

Trend Study 11B-4-05

Study site name: Coal Creek.

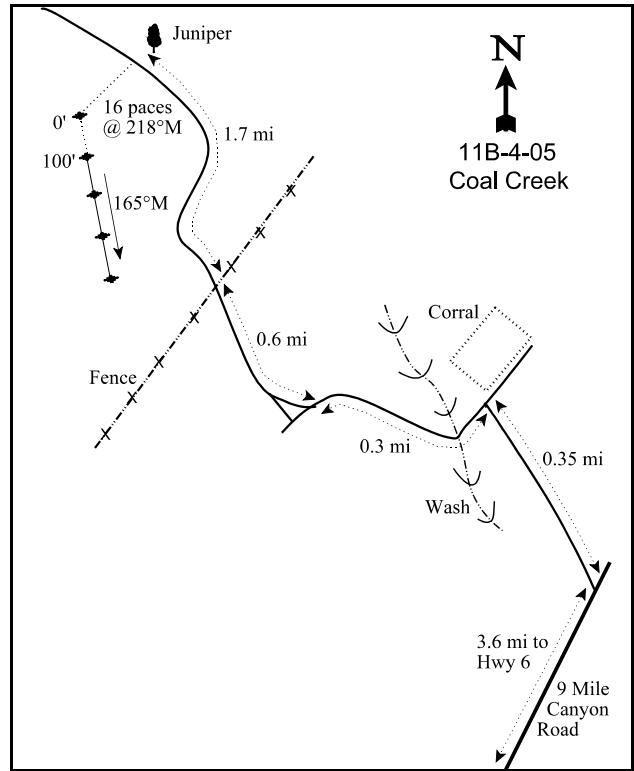
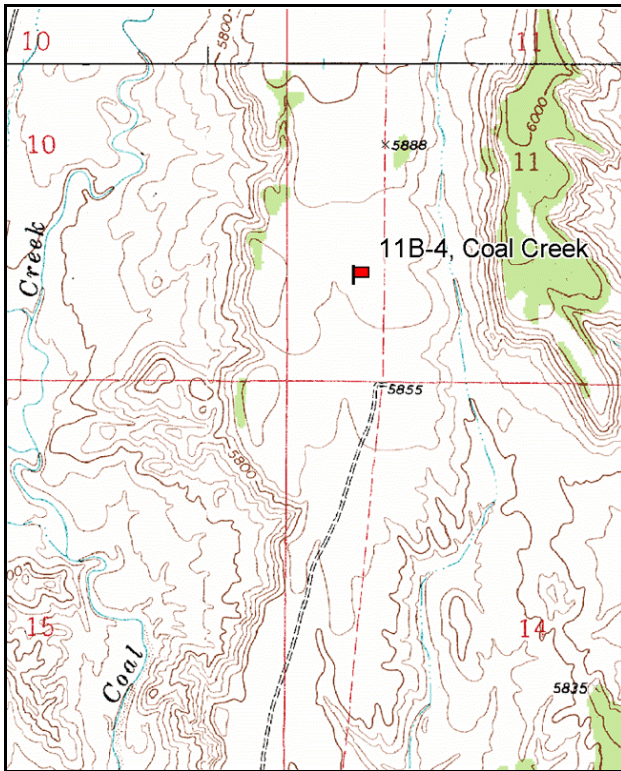
Vegetation type: Wyoming big sagebrush.

Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

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 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

Diagrammatic Sketch

Township 14S, Range 11, Section 11

GPS: NAD 27, UTM 12S 4385244 N, 529105 E

DISCUSSION

Coal Creek - Trend Study No. 11B-4

The Coal Creek study is in an open sagebrush 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 at an elevation of 5,850 feet. The area is managed by the BLM as part of the Soldier Canyon allotment. It is grazed by cattle in winter and again in late spring. Permitted numbers are for 119 cattle from November through May. 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. Deer days use/acre averaged 44 (109 ddu/ha) between 1981-82 and 1990-91, but dropped considerably in 1991-92 to only 23 ddu/acre (58 ddu/ha) and have averaged only 17 deer days use/acre (41 ddu/ha) between 1991-92 and 1995-96. 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. It does not appear that this study area is still being used by significant numbers of deer or elk since 1986. Quadrat frequency of deer pellet groups was only 15% in 1994, then declined to 3% in 2000 and 2005. Pellet group data on the trend study in 2000 was estimated at only 4 deer days use/acre (10 ddu/ha). In 2005, the estimated pellet group data was 7 deer and 1 cow days use/acre (17 ddu/ha and 2 cdu/ha). These low numbers may be partly due to the mild winter conditions of the several previous years. 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.

The soil is moderately deep but compacted. It has a sandy clay loam texture with a soil reaction that is slightly alkaline (7.5 pH). 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. Phosphorus is also low at just 6.4 ppm, where values less than 6 ppm may limit normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). Due to the compaction of the soil, effective rooting depth is estimated at just over 13 inches. There is abundant pavement on the surface in exposed areas, but little rock within the soil profile. Vegetation and litter cover are both low, yet erosion is minimized due to the level terrain. The erosion condition class determined soil movement as slight in 2005 due to localized soil loss evidenced by soil pedestaling around shrubs and grasses.

Wyoming big sagebrush dominates the plateau, it provided 15% cover in 1994, 17% in 2000, and 14% in 2005. It has steadily increased in density from 1,866 plants/acre in 1986 to 2,900 in 1994, to 5,560 in 2000, then returned to 2,940 in 2005. The major increase in 2000 came from a flush of young plants, which likely did not survive. Vigor had remained good and percent decadence had steadily remained around 22% from 1986 to 2000, but increased to 39% poor vigor and 71% decadence in 2005. Use was moderate to heavy in 1986, but has been light to moderate since. Annual growth has been minimal, with any browsing causing them to appear to have been heavily hedged and clubbed in appearance. Two desirable shrubs, winterfat and shadscale, occur at fairly low densities and are mostly decadent and over-utilized. Rabbits appear to be using these low growing shrubs. Density of shadscale was fairly stable in 1994 and 2000, but decreased by 56% in 2005. Winterfat was not sampled in 2000 or 2005.

Broom snakeweed densities estimated 11,465 plants/acre in 1986, 6,280 in 1994, and an amazingly high 26,900 in 2000. With continuing drought before 2005, the population of broom snakeweed had declined to only 1,360 plants/acre. However, it is still the second-most abundant shrub behind Wyoming big sagebrush. Other invaders, and possible indicators of range deterioration, are pricklypear cactus and narrowleaf low rabbitbrush. Both had remained at a fairly stable density from 1986 to 2000, but the densities for both species decreased substantially in 2005.

Grasses and forbs are lacking on the site. Grasses provided only 4% cover in 2000 and forbs accounted for less than 1%. The cover of grasses increased to 6% and forbs to 2% in 2005. There are some small open areas of perennial grasses, but these have been invaded by broom snakeweed. The most common grass species are galleta, bottlebrush squirreltail, needle-and-thread, red three-awn, and blue grama. Since most of the production is from warm season grasses, the value for spring use is limited. The forb composition is poor.

1986 APPARENT TREND ASSESSMENT

There are a large number of undesirable invader species on this site. Although they indicate a less than optimal range condition, they do not necessarily indicate a future downward trend. However, the hedged form of the Wyoming big sagebrush could indicate a downward trend. An encouraging sign is the presence of young sagebrush. Actually, the area appears more to be recovering from past abuses and with favorable conditions may continue to produce a large amount of winter range forage. Not much can be done to protect the scarce, more palatable shrubs from overuse. Because of inadequate ground cover, presence of erosion pavement, and lack of organic matter, the soil trend appears to be declining.

1994 TREND ASSESSMENT

With the lack of significant slope and percent bare ground changing little, trend for the soils is considered stable but in less than satisfactory condition. Even though the key browse species, Wyoming big sagebrush, has more plants that are now judged as decadent, this is more than compensated for by the exceptionally high amount of seedlings. Both shadscale and winterfat have greatly improved vigor and much lower rates of decadence. Trend for key browse is up, but the broom snakeweed population should be watched closely for any unusual increases in its population. The trend for the herbaceous understory is up, but still in very poor condition with a total of just 3% cover for all species combined. The Desirable Components Index score was fair due to good browse cover and low perennial grass and forb cover.

TREND ASSESSMENT

soil - stable (0)

browse - up (+2)

herbaceous understory - up (+2)

winter range condition (DC Index) - Fair (39) Lower Potential scale

2000 TREND ASSESSMENT

Trend for soil appears stable but still in poor condition with the ratio of bare ground to protective cover remaining unchanged. Litter and total vegetation cover are low while unprotected bare ground is high and herbaceous vegetation scarce. Interspaces between shrubs contain abundant erosion pavement while soil is pedestaled under the shrubs. Cryptogamic cover has increased but these are concentrated under shrub canopies. There is obviously some localized soil erosion occurring during high intensity storms but it is minimized by the level terrain. Trend for browse is up for the key species Wyoming big sagebrush. Density has increased due to a large number of young plants counted this year. Seedlings are also abundant. The number of decadent plants has increased (700 to 1,240 plants/acre) but this is more than compensated by the large number of young. Use is mostly light and vigor good. Rabbits appear to be heavily utilizing the other preferred browse, shadscale. It appears to have a stable population, but vigor is poor and percent decadence is high. One negative aspect of the browse trend is the dramatic 4-fold increase in density of broom snakeweed since 1994 (6,280 plants/acre to 26,900). Trend for the herbaceous understory is up, although grass and forb cover is less than ideal. The nested frequency of perennial grasses increased 48% and are moderately diverse. Sum of nested frequency for forbs declined, but perennial grasses are a more important component to winter range. The DCI score improved to good due mainly to improvements browse recruitment and perennial grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - up (+2)

herbaceous understory - up (+2)

winter range condition (DC Index) - Good (57) Lower Potential scale

2005 TREND ASSESSMENT

The trend for soil is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground remained unchanged from 2000 to 2005. The trend for browse is down. The population of the key browse species Wyoming big sagebrush decreased drastically from 5,560 plants/acre in 2000 to 2,940 in 2005, a 47% decline. The majority of the population loss is in the young and mature age classes. This population decrease is accompanied with an increase from 22% to 71% in decadent individuals and an increase from 10% to 39% in individuals classified as dying. Shadscale, another preferred browse species, decreased 56% in density, but the percentage of dying and decadent individuals decreased substantially. This decrease in shrub species is likely due to a three year drought from 2001 through 2003 where the annual precipitation for the area averaged 80% of normal. One positive effect of the drought is the decline in broom snakeweed numbers, which decreased 95% from 26,900 plants/acre in 2000 to 1,360 in 2005. The herbaceous understory trend is up. The sum of the nested frequencies perennial grasses and forbs increased 40% from 2000 to 2005. The cover of most perennial species also increased. Unfortunately, there was also an increase in weedy annual forb species, many of which first made their appearance in the 2005 study. The DCI score decreased to fair due mainly to the loss of young individuals and the increase in decadence.

TREND ASSESSMENT

soil - stable (0)

browse - down (-2)

herbaceous understory - up (+2)

winter range condition (DC Index) - Fair (35) Lower Potential scale

HERBACEOUS TRENDS --

Management unit 11B, Study no: 4

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'94	'00	'05	'94	'00	'05
G	Aristida purpurea	a-	b10	ab7	b10	.08	.16	.21
G	Bouteloua gracilis	a17	b41	b65	b43	1.04	1.86	1.52
G	Hilaria jamesii	a-	b34	a5	b26	.66	.18	.61
G	Oryzopsis hymenoides	a-	b9	b15	b20	.03	.44	.07
G	Poa fendleriana	-	3	-	-	.01	-	-
G	Sitanion hystrix	a28	a16	b65	b70	.20	.81	2.06
G	Stipa comata	a1	ab14	b31	c64	.57	.77	1.91
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		46	127	188	233	2.61	4.23	6.41
Total for Grasses		46	127	188	233	2.61	4.23	6.41
F	Astragalus convallarius	-	2	-	-	.00	-	.00
F	Chenopodium fremontii (a)	-	a-	a-	b34	-	-	.08

Type	Species	Nested Frequency				Average Cover %		
		'86	'94	'00	'05	'94	'00	'05
F	Chenopodium leptophyllum(a)	-	-	-	9	-	-	.02
F	Cruciferae	-	3	-	-	.03	-	-
F	Cryptantha sp.	-	4	-	4	.15	-	.01
F	Descurainia pinnata (a)	-	-	-	59	-	-	.72
F	Eriogonum cernuum (a)	-	_a 2	_a -	_b 41	.00	-	.15
F	Eriogonum ovalifolium	-	3	1	-	.01	.00	-
F	Gilia sp. (a)	-	_a -	_a -	_b 76	-	-	.27
F	Lappula occidentalis (a)	-	4	-	8	.01	-	.02
F	Leucelene ericoides	-	4	4	8	.15	.03	.06
F	Lepidium montanum	-	_b 24	_a 4	_b 24	.08	.01	.77
F	Oenothera sp.	-	-	-	3	-	-	.00
F	Sphaeralcea coccinea	3	1	-	4	.00	-	.09
Total for Annual Forbs		0	6	0	227	0.01	0	1.26
Total for Perennial Forbs		3	41	9	43	0.43	0.05	0.95
Total for Forbs		3	47	9	270	0.45	0.05	2.22

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	'94	'00	'05
B	Artemisia tridentata wyomingensis	74	82	78	15.10	16.59	13.94
B	Atriplex confertifolia	19	20	8	.45	.31	.44
B	Ceratoides lanata	2	0	0	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	37	38	20	1.63	.66	.70
B	Echinocereus sp.	0	1	1	-	.00	-
B	Gutierrezia sarothrae	81	95	40	2.20	4.37	.96
B	Juniperus osteosperma	0	1	1	-	-	-
B	Leptodactylon pungens	5	7	4	.30	.30	.18
B	Opuntia sp.	28	34	8	.25	.48	.03
Total for Browse		246	278	160	19.96	22.75	16.25

CANOPY COVER, LINE INTERCEPT --
Management unit 11B, Study no: 4

Species	Percent Cover
	'05
<i>Artemisia tridentata wyomingensis</i>	14.16
<i>Atriplex confertifolia</i>	.41
<i>Chrysothamnus viscidiflorus stenophyllus</i>	.30
<i>Gutierrezia sarothrae</i>	.81
<i>Leptodactylon pungens</i>	.13

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 11B, Study no: 4

Species	Average leader growth (in)
	'05
<i>Artemisia tridentata wyomingensis</i>	2.4

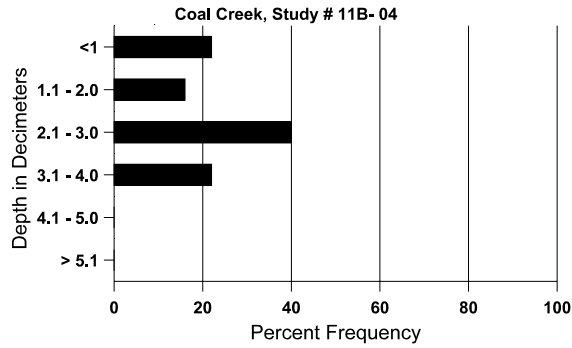
BASIC COVER --
Management unit 11B, Study no: 4

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

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 4, Study Name: Coal Creek

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
13.2	50.2 (11.7)	7.5	54.0	22.0	24.0	1.0	6.4	140.8	0.6

Stoniness Index



PELLET GROUP DATA --
Management unit 11B, Study no: 4

Type	Quadrat Frequency		
	'94	'00	'05
Rabbit	45	39	60
Cattle	-	-	-
Elk	-	1	-
Deer	15	3	3

Days use per acre (ha)	
'00	'05
-	-
-	1 (2)
-	-
4 (10)	7 (17)

BROWSE CHARACTERISTICS --
Management unit 11B, Study no: 4

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
86	1866	66	333	1133	400	-	64	29	21	-	0	14/15
94	2900	2860	80	2120	700	480	12	5	24	9	9	20/31
00	5560	2020	2300	2020	1240	480	15	3	22	10	10	22/35
05	2940	6380	200	660	2080	1640	27	6	71	39	39	23/34
<i>Atriplex canescens</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	17/14

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Atriplex confertifolia</i>												
86	133	-	-	-	133	-	0	100	100	-	100	-/-
94	600	-	-	360	240	-	7	7	40	7	7	10/13
00	540	-	20	140	380	80	7	85	70	70	70	8/14
05	240	40	80	140	20	20	8	25	8	-	0	14/17
<i>Ceratoides lanata</i>												
86	533	-	-	-	533	-	0	75	100	-	75	-/-
94	60	-	20	20	20	-	33	0	33	33	33	6/7
00	0	-	-	-	-	-	0	0	0	-	0	-/-
05	0	-	-	-	-	-	0	0	0	-	0	6/12
<i>Chrysothamnus viscidiflorus stenophyllus</i>												
86	1866	-	-	66	1800	-	4	0	96	3	18	3/7
94	1740	20	-	1300	440	-	1	7	25	5	11	7/10
00	1360	20	20	140	1200	380	1	6	88	74	74	4/7
05	740	-	-	520	220	180	5	5	30	11	11	8/11
<i>Echinocereus sp.</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
00	20	-	-	20	-	-	0	0	-	-	0	3/12
05	20	-	-	20	-	20	0	0	-	-	0	3/9
<i>Gutierrezia sarothrae</i>												
86	11465	866	1666	6666	3133	-	0	0	27	.87	7	7/8
94	6280	20	720	5060	500	360	0	0	8	.95	5	8/7
00	26900	100	1040	23660	2200	740	0	0	8	4	4	4/5
05	1360	120	-	1360	-	100	0	0	0	-	0	8/9
<i>Juniperus osteosperma</i>												
86	66	-	66	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
00	20	-	20	-	-	-	0	0	-	-	0	-/-
05	20	-	20	-	-	-	0	0	-	-	0	-/-
<i>Leptodactylon pungens</i>												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
94	440	-	-	420	20	-	0	0	5	5	5	5/7
00	700	40	60	60	580	60	0	40	83	20	20	8/7
05	260	-	-	200	60	100	0	0	23	8	8	5/8

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Opuntia</i> sp.												
86	1332	-	66	1133	133	-	0	0	10	-	40	4/6
94	1060	-	20	1020	20	-	0	0	2	-	0	3/11
00	1220	-	-	820	400	100	0	0	33	10	13	4/8
05	220	-	-	60	160	480	0	0	73	64	64	4/9
<i>Pinus edulis</i>												
86	0	66	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-