

Trend Study 25C-24-98

Study site name: Black Ridge .

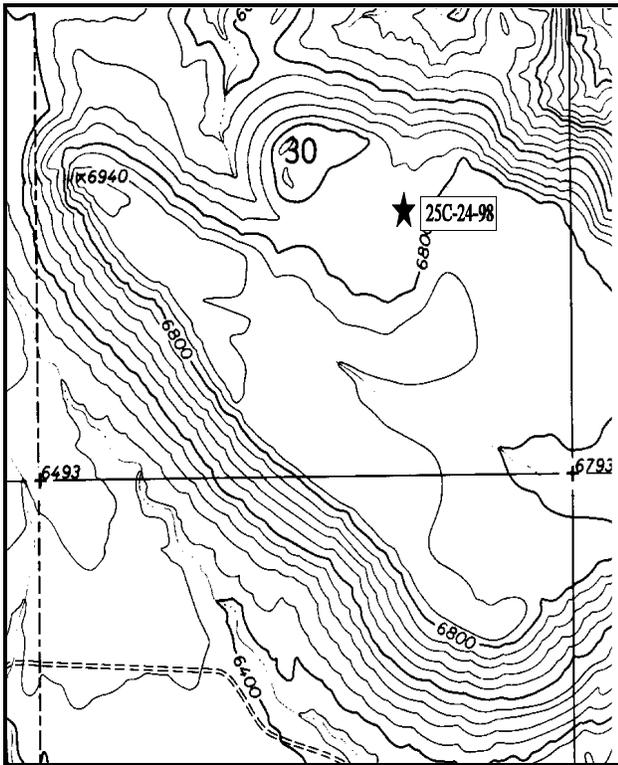
Range type: Big Sagebrush .

Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

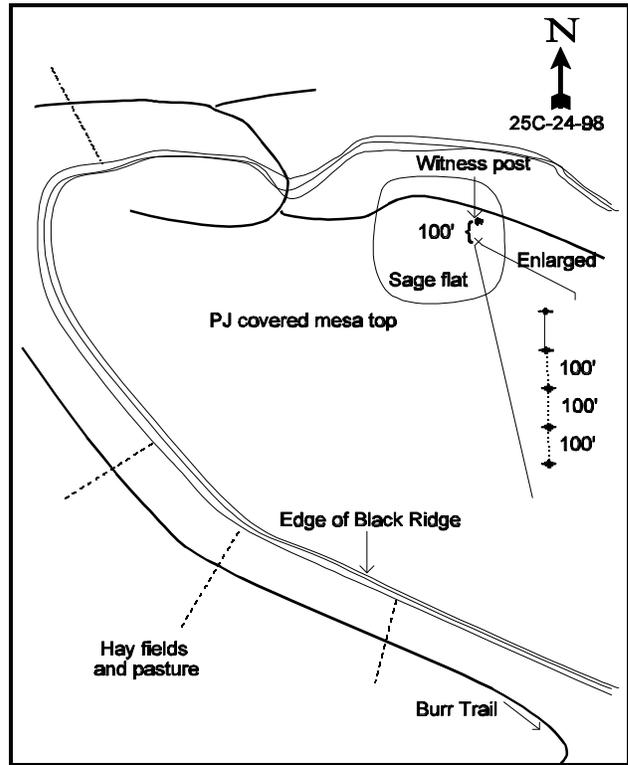
LOCATION DESCRIPTION

From the Anasazi State Park in Boulder, continue south on SR 12 for 0.1 miles then turn left (east) on a city street. Drive east for 0.7 miles to a fork. Stay left and continue 1.3 miles up Black Ridge Mesa and a witness post (full high) on the right, near the east edge of a sagebrush opening in the P-J. Make sure to stay on the main road avoiding various smaller forks. The short fenceposts marking the transect run south at 100 foot intervals. There are other routes to reach the one road leading to the top of the mesa. All, including the one described, involve crossing private land.



Map Name: Boulder Town

Township 33S, Range 5E, Section 30



Diagrammatic Sketch

UTM 4195350.045 N, 465541.966 E

DISCUSSION

Trend Study No. 25C-24 (51B-14)

The Black Ridge study site is an example of important low-elevation deer and elk winter range on a mesa top near the town of Boulder. This particular mesa is small, about 240 acres. Most of the mesa is covered with pinyon and juniper, except for a 10 acre sagebrush flat where the study was located. The mesa is privately owned and surrounded by alfalfa fields and pastures at its base. It has been used for livestock grazing in the past. During the 1998 reading, it was discovered that the mesa is being developed for houses. The road to the top has been improved and electricity and water lines have been installed. Building has not yet begun. It is not known how the sagebrush flat will be impacted, but it is apparent that big game will be affected. Frequent pellet groups and antler drops found during past readings verify the area's importance to mule deer. Pellet group data taken during the 1991 reading indicate heavy deer use with an estimated 70 deer days use/acre. Elk sign was less common. Pellet group data from 1998 estimate 87 deer and 6 elk days use/acre. Surrounding mesas are similarly flat-topped and dominated by pinyon-juniper, with use concentrated within the sagebrush flats.

Located in a sagebrush basin surrounded by rocky, pinyon-juniper covered ridges, the study site has a 1-2% slope and a northerly aspect. The elevation is 6,800 feet, about 400 feet higher than the surrounding fields. Sandstone bedrock is exposed on the sides of the mesa, but on top the sandy soil appears to be quite deep. Effective rooting depth (see methods) is estimated at 16 inches with no rock on the surface or within the profile. Texture is a loamy sand with a slightly acid pH (6.3). Phosphorus may be limiting to plant growth at just 3.8 ppm when 10 ppm is thought to be a minimum value for normal plant development. Although the soil is light and loose, erosion is not a significant problem with the lack of slope.

A moderately dense stand of Wyoming big sagebrush characterizes the site. The sagebrush is overly mature and 63% of the shrubs were classified as decadent in 1987. This percentage increased in 1991 to 85%. There were very few young plants or seedlings. Density was estimated at 4,799 plants/acre in 1987, declining 24% to 3,666 by 1991. The much larger sample used in 1998 estimated 2,440 plants/acre. Some of the change in density would be due to the larger sample, but it is apparent that the population is in a state of decline. During the 1991 reading, 30% of the decadent sagebrush were classified as dying, which equates to 940 plants/acre. By 1998, 39% or 560 plants/acre of the decadent sagebrush were classified as dying. Dead plants, first included in the 1998 sample, are numerous at 1,060 plant/acre. Reproduction is limited and percent decadency has declined to 59%, but this is still very high. Utilization has been light to moderate since 1987 with a few individuals displaying heavy use.

Only a few scattered pinyon and juniper were encountered on the study. Point quarter data from 1998 estimate 69 pinyon and 24 juniper trees/acre. Average diameter of pinyon is 1.8 inches while juniper averages 5.2 inches. The few other browse species observed occur along the edge or in the trees. These include black sagebrush, bitterbrush, Ephedra, and serviceberry. All are heavily hedged except for black sagebrush. Some old lone junipers near the site are highlined.

Herbaceous vegetation is diverse but not abundant. Blue grama, sandhill muhly, and Indian ricegrass are the most common grasses. However, all grasses combined produced only 5% cover in 1998. Ten species of forbs occur on the study site. Currently ('98), the most common forbs include: rockcress, Carruth sage, cryptantha, and hoary aster. Total forb cover is nearly 3%.

1991 TREND ASSESSMENT

Basic cover for soil has experienced some unfavorable changes since 1987. Vegetative basal cover improved from 7% to 10%, but litter cover declined from 44% to 34% and percent bare ground expanded from 46% to 53%. Total ground cover has dropped from 54% down to 47%. Trend for soil is down. The key browse on

the site is Wyoming big sagebrush. Its population has declined by 24%. The more serious problem is that percent decadency has risen from 63% up to 85%. One possible explanation is that it has been noted in the past that the sagebrush stand is on a flat that drains to the center from all sides. The lower central area during the winters of 1983 and 1984 experienced highly saturated soils for extended periods of time which has caused a noticeable change in the sagebrush as they are all dead. This could have had an effect on the rest of the sagebrush population within the sagebrush flat as well. Since those wet years, we have experienced an extended drought which have also affected the sagebrush population. The trend for browse is down. The herbaceous understory has the grasses which show some improvement (sum of nested frequency improved) , but the forbs demonstrate a decline. The overall trend would be stable.

TREND ASSESSMENT

soil - down

browse - down

herbaceous understory - stable

1998 TREND ASSESSMENT

Trend for soil is stable with similar amounts of bare ground compared to 1991. Litter cover increased slightly but cryptogamic cover declined. Trend for the key browse species, Wyoming big sagebrush, continues to be down with a decline in density, similar poor vigor compared to 1991, and lower but still high percent decadence at 59%. Reproduction is poor with only a few young plants encountered in 1998. Decadent/dying plants currently number 560 plants/acre which will likely be dead by the time the site is read again. Trend for the herbaceous understory is mixed. Sum of nested frequency of grasses has declined. The only grass to increase in nested frequency since 1991 is blue grama. All other perennial grasses declined in frequency. Sum of nested frequency of forbs increased. Trend is considered stable, but in poor condition. This area is being developed for houses. It is not known if homes will be built on the sagebrush flat where the study is located but any development will likely reduce deer and especially elk use of this mesa top. The site will be reevaluated in 5 years to determine if a trend study is still useful.

TREND ASSESSMENT

soil - stable

browse - down

herbaceous understory - stable, but in poor condition

HERBACEOUS TRENDS --

Herd unit 25C, Study no: 24

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '98
		'87	'91	'98	'87	'91	'98	
G	<i>Bouteloua gracilis</i>	85	107	115	37	46	46	2.56
G	<i>Hilaria jamesii</i>	3	-	-	2	-	-	-
G	<i>Muhlenbergia pungens</i>	_{ab} 67	_b 78	_a 36	28	28	15	.49
G	<i>Oryzopsis hymenoides</i>	25	39	23	15	17	13	.27
G	<i>Sitanion hystrix</i>	6	7	5	4	4	2	.06
G	<i>Sporobolus cryptandrus</i>	_a -	_b 17	_a 3	-	7	2	.01
G	<i>Stipa comata</i>	_b 16	_{ab} 4	_a 2	7	3	1	.03
G	<i>Vulpia octoflora</i> (a)	-	-	139	-	-	46	1.35
Total Annual Grasses		0	0	139	0	0	46	1.35
Total Perennial Grasses		202	252	184	93	105	79	3.43

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '98
		'87	'91	'98	'87	'91	'98	
F	Arabis spp.	a-	a-	b56	-	-	26	.36
F	Artemisia carruthii	a28	ab39	b57	12	16	23	.46
F	Astragalus convallarius	b34	a15	a2	18	7	2	.01
F	Cordylanthus wrightii (a)	85	-	9	42	-	5	.07
F	Cryptantha cinerea	a14	a14	b86	9	9	34	1.14
F	Cruciferae	b7	a-	a-	5	-	-	-
F	Descurainia pinnata (a)	-	-	2	-	-	2	.01
F	Eriogonum cernuum (a)	b55	a10	a-	28	7	-	-
F	Heterotheca villosa	3	2	-	1	1	-	-
F	Hymenopappus filifolius	ab2	b10	a-	1	5	-	-
F	Machaeranthera canescens	a-	a11	b48	-	5	19	.43
F	Oenothera pallida	a-	a3	b23	-	2	12	.08
F	Plantago patagonica (a)	-	-	31	-	-	14	.12
F	Tradescantia occidentalis	a7	b25	a3	4	14	1	.00
F	Unknown forb-perennial	3	-	-	2	-	-	-
Total Annual Forbs		140	10	42	70	7	21	0.20
Total Perennial Forbs		98	119	275	52	59	117	2.52

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25C, Study no: 24

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	72	16.87
B	Opuntia spp	4	-
B	Pinus edulis	1	.38
Total for Browse		77	17.25

BASIC COVER --

Herd unit 25C, Study no: 24

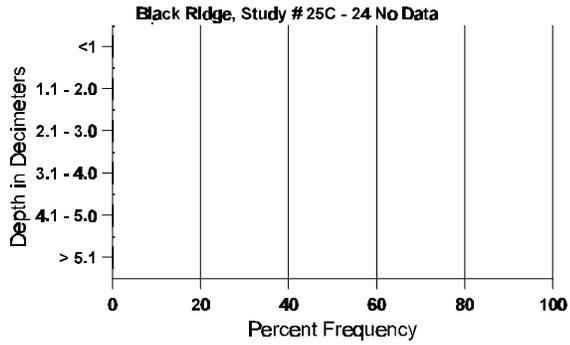
Cover Type	Nested Frequency '98	Average Cover %		
		'87	'91	'98
Vegetation	291	7.25	9.75	27.49
Rock	-	0	0	0
Pavement	28	0	0	.22
Litter	388	44.00	34.00	39.02
Cryptogams	50	3.00	3.25	.48
Bare Ground	371	45.75	53.00	51.87

SOIL ANALYSIS DATA --

Herd Unit 25C, Study # 24, Study Name: Black Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.2	60.8 (16.3)	6.3	86.0	5.4	8.6	.6	3.8	28.8	.3

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25C, Study no: 24

Type	Quadrat Frequency '98
Rabbit	14
Elk	2
Deer	64
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 25C, Study no: 24

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata wyomingensis																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	87	12	13	1	-	-	-	-	-	-	20	4	2	-	1733	22	21	26
	91	2	4	-	-	-	-	-	-	-	6	-	-	-	400	23	24	6
	98	33	13	-	1	-	-	-	-	-	47	-	-	-	940	24	40	47
D	87	28	13	4	-	-	-	-	-	-	35	2	8	-	3000			45
	91	17	12	1	12	4	1	-	-	-	32	1	-	14	3133			47
	98	54	18	-	-	-	-	-	-	-	43	1	-	28	1440			72
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1060			53
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		36%			07%			14%			-24%							
'91		36%			04%			25%			-33%							
'98		25%			00%			23%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	4799	Dec:	63%			
												'91	3666		85%			
												'98	2440		59%			
Opuntia spp.																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	2	5	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%										
'91		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-			
												'91	0		-			
												'98	100		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
S	'87	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	'91	2	-	-	-	-	-	-	-	-	1	-	1	-	133		2
	'98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	'87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	'98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'87		00%			00%			00%									
'91		00%			00%			00%									
'98		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-		
												'91	0		-		
												'98	20		-		