Trend Study 11A-3-05

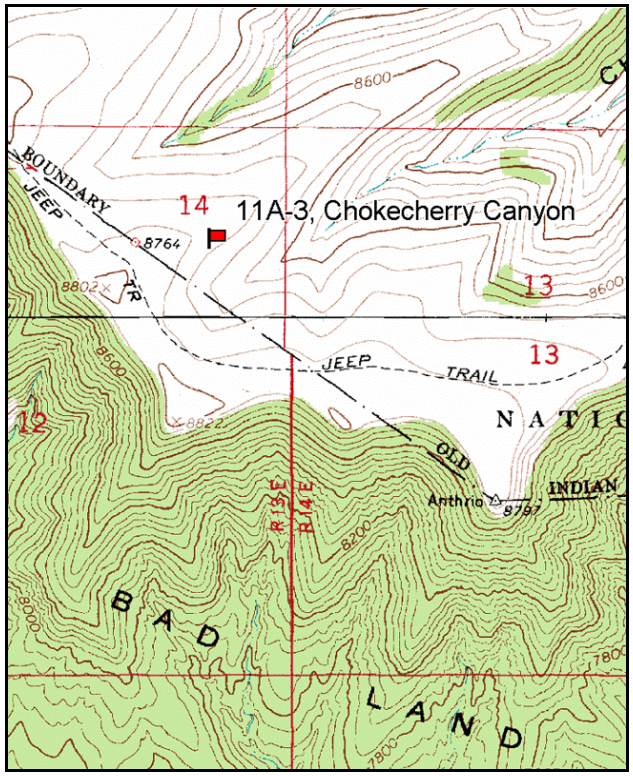
Study site name: Chokecherry Canyon . Vegetation type: Mountain big sagebrush .

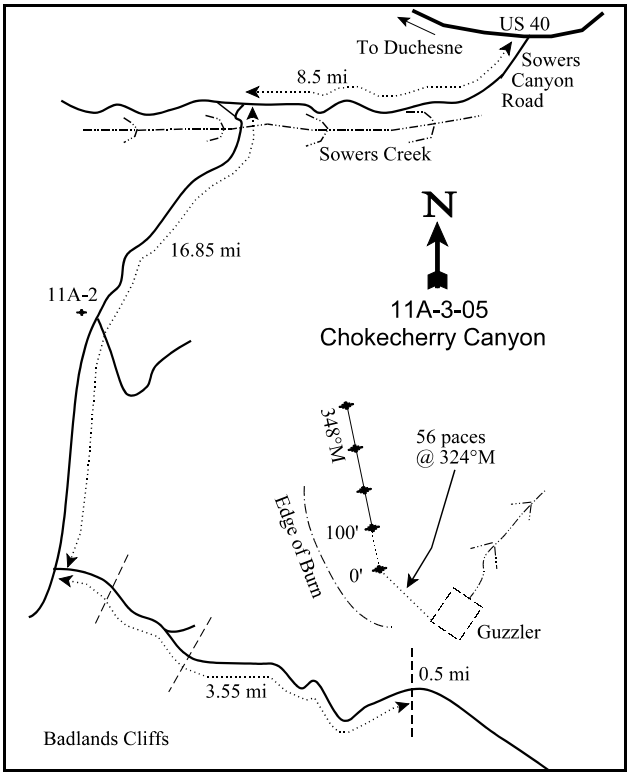
Compass bearing: frequency baseline 348 degrees magnetic.

Frequency belt placement: line 1 (6 & 95ft), line 2 (25ft), line 3 (46ft), line 4 (62ft).

LOCATION DESCRIPTION

From the junction of Highway U.S. 40 and the Sowers Canyon Road (near Bridgeland), proceed south on the Sowers Canyon Road for 8.5 miles to the Nutters Ridge road. Turn left and drive south 16.85 miles up Nutters Ridge to a “T" intersection above the Badland Cliffs. Turn left and go 3.55 miles along the edge to a fence. Continue 0.5 miles and stop. Walk north over the ridge to a large, fenced guzzler. From the southwest fence corner, the 0-foot baseline stake is located 56 paces away at a bearing of 324°. The baseline is marked by green steel fenceposts, 12-18 inches in height.





Map Name: Anthro Mountain

Diagrammatic Sketch

Township 7S , Range 5W , Section 14

GPS: NAD 27, UTM 12S 4414055 N, 550638 E

DISCUSSION

Chokecherry Canyon - Trend Study No. 11A-3

The Chokecherry Canyon trend study is located at the head of Chokecherry and Alkali Canyons and samples a prescribed burn treatment on a sagebrush/grass type. The burn was completed in 1977 and consumed approximately 500 acres. The burn was not seeded, however native species have readily reestablished on the burned area. The elevation is 8,700 feet. A wildlife guzzler is located adjacent to the site. The aspect is to the north with a gentle 10% slope. The Forest Service manages this land under the Antelope allotment and is grazed by 200 head of cattle from December 1 to March 23 on a 3-unit deferred rotation system. Wildlife use was estimated at 84 elk days use/acre (207 edu/ha) and 4 deer days use/acre (10 ddu/ha) in 2000, based on the pellet group data. Cattle use was an estimated 1 cow day use/acre (2 cdu/ha). In 2005, pellet group data estimates were 77 elk and 39 deer days use/acre (96 ddu/ha and 190 edu/ha), all of which were from early summer.

Soils are a moderately shallow clay loam with neutral reactivity (pH of 6.9). The stoniness index shows rock to be fairly uniformly distributed throughout the profile. Soil depth increases further down slope in the drainage bottom. Total relative vegetation cover has been moderately high and was 39% in 1995, 35% in 2000, and 45% in 2005, with around half of this total coming from perennial grasses all three years. High grass cover and abundant litter cover have kept erosion minimal. Combined relative rock and pavement cover were estimated at 8% in 1995, and 12% in both 2000 and 2005. The relative bare ground cover was low in 1995 at 11%, increased in 2000 to 18%, then 17% in 2005. The erosion index measurement in 2005 rated the soil erosion as stable.

The two principle browse species are mountain big sagebrush and mountain low rabbitbrush. In earlier readings, the rabbitbrush was the key browse species. The mountain low rabbitbrush density in 1995 was 9,660 plants/acre with 83% of the population in the mature age class. In 2000, the population had decreased to 5,800 plants/acre with a similar age class distribution as 1995 with 80% classified as mature. The 2005 rabbitbrush community had decreased to 5,360 plants/acre, 94% of which was classified as mature. Mature plants showed light use and the average height was 8 inches with an average crown diameter of 12 inches. Leader growth on rabbitbrush averaged between 3-4 inches in 2000.

The mountain big sagebrush population is productive and vigorous and has become the key browse. The sagebrush density was estimated at 1,500 plants/acre in 1995, increased to 6,000 in 2000, then decreased slightly to 5,100 in 2005. Utilization has been light to moderate with mostly good vigor throughout the population during all readings. The stature of sagebrush is relatively small with an average height of 14 inches and crown of 21 inches. Previous to 2005, around half of the community was made up of young individuals. In 2005, only 9% of the population consisted of young individuals. Percent decadency was low at 3% in 1995 and 2000, then increased slightly to 7% in 2005. In 2005, the dying individuals increased from less than 1% of the population in 2000 to 3%. Average leader growth on sagebrush was estimated at about 3 inches in 2000 and 1.8 inches in 2005. Other browse species include: snowberry, gray horsebrush, and dwarf rabbitbrush. In 2000, gray horsebrush had been used more than any other browse species with 88% of the plants sampled displaying moderate to heavy use. This had decreased to 46% moderate to heavy use by 2005. Average leader growth for gray horsebrush was less than one inch in 2000. Density for this species was estimated at 440 plants/acre in 1995, 500 plants/acre in 2000, and 480 plants/acre in 2005.

Perennial grasses are the dominant vegetation component. They provided an average cover of 22% in 1995, 26% in 2000, and 24% in 2005. Eleven species were sampled during the past 3 sampling dates, slender wheatgrass was the most abundant. Other abundant species include: Letterman needlegrass, needle-and-thread, prairie junegrass, and thickspike wheatgrass. The sum of nested frequency for perennial grass species slightly decreased with each reading since 1988. In 2000, nested frequency for thickspike wheatgrass, needle-

and-thread, and prairie junegrass significantly decreased, while that of slender wheatgrass significantly increased. All other species remained at stable frequencies in 2000. Identification of grasses was difficult in 2000 due to the lack of heads and common physical characteristics between the species. Minimal use was noted on grasses in 2000. In 2005, the nested frequency of slender wheatgrass decreased significantly and thickspike wheatgrass increased significantly. Sheep fescue also showed a significant nested frequency decrease in 2005.

Forbs are diverse and have been moderately abundant. In 1995, twenty-nine species of forbs were encountered and had increased in the sum of nested frequency from 1988. However, due to drought in 2000, forbs were less abundant in species richness (21 species), cover, and sum of nested frequency. In 2005, 29 forb species were sampled and both nested frequency and percent cover of forbs had increased. Bastard toadflax provides the greatest amount of forb cover, followed by sulfur eriogonum and Watson penstemon.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable, but could decline if grazing intensity were to increase. Vegetation condition is good considering the perceived management objectives of forb enhancement.

1988 TREND ASSESSMENT

Trend for soil is stable with adequate cover from litter and herbaceous vegetation to limit erosion. Browse species are increasing in abundance following the prescribed burn. Trend for browse is slightly up with the increase in shrub densities. Trend for the herbaceous understory is up with abundant herbaceous vegetation. Basal vegetation cover nearly doubled in 1988.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - up (+2)

1995 TREND ASSESSMENT

Soil trend is stable with little bare ground and excellent vegetation and litter cover. The mountain big sagebrush density appears to be expanding in size and exhibits moderate hedging. Mountain low rabbitbrush is the dominant browse species (50% of browse cover) with light to moderate hedging and a stable population. Snowberry is heavily utilized with an apparently stable population and heavy hedging. These factors lead to a slightly upward browse trend. The herbaceous understory sum of nested frequency is increasing although there is a slight decrease in the sum of nested frequency of grasses. Diversity of forbs has increased along with the sum of nested frequency for perennial forbs. There are very few annual species. This would indicate a stable herbaceous understory trend.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - stable (0)
winter range condition (DC Index) - not applicable, summer range

2000 TREND ASSESSMENT

Trend for soil is stable. Vegetation and litter cover remain high and erosion is minimal. Trend for browse is slightly up. Mountain big sagebrush has high recruitment from young plants and continues to increase in density. However, this increase in density is not at the expense of the herbaceous understory as cover from sagebrush is currently only 7%. Trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses slightly decreased, while that of perennial forbs decreased by more than half in 2000. This drastic decrease is due to the drought experienced in 2000. This trend should improve with normal precipitation patterns.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - slightly down (-1)
winter range condition (DC Index) - not applicable, summer range

2005 TREND ASSESSMENT

The trend for soil is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground remained relatively unchanged from 2000 to 2005. Trend for browse is stable. Density of mature sagebrush increased from 2,940 plants/acre in 2000 to 4,280 in 2005. However, the overall density decreased from 6,000 plants/acre to 5,100 plants/acre. The changes in density can be attributed to mostly losses of the young population between 2000 and 2005. Percent decadency remains low, vigor is good, and utilization is light. Seedlings were very abundant in 2005, there were 4,080 seedlings/acre. The trend for herbaceous understory is slightly up. Perennial grasses remained fairly stable and perennial forbs increased substantially. Watson penstemon showed the largest increase in nested frequency of perennial forbs.

TREND ASSESSMENT
soil - stable (0)
browse - stable (0)
herbaceous understory - slightly up (+1)
winter range condition (DC Index) - not applicable, summer range

HERBACEOUS TRENDS --
Management unit 11A, Study no: 3

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron dasystachyum	$_{d}$307	$_{c}$211	$_{a}$89	$_{b}$162	4.99	.77	2.69
G	Agropyron trachycaulum	$_{a}$16	$_{b}$115	$_{d}$234	$_{c}$175	3.54	13.17	9.15
G	Bromus anomalus	$_{b}$25	$_{a}$-	$_{a}$3	$_{a}$-	-	.03	-
G	Carex sp.	$_{b}$49	$_{a}$5	$_{a}$9	$_{a}$6	.03	.27	.15
G	Festuca ovina	$_{a}$-	$_{ab}$11	$_{b}$10	$_{a}$-	.04	.27	-
G	Koeleria cristata	$_{a}$7	$_{b}$49	$_{a}$12	$_{ab}$29	2.57	.21	1.62
G	Poa fendleriana	$_{b}$83	$_{a}$18	$_{a}$42	$_{a}$34	.25	.69	1.12
G	Stipa columbiana	-	4	-	5	.15	-	.01

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Stipa comata	a17	c122	b62	ab37	3.59	1.60	1.15
G	Stipa lettermani	b252	a154	a160	ab184	6.78	9.46	8.29
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		756	689	621	632	21.98	26.50	24.22
Total for Grasses		756	689	621	632	21.98	26.50	24.22
F	Agoseris glauca	a-	a-	a-	b40	-	-	.49
F	Antennaria rosea	6	-	4	-	-	.30	-
F	Androsace septentrionalis (a)	-	b31	a-	a3	.27	-	.01
F	Arabis drummondi	a1	b16	a-	a-	.06	-	-
F	Astragalus convallarius	1	4	-	5	.00	-	.06
F	Astragalus sp.	4	-	-	-	-	-	-
F	Castilleja flava	a-	b10	a-	b19	.33	-	.41
F	Calylophus lavandulifolius	a-	b22	b9	b14	.98	.05	.33
F	Calochortus nuttallii	a-	ab3	a-	b10	.00	-	.02
F	Chenopodium album (a)	-	b42	a-	b30	.15	-	.13
F	Chaenactis douglasii	b34	b20	a6	a4	.13	.03	.01
F	Chenopodium leptophyllum(a)	-	-	-	11	-	-	.04
F	Comandra pallida	a186	b250	a186	a202	3.52	3.40	4.84
F	Collinsia parviflora (a)	-	a-	b40	a-	-	.77	-
F	Crepis acuminata	a3	b76	a4	a14	.37	.06	.54
F	Cymopterus longipes	-	-	3	1	-	.00	.00
F	Delphinium nuttallianum	a-	a1	a-	b21	.00	-	.14
F	Eriogonum alatum	a-	a2	b14	a1	.00	.21	.03
F	Erigeron eatonii	b19	ab8	a-	a2	.07	-	.03
F	Eriogonum umbellatum	a35	b70	a34	a29	1.72	.45	.63
F	Geranium sp.	3	-	-	-	-	-	-
F	Hedysarum boreale	-	1	-	-	.00	-	-
F	Heterotheca villosa	-	-	3	-	-	.03	-
F	Hymenoxys acaulis	a-	b19	b12	b10	.32	.15	.05
F	Ipomopsis aggregata	8	3	-	1	.03	-	.00
F	Linum lewisii	a-	b21	ab10	a-	.27	.10	.00
F	Lithospermum ruderale	a-	b8	ab5	a-	.19	.06	-
F	Lupinus argenteus	c67	b25	ab8	a4	.65	.55	.33
F	Lychnis sp.	2	-	-	-	-	-	-
F	Machaeranthera canescens	b31	a4	a-	a-	.07	-	-
F	Penstemon caespitosus	a-	b21	a3	a5	.58	.01	.09

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
F	Penstemon comarrhenus	$_{c}$50	$_{b}$27	$_{ab}$18	$_{a}$3	.36	.31	.01
F	Penstemon watsonii	$_{b}$73	$_{b}$84	$_{a}$13	$_{b}$70	1.38	.27	2.86
F	Physaria acutifolia	$_{a}$-	$_{b}$9	$_{ab}$4	$_{ab}$5	.08	.03	.03
F	Phlox longifolia	$_{b}$86	$_{a}$20	$_{a}$4	$_{a}$8	.10	.06	.07
F	Polygonum douglasii (a)	-	$_{b}$51	$_{a}$-	$_{c}$106	.22	-	.53
F	Potentilla gracilis	-	8	9	4	.07	.02	.03
F	Schoencrambe linifolia	-	-	1	3	-	.00	.01
F	Senecio canus	-	-	-	3	-	-	.03
F	Tragopogon dubius	-	3	-	-	.03	-	-
F	Unknown forb-perennial	20	-	-	-	-	-	-
Total for Annual Forbs		0	124	40	150	0.64	0.76	0.71
Total for Perennial Forbs		629	735	350	478	11.41	6.15	11.11
Total for Forbs		629	859	390	628	12.06	6.92	11.82

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

BROWSE TRENDS --
Management unit 11A, Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Artemisia nova	2	0	0	-	-	-
B	Artemisia tridentata vaseyana	40	69	70	1.45	7.04	13.93
B	Chrysothamnus depressus	7	15	10	.16	.39	.07
B	Chrysothamnus viscidiflorus lanceolatus	83	82	77	4.86	4.06	4.90
B	Gutierrezia sarothrae	2	1	3	.01	.00	-
B	Opuntia sp.	4	2	3	.03	-	-
B	Symphoricarpos oreophilus	24	9	7	2.28	.21	.03
B	Tetradymia canescens	12	17	15	.83	.39	.62
Total for Browse		174	195	185	9.63	12.10	19.56

CANOPY COVER, LINE INTERCEPT --
Management unit 11A, Study no: 3

Species	Percent Cover '05
Artemisia tridentata vaseyana	18.98
Chrysothamnus depressus	.18
Chrysothamnus viscidiflorus lanceolatus	5.03
Symphoricarpos oreophilus	.35
Tetradymia canescens	.41

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 11A, Study no: 3

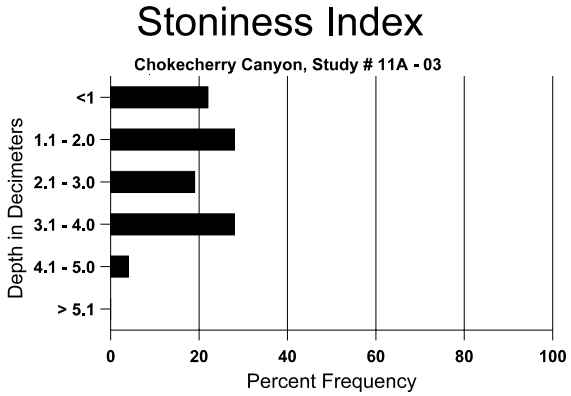
Species	Average leader growth (in) '05
Artemisia tridentata vaseyana	1.8

BASIC COVER --
Management unit 11A, Study no: 3

Cover Type	Average Cover %				
	'82	'88	'95	'00	'05
Vegetation	12.50	23.00	45.31	50.65	50.59
Rock	2.00	5.50	8.19	5.89	7.51
Pavement	4.75	2.50	1.29	10.82	5.93
Litter	55.75	53.75	47.58	49.29	29.78
Cryptogams	0	0	.63	0	.03
Bare Ground	25.00	15.25	12.67	26.07	19.37

SOIL ANALYSIS DATA --
Herd Unit 11A, Study # 3, Study Name: Chokecherry Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
13.5	56.2 (14.7)	6.9	32.9	33.8	33.2	4.3	11.8	217.6	0.9



PELLET GROUP DATA --
Management unit 11A, Study no: 3

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	4	3	3
Elk	27	46	55
Deer	3	9	11
Cattle	-	1	-

Days use per acre (ha)	
'00	'05
-	-
84 (208)	77 (190)
11 (28)	39 (96)
1 (2)	-

BROWSE CHARACTERISTICS --
Management unit 11A, Study no: 3

		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)
Artemisia nova												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
95	**120**	-	20	60	40	-	0	17	33	-	0	5/7
00	**0**	-	-	-	-	-	0	0	0	-	0	-/-
05	**0**	-	-	-	-	-	0	0	0	-	0	-/-
Artemisia tridentata vaseyana												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**800**	133	600	200	-	-	17	0	0	-	0	11/16
95	**1500**	960	820	640	40	240	28	1	3	-	1	16/23
00	**6000**	160	2900	2940	160	460	12	0	3	.33	3	14/25
05	**5100**	4080	480	4280	340	300	6	1	7	3	4	14/21

		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)
Chrysothamnus depressus												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
95	**360**	-	-	340	20	-	72	22	6	6	6	3/9
00	**960**	-	-	940	20	140	44	0	2	-	0	2/5
05	**300**	-	-	300	-	40	27	0	0	-	0	3/4
Chrysothamnus viscidiflorus lanceolatus												
82	**3733**	-	533	3200	-	-	0	0	0	-	0	12/18
88	**9199**	266	5200	2866	1133	-	7	0	12	-	13	13/14
95	**9660**	-	1660	8000	-	-	22	0	0	-	0	9/13
00	**5800**	20	640	4660	500	20	5	4	9	1	2	8/11
05	**5360**	-	240	5040	80	40	3	0	1	.74	.74	9/12
Gutierrezia sarothrae												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**40**	-	20	20	-	-	0	0	-	-	0	3/5
00	**80**	-	-	80	-	-	0	0	-	-	0	4/4
05	**60**	-	-	60	-	-	0	0	-	-	0	5/6
Opuntia sp.												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**80**	-	-	80	-	-	0	0	-	-	0	4/15
00	**40**	-	-	40	-	-	0	0	-	-	0	3/10
05	**60**	-	-	60	-	-	0	0	-	-	0	3/11
Symphoricarpos oreophilus												
82	**266**	-	-	266	-	-	0	0	0	-	0	12/21
88	**1199**	-	800	333	66	-	61	11	6	-	0	15/26
95	**1180**	40	140	960	80	-	5	58	7	-	0	13/28
00	**200**	-	100	20	80	-	0	0	40	-	0	11/20
05	**180**	-	-	180	-	-	0	0	0	-	0	12/20
Tetradymia canescens												
82	**133**	-	-	133	-	-	0	0	0	-	0	7/11
88	**199**	-	66	133	-	-	33	0	0	-	0	11/12
95	**440**	-	40	380	20	-	77	5	5	-	0	9/13
00	**500**	-	60	380	60	-	52	36	12	-	0	7/12
05	**480**	20	20	400	60	60	38	8	13	-	0	7/10