

COAL CREEK - TREND STUDY NO. 11B-4-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Substantial Deer Winter

NRCS Ecological Site Description: Semidesert Gravelly Loam (Wyoming Big Sagebrush), R034XY205UT

Land Ownership: BLM

Elevation: 5860 ft. (1786 m)

Aspect: South

Slope: 2%

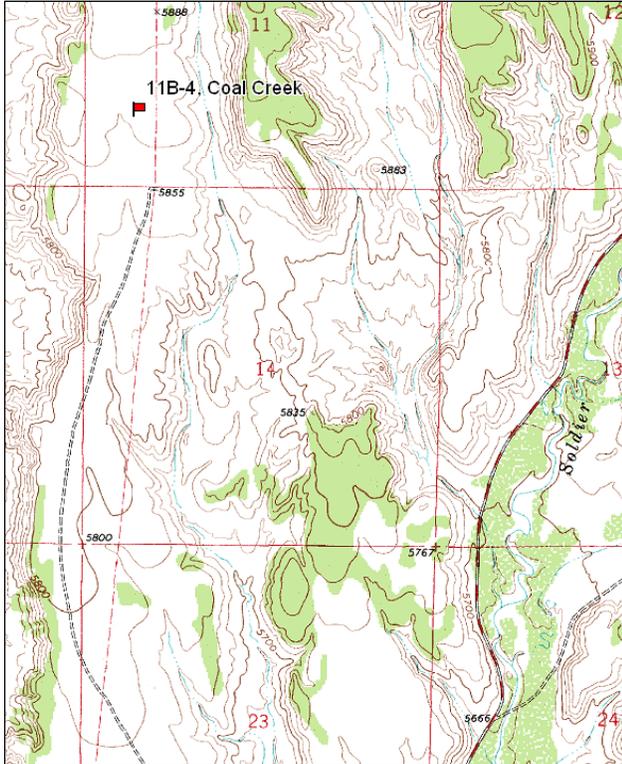
Transect bearing: 165° magnetic

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

Directions:

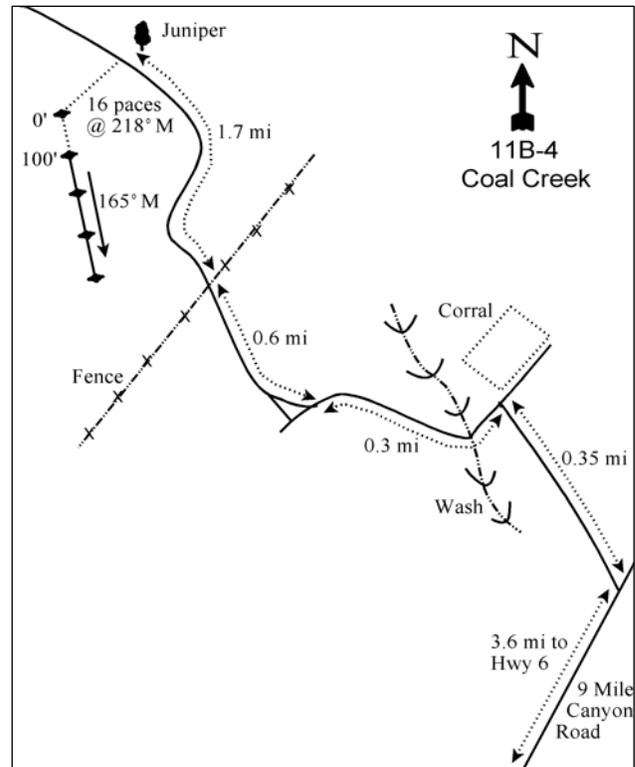
From Highway 6 east of Wellington, turn northeast on the Soldier Creek Road (9 Mile Canyon). Stay on this road 3.6 miles, then turn left onto a dirt road. Go 0.35 miles up to a fork near a corral. From the fork proceed 0.3 miles to another fork. Turn right and continue 0.6 miles to a wire gate. Go through the gate and drive 1.7 miles to a small juniper (*Juniperus osteosperma*) tree 20 feet to the right of the road. The transect baseline starts 16 paces from the juniper at a bearing of 218°M. There is a browse tag #7839 on the 0-foot baseline stake.

Map Name: Wellington



Township: 14S Range: 11E Section: 11

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 529044 E 4385450 N

COAL CREEK - TREND STUDY NO. 11B-4

Site Information

Site Description: The study is in an open Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat about four miles south of the mouth of Soldier Creek Canyon. The study is on top of a long, narrow, south-sloping plateau between Coal Creek and Soldier Creek. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Soldier Canyon allotment. Sign of cattle use was infrequent on this particular site in 1986 and deer pellet groups were encountered only occasionally. A pellet group transect located further up Coal Creek (elevation 6,300) is the lowest elevation pellet group transect in the unit. In the past, it has consistently shown the highest use of any area sampled in the herd unit. Numbers are usually higher in hard winters as the deer inevitably move to the lower elevations those years, even though thermal cover is limited on the plateau. Pellet group transect data on the study has estimated only light use by deer and cattle since 2000 (Table - Pellet Group Data). During the reading of 2005, a deer carcass was found on the site. Rabbits appear to be abundant on the site with numerous pellets and trails.

Browse: Wyoming big sagebrush dominates the plateau and provides nearly all of the browse cover (Table - Browse Trends). The density of sagebrush has fluctuated over the sample years with a fluctuation in the recruitment of young sagebrush plants. Decadence has been mostly moderate, but there was high decadence in sagebrush in 2005. Utilization of sagebrush has been mostly light to moderate, though heavy use was noted in 1986. The two desirable shrubs, winterfat (*Ceratoides lanata*) and shadscale (*Atriplex confertifolia*), have been sampled on the site at fairly low densities, but winterfat has not been sampled since 1994 and shadscale has decreased in density since 1994. Rabbits appear to be using these low growing shrubs. Broom snakeweed (*Gutierrezia sarothrae*) has been very abundant on the site, but has also decreased in density since 2000 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are fairly diverse, but are not overly abundant. The grass component is comprised of a number of native perennial grasses including blue grama (*Bouteloua gracilis*), bottlebrush squirreltail (*Sitanion hystrix*), needle-and-thread (*Stipa comata*), galleta (*Hilaria jamesii*) and Indian ricegrass (*Oryzopsis hymenoides*). The forb composition is poor with few perennial forbs sampled (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a soil reaction that is slightly alkaline (pH 7.5). Organic matter is low at only 1%, which is comparable to the Airport (11B-3) site as the lowest sites on unit 11, with respect to soil organic matter (Table - Soil Analysis Data). Bare ground cover is high despite the abundant pavement cover on the surface in exposed areas. Vegetation and litter cover are both low (Table - Basic Cover). The soil erosion condition was classified as slight in 2005 due to localized soil loss evidenced by soil pedestaling around shrubs and grasses, but was stable in 2010.

Trend Assessments

Browse:

- **1986 to 1994 - stable (0):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. Recruitment of young Wyoming big sagebrush plants decreased, but there were a high number of seedlings sampled. Decadence of winterfat and shadscale decreased substantially.
- **1994 to 2000 - up (+2):** The density of Wyoming big sagebrush nearly doubled from 2,900 plants/acre to 5,560 plants/acre due to a large increase in the recruitment of young plants, though cover only increased slightly from 15% to 17%. Sagebrush seedlings were very numerous and abundant on the site. Winterfat was no longer sampled on the site.
- **2000 to 2005 - down (-2):** Wyoming big sagebrush density decreased by 47% to 2,940 plants/acre and cover decreased to 14%. Most of the loss in density was due to a large decrease in the recruitment of

young sagebrush plants. Decadence of sagebrush increased from 22% to 71%. Shadscale also decreased substantially in density.

- **2005 to 2010 - up (+2):** Recruitment of young sagebrush increased causing a 59% increase in the density of sagebrush to 4,680 plants/acre. Cover of sagebrush increased to 16% and decadence decreased to 26%. Shadscale density continued to decrease.

Grass:

- **1986 to 1994 - up (+2):** There was nearly a two-fold increase in the sum of nested frequency of perennial grasses.
- **1994 to 2000 - up (+2):** The sum of nested frequency of perennial grasses increased by 48% and cover increased from 3% to 4%.
- **2000 to 2005 - up (+2):** The perennial grass sum of nested frequency increased by 24% and cover increased to 6%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 18%, though cover increased slightly to 7%.

Forb:

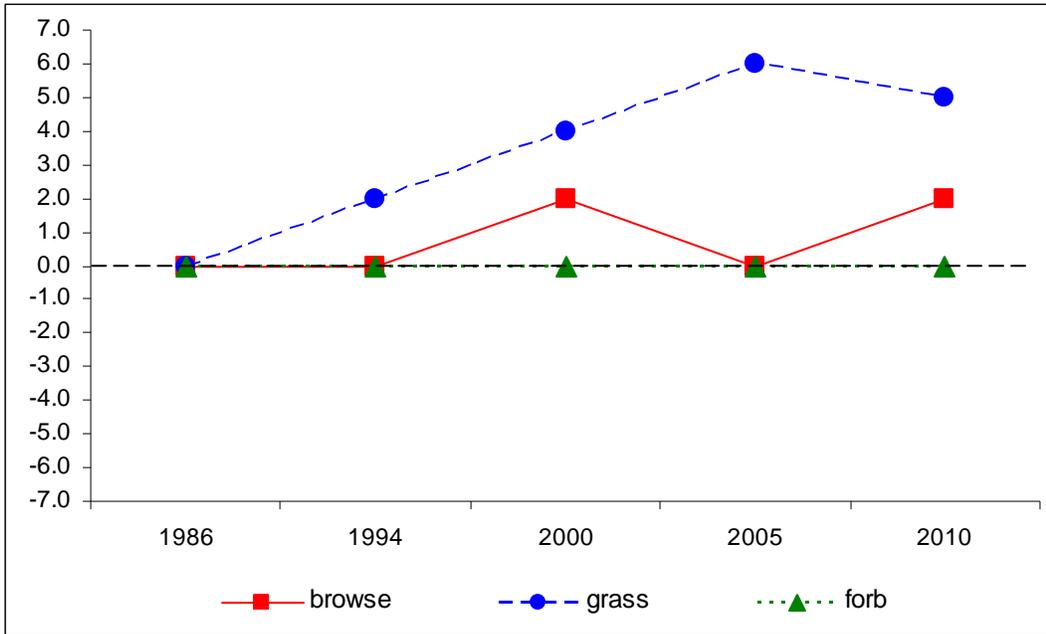
- **1986 to 1994 - stable (0):** Perennial forbs are rare on the site.
- **1994 to 2000 - stable (0):** Perennial forbs are rare on the site.
- **2000 to 2005 - stable (0):** Perennial forbs are rare on the site.
- **2005 to 2010 - stable (0):** Perennial forbs are rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 11B, study no: 4

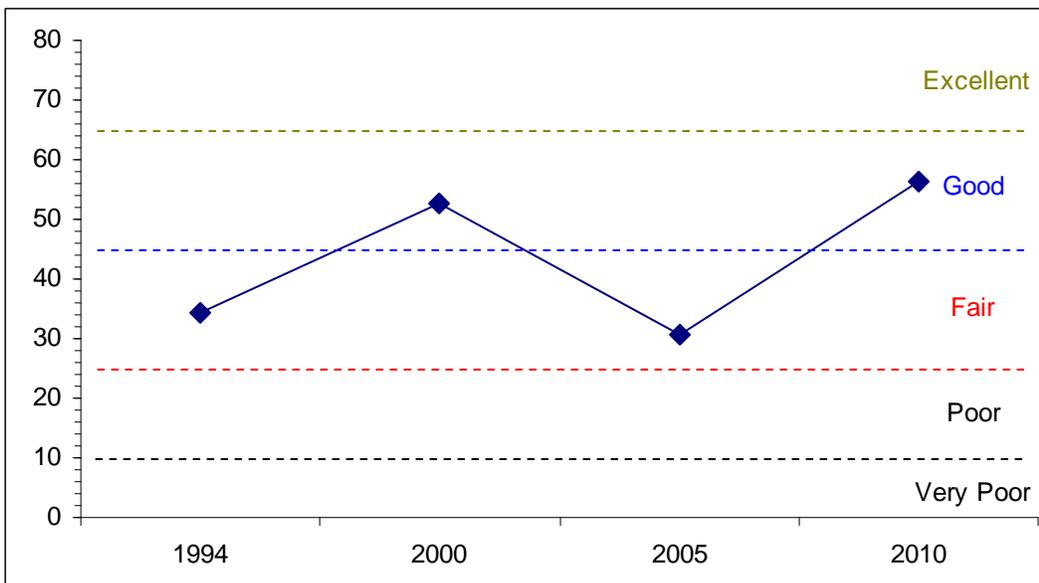
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	19.3	7.7	1.5	5.2	0.0	0.9	0.0	34.5	Fair
00	21.0	8.1	15.0	8.5	0.0	0.1	0.0	52.7	Good
05	17.9	-5.7	3.9	12.8	0.0	1.9	0.0	30.8	Fair
10	20.4	7.2	15.0	13.3	0.0	0.6	0.0	56.5	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 11B, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 11B, Study no: 4



HERBACEOUS TRENDS--
Management unit 11B, Study no: 4

Type	Species	Nested Frequency					Average Cover %			
		'86	'94	'00	'05	'10	'94	'00	'05	'10
G	<i>Aristida purpurea</i>	a-	b10	ab7	b10	a-	.08	.16	.21	-
G	<i>Bouteloua gracilis</i>	a17	ab41	bc65	bc43	c69	1.04	1.86	1.52	2.80
G	<i>Hilaria jamesii</i>	a-	b34	a5	ab26	ab17	.66	.18	.61	.64
G	<i>Oryzopsis hymenoides</i>	a-	b9	b15	b20	b13	.03	.44	.07	.27
G	<i>Poa fendleriana</i>	-	3	-	-	-	.01	-	-	-
G	<i>Sitanion hystrix</i>	a28	a16	b65	b70	b60	.20	.81	2.06	2.07
G	<i>Stipa comata</i>	a1	ab14	bc31	d64	cd32	.57	.77	1.91	.86
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		46	127	188	233	191	2.61	4.23	6.41	6.66
Total for Grasses		46	127	188	233	191	2.61	4.23	6.41	6.66
F	<i>Astragalus convallarius</i>	-	2	-	-	2	.00	-	.00	.03
F	<i>Chenopodium fremontii</i> (a)	-	a-	a-	b34	a-	-	-	.08	-
F	<i>Chenopodium leptophyllum</i> (a)	-	-	-	9	-	-	-	.02	-
F	Cruciferae	-	3	-	-	-	.03	-	-	-
F	<i>Cryptantha</i> sp.	-	4	-	4	-	.15	-	.01	-
F	<i>Descurainia pinnata</i> (a)	-	a-	a-	b59	a-	-	-	.72	-
F	<i>Eriogonum cernuum</i> (a)	-	a2	a-	b41	a	.00	-	.15	-
F	<i>Eriogonum ovalifolium</i>	-	3	1	-	-	.01	.00	-	-
F	<i>Gilia</i> sp. (a)	-	a-	a-	b76	a-	-	-	.27	-
F	<i>Lappula occidentalis</i> (a)	-	ab4	a-	b8	a-	.01	-	.02	-
F	<i>Lepidium montanum</i>	-	ab24	a4	b24	ab18	.08	.01	.77	.24
F	<i>Leucelene ericoides</i>	-	4	4	8	-	.15	.03	.06	-
F	<i>Oenothera</i> sp.	-	-	-	3	-	-	-	.00	-
F	<i>Sphaeralcea coccinea</i>	3	1	-	4	6	.00	-	.09	.04
Total for Annual Forbs		0	6	0	227	0	0.01	0	1.26	0
Total for Perennial Forbs		3	41	9	43	26	0.43	0.05	0.95	0.31
Total for Forbs		3	47	9	270	26	0.45	0.05	2.22	0.31

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

BROWSE TRENDS--

Management unit 11B, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'94	'00	'05	'10	'94	'00	'05	'10
B	Artemisia tridentata wyomingensis	74	82	78	86	15.10	16.59	13.94	16.26
B	Atriplex confertifolia	19	20	8	1	.45	.31	.44	.03
	Ceratoides lanata	2	0	0	0	-	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	37	38	20	19	1.63	.66	.70	.91
B	Echinocereus sp.	0	1	1	1	-	.00	-	-
B	Gutierrezia sarothrae	81	95	40	26	2.20	4.37	.96	.27
B	Juniperus osteosperma	0	1	1	1	-	-	-	-
B	Leptodactylon pungens	5	7	4	4	.30	.30	.18	.18
B	Opuntia sp.	29	34	8	5	.25	.48	.03	.18
Total for Browse		247	278	160	143	19.96	22.75	16.25	17.84

CANOPY COVER, LINE INTERCEPT--

Management unit 11B, Study no: 4

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	14.16	14.50
Atriplex confertifolia	.41	-
Chrysothamnus viscidiflorus stenophyllus	.30	.18
Gutierrezia sarothrae	.81	.06
Leptodactylon pungens	.13	.06

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 11B, Study no: 4

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.4	4.8

BASIC COVER--

Management unit 11B, Study no: 4

Cover Type	Average Cover %				
	'86	'94	'00	'05	'10
Vegetation	3.75	21.64	28.34	23.04	25.34
Rock	0	10.46	1.77	2.06	2.29
Pavement	18.25	4.25	17.54	11.66	15.68
Litter	39.00	20.09	17.54	22.19	27.73
Cryptogams	3.50	3.26	10.94	5.90	4.86
Bare Ground	35.50	35.29	47.24	47.62	42.68

SOIL ANALYSIS DATA --

Management unit 11B, Study no: 4, Study Name: Coal Creek

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.2	7.5	54.0	22.0	24.0	1.0	6.4	140.8	0.6

PELLET GROUP DATA--

Management unit 11B, Study no: 4

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'00	'05	'10	'00	'05	'10
Rabbit	45	39	60	44	-	-	-
Elk	-	1	-	-	-	-	-
Deer	15	3	3	4	4 (10)	7 (17)	4 (10)
Cattle	-	-	-	-	-	1 (2)	3 (7)

BROWSE CHARACTERISTICS--

Management unit 11B, Study no: 4

		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>									
86	1865	18	61	21	66	64	29	0	14/15
94	2900	3	73	24	2860	12	5	9	20/31
00	5560	41	36	22	2020	15	3	10	22/35
05	2940	7	22	71	294680	27	6	39	23/34
10	4680	38	36	26	2500	22	2	18	22/36
<i>Atriplex canescens</i>									
86	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	17/14
10	0	0	0	-	-	0	0	0	16/13
<i>Atriplex confertifolia</i>									
86	133	0	0	100	-	0	100	100	-/-
94	600	0	60	40	-	7	7	7	10/13
00	540	4	26	70	-	7	85	70	8/14
05	240	33	58	8	40	8	25	0	14/17
10	20	0	100	0	-	0	0	0	7/8
<i>Ceratoides lanata</i>									
86	533	0	0	100	-	0	75	75	-/-
94	60	33	33	33	-	33	0	33	6/7
00	0	0	0	0	-	0	0	0	-/-
05	0	0	0	0	-	0	0	0	6/12
10	0	0	0	0	-	0	0	0	6/11

		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>Chrysothamnus viscidiflorus stenophyllus</i>										
86	1865	0	4	96	-	4	0	18	3/7	
94	1740	0	75	25	20	1	7	11	7/10	
00	1360	1	10	88	20	1	6	74	4/7	
05	740	0	70	30	-	5	5	11	8/11	
10	540	22	63	15	-	0	0	11	7/10	
<i>Echinocereus sp.</i>										
86	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
00	20	0	100	-	-	0	0	0	3/12	
05	20	0	100	-	-	0	0	0	3/9	
10	20	0	100	-	-	0	0	0	3/10	
<i>Gutierrezia sarothrae</i>										
86	11465	15	58	27	866	0	0	7	7/8	
94	6280	11	81	8	20	0	0	5	8/7	
00	26900	4	88	8	100	0	0	4	4/5	
05	1360	0	100	0	120	0	0	0	8/9	
10	640	16	81	3	-	0	0	3	5/7	
<i>Juniperus osteosperma</i>										
86	66	100	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
00	20	100	0	-	-	0	0	0	-/-	
05	20	100	0	-	-	0	0	0	-/-	
10	20	0	100	-	-	0	0	0	-/-	
<i>Leptodactylon pungens</i>										
86	0	0	0	0	-	0	0	0	-/-	
94	440	0	95	5	-	0	0	5	5/7	
00	700	9	9	83	40	0	40	20	8/7	
05	260	0	77	23	-	0	0	8	5/8	
10	280	0	100	0	-	0	0	0	3/6	
<i>Opuntia sp.</i>										
86	1332	5	85	10	-	0	0	40	4/6	
94	1140	2	96	2	-	0	0	0	3/11	
00	1220	0	67	33	-	0	0	13	4/8	
05	220	0	27	73	-	0	0	64	4/9	
10	120	0	100	0	-	0	0	0	4/13	
<i>Pinus edulis</i>										
86	0	0	0	-	66	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	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)
Purshia tridentata									
86	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	6/11