

Trend Study 30-55-08

Study site name: Quichapa Canyon

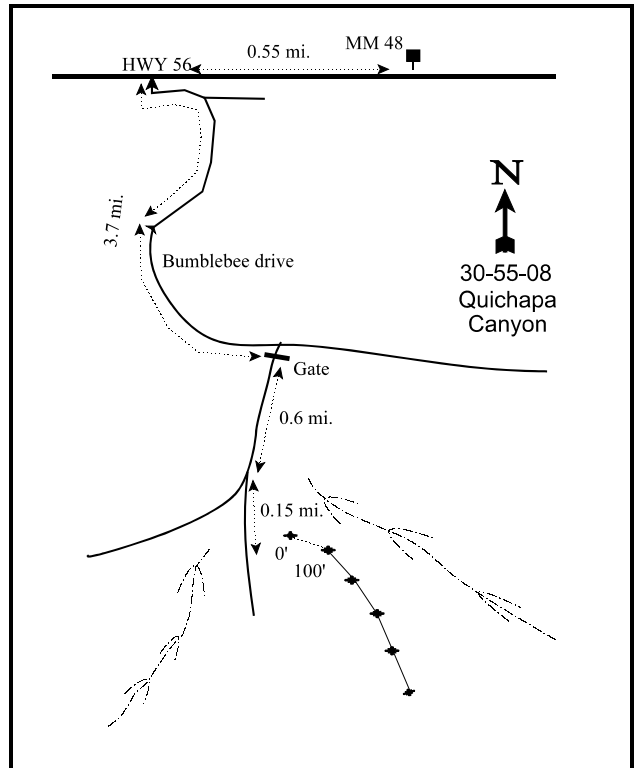
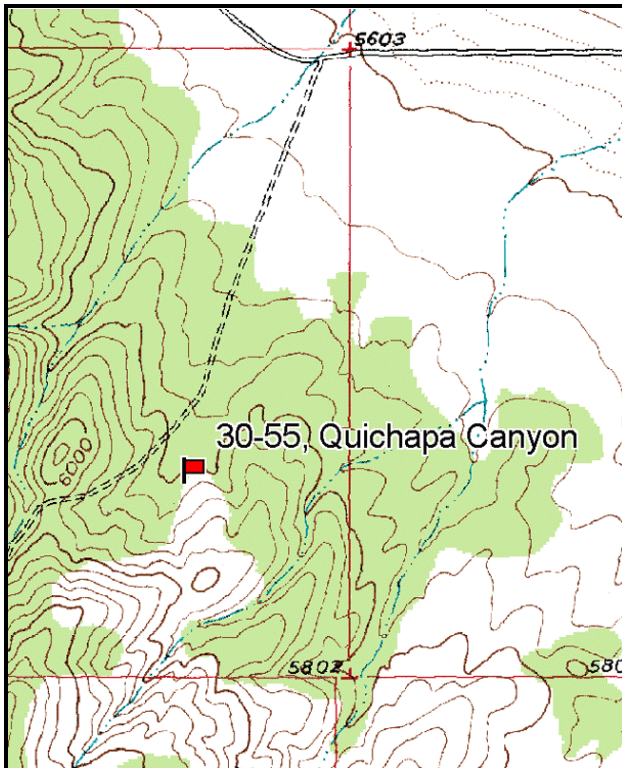
Vegetation type: Mountain Brush.

Compass bearing: frequency baseline 103 degrees magnetic. (lines 2-3, 142°M, line 4, 156°M, line 5, 153°M).

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

LOCATION DESCRIPTION

From Highway 56, drive to mile marker 48 and continue east 0.55 miles to Bumble Bee Dr., a road on the right (south). Travel 3.7 miles south to a gate on the right. Proceed through the gate and drive 0.6 miles to a fork. Take the left fork for 0.15 miles to the witness post on the left side of the road. The 0-foot stake is 5 paces away at 77 degrees magnetic. The study is marked by half high fenceposts. The 0-foot stake is marked by browse tag # 498.



Map name: Kannarraville

Diagrammatic Sketch

Township 37S, Range 12W, Section 7

GPS: NAD 83, UTM 12S 302302 E, 4162874 N

## DISCUSSION

### Quichapa Canyon - Trend Study No. 30-55

#### Study Information

This trend study was established in 1998 to monitor deer winter range on the northeast side of the Pine Valley unit [elevation: 5,800 feet (1,768 m), slope: 20%, aspect: northwest]. The site is a mountain brush type with a Utah juniper (*Juniperus osteosperma*) overstory. Water is available about one-quarter of a mile to the northeast in a stream. The area receives use by deer, sheep, and some cattle. Pellet group data taken from the site in 1998 estimated 41 deer days use/acre (101 ddu/ha). Several deer were seen near the site during study establishment and fresh pellet groups were also observed. Sheep had also recently used the site in 1998 and a sheep camp was located one-half mile to the northeast. Some cow sign was also observed in low numbers. Pellet group data from 2003 estimated 33 deer days use/acre (83 ddu/ha). Only 1 cattle pat was encountered in 2003. Pellet group data from 2008 estimated 1 elk day use/acre (3 edu/ha), 38 deer days use/acre (93 ddu/ha) and 16 cow days use/acre (40 cdu/ha).

#### Soil

Soil at the site is moderately deep with an effective rooting depth of just over 14 inches. It has a sandy loam texture with clay concentrated in lower horizons. Rock and pavement are common on the surface and within the profile. Some erosion appears to be occurring due to poor protective ground cover combined with the steep terrain. The soil erosion condition was classified as stable in 2003 and 2008.

#### Browse

Utah juniper is abundant on the site and slowly increasing. Smaller numbers of pinyon pine (*Pinus edulis*) are also found. Point-quarter data from 2003 estimated 196 juniper and 32 pinyon trees/acre. Average basal diameter was 4.9 inches for juniper and 2.8 inches for pinyon. These trees provided 37% of the browse cover in 2003 with a line-intercept canopy cover value of 14%. By 2008, these estimates were 88 juniper and 39 pinyon trees/acre with diameters of 4 and 1 inches, respectively. Drought conditions in 2003 caused several trees to have brown leaves. Key understory species consist of Utah serviceberry (*Amelanchier utahensis*), mountain big sagebrush (*Artemisia tridentata vaseyana*), and antelope bitterbrush (*Purshia tridentata*). Serviceberry provided 26% of the browse cover in 1998, 30% in 2003 and 15% in 2008. Density was estimated at 1,240 plants/acre in 1998, 1,780 plants/acre in 2003 and 1,020 plants/acre in 2008. Mature plants average nearly 4 feet in height. They have been moderate to heavily utilized and decadence has been moderately high at 44% in 1998, 34% in 2003, and 37% in 2008. Recruitment of young plants has been good in all readings.

Mountain big sagebrush provides 38% of the shrub cover with an estimated density of around 4,820 plants/acre in 2008. Use of the sagebrush has been mostly light to moderate. Vigor is normal on most plants and decadence increased from 25% in 1998 to 50% in 2003 before falling to 16% in 2008. Bitterbrush occurs in small numbers of about 220 plants/acre. It displays very heavy hedging with most individuals sampled being classified as partly unavailable due to hedging. There is no sign of reproduction, and decadence was only 13% in 1998, increasing to 38% in 2003, then to 55% in 2008. There are also small numbers of black sagebrush (*Artemisia nova*), true mountain mahogany (*Cercocarpus montanus*), and Gambel oak (*Quercus gambelii*) which provide some additional forage.

### Herbaceous Understory

The herbaceous understory is very poor. Cheatgrass (*Bromus tectorum*) is the most common species as it provided 72% of the grass cover and 66% of the total herbaceous cover in 1998. Drought conditions likely caused a significant decline in the nested frequency of cheatgrass in 2003 with a corresponding drop in cover from 7% in 1998 to less than 1% in 2003. Cheatgrass rebounded in 2008 with a significant increase in nested frequency and a large increase in cover. Bottlebrush squirreltail (*Sitanion hystrix*) is the only common perennial grass on the site with several other perennial species occurring less frequently. Forbs are diverse with 19 species encountered in 1998. However, none are very abundant with all of these forbs combining to produce less than 1% cover in 1998 and 2008, and only 2% cover in 2003.

### 1998 DESIRABLE COMPONENTS INDEX

winter range condition (DCI) - very poor (27) mid-level potential scale

### 2003 TREND ASSESSMENT

Trend for browse is mixed. Trend for serviceberry is stable. Serviceberry vigor remained similar and the number of decadent plants declined slightly to 34%. Serviceberry seedlings are fairly abundant and young plants account for 42% of the population. Trend for sagebrush and bitterbrush are down. Density of mountain big sagebrush declined slightly since 1998, more plants display poor vigor, and one-half the population is now decadent. No seedlings or young were encountered in 2003. Bitterbrush is still being extremely heavily hedged. This is due primarily to its limited numbers (260 plants/acre). Vigor remains normal but the number of decadent plants has increased from 13% to 38%. Due to the high level of use, no flowering was occurring even though annual leader growth was good averaging 2 inches. Taking all of this into consideration, the overall browse trend is considered slightly down. Trend for the herbaceous understory is stable but poor. Sum of nested frequency for perennial grasses remained stable yet nested frequency of cheatgrass declined significantly. Average cover of cheatgrass declined from 7% in 1998 to less than 1% in 2003. Nested frequency of bottlebrush squirreltail also declined, but other perennial grass species increased. Several sites on the unit also show a decline of bottlebrush squirreltail during this drought period. The forb composition remains poor with few perennial forbs found on the site more than occasionally. Annual forbs are more abundant.

winter range condition (DCI) - very poor (30) mid-level potential scale

browse - slightly down (-1)

grass - stable (0)

forb - stable (0)

### 2008 TREND ASSESSMENT

Trend for browse is slightly up. Serviceberry density has declined 43% to 1,020 plants/acre while recruitment has dropped from 740 young/acre to 380 young/acre and the number of seedlings has decreased from 220/acre to 60/acre. Decadence has remained steady at 37%. Mountain big sagebrush has increased in density from 1,880 plants/acre to 4,820 plants/acre and decadence has decreased from 50% to 16%. Recruitment has improved from no young in 2003 to 1,980 young/acre and 4,640 seedlings/acre. Individuals displaying poor vigor has also fallen (22% in 2003 to 7%). Bitterbrush has decreased in density 15% (220 plants/acre), plants displaying poor vigor has increased to 45%, and decadence is at 55%. In the herbaceous understory, perennial grasses have doubled in cover and seen a 49% increase in sum of nested frequency. Cheatgrass has increased 57% in nested frequency and nearly tripled in cover. Bottlebrush squirreltail is the predominant perennial species and had a significant increase in nested frequency. Trend for forbs is up. The sum of nested frequency

of perennial forbs increased 21%, but the sum of nested frequency of annual forbs decreased markedly. Cover of perennial forbs increased slightly, but cover of annual forbs decreased from 2% in 2003 to 0.1%.

winter range condition (DCI) - poor (40) mid-level potential scale

browse - slightly up (+1)

grass - up (+2)

forb - up (+2)

HERBACEOUS TRENDS --

Management unit 30 , Study no: 55

Type	Species	Nested Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
G	Bromus tectorum (a)	c371	a150	b235	7.05	.87	2.36
G	Hilaria jamesii	a-	b14	a-	-	.22	-
G	Oryzopsis hymenoides	8	11	11	.21	.10	.19
G	Poa bulbosa	2	-	-	.00	-	-
G	Poa fendleriana	31	44	38	.68	.20	.69
G	Poa secunda	a3	a2	b29	.03	.00	.09
G	Sitanion hystrix	ab79	a51	b104	1.86	.66	1.66
G	Vulpia octoflora (a)	4	-	-	.01	-	-
Total for Annual Grasses		375	150	235	7.06	0.87	2.36
Total for Perennial Grasses		123	122	182	2.80	1.20	2.65
Total for Grasses		498	272	417	9.86	2.07	5.01
F	Agoseris glauca	6	5	7	.01	.01	.07
F	Alyssum alyssoides (a)	-	-	2	-	-	.00
F	Allium sp.	2	-	-	.00	-	-
F	Arabis sp.	-	8	7	-	.07	.01
F	Astragalus convallarius	2	-	-	.15	-	-
F	Astragalus sp.	8	2	2	.02	.00	.03
F	Brodiaea pulchella	a-	a-	b10	-	-	.02
F	Castilleja chromosa	3	-	-	.00	-	-
F	Calochortus nuttallii	4	2	10	.01	.01	.03
F	Chaenactis douglasii	9	-	5	.02	-	.01
F	Comandra pallida	-	10	-	-	.06	-
F	Collinsia parviflora (a)	b61	c208	a6	.15	1.25	.01
F	Cymopterus sp.	-	2	6	.00	.00	.01
F	Descurainia pinnata (a)	a3	b30	a-	.01	.21	-
F	Draba sp. (a)	b13	a1	ab2	.03	.00	.01
F	Gilia sp. (a)	a-	b55	a1	-	.30	.00
F	Lappula occidentalis (a)	-	-	5	-	-	.00

Type	Species	Nested Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
		F	Lomatium sp.	3	1	-	.00
F	Microsteris gracilis (a)	<sub>b</sub> 73	<sub>b</sub> 100	<sub>a</sub> 11	.17	.28	.02
F	Orobanche fasciculata	2	-	3	.00	-	.03
F	Penstemon sp.	2	-	-	.00	-	-
F	Phlox longifolia	19	24	16	.05	.08	.04
F	Polygonum douglasii (a)	<sub>a</sub> -	<sub>a</sub> 5	<sub>b</sub> 19	-	.01	.04
F	Sphaeralcea grossulariifolia	-	2	-	-	.00	-
F	Streptanthus cordatus	-	1	4	-	.03	.01
F	Stellaria jamesiana	1	-	-	.03	-	-
F	Trifolium sp.	18	8	16	.03	.02	.10
F	Vicia americana	-	-	1	-	-	.00
F	Zigadenus paniculatus	<sub>a</sub> 3	<sub>a</sub> -	<sub>b</sub> 14	.03	-	.04
Total for Annual Forbs		150	399	46	0.36	2.08	0.10
Total for Perennial Forbs		82	65	101	0.39	0.31	0.42
Total for Forbs		232	464	147	0.76	2.39	0.53

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

#### BROWSE TRENDS --

Management unit 30 , Study no: 55

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
		B	Amelanchier utahensis	37	34	29	5.16
B	Artemisia nova	4	0	0	2.02	-	-
B	Artemisia tridentata vaseyana	68	59	68	3.82	3.53	6.19
B	Juniperus osteosperma	8	8	12	7.06	6.21	6.94
B	Opuntia sp.	1	3	3	.00	.00	.00
B	Pinus edulis	2	0	3	.15	-	.00
B	Pinus monophylla	0	2	0	-	.63	-
B	Purshia tridentata	11	6	6	1.41	1.31	.41
B	Quercus gambelii	5	5	7	.03	.06	.21
Total for Browse		136	117	128	19.68	16.73	16.22

CANOPY COVER, LINE INTERCEPT --

Management unit 30 , Study no: 55

Species	Percent Cover		
	'98	'03	'08
Amelanchier utahensis	-	4.26	3.11
Artemisia tridentata vaseyana	-	6.44	9.93
Juniperus osteosperma	10.19	13.50	13.48
Opuntia sp.	-	-	.26
Pinus monophylla	-	.51	-
Purshia tridentata	-	.48	.56
Quercus gambelii	1.00	.51	1.13

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 30 , Study no: 55

Species	Average leader growth (in)	
	'03	'08
Amelanchier utahensis	2.0	1.1
Artemisia tridentata vaseyana	1.0	1.4

POINT-QUARTER TREE DATA --

Management unit 30 , Study no: 55

Species	Trees per Acre		
	'98	'03	'08
Juniperus osteosperma	163	196	88
Pinus edulis	23	32	39

Average diameter (in)		
'98	'03	'08
6.4	4.9	4.0
7.2	2.8	1.0

BASIC COVER --

Management unit 30 , Study no: 55

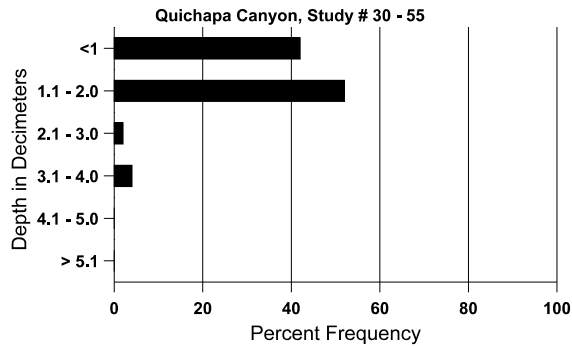
Cover Type	Average Cover %		
	'98	'03	'08
Vegetation	30.07	25.30	19.97
Rock	11.87	13.54	12.31
Pavement	17.17	22.48	22.31
Litter	39.04	32.59	44.25
Cryptogams	.22	.05	.08
Bare Ground	27.82	20.30	18.71

SOIL ANALYSIS DATA --

Management unit 30, Study no: 55, Study Name: Quichapa Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
14.3	54.8 (14.2)	6.5	36.6	38.7	24.7	3.7	14.1	492.8	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 30 , Study no: 55

Type	Quadrat Frequency		
	'98	'03	'08
Sheep	2	-	7
Rabbit	30	19	84
Elk	-	-	1
Deer	35	23	42
Cattle	-	-	1

Days use per acre (ha)		
'98	'03	'08
6 (15)	-	16 (40)
-	-	-
-	-	1 (3)
41 (101)	33 (83)	38 (93)
-	-	-

BROWSE CHARACTERISTICS --  
Management unit 30 , Study no: 55

		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>Amelanchier utahensis</i>												
98	<b>1240</b>	400	260	440	540	240	27	52	44	26	26	45/42
03	<b>1780</b>	220	740	440	600	300	22	25	34	20	20	35/34
08	<b>1020</b>	60	380	260	380	160	12	14	37	16	18	39/40
<i>Artemisia nova</i>												
98	<b>80</b>	-	-	-	80	160	0	0	100	75	75	8/17
03	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
<i>Artemisia tridentata vaseyana</i>												
98	<b>2100</b>	80	240	1400	460	480	17	.95	22	6	6	21/28
03	<b>1880</b>	-	-	940	940	920	40	3	50	22	22	22/26
08	<b>4820</b>	4640	1980	2060	780	740	9	1	16	7	7	20/25
<i>Cercocarpus montanus</i>												
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	44/52
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Gutierrezia sarothrae</i>												
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	8/9
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Juniperus osteosperma</i>												
98	<b>160</b>	20	100	60	-	-	0	0	-	-	0	-/-
03	<b>160</b>	-	60	100	-	-	0	0	-	-	0	-/-
08	<b>260</b>	80	160	100	-	-	0	0	-	-	8	-/-
<i>Opuntia sp.</i>												
98	<b>20</b>	-	-	20	-	-	0	0	-	-	0	6/12
03	<b>60</b>	-	-	60	-	-	0	0	-	-	0	4/15
08	<b>60</b>	-	-	60	-	-	0	0	-	-	0	6/11
<i>Pinus edulis</i>												
98	<b>60</b>	20	60	-	-	-	0	0	-	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
08	<b>60</b>	-	40	20	-	-	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)
<b>Pinus monophylla</b>												
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
03	<b>40</b>	-	40	-	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<b>Purshia tridentata</b>												
98	<b>300</b>	-	-	260	40	20	0	93	13	13	13	20/34
03	<b>260</b>	-	-	160	100	100	23	69	38	-	0	14/29
08	<b>220</b>	-	-	100	120	60	0	91	55	45	45	12/21
<b>Quercus gambelii</b>												
98	<b>160</b>	20	120	40	-	-	0	13	-	-	13	31/30
03	<b>200</b>	-	160	40	-	-	0	20	-	-	0	46/37
08	<b>760</b>	-	560	200	-	-	5	0	-	-	3	40/38