

Trend Study 6-12-06

Study site name: Stag Canyon .

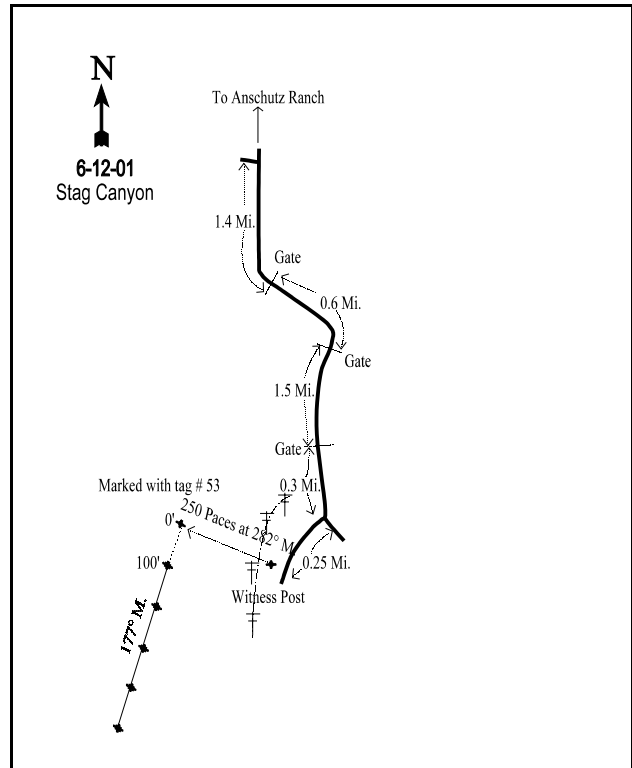
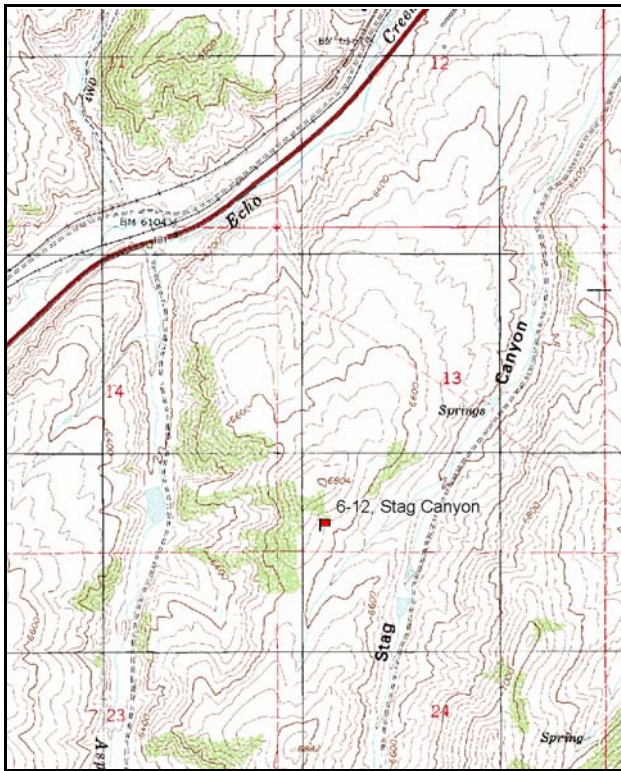
Vegetation type: Big sagebrush .

Compass bearing: frequency baseline 177 degrees magnetic.

Frequency belt placement: Line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

Take exit # 185 on I-80, up Echo Canyon and turn right on the frontage road (west). Drive 1.4 miles, turn left, and go through the locked Aspen Meadows Ranch gate. Go 0.6 miles and turn off to the right through the gate next to the corral. Go 1.5 miles to a gate and proceed 0.3 miles from the gate to a fork. Turn right and drive 0.25 miles to a witness post on the right hand (west) side of the road. From the witness post walk 90 paces at 282 degrees magnetic to the 0-foot baseline stake, marked by browse tag #53. The baseline runs 177 degrees magnetic.



Map Name: Castle Rock

Diagrammatic Sketch

Township 4N, Range 6E, Section 13

UTM NAD 27, UTM 12T 4546607 N 481092 E

DISCUSSION

Stag Canyon - Trend Study No. 6-12

Study Information

This study was established in 1996 over concerns of elk use on an old burn (elevation: 6,700 feet, slope: 10-15%, aspect: east). The area is dominated by mountain big sagebrush and adequate juniper thermal cover is located a short distance up the ridge. The study location was determined by the abundant elk pellet groups. In 1996, the pellet group quadrat frequency was 47% for elk, 10% for deer, and 6% for cattle. The pellet group quadrat frequency in 2001 was only 9% for elk, 13% for deer, and 4% for cattle. The pellet group transect estimates in 2001 were 60 elk days use/acre (149 edu/ha), 15 deer days use/acre (36 ddu/ha), and 11 cow days use/acre (27 cdu/ha). Most of the elk pellet groups were from late winter and deer pellets were from spring and early summer. In 2006, the pellet group quadrat frequency remained low. The pellet group transect estimates in 2006 were 35 elk, 21 deer, and 1 horse days use/acre (86 edu/ha, 51 ddu/ha, and 3 hdu/ha). Most pellet groups were from winter.

Soil

The soil is in the Richsum-Heiners series complex, which are shallow to very deep, well drained, moderately permeable soils on high tablelands, low mountains, and valley sides. They formed in residuum, slope alluvium, and valley side alluvium derived from shale, sandstone, and conglomerate (USDA-NRCS 2006). The soil texture is sandy clay loam with a slightly alkaline soil reaction (7.4 pH). There is little surface rock, but there is considerable rock throughout the profile. Relative bare ground cover has been high at 31% in 1996, 37% in 2001, and 40% in 2006. There are some signs of minor sheet erosion, but it is limited by the moderately gentle slopes. The soil erosion condition class measurement was stable in 2001 and slight in 2006.

Browse

The browse composition consists primarily of mountain big sagebrush and stickyleaf low rabbitbrush. Mountain big sagebrush provided 10% cover in 1996, 12% in 2001, and 17% in 2006. The sagebrush population appeared to be expanding in 1996 with a high abundance of seedlings (1,960 plants/acre) and young (3,640 plants/acre). Young plants made up 71% of the population. This caused the density to increase from 5,120 plants/acre in 1996 to 5,720 plants/acre in 2001. Young plants continued to be abundant in 2001, making up 29% of the population, but seedlings were scarce. The population then dropped to 3,880 plants/acre in 2006, with few seedlings and 820 young plants/acre (21% of the population). It is likely that a few dry years between 2001 and 2006, especially 2002 (Utah Climate Summaries 2006), were the cause of some die off in the young and less-established mature age classes. Sagebrush has exhibited very low percent decadence, light use, and normal vigor. The sagebrush defoliator moth (*Aroga websterii*) was also identified on 600 plants/acre in 2006, but did not appear to have affected the vigor of the plants (which could have been because the effects of the moth were not yet apparent by the end of June when the study was sampled). Average leader growth on big sagebrush was less than 2 inches in 2001 and 2006. Increaser species make up the remainder of the browse; these species include stickyleaf low rabbitbrush, broom snakeweed, and prickly pear.

Herbaceous Understory

The herbaceous understory is marginal and weedy. The major problem in 1996 was that three species (cheatgrass, wavyleaf thistle, and flannel mullein) contributed most of the herbaceous cover. Elk tend to congregate on areas with these forbs and select them in the spring. In 2001, all three of these species significantly decreased in nested frequency. In 2006, cheatgrass increased significantly, but the other two species decreased significantly again. In 2001, the nested frequency for perennial grasses increased, while that of perennial forbs drastically decreased. In 2006, the nested frequency of perennial grasses decreased slightly and perennial forbs increased slightly. Musk thistle was very thick on the road and surrounding meadows in 2001 and 2006.

2001 TREND ASSESSMENT

The trend for browse is slightly up. Mountain big sagebrush density increased, has low decadence, light use, and normal vigor. Young plants remained abundant in the population. The grass trend is up. The nested frequency of perennial grasses increased 21% and cheatgrass nested frequency decreased significantly. The forb trend is down. The nested frequency of perennial forbs decreased 68%, most of which was due to significant decreases in the nested frequencies of wavyleaf thistle, flannel mullein, scarlet globemallow, and longleaf phlox. The 1996 Desirable Components Index score was fair due to moderate browse cover, low browse decadence, high recruitment, moderate perennial grass cover, and excellent perennial forb cover. The 2001 DCI remained fair.

1996 winter range condition (DC Index) - fair (63) Mid-level potential scale
2001 winter range condition (DC Index) - fair (60) Mid-level potential scale
browse - slightly up (+1) grass - up (+2) forb - down (-2)

2006 TREND ASSESSMENT

The browse trend is slightly down. The density of sagebrush decreased 32%. This decrease occurred in both the young and mature age classes. However, the sagebrush cover increased from 12% to 17% and average height/crown measurements also increased, which indicate possible self-thinning and stabilization of the population. The grass trend is slightly down. The nested frequency of perennial grasses decreased 13% and cheatgrass nested frequency increased significantly. The forb trend is slightly up. The nested frequency of perennial forbs increased, but this was due mainly to significant increases in low growing forbs. The nested frequency of annual forbs increased more than two-fold and the nested frequency of the weedy annual forb, bur buttercup, increased significantly. The DCI score remained fair.

winter range condition (DC Index) - fair (63) Mid-level potential scale
browse - slightly down (-1) grass - slightly down (-1) forb - slightly up (+1)

HERBACEOUS TRENDS --
 Management unit 06 , Study no: 12

T y p e	Species	Nested Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
G	Agropyron dasystachyum	78	91	57	2.58	2.12	1.14
G	Agropyron spicatum	11	11	11	.18	.19	.52
G	Bromus tectorum (a)	_b 272	_a 154	_b 273	4.43	1.85	3.98
G	Elymus cinereus	5	5	5	.03	.41	.15
G	Oryzopsis hymenoides	57	64	66	2.05	1.42	3.57
G	Poa fendleriana	-	2	3	-	.00	.03
G	Poa pratensis	14	34	23	.45	1.35	.08
G	Poa secunda	10	8	17	.12	.05	.42
G	Stipa comata	_b 15	_a 14	_b 18	.34	.42	.34
Total for Annual Grasses		272	154	273	4.43	1.85	3.98
Total for Perennial Grasses		190	229	200	5.77	5.99	6.27
Total for Grasses		462	383	473	10.21	7.84	10.26

Type	Species	Nested Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
F	<i>Alyssum alyssoides</i> (a)	_a 103	_b 342	_b 355	.27	3.48	1.23
F	<i>Allium</i> sp.	_a -	_a 2	_b 13	-	.00	.10
F	<i>Arabis</i> sp.	2	-	-	.00	-	-
F	<i>Astragalus beckwithii</i>	_a -	_a 1	_b 28	-	.15	.61
F	<i>Astragalus convallarius</i>	_a 3	_{ab} 9	_b 16	.00	.07	.28
F	<i>Astragalus</i> sp.	-	-	-	-	-	.00
F	<i>Astragalus utahensis</i>	2	-	2	.03	-	.03
F	<i>Calochortus nuttallii</i>	-	-	9	-	-	.03
F	<i>Cirsium undulatum</i>	_b 144	_a 32	_a 8	4.98	.51	.07
F	<i>Collomia linearis</i> (a)	-	4	-	-	.00	-
F	<i>Collinsia parviflora</i> (a)	_a 18	_a 6	_b 167	.07	.01	.53
F	<i>Cordylanthus ramosus</i> (a)	_a 1	_a 19	_b 51	.03	.58	1.51
F	<i>Crepis acuminata</i>	-	-	1	-	-	.00
F	<i>Draba</i> sp. (a)	-	-	10	-	-	.02
F	<i>Epilobium brachycarpum</i> (a)	1	-	9	.00	-	.04
F	<i>Erigeron pumilus</i>	3	2	-	.00	.00	-
F	<i>Gayophytum ramosissimum</i> (a)	-	2	3	-	.01	.00
F	<i>Gilia</i> sp. (a)	-	4	-	-	.00	-
F	<i>Holosteum umbellatum</i> (a)	5	-	7	.01	-	.01
F	<i>Lithospermum ruderale</i>	-	-	4	-	.00	.07
F	<i>Machaeranthera</i> spp	-	1	-	-	.15	-
F	<i>Microsteris gracilis</i> (a)	_a -	_a 4	_b 91	-	.00	.24
F	<i>Phlox longifolia</i>	_b 42	_a 19	_b 49	.19	.09	.62
F	<i>Polygonum douglasii</i> (a)	_b 26	_a -	_a -	.05	-	-
F	<i>Ranunculus testiculatus</i> (a)	_a 5	_a 3	_b 178	.01	.00	1.08
F	<i>Sisymbrium altissimum</i> (a)	1	-	-	.00	-	-
F	<i>Sphaeralcea coccinea</i>	_b 26	_a 9	_a 7	.28	.05	.39
F	<i>Tragopogon dubius</i>	6	-	-	.01	.00	.00
F	Unknown forb-perennial	2	-	-	.03	-	-
F	<i>Verbascum thapsus</i>	_c 59	_b 17	_a -	2.33	.32	-
Total for Annual Forbs		160	384	871	0.46	4.10	4.69
Total for Perennial Forbs		289	92	137	7.88	1.37	2.23
Total for Forbs		449	476	1008	8.34	5.48	6.93

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

BROWSE TRENDS --

Management unit 06 , Study no: 12

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
		B	Artemisia tridentata vaseyana	66	74	77	9.56
B	Chrysothamnus viscidiflorus viscidiflorus	59	61	48	5.48	5.69	5.32
B	Gutierrezia sarothrae	35	27	9	1.61	.86	.09
B	Opuntia sp.	3	3	4	.15	.03	.03
Total for Browse		163	165	138	16.80	18.27	22.09

CANOPY COVER, LINE INTERCEPT --

Management unit 06 , Study no: 12

Species	Percent Cover
	'06
Artemisia tridentata vaseyana	25.86
Chrysothamnus viscidiflorus viscidiflorus	6.66

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 06 , Study no: 12

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata vaseyana	1.9	1.6

BASIC COVER --

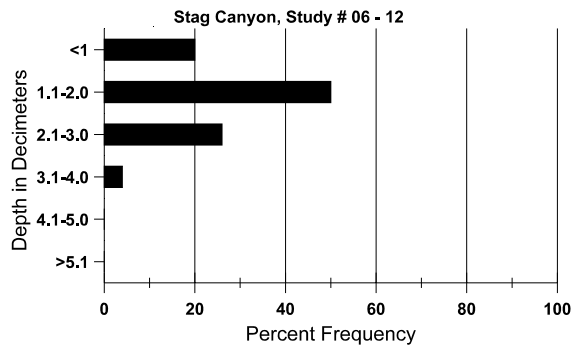
Management unit 06 , Study no: 12

Cover Type	Average Cover %		
	'96	'01	'06
Vegetation	33.05	32.68	34.59
Rock	1.72	1.37	1.80
Pavement	2.63	5.55	5.02
Litter	40.31	36.14	26.92
Cryptogams	.04	.24	.57
Bare Ground	34.56	45.35	45.02

SOIL ANALYSIS DATA --
Herd Unit 06, Study no: 12, Stag Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy clay loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
11.8	70.8 (9.7)	7.4	47.3	26.7	26.0	2.9	11.9	169.6	0.7

Stoniness Index



PELLET GROUP DATA --
Management unit 06 , Study no: 12

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	3	5	22
Horse	-	-	2
Elk	47	9	6
Deer	10	13	10
Cattle	6	4	1

Days use per acre (ha)	
'01	'06
-	-
-	1 (3)
60 (149)	35 (86)
15 (36)	21 (51)
11 (27)	-

BROWSE CHARACTERISTICS --
Management unit 06 , 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)
<i>Artemisia tridentata vaseyana</i>												
96	5120	1960	3640	1460	20	660	2	.78	0	-	.39	33/40
01	5720	20	1680	3900	140	60	2	0	2	.34	.34	30/35
06	3880	400	820	2820	240	80	13	0	6	5	6	33/41
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
96	2660	40	80	2460	120	-	5	.75	5	-	0	11/23
01	3480	40	20	3040	420	-	0	0	12	4	4	9/21
06	3040	-	540	1960	540	-	4	0	18	3	6	10/22
<i>Gutierrezia sarothrae</i>												
96	3120	-	560	2520	40	-	0	0	1	-	0	7/10
01	1840	-	-	1780	60	-	0	0	3	3	3	7/11
06	240	-	20	200	20	20	0	0	8	8	8	5/6
<i>Juniperus osteosperma</i>												
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	20	-	-	-	-	0	0	-	-	0	-/-
<i>Opuntia sp.</i>												
96	100	-	-	100	-	-	0	0	-	-	0	5/8
01	140	-	-	140	-	-	0	0	-	-	0	4/10
06	100	-	-	100	-	-	0	0	-	-	0	5/7
<i>Purshia tridentata</i>												
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	10/63
06	0	-	-	-	-	-	0	0	-	-	0	10/78
<i>Tetradymia canescens</i>												
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	6/26