventually return this plant community at or near the HCPC.

- Severe ground disturbance will convert this state to the Halogeton Plant Community.

General View of Cover Transect #1 from Beginning

General View of Cover Transect #1 from End



Cover Transect #1 - 150' mark

<u>Site 2</u>

Shale 5-9"

The Historic Climax Plant Community for the Shale range site is Bottlebrush Squirreltail/Gardner's Saltbush Plant Community. This state evolved with grazing by large herbivores and droughty soils due to the shallow depth to undeveloped salty weathered shale material. Historically fire has not played an important role in this state due to the naturally sparse vegetation, which prohibits the spread of fire. Potential vegetation is about 60% grasses, 15% forbs, and 25% woody plants. Cool season midgrasses dominate the state. The major grasses include bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, and rhizomatous wheatgrasses. Other grasses occurring in this state include alkali sacaton, blue grama, and Sandberg bluegrass. Gardner's saltbush and winterfat are conspicuous elements of this state. A variety of forbs also occurs in this state and plant diversity is high. This state is fragile, but well adapted to the Northern Intermountain Desertic Basins climate conditions. The diversity in plant species allows for some drought resistance. This is a sustainable plant community, but is difficult to reestablish when damaged. Moderate, continuous season-long grazing will convert this plant community to the Perennial Grass/Mixed Shrub Plant Community. Prolonged drought will exacerbate this transition.

According to the ecological site descriptions developed by the Natural Resources Conservation Service, as a Shale range site this site has the vegetative components expected for the ***Perennial Grass/Mixed Shrub Plant Community***. The attribute rating justification for the *Biotic Integrity* at this site was Slight to Moderate. The dominant functional / structural groups at this monitoring site are half-shrubs (Gardner's Saltbush), followed by short stature grasses (Sandberg bluegrass), and then annual grasses (annual wheatgrass). The percent litter (17%) was slightly more than expected (10-15%) and bare ground (58%) was less than expected (75-85%) for this site. None of the expected native, cool season perennial grasses were found on the transect and the majority of vegetation was composed of Gardner's saltbush, Sandberg bluegrass, annual wheatgrass, plains pricklypear cactus, biological crusts, and a rare

Indian ricegrass plant. Mortality and decadence was what was expected for the site. Annual production and reproductive capability of the plants present was what was expected for the site.

This plant community is resistant to change. The watershed is functioning and the biotic community is intact.

Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing or possibly long-term prescribed grazing will convert this plant community to the *HCPC*. The probability of this occurring is high especially if rotational grazing along with short deferred grazing is implemented as part of the prescribed method of use.

- Frequent and severe grazing over the long-term will convert this plant community to the *Birdsfoot Sagebrush/Woodyaster vegetative state*.

Saline Upland 5-9"

The Historic Climax Plant Community for the Saline Upland range site is Gardner's Saltbush/Indian Ricegrass/Bottlebrush Squirreltail Plant Community. Gardner's saltbush dominates this state. Other salt tolerant shrubs include greasewood and birdfoot sage. The major grasses include Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, and rhizomatous wheatgrass. A variety of forbs also occurs in this state and plant diversity is high. This state is fragile, but well adapted to the Northern Intermountain Desertic Basins climate conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community, but is difficult to reestablish when damaged. Moderate, continuous season-long grazing will convert this plant community to the Gardner's Saltbush/Bottlebrush Squirreltail Plant Community. Severe ground disturbance will convert this state to the Halogeton Plant Community.

According to the ecological site descriptions developed by the Natural Resources Conservation Service, this site has the vegetative components expected for the Gardner's ***Saltbush/Bare Ground Plant Community.*** The attribute rating justification for the *Biotic Integrity* at this site was Moderate. The dominant functional / structural groups at this monitoring site are half-shrubs (Gardner's Saltbush), followed by short stature grasses (Sandberg bluegrass), and then annual grasses (annual wheatgrass). The percent litter (17%) was slightly more than expected (10-15%) and bare ground (58%) was less than expected (75-85%) for this site. None of the expected native, cool season perennial grasses were found on the transect and the majority of vegetation was composed of Gardner's saltbush, Sandberg bluegrass, annual wheatgrass, plains pricklypear cactus, biological crusts, and a rare Indian ricegrass plant. Mortality and decadence was what was expected for the site. Annual production and reproductive capability of the plants present was what was expected for the site.

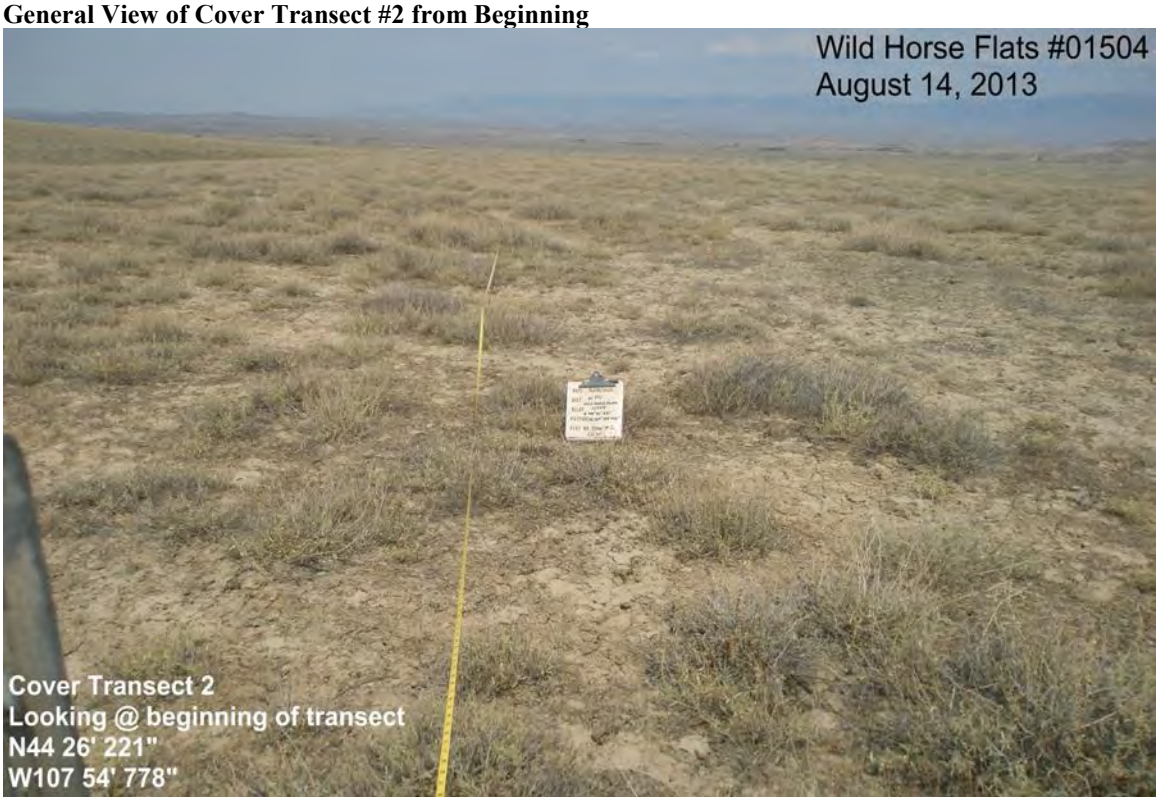
This plant community is resistant to change as the stand becomes more decadent. Plant diversity is extremely low. The plant vigor is diminished and replacement capabilities are severely reduced due to the decrease in the number of cool-season grasses.

Transitional pathways leading to other plant communities are as follows:

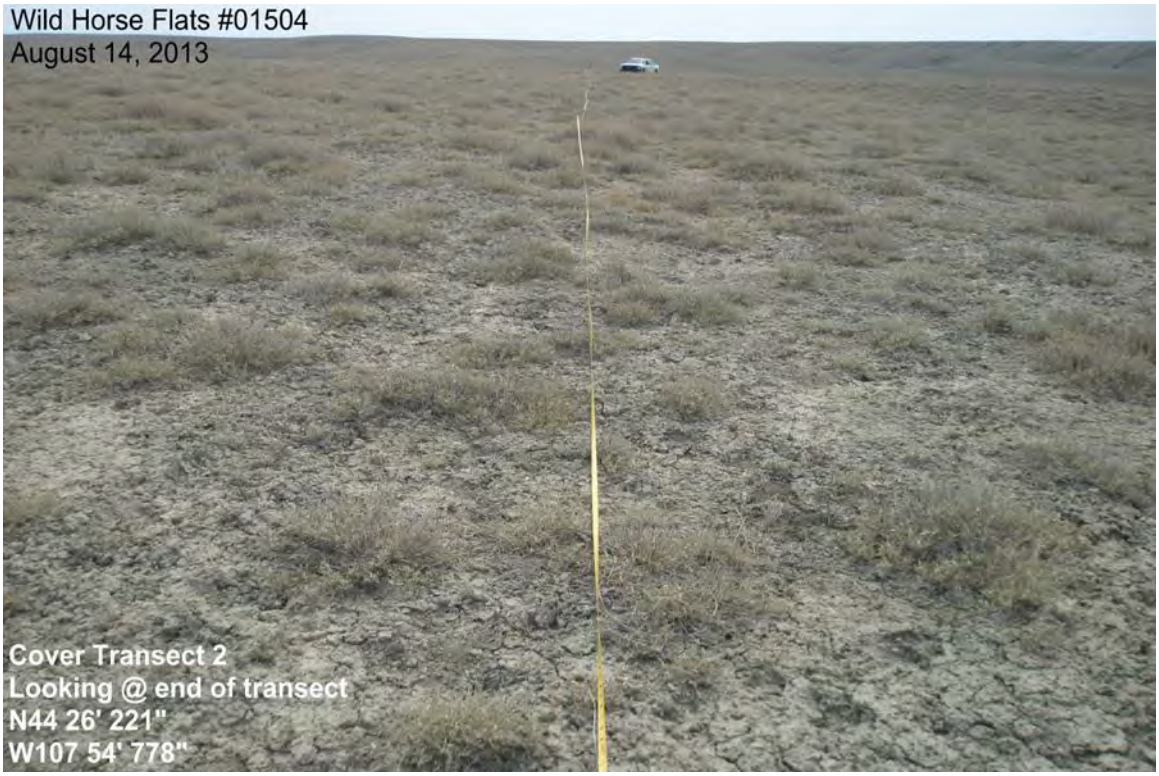
- Very long term prescribed grazing may eventually return this plant community at or near the HCPC.

- Severe ground disturbance will convert this state to the Halogeton Plant Community.

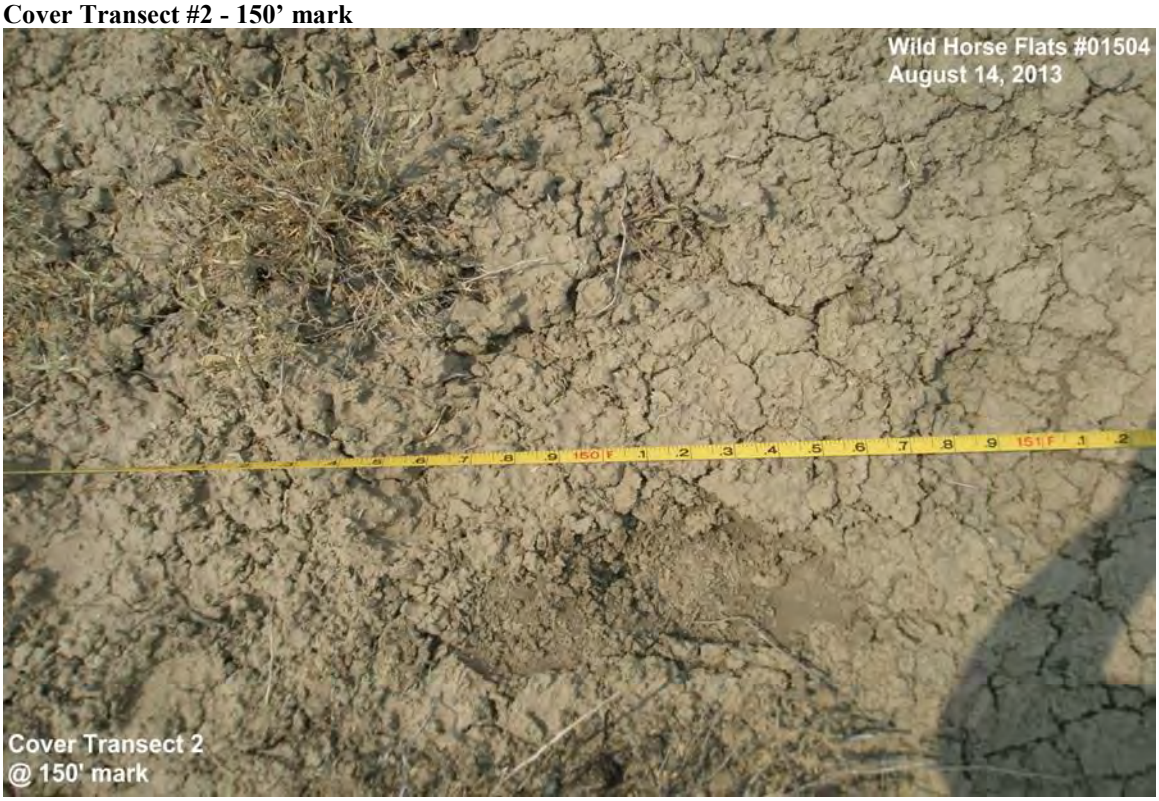
General View of Cover Transect #2 from Beginning



General View of Cover Transect #2 from End



Cover Transect #2 - 150' mark



Site 3

The vegetative community, ground cover, and soil surface attributes for the assessment sites were noted, measured and compared to the ecological site description (ESD) and corresponding reference sheet for the Saline Upland RO32XY144WY ecological site dated 5/2/2008.

The Historic Climax Plant Community for this site is *Gardner's Saltbush/Indian Ricegrass/Bottlebrush Squirreltail Plant Community*. Gardner's saltbush dominates this state. Other salt tolerant shrubs include greasewood and birdfoot sage. The major grasses include Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, and rhizomatous wheatgrass. A variety of forbs also occurs in this state and plant diversity is high. This state is fragile, but well adapted to the Northern Intermountain Desertic Basins climate conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community, but is difficult to reestablish when damaged. Moderate, continuous season-long grazing will convert this plant community to the *Gardner's Saltbush/Bottlebrush Squirreltail Plant Community*. Frequent and severe grazing can transition this community to a *Gardner's Saltbush/Bare Ground Plant Community* while severe ground disturbance will convert this plant community to the *Halogeton Plant Community*.

According to the ecological site descriptions developed by the Natural Resources Conservation Service, this site has the vegetative components expected for the Gardner's ***Saltbush/Bare Ground Plant Community.*** The attribute rating justification for the *Biotic Integrity* at this site was Moderate. The dominant functional / structural groups at this monitoring site are half-shrubs (Gardner's Saltbush), followed by trace amounts of short stature grasses (Sandberg bluegrass. The percent litter (18%) was slightly more than expected (10-15%) and bare ground (48%) was more than expected (30-40%) for this site. None of the expected native, cool season perennial grasses were found on the transect and the majority of vegetation was composed of Gardner's saltbush. Only trace amounts of Sandberg bluegrass

was found in the assessment area. Mortality and decadence was what was expected for the site. Annual production was somewhat reduced but reproductive capability of the plants present was what was expected for the site.

This plant community is resistant to change as the stand becomes more decadent. Plant diversity is extremely low. The plant vigor is diminished and replacement capabilities are severely reduced due to the decrease in the number of cool-season grasses.

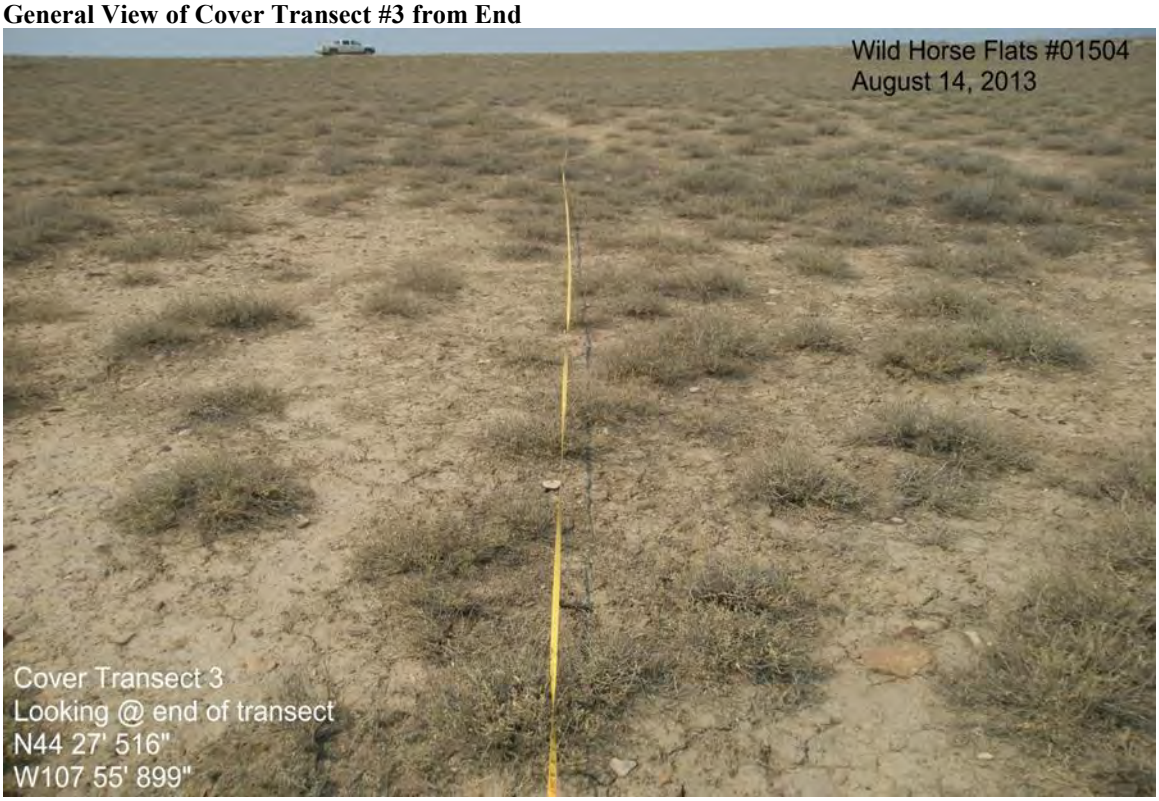
Transitional pathways leading to other plant communities are as follows:

- Very long term prescribed grazing may eventually return this plant community at or near the HCPC.

- Severe ground disturbance will convert this state to the Halogeton Plant Community.

General View of Cover Transect #3 from Beginning

General View of Cover Transect #3 from End



Cover Transect #3 - 150' mark

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. ***NOT MET/MET***

Rationale: The area mapped as unit 371 which consisted of transect 1 and similarly mapped areas are not currently meeting the standard as outlined above. Although the landform, climate, and geology have naturally high runoff rates as described in the soil series descriptions, these areas have very low soil site stability index readings for the site and notable amounts of bare ground and accelerated runoff patterns from these ecological sites. They were rated as a moderate departure from reference conditions and therefore are not within the potential for the ecological site as described above.

The other areas as mapped soil unit #390 and soil unit 374 as represented in transects 2 and 3 were rated as a slight to moderate departure from reference conditions for the soil indicators. Although notable historic soil erosion and soil loss has occurred, these sites are still within the potential for the ecological sites that they support.

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. ***Not Applicable***

Rationale:
There are no naturally occurring riparian areas or wetlands within the allotment that have been documented, verified, and monitored.

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 / NOT MET

Based on the assessment of the data collected as well as observations throughout the allotment, the following table summarizes the number of acres that were determined to meet Standards, the number of acres that were determined to not meet Standard, and the number of acres that no determination was made.

Wild Horse Flats Allotment #01504

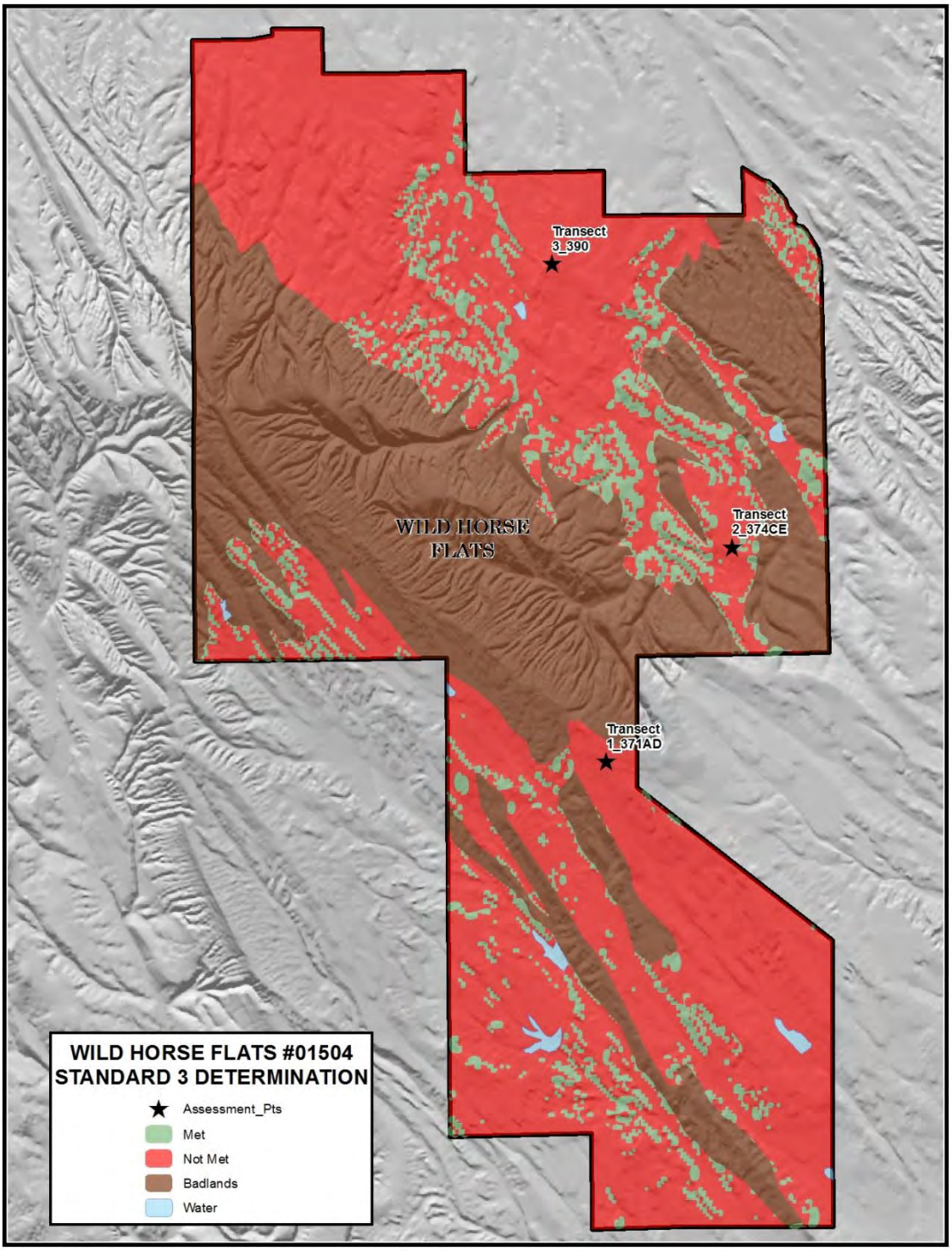
Ecological_Site	Soil_No	Ecological_State	Standard_3	Acres
Badlands	102	Badlands	Not Applicable	3380
Saline Upland 5-9”	390CD	Gardner’s Saltbush/Bare Ground	NOT MET	2135
Shale 5-9”	371ad			3156
Shale 5-9”		Slope > 10% - Perennial Grass/Mixed Shrub	MET	834
*Shale 5-9”		Slope < 10% - Gardner's Saltbush/Bare Ground	NOT MET	2322
Water	85	Reservoir	Not Applicable	461
		Total		**9132**

*Soils 12" to bedrock/assessed as Saline Upland

GIS mapping calculates total public acreage for this allotment as 9132 acres[1]. State and/or private lands were not included in this acreage. Of that acreage, 3,841 acres of badlands and reservoirs were not assessed for Standard and Guidelines and were not suitable for grazing. Of the 5,291 acres suitable for grazing, 4,457 acres were determined to **not meet** Standard and Guidelines, and 834 acres were determined to **meet** Standard and Guidelines. This table is also visually represented by Map 7 below.

[1] The Washakie Resource Management Plan, Record of Decision – September 2, 1988, Appendix C, Table C-1 on page 53 lists the public land acreage within this allotment as 8,032.

Standard 3 Determination Map



As described in the monitoring section above there were multiple assessment sites that, after extensive touring of the allotments, were determined to represent multiple areas within the allotment.

RATIONALE-MET: As it pertains to the acres that ***MET*** the standard, these sites are in a dynamic equilibrium with the Historic Climax Plant Community. 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 disturbances. The sites have a vegetative community that is stable, intact, resistant to change, and provides for soil and watershed stability. These acres are generally the shale slopes throughout the allotment, which are generally steep (>10% slope), sparsely vegetated and have received little or no disturbance.

RATIONALE-NOT MET: Acres that were determined to have ***NOT MET*** the standard are those that have had a significant change or shift from the potential of the site and do not have an appropriate plant community capable of recovering or returning to a functional community without mechanical treatments, seedings, intensive grazing management, etc. These sites have little capability or probability of returning to a more desirable state. These acres are the benches and ridgetops in the north and south portion of the allotment, adjacent to travel routes or water sources, which have historically been grazed by sheep.

The allotment is part of an area around Potato Ridge that was created in the early 1940's and historically used by sheep. The allotment was never fenced as an individual allotment but was technically a use area and went through several permutations until 1970 when the current allotment boundaries were established. The allotment was originally named the Torchlight Allotment, but the name was changed to Wild Horse Flats in 2006. These use areas were typically allocated at 900-916 AUMs during this time according to the adjudication records and were used spring/fall/winter periods. The current Wild Horse Flats Allotment is a combination of two of these historical use areas, which could have resulted in an allocation of 1800 AUMs, and equates to a stocking rate of 5 acres per AUM. A grazing permit issued to Martin Michelena in 1978 authorized use as 509 Active AUMs, 407 Suspended AUMs, and Total 916 AUMs, which would make the stocking rate 17 acres/AUM. In 1997 a second grazing permit was created for the allotment from the transfer 100 total AUMs (58 Active AUMs and 42 Suspended AUMs) to Flitner Limited Partnership from the Martin Michelena grazing permit. In 2005 the Martin Michelena grazing permit was cancelled due to lack of control of the base property. Currently the only grazing permit authorized for the Wild Horse Flats Allotment is for 58 Active AUMs, 42 Suspended AUMs, and a100 Total AUMs.

As such, the historic grazing use as described above is determined to be the causal factor for acres not meeting the standard.

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/NOT MET***

Rationale: Wildlife habitat on the Wildhorse Flats allotment cannot be expected to sustain large or diverse wildlife populations due to its minimally productive soil types, low precipitation, and sparse vegetation characteristics.

Transect number 2 (and those acres represented by these areas as described in Standard 3) was found to be in a perennial grass/mixed shrub community. This community is naturally sparse however in its current state is capable of providing foraging, brood rearing areas and when coupled with the natural variations in the topography or occasional sagebrush stand can provide areas of escape and possible thermal cover to larger animals. As mentioned, it is sparse by

nature but can provide for a mosaic/diversity in landscape and given its current ecological state provide for those wildlife that depend upon it and therefore does meet the definition of Standard 4.

Transect numbers 1 and 3 (and those acres represented by these areas as described in Standard 3) were found to be in a gardener's saltbush/bare ground community. This community provides little to wildlife through plant diversity and may provide forage to a select group of wildlife, specifically antelope but is not desirable and therefore would not meet the definition of Standard 4.

4.5 Standard 5

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

Rationale:

There is no BLM, USGS, or other state agency water quality data for these segments. Therefore compliance with Wyoming State Water Quality Standards is unknown.

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_____

John Elliott
Supervisory Rangeland Management Specialist

X_____

Ted Iglehart
Wildlife Biologist

X_____

Jared Dalebout
Hydrologist

X_____

Michael J. Phillips
Assistant Field Manager - Resources

X_____

Other_____

6.0 DETERMINATION

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 guidelines.***

X _____

Rebecca Good
Worland Field Office Manager

DATE:_____

7.0 Factors related to nonconformance with standards: Historic livestock use has likely resulted in the existing range conditions.

8.0 REFERENCES

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