Trend Study 3-12-06

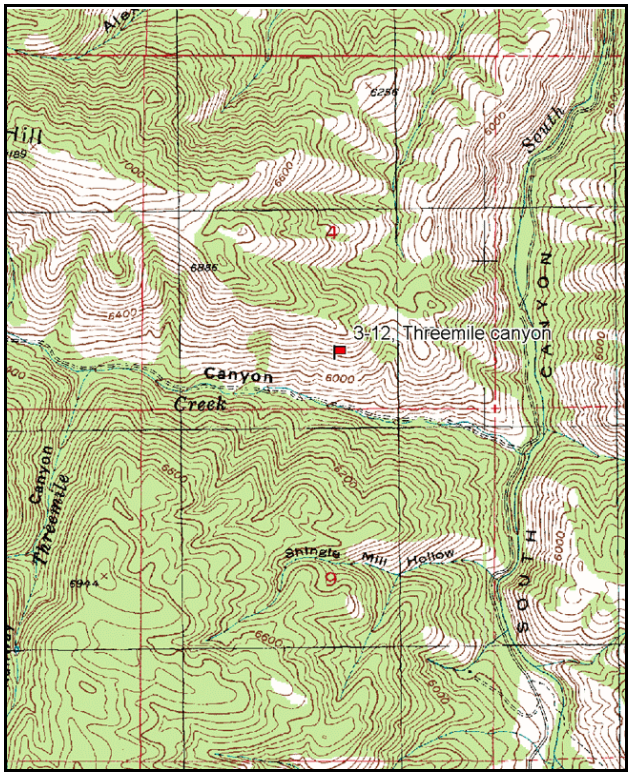
Study site name: Threemile Canyon . Vegetation type: Bitterbrush .

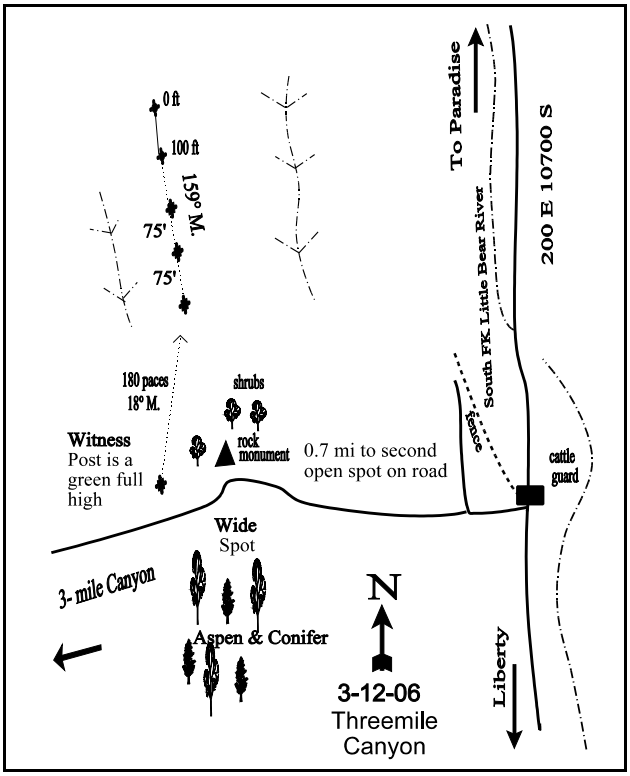
Compass bearing: frequency baseline 159 degrees magnetic.

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

LOCATION DESCRIPTION

From 200 East and 10700 South in Avon, proceed south (towards Liberty) on a dirt road for 7.0 miles. Cross the cattle guard and turn immediately right (west). Travel. 0.7 miles up Three-mile Canyon and stop adjacent to a green and white witness post on the right side of road. Walk 180 paces at 18 degrees magnetic from the witness post to the last baseline stake. From the last baseline stake to the 0-foot baseline stake walk 400 feet at an azimuth 340 degrees magnetic. The 0-foot stake is marked by browse tag #7982.





Map Name: James Peak

Diagrammatic Sketch

Township 8N , Range 1E , Section 4

UTM NAD 27, UTM 12T 4589284 N 429627 E

DISCUSSION

Threemile Canyon - Trend Study No. 3-12

Study Information

This study samples a sparse but heavily used bitterbrush/sagebrush community in Threemile Canyon, a tributary of the South Fork of the Little Bear River (elevation 6,100 feet, slope 60%, aspect south). Use of the available browse was very heavy in 1984 and moderately heavy in 1990. Deer use was light in 1996, 2001, and 2006. Elk use has also been very light. Pellet group transect data taken in 2001 estimated 26 deer and 2 elk days use/acre (65 ddu/ha and 5 edu/ha). Pellet group data in 2006 was estimated at 13 deer and 1 elk days use/acre (33 ddu/ha and 2 edu/ha).

Soil

The soil is classified in the Sheep Creek series, a moderately deep (28-40 inches to fractured limestone bedrock), well drained soils that formed in residuum and colluvium derived from calcareous sandstone, limestone, or quartzite (USDA-NRCS 2006). This soil often has a calcareous accumulation at approximately 22 inches depth. Soils have a clay loam texture with a neutral soil reaction (7.2 pH). Effective rooting depth was estimated at 16 inches in 1996. Rocks are common on the surface and within the profile. Although the soil has a high erosion hazard, an erosion condition class assessment done in 2001 and 2006 showed the soil to be stable with little erosion. The ratio of protective cover (vegetation, litter, and cryptograms) to bare ground is moderately high at 3 to 1, but has decreased from 5 to 1 in 2001. Bare ground and rock/pavement cover have both increased with each reading since 1996.

Browse

Browse composition consists of a moderate stand of antelope bitterbrush interspersed with a low density of mountain big sagebrush. Small amounts of mountain snowberry, Wood's rose, and serviceberry are also present. Bitterbrush density was estimated at 820 plants/acre in 1996 and 2006, with a slight decline in 2001 to 700 plants/acre. Cover has averaged 8% since 1996. Those plants sampled in 1984 all displayed heavy use, but this has declined to moderate use. Decadence was quite high at over 40% in 1984 and 1990. However, it declined to 5-7% in 1996 and 2006, with a slight increase to 17% in 2001. Recruitment from young plants was low in 2001 and 2006 and may have difficultly establishing with a thick understory of weeds (Hall et al. 1999). Vigor remains normal on mature plants. Average leader growth on bitterbrush was about 3-4 inches in 2001 and 2006.

Mountain big sagebrush density has steadily declined since 1984, until no plants were sampled in 2006. Density was estimated at 180 plants/acre in 1996 and 100 plants/acre in 2001. Cover has averaged less than 1% since 1996. Utilization was heavy in 1984, but has been light since 1996. Decadence ranged from 40-50% in all sampling years and young recruitment was minimal. The average number of young plants since 1984 was not adequate to replace the dying plants within the population.

Herbaceous Understory

The herbaceous understory is dominated by introduced weedy species including: cheatgrass, Japanese brome, bulbous bluegrass, tarweed, and dyer's woad. Desired perennial grasses such as bluebunch wheatgrass, Sandberg bluegrass, and Great Basin wildrye are present. They have maintained fairly stable frequencies from 1996 to 2006, except bluebunch wheatgrass which increased significantly in 2006. Both Sandberg bluegrass and Great Basin wildrye combined have provided less than 1% cover. Nested frequency of bulbous bluegrasses increased significantly in 2001 and again in 2006. Forbs are fairly diverse and abundant, but are mainly low growing and/or increaser species which include Louisiana sagebrush, yellow salsify, and prickly lettuce. Arrowleaf balsamroot is perhaps the most desirable forb, but it occurs only occasionally.

1990 TREND ASSESSMENT

Bitterbrush and mountain big sagebrush populations both decreased, 22% and 67% respectively. Together, it

indicates a definite downward trend for these key browse species. A moderating factor is that, while in 1984 all the bitterbrush were classified as heavily hedged, in 1990 all form classes were represented, suggesting generally lighter utilization. Bitterbrush canopy cover was estimated at 5%. Sagebrush cover was too low to measure with the variable plot method. Trend for grasses is slightly down. Bluebunch wheatgrass decreased significantly while bulbous bluegrass increased. Trend for forbs is up. Most species are desirable and increased significantly, especially yellow salsify.

browse - down (-2) grasses - slightly down (-1) forbs - up (+2)

1996 TREND ASSESSMENT

Trend for browse is stable but limited. Density of bitterbrush is estimated at 820 plants/acre with the new, much larger sample size. Utilization is mostly moderate and percent decadence low at 5%. Recruitment appears sufficient to maintain the population. Mountain big sagebrush has a density of only 180 plants/acre, providing little forage. Reproduction is limited and likely hindered by the abundant herbaceous understory. Trend for grasses is slightly down. Perennial grasses nested frequency decreased by 20%, mostly bluebunch wheatgrass. Annual grasses, cheatgrass and Japanese brome, are abundant and this was the first year they were included in the study. Trend for the forbs is stable. Nested frequency for perennial forbs remained similar to 1990. Annual forbs were included in the study this year and most are weedy and abundant. The Desirable Components Index rated this site as very poor with a score of 33 due to moderate browse cover, moderate Decadence, moderate perennial grass cover, and high annual grass cover.

winter range condition (DC Index) - very poor (33) Mid Potential scale
browse - stable (0) grasses - slightly down (-1) forbs - stable (0)

2001 TREND ASSESSMENT

Trend for browse is slightly down. Bitterbrush density slightly decreased with a reduction in the number of young plants and percent decadence increased. Decadence in the mountain big sagebrush population remains at a moderately high level (40%). Those classified with poor vigor increased from 0% to 20%. These negative parameters are likely drought related and should improve with normal precipitation in the future. Trend for grasses is slightly down. Perennial grasses stayed the same except for bulbous bluegrass, which increased significantly. Annual grasses are abundant and it appears the nested frequency of Japanese brome is decreasing while cheatgrass is increasing. Trend for forbs is slightly down. Forbs nested frequency decreased by 20% since 1996. The Desirable Components Index rated this site as very poor with a score of 31 due to moderate browse cover, moderate decadence, moderate perennial grass cover, and high annual grass cover.

winter range condition (DC Index) - very poor (31) Mid Potential scale
browse - slightly down (-1) grasses - slightly down (-1) forbs - slightly down (-1)

2006 TREND ASSESSMENT

Trend for key browse species is slightly up. Bitterbrush density increased from 700 plants/acre to 820 plants/acre. Decadence decreased from 17% to 7% and vigor is good despite moderate utilization. A small population of mountain big sagebrush was sampled in previous years, but was not sampled this year. Trend for grasses is slightly up. Nested frequency of bluebunch wheatgrass increased significantly. Cheatgrass nested frequency remained the same as 2001, while Japanese brome continued to decrease. Bulbous bluegrass continues to significantly increase at each observation. Trend for forbs is slightly down. Perennial forb sum of nested frequency increased by 40%, but were due to two undesirable species, dyer's woad and pale stickseed. The Desirable Components Index rated this site as poor-fair with a score of 48 due to fairly low browse cover, low decadence, moderate perennial grass cover, and moderate annual grass cover.

winter range condition (DC Index) - poor-fair (48) Mid Potential scale
browse - slightly up (+1) grasses - slightly up (+1) forbs - slightly down (-1)

HERBACEOUS TRENDS --
Management unit 03 , Study no: 12

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron spicatum	c220	ab164	a120	a131	bc178	4.64	7.90	9.40
G	Bromus japonicus (a)	-	-	c354	b205	a90	20.07	8.06	.52
G	Bromus tectorum (a)	-	-	a209	b276	b300	6.28	22.38	9.89
G	Carex sp.	-	-	-	3	-	-	.00	-
G	Elymus cinereus	a-	a1	b22	ab13	ab8	1.63	1.83	.36
G	Poa bulbosa	a-	b18	b11	c75	d121	.12	1.57	2.61
G	Poa secunda	a-	b32	b18	b18	b30	.20	.20	.55
Total for Annual Grasses		0	0	563	481	390	26.36	30.44	10.41
Total for Perennial Grasses		220	215	171	240	337	6.60	11.52	12.92
Total for Grasses		220	215	734	721	727	32.96	41.97	23.34
F	Achillea millefolium	-	-	6	6	2	.03	.06	.15
F	Agoseris glauca	c34	bc19	ab5	a1	abc17	.01	.01	.10
F	Allium acuminatum	b17	a-	a-	a-	ab4	-	-	.01
F	Alyssum alyssoides (a)	-	-	ab88	b109	a50	.30	1.23	.18
F	Artemisia ludoviciana	a25	ab30	ab29	b56	ab31	.88	3.27	1.70
F	Aster chilensis	-	-	1	1	-	.06	.00	-
F	Balsamorhiza sagittata	14	16	6	14	11	1.75	2.82	2.75
F	Camelina microcarpa (a)	-	-	1	5	6	.00	.04	.02
F	Calochortus nuttallii	a-	b8	a-	ab2	ab9	-	.00	.04
F	Cirsium sp.	a1	b29	a13	a2	a5	.37	.06	.42
F	Collomia linearis (a)	-	-	b44	a10	b67	.18	.02	.28
F	Collinsia parviflora (a)	-	-	a3	a1	b54	.00	.00	.13
F	Crepis acuminata	a-	b29	ab21	a6	ab7	.22	.09	.45
F	Epilobium brachycarpum (a)	-	-	b104	a18	c166	.91	.04	3.18
F	Erodium cicutarium (a)	-	-	a-	b10	c83	-	.13	1.60
F	Galium aparine (a)	-	-	a3	a-	b34	.03	-	.20
F	Hackelia patens	a-	a-	a-	a6	b41	-	.06	.80
F	Holosteum umbellatum (a)	-	-	a7	b77	b104	.02	.33	.35
F	Isatis tinctoria	a-	a4	a7	ab16	b32	.16	.22	1.38
F	Lappula occidentalis (a)	-	-	a2	b18	ab12	.00	.06	.03
F	Lactuca serriola	a-	b43	c99	c113	c133	1.13	2.82	2.46
F	Lesquerella sp.	-	-	-	2	-	-	.00	-
F	Lithospermum ruderale	-	-	12	6	5	1.06	.45	.93
F	Lomatium grayi	-	1	-	-	6	-	-	.16
F	Madia glomerata (a)	-	-	a-	a-	b17	-	-	1.14

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Microsteris gracilis (a)	-	-	a-	a-	b41	-	-	.15
F	Polygonum douglasii (a)	-	-	-	1	6	.00	.00	.01
F	Ranunculus testiculatus (a)	-	-	-	3	4	-	.00	.00
F	Senecio multilobatus	b41	a-	a-	a2	a-	-	.00	-
F	Sisymbrium altissimum (a)	-	-	-	-	5	-	-	.48
F	Tragopogon dubius	a32	c185	c195	b76	b95	5.07	2.05	2.01
F	Unknown forb-perennial	a-	a-	a-	b16	a-	-	.13	-
F	Veronica biloba (a)	-	-	a21	a45	b170	.70	.14	1.11
Total for Annual Forbs		0	0	273	297	819	2.17	2.01	8.92
Total for Perennial Forbs		164	364	394	325	398	10.78	12.09	13.42
Total for Forbs		164	364	667	622	1217	12.96	14.11	22.34

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

BROWSE TRENDS --
Management unit 03 , Study no: 12

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia tridentata vaseyana	8	5	0	.41	-	-
B	Mahonia repens	2	2	2	.15	.03	.18
B	Purshia tridentata	25	27	26	8.01	7.73	8.06
B	Rosa woodsii	5	4	5	.24	.03	.30
Total for Browse		40	38	33	8.81	7.79	8.55

CANOPY COVER, LINE INTERCEPT --
Management unit 03 , Study no: 12

Species	Percent Cover '06
Mahonia repens	.18
Purshia tridentata	11.78
Rosa woodsii	.43

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 03 , Study no: 12

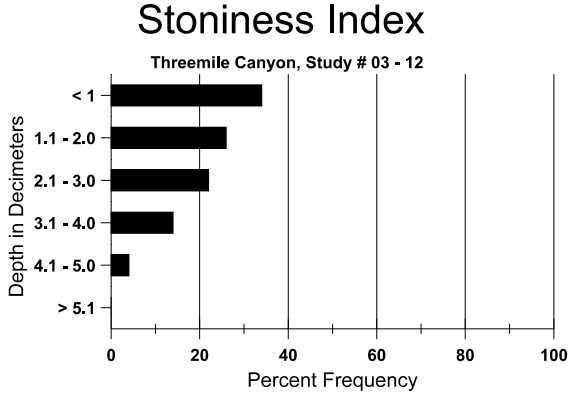
Species	Average leader growth (in)	
	'01	'06
Purshia tridentata	3.9	3.1

BASIC COVER --
Management unit 03 , Study no: 12

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	3.50	9.00	56.96	62.90	55.22
Rock	15.25	12.75	5.47	8.76	14.80
Pavement	10.25	17.00	.50	5.16	3.67
Litter	49.75	40.50	64.06	33.45	35.54
Cryptogams	.75	0	0	0	.03
Bare Ground	20.50	20.75	4.86	7.33	14.36

SOIL ANALYSIS DATA --
Herd Unit 03, Study no: 12, Threemile Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
16.1	67.4 (16.3)	7.2	27.3	40.7	32.0	3.1	15.8	201.6	0.6



PELLET GROUP DATA --
Management unit 03 , Study no: 12

Type	Quadrat Frequency		
	'96	'01	'06
Elk	1	-	-
Deer	5	13	5
Cattle	-	1	-

Days use per acre (ha)	
'01	'06
2 (5)	1 (2)
26 (65)	13 (33)
-	-

BROWSE CHARACTERISTICS --
Management unit 03 , Study no: 12

		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)
Amelanchier alnifolia												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**0**	-	-	-	-	-	0	0	-	-	0	29/34
01	**0**	-	-	-	-	-	0	0	-	-	0	-/-
06	**0**	-	-	-	-	-	0	0	-	-	0	42/42
Artemisia tridentata vaseyana												
84	**999**	-	-	566	433	-	13	87	43	-	0	26/32
90	**332**	-	-	166	166	-	70	10	50	18	30	21/17
96	**180**	-	20	80	80	60	22	0	44	-	0	18/22
01	**100**	-	-	60	40	80	0	0	40	20	20	19/22
06	**0**	-	-	-	-	-	0	0	0	-	0	28/43
Mahonia repens												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**320**	-	-	320	-	-	0	0	-	-	0	6/6
01	**440**	-	20	420	-	-	0	0	-	-	0	-/-
06	**620**	-	-	620	-	-	0	0	-	-	0	3/5
Purshia tridentata												
84	**599**	-	-	333	266	-	0	100	44	-	0	30/48
90	**466**	-	-	266	200	-	21	36	43	4	7	25/48
96	**820**	20	100	680	40	160	51	15	5	-	0	32/59
01	**700**	-	20	560	120	80	37	17	17	-	0	34/57
06	**820**	-	40	720	60	120	61	22	7	2	2	32/53
Rosa woodsii												
84	**332**	-	166	166	-	-	0	0	-	-	0	7/4
90	**1100**	-	1100	-	-	-	0	0	-	-	0	-/-
96	**420**	-	160	260	-	-	33	0	-	-	0	12/11
01	**340**	-	140	200	-	-	0	0	-	-	0	17/12
06	**400**	-	-	400	-	20	0	0	-	-	0	23/23

		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)
Symphoricarpos oreophilus												
84	**233**	-	100	100	33	-	14	29	14	-	0	18/43
90	**100**	-	100	-	-	-	33	0	0	-	0	-/-
96	**0**	-	-	-	-	-	0	0	0	-	0	-/-
01	**0**	-	-	-	-	-	0	0	0	-	0	-/-
06	**0**	-	-	-	-	-	0	0	0	-	0	37/51