Trend Study 6-6-06

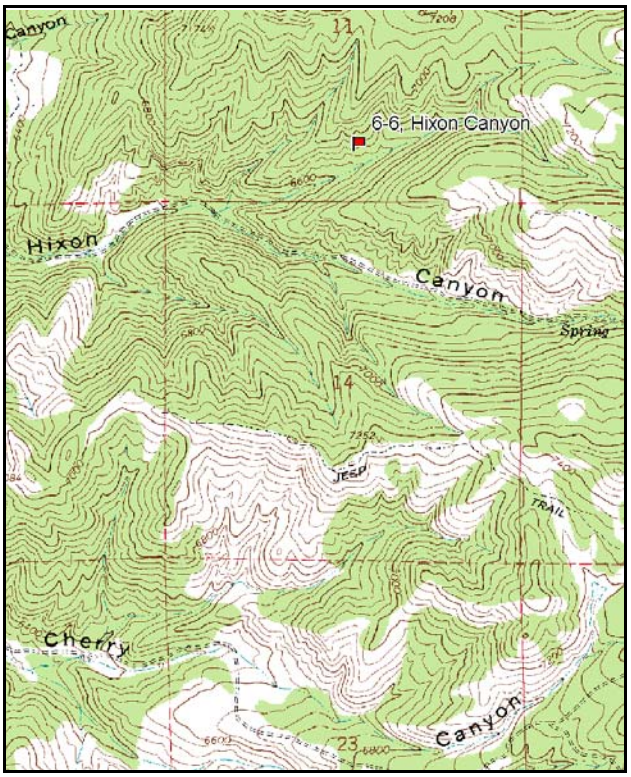
Study site name: Hixon Canyon . Vegetation type: True Mountain Mahogany .

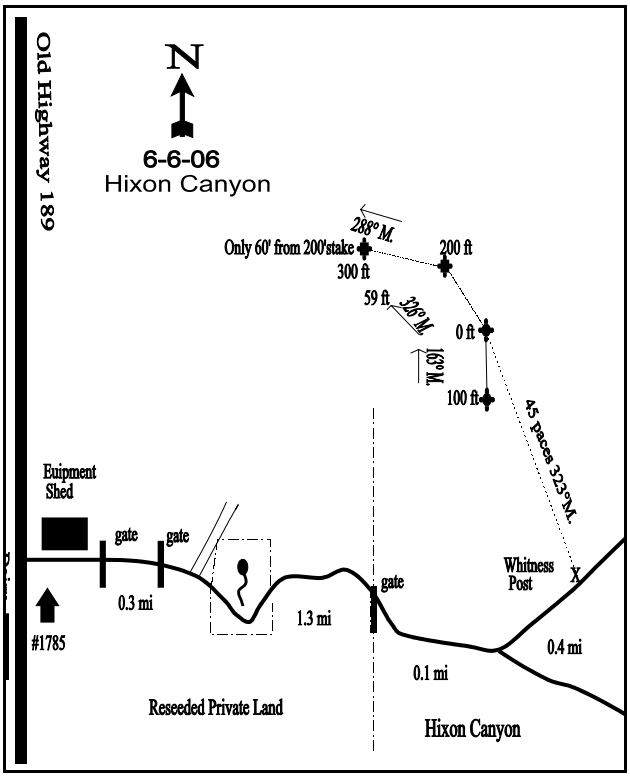
Compass bearing: frequency baseline 146 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (34 & 76ft), line 3 (59ft).

LOCATION DESCRIPTION

From 1875 Old Highway 189, travel east up Hixon Canyon on a dirt road through a gate and proceed 0.3 miles to another gate. Turn right and proceed 1.3 miles to a fence with a gate. Continue 0.1 miles and turn left at the fork. This road is only shown as an intermittent stream on 1967 quad map. Proceed 0.40 miles to a white topped green steel fence post stake in a rockpile. From the rockpile, walk 45 paces at 323 degrees magnetic to the 0-foot stake of the baseline marked by browse tab #7966. The baseline runs 146 degrees. The rest of the baseline runs off the 0-foot baseline stake. Line 2 runs 326 degrees magnetic. Line 3 runs 288 degrees magnetic.





Map Name: Crandall Canyon

Diagrammatic Sketch

Township 1N , Range 5E , Section 11

UTM NAD 27, UTM 12T 4519983 N 470604 E

DISCUSSION

Hixon Canyon - Trend Study No. 6-6

Study Information

This study was established in 1984 in the upper reaches of Hixon Canyon (elevation: 6,700 feet, slope: 30-40%, aspect: south). It samples a mixed mountain brush type on moderately steep terrain in critical deer winter range. Access to the study through private land was not obtained in 2001, so it was not sampled. Pellet group frequency for deer in 1996 indicated moderate use; elk pellet groups indicated light use. Domestic sheep and cattle also utilize the area. The 2006 pellet group transect data estimates were 7 elk, 3 deer, and 1 cow days use/acre (18 edu/ha, 7 ddu/ha, and 2 cdu/ha). Most pellets were sampled on the ridge.

Soil

The soil is in the Heiners-Fewkes-Hades series complex, which consists of shallow to very deep, well drained moderately slowly permeable soils that formed in slope residuum, colluvium, till, and alluvium derived from quartzite, sandstone, conglomerate, and shale. They are found on mountain slopes, hills, structural benches, and fan remnants (USDA-NRCS 2006). It is red in color and appears to be highly erodible. Most surface rock and herbaceous plants are pedestalled. The soil texture is a sandy clay loam with a soil reaction that is moderately alkaline (7.9 pH). The effective rooting depth is 12 inches. Relative bare ground cover was 39% in 1984, 31% in 1990, only 16% in 1996, and 35% in 2006. Consequently, the erosion condition class was critical in 2006. This was due to the steep slope, heavy surface rock movement, flow patterns covering 10-25% of the surface area, rills 1.5 to 3 inches deep, gullies with 10-50% of the channel bed actively eroding, and soil deposits around obstacles 0.2-0.4 inches deep.

Browse

This area, like many mountain brush types, has a plant composition that is quite variable between the microsites sampled. On much of the area, the preferred browse species (true mountain mahogany and mountain big sagebrush) and juniper are the dominant species of the community. True mountain mahogany provided 3% cover in 1996 and 4% in 2006. Mahogany density has been around 300 plants/acre since 1996, with around 20% of the population classified as decadent. Mountain big sagebrush provided less than 1% cover in 1996 and 2% in 2006. Sagebrush density has been around 250 plants/acre since 1996, with 62% of population classified as decadent in 1996 and 42% in 2006. Both of the preferred key browse species, as well as the less abundant Saskatoon serviceberry and mountain snowberry, have sustained heavy use.

Juniper line intercept cover was 23% in 2006. The juniper tree density was 78 trees/acre in 1990. The juniper point-centered-quarter density estimate was 80 trees/acre with an average diameter of 15 inches in 2006.

Herbaceous Understory

The herbaceous understory contributes little quality forage. Plant distribution is random and greatly effected by soil erosion. Many of the shrub interspaces are bare soil and rock. The most numerous perennial species are Sandberg bluegrass, bluebunch wheatgrass, and Indian ricegrass, which are important forage species. All showed past evidence of utilization. The forb component is dominated by annuals with a moderate diversity of perennials.

1990 TREND ASSESSMENT

The key browse species are highly decadent and heavily used. There is some mountain mahogany recruitment with the young age class, accounting for 13% of the population. The low density sagebrush population has an average cover of only 2%. Undesirable woody species make up the vast majority of the browse composition. Broom snakeweed density has increased by 31%. Juniper has an estimated density of 78 trees/acre. Indian ricegrass shows an increase in nested frequency with moderate utilization.

browse - down (-2) grass - up (+2) forb - slightly up (+1)

1996 TREND ASSESSMENT

Decadence for sagebrush is high at 62%. Mahogany is showing some improvement with only about 20% decadence, but mahogany density is down to 300 plants/acre. The only real positive aspect is that the population of broom snakeweed has decreased by 97%. The decrease in mahogany and snakeweed are likely a product of the increased sample size in 1996, which better estimates patchy distributions of plants. The grass trend is stable. The nested frequency of perennial grasses decreased slightly, but this is likely a cause of an increased sampled area. The forb trend is slightly down. The nested frequency of perennial forbs decreased, some of which was caused by the change in sample area. The Desirable Components Index score is very poor due to the low browse cover.

winter range condition (DC Index) - very poor (11) Mid-level potential scale
browse - stable (0) grass - stable (0) forb - slightly down (-1)

2006 TREND ASSESSMENT

The browse trend is stable. The density of sagebrush and mahogany changed little. Sagebrush decadence improved, but continues to be high. The grass trend is up. The nested frequency of perennial grasses, excluding bulbous bluegrass, increased 35%. The nested frequency of Sandberg bluegrass increased significantly and that of cheatgrass decreased significantly. The forb trend is stable. The nested frequency of perennial forbs is unchanged. The DCI score remained very poor.

winter range condition (DC Index) - very poor (32) Mid-level potential scale
browse - stable (0) grass - up (+2) forb - stable (0)

HERBACEOUS TRENDS --
Management unit 06 , Study no: 6

Type	Species	Nested Frequency				Average Cover %	
		'84	'90	'96	'06	'96	'06
G	Agropyron dasystachyum	-	-	3	-	.03	-
G	Agropyron spicatum	ab29	a27	c64	bc50	1.64	2.49
G	Bromus tectorum (a)	-	-	b269	a155	6.09	2.27
G	Elymus cinereus	-	-	6	7	.53	1.25
G	Oryzopsis hymenoides	bc86	c116	a29	ab63	1.04	4.21
G	Poa bulbosa	a-	a-	a3	b16	.00	.25
G	Poa fendleriana	-	-	1	2	.15	.15
G	Poa pratensis	-	-	-	1	-	.03
G	Poa secunda	a18	b58	b69	c109	1.97	3.03
Total for Annual Grasses		0	0	269	155	6.09	2.27
Total for Perennial Grasses		133	201	175	248	5.38	11.43
Total for Grasses		133	201	444	403	11.48	13.71

Type	Species	Nested Frequency				Average Cover %	
		'84	'90	'96	'06	'96	'06
F	Alyssum alyssoides (a)	-	-	$_{b}$252	$_{a}$83	2.32	.18
F	Arabis sp.	-	-	-	1	-	.00
F	Artemisia ludoviciana	$_{c}$21	$_{bc}$17	$_{a}$-	$_{ab}$1	.03	.00
F	Camelina microcarpa (a)	-	-	1	-	.00	-
F	Calochortus nuttallii	-	5	-	-	-	-
F	Chenopodium album (a)	-	-	1	-	.00	-
F	Chaenactis douglasii	$_{a}$9	$_{b}$53	$_{a}$3	$_{a}$9	.01	.05
F	Cirsium undulatum	$_{ab}$9	$_{b}$17	$_{a}$5	$_{ab}$3	.04	.01
F	Comandra pallida	$_{ab}$6	$_{a}$1	$_{b}$11	$_{ab}$5	.07	.06
F	Collinsia parviflora (a)	-	-	-	6	-	.02
F	Cryptantha sp.	6	16	8	2	.02	.15
F	Cynoglossum officinale	1	-	-	-	-	-
F	Erigeron pumilus	-	-	8	5	.01	.03
F	Eriogonum racemosum	-	-	-	1	-	.03
F	Hackelia patens	6	12	11	3	.02	.15
F	Hedysarum boreale	-	-	-	1	-	.15
F	Holosteum umbellatum (a)	-	-	1	6	.00	.01
F	Lesquerella sp.	-	-	-	6	-	.03
F	Lomatium sp.	-	-	-	2	-	.03
F	Machaeranthera canescens	1	2	-	-	-	-
F	Microsteris gracilis (a)	-	-	-	3	-	.00
F	Oenothera caespitosa	$_{ab}$8	$_{b}$13	$_{a}$-	$_{a}$-	-	-
F	Phlox austromontana	$_{a}$-	$_{a}$-	$_{a}$2	$_{b}$7	.00	.44
F	Phlox longifolia	-	2	-	2	-	.00
F	Ranunculus testiculatus (a)	-	-	$_{a}$13	$_{b}$35	.02	.07
F	Tragopogon dubius	2	1	-	-	-	-
F	Veronica biloba (a)	-	-	-	4	-	.01
Total for Annual Forbs		0	0	268	137	2.35	0.31
Total for Perennial Forbs		69	139	48	48	0.22	1.16
Total for Forbs		69	139	316	185	2.57	1.47

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

BROWSE TRENDS --
Management unit 06 , Study no: 6

Type	Species	Strip Frequency '96	Strip Frequency '06	Average Cover % '96	Average Cover % '06
B	Amelanchier alnifolia	2	1	.03	-
B	Artemisia tridentata vaseyana	10	11	.25	1.67
B	Cercocarpus montanus	15	13	2.93	3.74
B	Chrysothamnus viscidiflorus viscidiflorus	3	2	.03	.15
B	Gutierrezia sarothrae	11	8	.32	.18
B	Juniperus osteosperma	8	3	7.08	11.42
B	Opuntia sp.	19	23	.16	.89
B	Quercus gambelii	2	1	1.63	1.00
B	Symphoricarpos oreophilus	1	3	.18	.00
Total for Browse		71	65	12.62	19.08

CANOPY COVER, LINE INTERCEPT --
Management unit 06 , Study no: 6

Species	Percent Cover '06
Artemisia tridentata vaseyana	1.11
Cercocarpus montanus	3.16
Juniperus osteosperma	23.43
Opuntia sp.	.76
Quercus gambelii	1.11
Symphoricarpos oreophilus	.08

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 06 , Study no: 6

Species	Average leader growth (in) '06
Artemisia tridentata vaseyana	1.7
Cercocarpus montanus	3.1

POINT-QUARTER TREE DATA --
Management unit 06 , Study no: 6

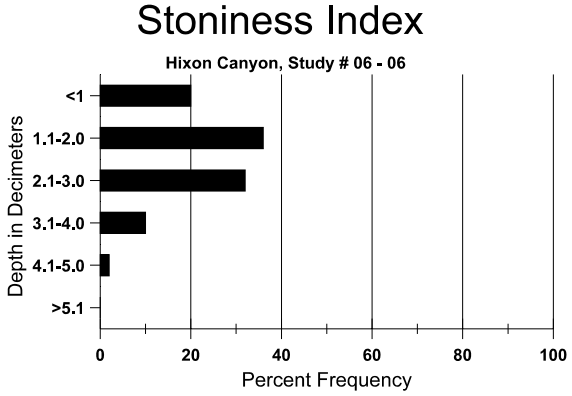
Species	Trees per Acre '06	Average diameter (in) '06
Juniperus osteosperma	80	15

BASIC COVER --
Management unit 06 , Study no: 6

Cover Type	Average Cover % '84	'90	'96	'06
Vegetation	2.75	7.00	28.37	32.02
Rock	21.00	23.00	15.63	15.44
Pavement	4.00	18.25	10.17	8.48
Litter	33.25	20.50	39.14	22.73
Cryptogams	0	0	.09	1.28
Bare Ground	39.00	31.25	17.65	43.99

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

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
11.3	66.3 (12.4)	7.9	46.9	25.1	28.0	1.7	9.7	19.2	0.5



PELLET GROUP DATA --
Management unit 06 , Study no: 6

Type	Quadrat Frequency '96	Quadrat Frequency '06	Days use per acre (ha) '06
Rabbit	18	8	-
Elk	3	3	7 (18)
Deer	17	-	3 (7)
Cattle	1	-	1 (2)

BROWSE CHARACTERISTICS --
Management unit 06 , Study no: 6

		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	**99**	-	-	66	33	-	0	100	33	-	0	30/30
90	**66**	-	-	66	-	-	0	100	0	-	0	39/31
96	**40**	-	-	20	20	-	50	0	50	-	0	24/24
06	**20**	-	-	20	-	-	0	100	0	-	0	23/31
Artemisia tridentata vaseyana												
84	**766**	-	-	233	533	-	9	91	70	5	9	21/28
90	**166**	33	33	33	100	-	20	20	60	24	40	14/43
96	**260**	-	-	100	160	320	54	8	62	15	15	18/32
06	**240**	-	-	140	100	220	0	0	42	25	25	19/34
Cercocarpus montanus												
84	**499**	-	33	-	466	-	0	93	93	-	0	-/-
90	**498**	-	66	66	366	-	7	93	73	20	60	22/31
96	**300**	-	60	180	60	120	20	73	20	7	7	23/34
06	**260**	80	20	180	60	20	0	100	23	-	0	28/43
Chrysothamnus viscidiflorus viscidiflorus												
84	**299**	-	-	233	66	-	0	56	22	-	0	20/18
90	**366**	-	-	333	33	-	0	0	9	-	45	19/27
96	**60**	-	-	60	-	-	0	0	0	-	0	11/19
06	**40**	20	-	-	40	-	0	0	100	50	50	18/30
Gutierrezia sarothrae												
84	**15333**	-	3233	12100	-	-	0	0	0	-	0	9/9
90	**22332**	366	14833	7233	266	-	.14	0	1	.35	.74	9/10
96	**740**	-	280	460	-	-	0	0	0	-	0	7/13
06	**260**	-	-	220	40	-	0	0	15	15	15	10/13

		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)
Juniperus osteosperma												
84	**133**	-	-	133	-	-	0	0	-	-	0	60/48
90	**100**	-	-	100	-	-	0	0	-	-	0	71/56
96	**160**	-	-	160	-	20	0	25	-	-	0	-/-
06	**60**	20	-	60	-	-	0	0	-	-	0	-/-
Mahonia repens												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
06	**0**	-	-	-	-	-	0	0	-	-	0	2/4
Opuntia sp.												
84	**633**	-	133	500	-	-	0	0	0	-	0	6/7
90	**499**	33	233	233	33	-	0	0	7	-	13	4/8
96	**560**	-	20	540	-	60	4	0	0	-	11	6/16
06	**800**	-	40	640	120	-	0	0	15	5	5	4/13
Quercus gambelii												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**140**	-	-	140	-	-	0	0	-	-	0	-/-
06	**140**	-	-	140	-	-	0	0	-	-	0	42/28
Symphoricarpos oreophilus												
84	**66**	-	-	33	33	-	50	50	50	-	0	19/17
90	**266**	-	-	233	33	-	0	0	12	-	100	23/24
96	**20**	20	20	-	-	-	0	0	0	-	0	17/37
06	**60**	-	20	20	20	-	0	0	33	-	0	22/33