

BITTER CREEK - TREND STUDY NO. 10-26-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: Private

Elevation: 5575 ft. (1700 m)

Aspect: East

Slope: 4%

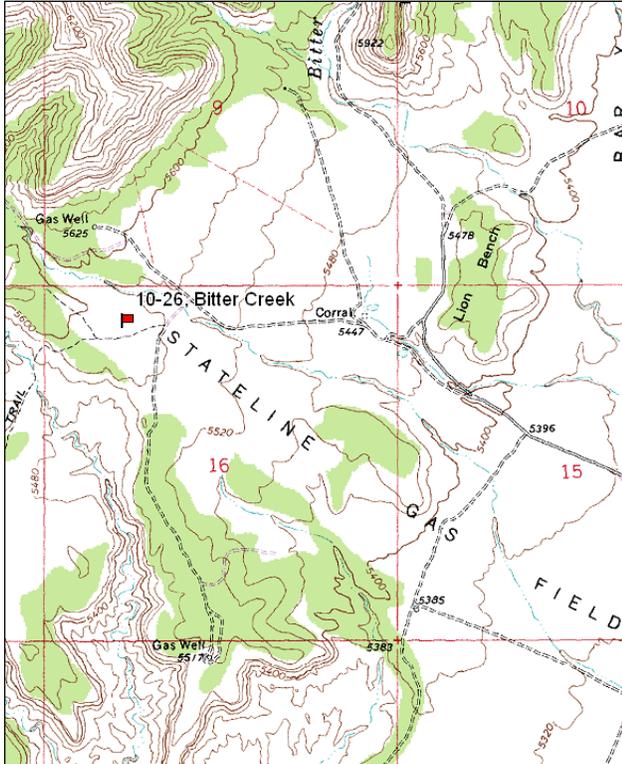
Transect bearing: 291° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

Directions:

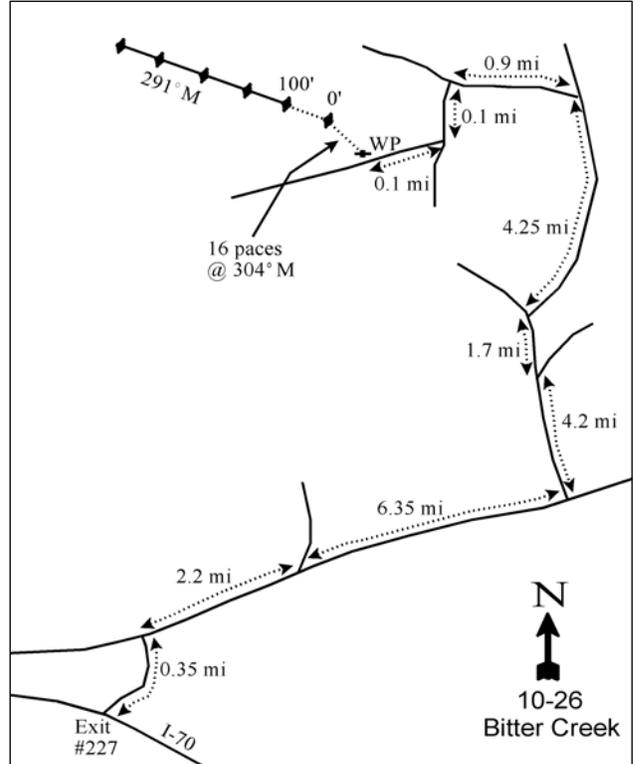
Take I-70 exit #227 Westwater and turn left to the Book Cliff area. Travel 0.35 miles to a “T” intersection and turn right (northeast). Proceed 2.2 miles to a fork and keep right. Stay on the main road for 6.35 miles to a dirt road on the left. Turn left traveling north-northwest. Proceed 4.2 miles and stay left on the main road. Continue 1.7 and turn right. Travel another 4.25 to a fork. Turn left at this fork and go 0.9 miles. At the next fork turn left and go 0.1 miles. Then take the right fork and go 0.1 miles to the witness post on the right side of the road. The 0-foot stake is 16 paces away at 304°M, marked with browse tag #9142.

Map Name: Bryson Canyon



Township: 17S Range: 25E Section: 16

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 658608 E 4355437 N

## BITTER CREEK - TREND STUDY NO. 10-26

### Site Information

Site Description: The study was established in 2000 to monitor crucial winter range for big game, primarily elk, and is located near the Utah-Colorado state line on the south Book Cliffs. The transect was placed on the alluvial fan that was deposited where Bitter Creek comes off of the cliffs. The study lies in a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands. The area is grazed as part of the Bureau of Land Management (BLM) San Arroyo allotment. According to DWR biologists, a moderate herd of elk are year round residents to this area. Pellet group transect data estimated heavy elk use in 2000, but elk use has been light since 2005. Estimated deer use was light in 2000 and 2010, but was lightly moderate in 2005. Sheep pellets were only sampled in 2005, but estimated use was heavy in that year (Table - Pellet Group Data).

Browse: Wyoming big sagebrush is the key browse species providing nearly all of the browse cover on the site (Table - Browse Trends). The sagebrush population is mostly mature with high decadence, high amounts of poor vigor and little recruitment of young sagebrush plants. Utilization of sagebrush has been moderate to heavy since the outset of the study in 2000. Other browse include: broom snakeweed (*Gutierrezia sarothrae*) and spiny hopsage (*Grayia spinosa*) in very low numbers (Table - Browse Characteristics).

Herbaceous Understory: Perennial grasses are sparse on the site with limited diversity. Cheatgrass (*Bromus tectorum*) is the dominant grass species on the site, but frequency and density have fluctuated with precipitation patterns. The only perennial grass species sampled were Sandberg bluegrass (*Poa secunda*) and bottlebrush squirreltail (*Sitanion hystrix*). Perennial forbs are infrequent and not diverse (Table - Herbaceous Trends).

Soil: Soils have a sandy clay loam texture with a neutral soil reactivity (pH 7.1) and low organic matter at 0.4%. Phosphorus may have limited availability for plant growth and development at 4.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Shrub interspaces are high in bare ground cover except when cheatgrass is present, with pedestaling occurring around and underneath shrub canopies. Vegetation and litter cover appear to be adequate to minimize erosion (Table - Basic Cover). Some heavy localized erosion was noted in the general area of this transect with deep gullies, but erosion is not as severe on the site because of the gentle slope. The soil erosion condition was classified as stable in 2005 and 2010.

### Trend Assessments

#### Browse:

- **2000 to 2005 - down (-2):** Wyoming big sagebrush density decreased by 33% from 5,320 plants/acre to 3,540 plants/acre, and cover decreased from 20% to 14%. Decadent sagebrush increased from 56% to 75% and sagebrush plants displaying poor vigor increased from 27% to 51%.
- **2005 to 2010 - slightly up (+1):** The density of sagebrush changed little with a slight increase to 3,640 plants/acre, but cover increased to 21%. Sagebrush decadence decreased to 36% and poor vigor decreased to 18%. Recruitment of young plants remained poor, but seedlings were sampled in low numbers for the first time.

#### Grass:

- **2000 to 2005 - down (-2):** The sum of nested frequency of perennial grasses decreased by 37% with a significant decrease in the nested frequency of bottlebrush squirreltail. The annual species cheatgrass and sixweeks fescue (*Vulpia octoflora*) increased significantly in nested frequency and cover of cheatgrass increased from 1% to 30%.
- **2005 to 2010 - up (+2):** There was a 36% increase in the sum of nested frequency of perennial grasses and cover increased from 2% to 3%. Cheatgrass decreased significantly in nested frequency and cover decreased to 9%, though it remains the dominant herbaceous species on the site.

Forb:

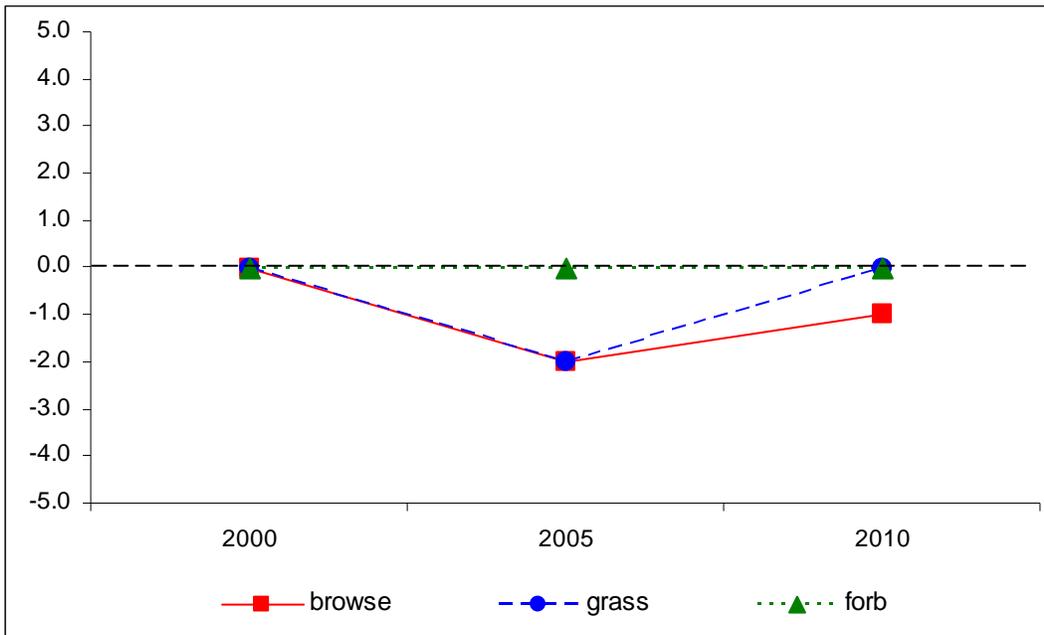
- **2000 to 2005 - stable (0):** Perennial forbs are rare.
- **2005 to 2010 - stable (0):** Perennial forbs are rare.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
 Management unit 10, study no: 26

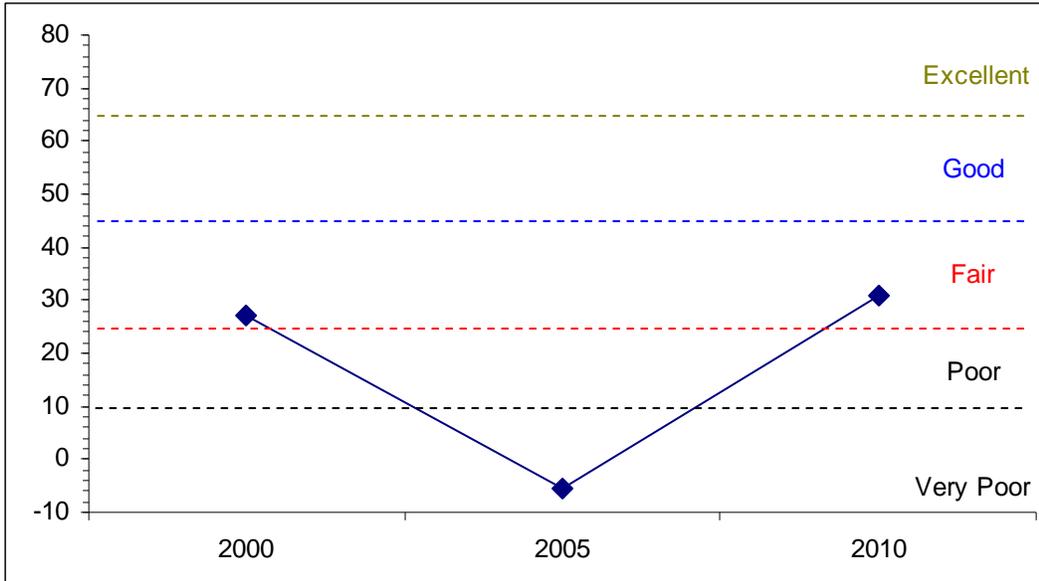
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
00	25.0	-1.8	0.0	4.3	-0.8	0.4	0.0	<b>27.1</b>	Fair
05	16.9	-7.5	0.5	4.5	-20.0	0.1	0.0	<b>-5.5</b>	Very Poor
10	25.9	4.2	0.5	6.4	-6.5	0.3	0.0	<b>30.8</b>	Fair

**Trend Summary**

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 10, Study no: 26



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--  
 Management unit 10, Study no: 26



HERBACEOUS TRENDS--  
 Management unit 10, Study no: 26

Type	Species	Nested Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
G	Bromus tectorum (a)	<sub>a</sub> 203	<sub>c</sub> 467	<sub>b</sub> 346	1.02	30.21	8.61
G	Poa secunda	114	83	109	1.09	1.87	.68
G	Sitanion hystrix	<sub>b</sub> 78	<sub>a</sub> 38	<sub>a</sub> 55	1.04	.39	2.50
G	Vulpia octoflora (a)	<sub>a</sub> 4	<sub>b</sub> 186	<sub>a</sub> -	.01	.86	-
Total for Annual Grasses		207	653	346	1.03	31.07	8.61
Total for Perennial Grasses		192	121	164	2.13	2.26	3.19
Total for Grasses		399	774	510	3.17	33.34	11.80
F	Astragalus sp.	-	2	-	-	.00	-
F	Calochortus nuttallii	-	6	10	-	.01	.02
F	Castilleja linariaefolia	-	-	1	-	-	.00
F	Descurainia pinnata (a)	<sub>a</sub> -	<sub>b</sub> 75	<sub>a</sub> 1	-	.39	.00
F	Draba sp. (a)	-	3	-	-	.00	-
F	Erigeron pumilus	<sub>b</sub> 23	<sub>a</sub> -	<sub>a</sub> 3	.07	-	.04
F	Erodium cicutarium (a)	3	1	3	.00	.00	.00
F	Gilia sp. (a)	<sub>a</sub> -	<sub>c</sub> 61	<sub>b</sub> 15	-	.27	.03
F	Lappula occidentalis (a)	-	6	3	-	.04	.00
F	Lepidium sp. (a)	<sub>a</sub> -	<sub>b</sub> 22	<sub>a</sub> -	-	.07	-
F	Leucelene ericoides	12	-	-	.05	-	-
F	Phlox longifolia	6	8	6	.01	.02	.03
F	Plantago patagonica (a)	<sub>a</sub> 2	<sub>c</sub> 204	<sub>b</sub> 31	.00	.74	.07
F	Schoenrambe linifolia	<sub>b</sub> 23	<sub>a</sub> 3	<sub>ab</sub> 23	.06	.04	.06
Total for Annual Forbs		5	372	53	0.00	1.53	0.12
Total for Perennial Forbs		64	19	43	0.19	0.07	0.16

Type	Species	Nested Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
	Total for Forbs	69	391	96	0.20	1.61	0.28

Values with different subscript letters are significantly different at alpha = 0.10

#### BROWSE TRENDS--

Management unit 10, Study no: 26

Type	Species	Strip Frequency			Average Cover %		
		'00	'05	'10	'00	'05	'10
B	Artemisia tridentata wyomingensis	91	88	92	20.00	13.50	20.71
B	Grayia spinosa	1	1	1	-	.03	.15
B	Gutierrezia sarothrae	8	0	1	.30	-	-
B	Juniperus osteosperma	0	1	0	-	-	-
B	Opuntia sp.	6	7	9	.18	.21	1.16
	Total for Browse	106	97	103	20.48	13.73	22.02

#### CANOPY COVER, LINE INTERCEPT--

Management unit 10, Study no: 26

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	13.31	28.53
Grayia spinosa	.20	.18
Gutierrezia sarothrae	-	.13
Opuntia sp.	.68	.55

#### KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10, Study no: 26

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata syomingensis	1.9	1.2

#### BASIC COVER--

Management unit 10, Study no: 26

Cover Type	Average Cover %		
	'00	'05	'10
Vegetation	27.48	45.09	34.59
Rock	.89	.97	.55
Pavement	.75	.80	.41
Litter	34.70	25.46	50.29
Cryptogams	14.39	4.30	7.40
Bare Ground	44.19	33.99	32.44

SOIL ANALYSIS DATA --

Management unit 10, Study no: 26, Study Name: Bitter Creek

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11.8	7.1	60.0	17.4	22.6	0.4	4.5	99.2	0.5

PELLET GROUP DATA--

Management unit 10, Study no: 26

Type	Quadrat Frequency			Days use per acre (ha)		
	'00	'05	'10	'00	'05	'10
Sheep	-	18	-	-	67 (165)	-
Rabbit	5	33	23	-	-	-
Elk	44	23	2	82 (203)	8 (20)	17 (43)
Deer	18	31	35	4 (10)	26 (65)	18 (45)
Cattle	-	-	2	-	-	-

BROWSE CHARACTERISTICS--

Management unit 10, Study no: 26

		Age class distribution				Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata wyomingensis</i>										
00	<b>5320</b>	0	44	56	-	59	24	27	20/31	
05	<b>3540</b>	1	25	75	-	47	50	51	23/37	
10	<b>3640</b>	1	63	36	240	32	12	18	25/37	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
00	<b>0</b>	0	0	-	-	0	0	0	-/-	
05	<b>0</b>	0	0	-	-	0	0	0	6/8	
10	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Echinocereus sp.</i>										
00	<b>0</b>	0	0	-	-	0	0	0	-/-	
05	<b>0</b>	0	0	-	-	0	0	0	7/18	
10	<b>0</b>	0	0	-	20	0	0	0	7/8	
<i>Grayia spinosa</i>										
00	<b>20</b>	0	100	-	-	0	0	0	10/16	
05	<b>20</b>	0	100	-	-	0	0	0	24/27	
10	<b>20</b>	0	100	-	-	0	100	0	24/32	
<i>Gutierrezia sarothrae</i>										
00	<b>620</b>	19	68	13	80	0	0	13	8/9	
05	<b>0</b>	0	0	0	-	0	0	0	-/-	
10	<b>40</b>	0	100	0	-	0	0	0	11/16	
<i>Juniperus osteosperma</i>										
00	<b>0</b>	0	0	-	-	0	0	0	-/-	
05	<b>20</b>	100	0	-	-	0	0	0	-/-	
10	<b>0</b>	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Opuntia sp.										
00	<b>120</b>	0	100	0	-	0	0	0	5/16	
05	<b>140</b>	0	86	14	-	0	0	29	6/28	
10	<b>220</b>	0	100	0	-	0	0	0	6/22	
Sclerocactus sp.										
00	<b>0</b>	0	0	-	-	0	0	0	-/-	
05	<b>0</b>	0	0	-	-	0	0	0	7/4	
10	<b>0</b>	0	0	-	-	0	0	0	6/7	