

Trend Study 13B-4-05

Study site name: Red Cliffs.

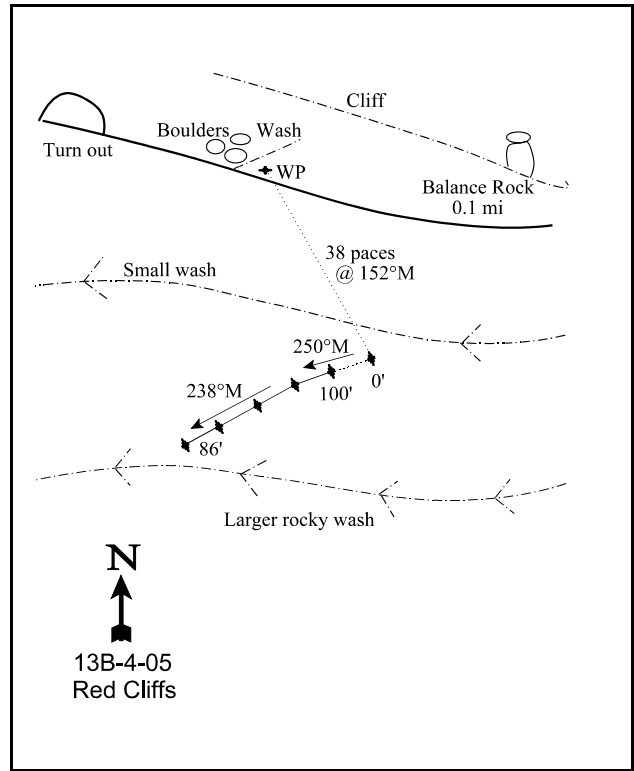
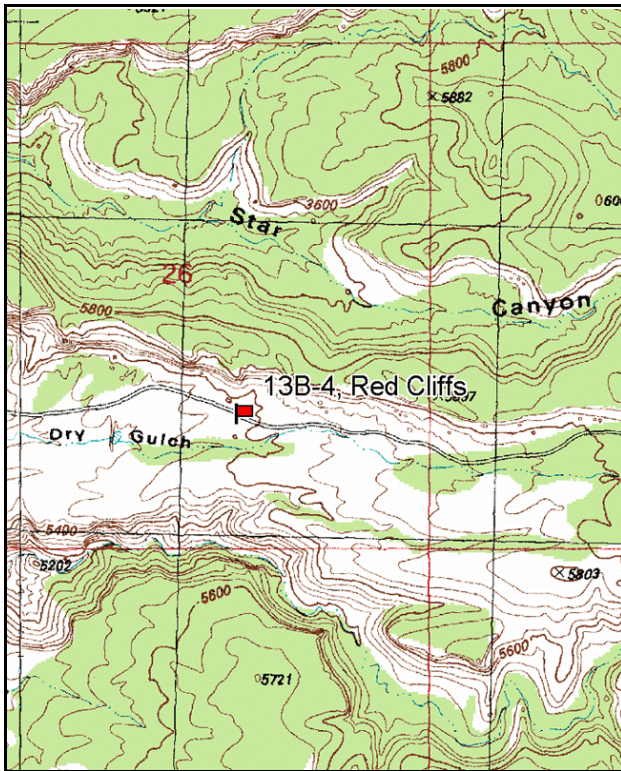
Vegetation type: Blackbrush.

Compass bearing: frequency baseline 250 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (86ft). Belt rebar placement: belt 2 @ 1ft, belt 3 @ 2ft, belt 5 @ 5ft.

LOCATION DESCRIPTION

From the Utah-Colorado state line west of Glade Park, go west 2.1 miles on the Coates Creek Road to a cattle guard. Continue on the main road 2.1 miles to a P-J area bordered on the right by large sandstone cliffs. Here you will find a witness stake (fence post) on the right (north) side of the road. The baseline starts 140 feet south (across the road) from the witness post. A short rebar, tagged #7816, marks the 0-foot end.



Map Name: Marble Canyon

Diagrammatic Sketch

Township 21S, Range 25E, Section 26

GPS: NAD 27, UTM 12S 4312350 N, 663181 E

DISCUSSION

Red Cliffs - Trend Study No. 13B-4

The Red Cliffs study site is located along the Coates Creek Road at an elevation of 5,600 feet. The area is dominated by pinyon-juniper and blackbrush. Steep red sandstone cliffs are located just north and across the road from the site. The transect samples slightly rolling topography with exposures varying from north to south and west. Overall, the area drains to the west with a 3-4% slope. There is a stock pond down the wash about one-tenth of a mile from the transect, although livestock do not appear to utilize this site. Deer and rabbit pellet groups are usually common in the area. To accommodate the increased sample size and stay within the same vegetation type, the position of the transect extension was slightly altered in 1995. The pellet-group data in 2000 estimated 44 deer days use/acre (18 ddu/ha), cow and elk were not sampled. In 2005, the pellet group data estimated 80 deer and 3 elk days use/acre (197 ddu/ha and 8 edu/ha) and no cow pats were sampled.

The moderately shallow soil is light orange in color and is composed of very fine particles which is loosely compacted on the surface. The soil texture is a sandy clay loam with a soil reaction that is mildly alkaline (pH 7.6). The amount of phosphorus in the soil is 5.9 ppm, where values less than 6 ppm may hinder normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). Black rock and pavement are scattered throughout the site with an average combined relative cover of 14%. Relative vegetation cover has been estimated at 31% in 1995, 21% in 2000, and 35% in 2005. Around half of the vegetation cover is contributed by blackbrush, and most of the other half is annual species. Relative litter cover has been estimated at 21% in 1995, 18% in 2000, and 12% in 2005. Most of the litter is beneath the crown of blackbrush. The bare soil interspaces between the blackbrush plants is protected mainly by cryptogamic crust. Some slight erosion, as well as pedestaling under the shrubs, was noted in 1995 and 2000. The erosion condition class determined soil movement as slight in 2005 due to common pedestaling under the shrubs, a small amount recent soil and rock movement, small rills on the site, and a large gully north of the site near the road.

The key browse species on this site is blackbrush which provided 17% cover in 1995, 14% in 2000, and 15% in 2005. Age class structure has changed little since 1986. This is a mature population (86-94%) with few young (2-3%) or decadent plants (4-12%). There were no seedlings encountered in either 1986 or 1995, however a few were classified in 2000 and several in 2005. Utilization is light to moderate and plants exhibit good vigor. Several other browse species were present but infrequently encountered. These include: broom snakeweed, Wyoming big sagebrush, cliffrose, prickly pear cactus, spiny hopsage, and green ephedra. Point-center quarter data in 2000 estimated 33 juniper trees/acre and 8 pinyon trees/acre, and 36 pinyon-juniper trees/acre in 2005.

Cheatgrass is the most abundant grass. Cheatgrass was sampled in 96% of the quadrats in 1995 with 5% cover. Sum of nested frequency declined significantly in 2000, but was still sampled in 84% of the quadrats. In 2005, sum of nested frequency significantly increased, quadrat frequency was 92%, and cover was nearly 15%. Since 1995, only one perennial grass has contributed more than 1% total cover in any sampling year, which was Sandberg bluegrass in 2005 at 2% cover. The remaining grasses include: mutton bluegrass, purple three-awn, sand dropseed, bottlebrush squirreltail, indian ricegrass, sixweeks fescue, and needle-and-thread grass none of which are common. Perennial forbs have rarely been found and a few annual forbs are abundant, such as Nuttall milkvetch.

1986 APPARENT TREND ASSESSMENT

The vegetation appears stable. Because of its abundance, blackbrush is the key browse species on this critical winter range. The browse density and population characteristics represent a healthy stand that appears to be stable. The site has potential to support a diverse perennial grass component. The soil trend appears to be slightly down due to some signs of erosion. Cryptogams are especially important on this site in reducing soil loss on the north-facing slope.

1995 TREND ASSESSMENT

The soil trend appears stable at this time, but in poor condition. The interspaces between the shrubs are protected by cryptogamic crusts which hold the soil in place. If these crusts are disturbed, erosion will likely be accelerated. Vegetation and litter are provide some soil cover. Blackbrush has a stable population with increased vigor and decreased decadence. Other browse species do not appear to be expanding, therefore, the browse trend is stable. The herbaceous understory is almost exclusively annual species. Perennial species in the interspaces would be more dependable at stopping erosion. There is not really a concern for destructive fires because the annual species are mainly located under shrub crowns, leaving the interspaces with little fuel to carry a fire. The decrease in perennial nested frequency and the overall lack of perennial species leads to a downward herbaceous understory trend. The Desirable Components Index rated this site as fair with a score of 38 due to low perennial grass cover, low perennial forb cover, low recruitment of shrubs, good browse cover, low shrub decadence, and low annual grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - down (-2)

winter range condition (DC Index) - Fair (38) Lower Potential scale

2000 TREND ASSESSMENT

The soil trend is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground decreased a little. Percent relative bare soil increased slightly but not enough to warrant a change in trend. The interspaces between the shrubs are protected by cryptogamic crusts which help to hold the soil in place. Cryptogams still provide an important protective ground cover for this blackbrush community. Currently cryptogams provide 20% cover. If these crusts are disturbed, erosion will likely be accelerated with high intensity summer storms. Blackbrush continues to have a fairly stable population with improved vigor and stable decadency. Other browse species do not appear to be increasing, therefore the browse trend continues to be stable. Herbaceous perennial species in the interspaces would be more dependable at stopping erosion, however the perennial understory currently provides less than 1% total cover. There is no real concern for destructive fires because the annual species are mostly associated with the shrub crowns, leaving the interspaces with little fine fuels to carry a fire. There was an increase in the sum of nested frequency of perennial grasses but nested frequency of perennial forbs remained stable. There is, however, an overall lack of herbaceous perennial species. Annuals make up almost 75% of the total herbaceous cover. Herbaceous trend is up due to the decrease of cheatgrass and increase of perennial grasses. The Desirable Components Index rated this site as fair with a score of 36 due to low perennial grass cover, low perennial forb cover, low recruitment of shrubs, good browse cover, low shrub decadence, and low annual grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - up (+2)

winter range condition (DC Index) - Fair (36) Lower Potential scale

2005 TREND ASSESSMENT

The soil trend is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground increased slightly. The percent relative bare soil decreased slightly from 26 to 21%. There was not enough change to warrant a change in trend at this time. The increase in vegetation cover was due to a drastic increase in annuals. The browse trend for the key browse species, blackbrush, is stable. The population increased only

4% from 2000 to 2005. With this increase in population, the percentage of decadent individuals increased from 5% in 2000 to 12% in 2005, which shows little negative effect on the population at this time. The percentages of young and dying individuals remained similar to 2000. The number of seedlings on the site increased in 2005, which may become established as young plants. Spiny hopsage density increased from 20 plants/acre to 80 plants/acre in 2005. Other browse species made up very little of the community. The herbaceous trend is down. The nested frequency of perennial grasses remained stable, but cheatgrass increased significantly to the same level as 1995. Also, cheatgrass cover increased to 15%, which fills the interspaces between shrubs. This creates a fire hazard that could eliminate the shrub component. The Desirable Components Index rated this site as fair with a score of 30 due to low perennial grass cover, low perennial forb cover, low recruitment of shrubs, good browse cover, low shrub decadence, and moderately high annual grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - down (-2)

winter range condition (DC Index) - Fair (30) Lower Potential scale

HERBACEOUS TRENDS --

Management unit 13B, Study no: 4

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
G	Aristida purpurea	3	3	6	-	.30	.06	-
G	Bromus tectorum (a)	-	_b 336	_a 264	_b 308	4.56	2.24	14.91
G	Oryzopsis hymenoides	-	-	5	-	-	.03	-
G	Poa fendleriana	_c 110	_b 21	_b 11	_a -	.15	.13	-
G	Poa secunda	_a -	_a -	_b 31	_c 57	-	.68	1.98
G	Sitanion hystrix	5	-	-	1	-	-	.01
G	Sporobolus cryptandrus	3	-	-	-	-	-	-
G	Stipa comata	-	3	-	-	.03	-	-
G	Vulpia octoflora (a)	-	_a -	_b 24	_b 33	-	.05	.44
Total for Annual Grasses		0	336	288	341	4.56	2.28	15.35
Total for Perennial Grasses		121	27	53	58	0.48	0.91	1.99
Total for Grasses		121	363	341	399	5.04	3.20	17.34
F	Astragalus nuttallianus (a)	-	_c 242	_a -	_b 177	6.36	-	1.54
F	Calochortus nuttallii	-	-	1	5	-	.00	.01
F	Chaenactis stevioides	-	-	-	12	-	-	.21
F	Cryptantha sp.	_a -	_a 2	_a -	_b 14	.00	-	.03
F	Cymopterus sp.	-	-	1	1	-	.00	.01
F	Delphinium nuttallianum	-	-	-	4	-	-	.02
F	Delphinium occidentale	-	-	-	3	-	-	.00
F	Draba nemorosa (a)	-	_a 12	_b 33	_a 16	.02	.08	.05
F	Erodium cicutarium (a)	-	_a 18	_a 20	_b 41	.19	.07	.38

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'95	'00	'05	'95	'00	'05
F	Erigeron sp.	-	1	-	-	.00	-	-
F	Gilia hutchinifolia (a)	-	_a 14	_a 10	_b 88	.03	.64	.45
F	Lappula occidentalis (a)	-	3	-	4	.01	-	.01
F	Lepidium sp. (a)	-	_b 12	_a -	_{ab} 7	.02	-	.02
F	Machaeranthera glabriusculas	3	-	-	-	-	-	-
F	Mentzelia sp.	-	_a -	_b 20	_c 43	-	.03	.36
F	Navarretia intertexta (a)	-	-	7	8	-	.01	.04
F	Phlox longifolia	_a -	_b 9	_a -	_a 3	.04	-	.00
F	Plantago patagonica (a)	-	8	-	4	.01	-	.01
F	Schoenocrambe linifolia	-	1	-	-	.00	-	-
F	Unknown forb-annual (a)	-	2	-	-	.00	-	-
Total for Annual Forbs		0	311	70	345	6.68	0.81	2.51
Total for Perennial Forbs		3	13	22	85	0.05	0.04	0.66
Total for Forbs		3	324	92	430	6.73	0.86	3.17

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

BROWSE TRENDS --

Management unit 13B, Study no: 4

T y p e	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Artemisia tridentata wyomingensis	2	5	2	-	.84	.00
B	Coleogyne ramosissima	81	72	76	16.70	13.51	14.83
B	Ephedra viridis	0	1	1	-	-	.53
B	Grayia spinosa	0	1	2	-	.38	.93
B	Gutierrezia sarothrae	3	2	0	.04	.15	-
B	Juniperus osteosperma	0	3	2	4.65	4.22	4.43
B	Opuntia sp.	2	5	4	.03	.15	.38
B	Pinus edulis	0	0	0	.38	-	-
B	Sclerocactus sp.	1	8	3	-	.06	-
Total for Browse		89	97	90	21.80	19.30	21.12

CANOPY COVER, LINE INTERCEPT --

Management unit 13B, Study no: 4

Species	Percent Cover	
	'00	'05
<i>Coleogyne ramosissima</i>	-	18.73
<i>Grayia spinosa</i>	-	1.10
<i>Juniperus osteosperma</i>	3.40	5.19
<i>Opuntia sp.</i>	-	.16

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 13B, Study no: 4

Species	Average leader growth (in)
	'05
<i>Artemisia tridentata wyomingensis</i>	1.8
<i>Coleogyne ramosissima</i>	1.5

POINT-QUARTER TREE DATA --

Management unit 13B, Study no: 4

Species	Trees per Acre	
	'00	'05
<i>Juniperus osteosperma</i>	33	36
<i>Pinus edulis</i>	8	-

Average diameter (in)	
'00	'05
11.9	9.1
6.2	-

BASIC COVER --

Management unit 13B, Study no: 4

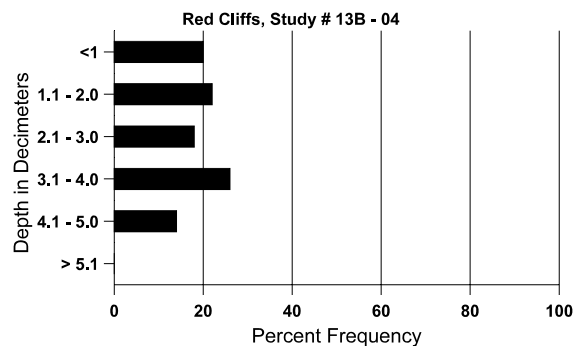
Cover Type	Average Cover %			
	'86	'95	'00	'05
Vegetation	13.75	33.59	24.73	39.10
Rock	16.25	11.28	13.46	10.78
Pavement	3.00	.08	6.66	5.07
Litter	25.00	23.32	20.85	13.35
Cryptogams	23.50	15.57	20.23	20.57
Bare Ground	18.50	25.61	30.77	24.21

SOIL ANALYSIS DATA --

Herd Unit 13B, Study # 4, Study Name: Red Cliffs

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
13.8	58.6 (13.5)	7.6	60.0	19.4	20.6	0.7	5.8	147.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 13B, Study no: 4

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	23	11	24
Elk	-	-	1
Deer	34	29	37

Days use per acre (ha)	
'00	'05
-	-
-	3 (8)
44 (108)	80 (197)

BROWSE CHARACTERISTICS --

Management unit 13B, Study no: 4

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
95	40	-	-	20	20	-	50	0	50	-	0	26/41
00	100	-	20	80	-	-	20	40	0	-	0	27/44
05	40	-	20	20	-	20	50	50	0	-	0	29/37
<i>Chrysothamnus nauseosus albicaulis</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	15/42
05	0	-	-	-	-	-	0	0	-	-	0	19/43
<i>Chrysothamnus viscidiflorus stenophyllus</i>												
86	133	-	-	-	133	-	0	0	100	-	0	-/-
95	0	-	-	-	-	-	0	0	0	-	0	-/-
00	0	-	-	-	-	-	0	0	0	-	0	-/-
05	0	-	-	-	-	-	0	0	0	-	0	-/-

		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>Coleogyne ramosissima</i>												
86	11200	-	400	9600	1200	-	27	5	11	-	11	15/16
95	4560	-	120	4280	160	60	20	2	4	.87	1	16/30
00	4280	20	80	4000	200	120	12	0	5	1	1	15/26
05	4460	240	80	3840	540	40	21	0	12	2	2	16/31
<i>Ephedra viridis</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	26/33
00	20	-	-	20	-	-	0	0	-	-	0	26/43
05	220	-	100	120	-	-	55	0	-	-	0	36/49
<i>Grayia spinosa</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	20	-	-	20	-	-	0	0	-	-	0	23/59
05	80	-	-	80	-	-	0	0	-	-	0	23/48
<i>Gutierrezia sarothrae</i>												
86	66	-	-	66	-	-	0	0	-	-	0	10/5
95	100	-	-	100	-	-	0	0	-	-	0	10/12
00	40	-	-	40	-	-	0	0	-	-	0	7/13
05	0	-	-	-	-	-	0	0	-	-	0	10/10
<i>Juniperus osteosperma</i>												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
95	0	-	-	-	-	-	0	0	0	-	0	-/-
00	60	20	20	40	-	20	0	0	0	-	0	22/48
05	40	-	-	20	20	-	0	0	50	50	50	-/-
<i>Opuntia sp.</i>												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
95	40	-	-	40	-	-	0	0	0	-	0	5/26
00	220	-	-	220	-	-	0	0	0	-	0	5/23
05	160	-	-	60	100	20	0	0	63	63	63	6/24
<i>Sclerocactus sp.</i>												
86	66	-	-	66	-	-	0	0	-	-	0	7/3
95	20	-	-	20	-	-	0	0	-	-	0	4/3
00	260	-	-	260	-	-	0	0	-	-	0	5/3
05	80	-	-	80	-	40	0	0	-	-	0	5/7