

Trend Study 15-4-04

Study site name: South Creek Chaining.

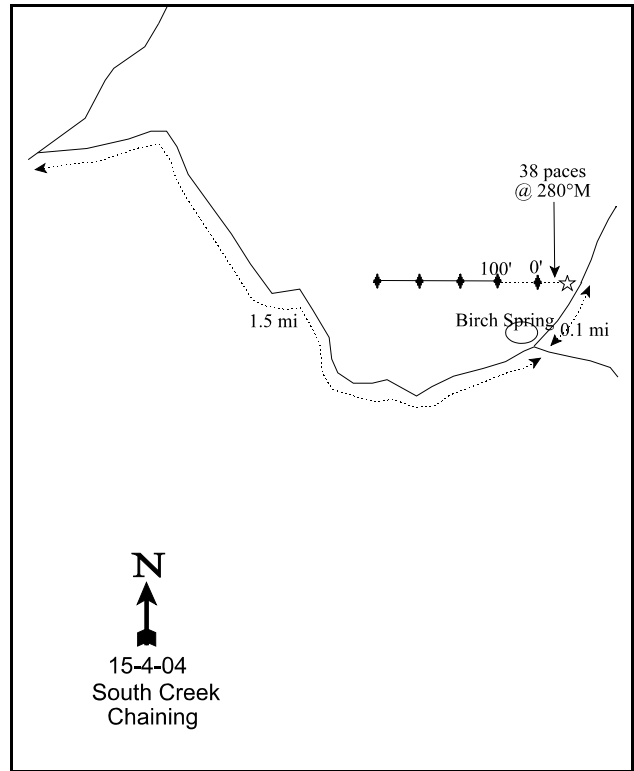
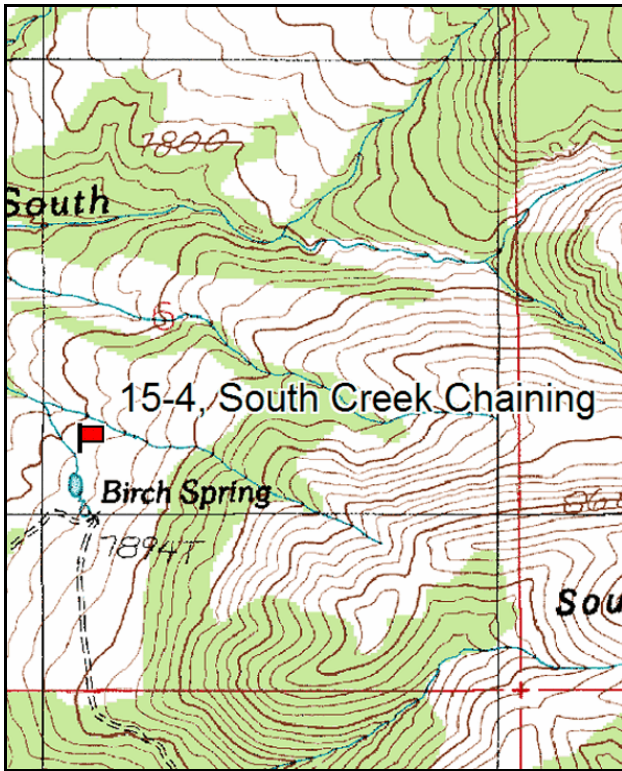
Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 285 degrees magnetic.

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

LOCATION DESCRIPTION

From the intersection of the Willow Creek and South Creek Roads, (T32S, R9F, Sec.1) travel 1.5 miles west-southwest to a fork by Birch Spring. Turn left and go 0.1 miles past the fenced spring, and down a faint road. A witness post (tall green fence post) is located in the P-J just west of the road. The transect starts 38 paces away at a bearing of 280°M from the witness post.



Map Name: Mount Ellen

Diagrammatic Sketch

Township 32S, Range 10E, Section 6

GPS: NAD 27, UTM 12S 4211133 N, 513082 E

DISCUSSION

South Creek Chaining - Trend Study No. 15-4

The South Creek chaining study is located in the pinyon-juniper foothills on the west slope of the Henry Mountains at an elevation of 7,800 feet. It samples a portion of the South Creek pinyon-juniper project that was completed in the mid-1960's. The study is on a 5% slope that has a northern exposure. Water is available for livestock and wildlife at Birch Spring a few hundred yards to the south. The site is within the Nasty Flat Cattle Allotment and a key area for bison and mule deer. Pellet group data also indicates a high amount of rabbit use. The 1999 pellet group transect estimated a moderate level of use on the site with 13 deer, 7 bison days use/acre, and 39 cow days use/acre (32 ddu/ha, 16 bdu/ha, and 96 cdu/ha). Pellet group data from 2004 estimated moderate use by livestock with 41 cow days use/acre (100 cdu/ha), light use by bison (9 bdu/acre - 23 bdu/ha) and deer (5 ddu/acre - 13 ddu/ha). Human use of the area, which could negatively impact wildlife, is minimal. A road skirts the lower edge of the chaining, but it is not heavily traveled. Undulating topography and adequate escape cover buffer wildlife from human disturbances near the road.

The soil on the site is a dark brown loam of granitic origin, with a neutral pH (6.9). The soil surface is rocky as is the profile, especially the upper 2 decimeters. Penetrometer readings estimated the effective rooting depth to be just over 12 inches. The steeper slopes of the area show pedestaling around grasses and shrubs from overland water flow. However, the more gentle slopes show minimal erosion occurring. There is a relatively high amount of rock, pavement, and bare ground on the site, but gentle slopes and fairly continuous vegetative cover limit erosion on the site.

Mountain big sagebrush and green rubber rabbitbrush continue to be the most abundant browse species on the site. Sagebrush is the key browse for this site. The population density has increased substantially from 33 plants/acre in 1987 to 5,400 plants/acre in 2004. The percentage of young plants was highest in 1999 when they made up 38% of the population. There were 4,560 seedlings/acre estimated in 1999. In 2004 there were 10,460 seedlings/acre, which could result in the further increases of sagebrush if a high proportion of these can persist on the site. Mature sagebrush plants have greatly increased from 1,680/acre in 1999 to 4,360/acre in 2004. The population appears healthy with most plants (58%) showing moderate to heavy use, good vigor, with less than 20 decadent plants sampled/acre. Green rubber rabbitbrush also greatly increased in density from 1987 to 1999, but decreased 40% in 2004 from 3,220 plants/acre to 1,940 plants/acre. Much of the young age class of 1999 died off. This population appears to be decreasing with competition from mountain big sagebrush. This is characteristic of increaser shrub, as they are usually not very competitive with other longer lived shrubs like sagebrush.

Pinyon and juniper trees were hand cut prior to the 2004 reading. Utah serviceberry, snowberry, and true mountain mahogany are also occur on the site, but none are very abundant with density varying from 20 to 100 plants/acre and providing less than 1% cover for all species combined. Serviceberry and mahogany are heavily utilized due to their infrequent occurrence and preference by browsing animals. The transect is located near the edge of the chaining, where shrub utilization would be expected to exceed that observed for shrubs found toward the interior of the chaining. Serviceberry and mahogany are not classified as key species due to their very low numbers.

Crested wheatgrass and alfalfa provide the bulk of the herbaceous forage found in the chaining. These species provide early spring green-up and fall regrowth for wildlife use. Both species have continued to receive heavy utilization each sampling date since the trend study was established in June of 1987. Very heavy use was noted by crested wheatgrass and alfalfa in 2004. Alfalfa still makes up about two-thirds of the perennial forb cover, even though the annual component has been increasing since 1987. One thing that should be noted is that quadrat frequency for alfalfa has shown a continuous drop since 1987 (from 47% to 21%). This species is decreasing most likely as the result of the drought and/or continued heavy use. In 2004, crested wheatgrass

provided 95% of the grass cover, 76% of the herbaceous cover, and 40% of the total vegetative cover. Other grasses and forbs are diverse, but provide little cover and are insignificant.

1994 TREND ASSESSMENT

Protective ground cover has increased on this site indicating a slightly upward soil trend. The decrease in percent litter cover can be partially explained by the fact that the chaining had not been heavily utilized in 1994, which increased total vegetative cover and reduced the amount of visible litter. Browse trend is mixed. Preferred browse have increased slightly in density and shows light hedging. Conversely, green rubber rabbitbrush has increased significantly. Overall, the browse trend is slightly down, but if the seedlings of mountain big sagebrush become established, this could change dramatically. The herbaceous understory is dominated by crested wheatgrass and alfalfa. These two species make up 90% of the herbaceous cover. Nested frequency of crested wheatgrass has increased, while that of alfalfa has declined significantly. The decline in alfalfa would be expected with the prolonged drought. Nested and quadrat frequencies of grasses have declined slightly, while those of forbs increased significantly. Combined nested frequencies of grasses and forbs have remained stable.

TREND ASSESSMENT

soil - slightly up (4)

browse - slightly down because of the significant increase in green rabbitbrush density (2)

herbaceous understory - stable (3)

winter range condition (DC index) - 74 (good) Mountain big sagebrush/chaining type

1999 TREND ASSESSMENT

Trend for soil is stable. Relative percent cover of bare ground, rock and pavement remained almost unchanged. The proportion of protective ground cover and bare soil has shown no change. Overall trend for browse is slightly down. Trend for sagebrush is up with the increase in density and good recruitment. However, green rubber rabbitbrush density has also greatly increased and recruitment is high, offsetting the upward trend for sagebrush. Green rubber rabbitbrush makes up 52% of the browse cover. Trend for herbaceous understory is stable. Sum of nested frequency for perennial species overall stayed nearly the same with grasses slightly increasing, and forbs slightly decreasing. Crested wheatgrass and alfalfa still dominate the understory. Both are vigorous and provide good forage for wildlife and livestock. Annual species continue to play an insignificant role in the community.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down an increase in mountain big sagebrush being more than offset by the increase in rubber rabbitbrush (2)

herbaceous understory - stable (3)

winter range condition (DC index) - 83 (excellent) Mountain big sagebrush/chaining type

2004 TREND ASSESSMENT

Trend for soil is slightly down because of the increase in relative cover for bare soil mostly because of the loss of almost half of the crested wheatgrass cover. Overall trend for browse is up. Trend for sagebrush is up with the increase in density (2,700 to 5,400 plants/acre) and good recruitment (19% young). Sagebrush cover has increased by 106%. Conversely, green rubber rabbitbrush density has decreased by 40%, while recruitment (percent young) has also decreased by 79%. This indicates a change in trend to a more preferred browse species which shows 58% of the plants with moderate to heavy use, yet they show excellent vigor. Trend for herbaceous understory is slightly down with a major loss of the most dominant grass cover, crested

wheatgrass, which declined from 21% in 1999 to 11% cover. Alfalfa, the major forb, has also decreased. This all points to losses mostly because of drought. Annual cover has increased since 1999 and are are beginning to play a more significant role in the community.

TREND ASSESSMENT

soil - slightly down (2)

browse - up (5), with increases in mountain big sagebrush and decreases in green rubber rabbitbrush

herbaceous understory - slightly down (2)

winter range condition (DC index) - 65 (fair-good) Mountain big sagebrush/chaining type, declined mostly because of the losses to the herbaceous species.

HERBACEOUS TRENDS --

Management unit 15 , Study no: 4

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
G	Agropyron cristatum	b ₂₉₃	b ₂₉₄	b ₂₉₄	a ₂₄₅	22.07	20.97	11.25
G	Agropyron smithii	ab ₅	a ₋	b ₁₃	ab ₇	-	.77	.06
G	Bromus tectorum (a)	-	a ₂₄	b ₅₇	b ₅₈	.26	.63	.43
G	Poa fendleriana	3	1	2	-	.00	.15	-
G	Sitanion hystrix	b ₄₂	a ₄	a ₋	a ₃	.01	-	.06
Total for Annual Grasses		0	24	57	58	0.26	0.62	0.43
Total for Perennial Grasses		343	299	309	255	22.08	21.89	11.37
Total for Grasses		343	323	366	313	22.35	22.52	11.80
F	Arabis spp.	-	-	2	-	-	.00	-
F	Artemisia ludoviciana	3	1	6	5	.00	.06	.01
F	Astragalus henrimontanensis	7	5	6	3	.01	.04	.06
F	Casella bursa-pastoris	-	-	3	-	-	.00	-
F	Chenopodium album (a)	-	3	-	-	.01	-	-
F	Chaenactis douglasii	-	-	2	3	-	.00	.00
F	Cirsium vulgare	9	-	-	-	-	-	-
F	Cryptantha spp.	-	2	-	-	.00	-	-
F	Descurainia pinnata (a)	-	b ₃₃	a ₉	ab ₁₈	.10	.04	.04
F	Erigeron spp.	-	-	1	-	-	.03	-
F	Eriogonum racemosum	-	-	-	2	-	-	.00
F	Gayophytum ramosissimum(a)	-	a ₋	a ₋	b ₁₀	-	-	.05
F	Hymenoxys acaulis	-	3	2	-	.00	.00	-
F	Lappula occidentalis (a)	-	a ₋	b ₆₄	c ₁₅₇	-	.38	1.61
F	Lesquerella kingii	b ₁₈	c ₅₄	bc ₄₂	a ₋	.36	.25	-
F	Lomatium spp.	a ₋	b ₁₆	a ₋	ab ₃	.43	-	.04
F	Malcolmia africana	-	-	3	9	-	.38	.33
F	Machaeranthera canescens	1	-	6	8	-	.18	.19

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
F	<i>Medicago sativa</i>	_b 110	_a 73	_a 71	_a 50	6.50	4.38	1.94
F	<i>Microsteris gracilis</i> (a)	-	-	-	2	-	-	.00
F	<i>Phlox longifolia</i>	_a -	_b 13	_a -	_{ab} 10	.03	-	.07
F	<i>Polygonum douglasii</i> (a)	-	_a 57	_a 41	_b 240	.51	.11	1.37
F	<i>Ranunculus testiculatus</i> (a)	-	-	-	5	-	-	.01
F	<i>Sisymbrium altissimum</i> (a)	-	-	2	-	-	.00	-
F	<i>Sphaeralcea coccinea</i>	_b 35	_{ab} 20	_a 17	_a 12	.14	.11	.27
F	<i>Taraxacum officinale</i>	_b 27	_a 3	_b 21	_a -	.00	.38	-
F	Unknown forb-perennial	6	-	-	-	-	-	-
Total for Annual Forbs		0	93	116	432	0.62	0.54	3.10
Total for Perennial Forbs		216	190	182	105	7.49	5.84	2.93
Total for Forbs		216	283	298	537	8.11	6.38	6.04

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

BROWSE TRENDS --

Management unit 15 , Study no: 4

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	<i>Amelanchier utahensis</i>	2	1	2	-	-	-
B	<i>Artemisia tridentata vaseyana</i>	7	33	47	1.30	3.87	7.98
B	<i>Cercocarpus montanus</i>	0	1	1	-	-	-
B	<i>Chrysothamnus depressus</i>	0	0	1	-	-	-
B	<i>Chrysothamnus nauseosus graveolens</i>	37	44	48	1.46	5.48	4.89
B	<i>Juniperus osteosperma</i>	0	0	1	.85	.15	.38
B	<i>Pinus edulis</i>	0	3	1	1.74	.85	-
B	<i>Symphoricarpos oreophilus</i>	2	2	4	-	.18	.15
Total for Browse		48	84	105	5.36	10.55	13.40

CANOPY COVER, LINE INTERCEPT --
 Management unit 15 , Study no: 4

Species	Percent Cover	
	'99	'04
Artemisia tridentata vaseyana	-	9.60
Cercocarpus montanus	-	.16
Chrysothamnus nauseosus graveolens	-	6.93
Juniperus osteosperma	1.39	.11
Pinus edulis	1.00	.60

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 15 , Study no: 4

Species	Average leader growth (in)
	'04
Amelanchier utahensis	6.6
Artemisia tridentata vaseyana	2.5

POINT-QUARTER TREE DATA --
 Management unit 15 , Study no: 4

Species	Trees per Acre	
	'99	'04
Juniperus osteosperma	25	-
Pinus edulis	47	-

Average diameter (in)	
'99	'04
5.8	-
4.9	-

BASIC COVER --
 Management unit 15 , Study no: 4

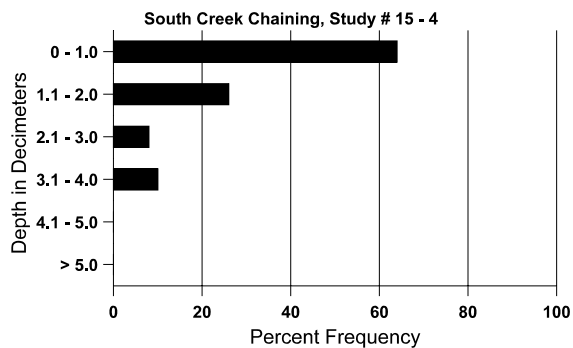
Cover Type	Average Cover %			
	'87	'94	'99	'04
Vegetation	7.25	39.24	38.48	32.77
Rock	12.25	13.10	18.34	14.31
Pavement	9.75	3.17	6.53	6.56
Litter	49.75	22.01	28.75	33.16
Cryptogams	0	.03	.04	0
Bare Ground	21.00	10.62	18.14	28.37

SOIL ANALYSIS DATA --

Management unit 15, Study no: 4, Study Name: South Creek Chaining

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
12.4	65.0 (12.6)	6.9	45.6	27.8	26.6	3.7	19.7	156.8	0.7

Stoniness Index



PELLET GROUP DATA --

Management unit 15, Study no: 4

Type	Quadrat Frequency			Days use per acre (ha)	
	'94	'99	'04	'99	'04
Rabbit	31	39	15	-	-
Deer	6	4	2	13 (32)	5 (13)
Cattle	-	22	9	39 (96)	41 (100)
Buffalo	12	-	2	7 (16)	9 (23)

BROWSE CHARACTERISTICS --

Management unit 15, Study no: 4

		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 utahensis												
87	66	-	66	-	-	-	0	100	-	-	0	-/-
94	40	100	-	40	-	-	0	100	-	-	0	34/55
99	20	-	-	20	-	-	0	100	-	-	0	17/30
04	40	-	-	40	-	-	0	100	-	-	0	35/56
Artemisia tridentata vaseyana												
87	33	-	33	-	-	-	0	100	0	-	0	-/-
94	160	6120	60	100	-	-	0	0	0	-	0	16/28
99	2740	4560	1060	1680	-	-	9	0	0	-	0	14/22
04	5400	30460	1020	4360	20	-	27	31	0	-	0	13/23

		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)
Cercocarpus montanus												
87	66	-	-	66	-	-	0	100	-	-	0	8/12
94	0	-	-	-	-	-	0	0	-	-	0	9/22
99	20	-	-	20	-	-	0	100	-	-	0	9/27
04	20	-	-	20	-	-	0	100	-	-	0	22/33
Chrysothamnus depressus												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	20	-	-	20	-	-	0	0	-	-	0	-/-
Chrysothamnus nauseosus graveolens												
87	33	-	-	33	-	-	100	0	0	-	0	43/33
94	1340	3880	760	540	40	-	22	4	3	-	1	22/24
99	3220	1000	1860	1300	60	20	25	4	2	-	0	25/27
04	1940	6120	240	1520	180	40	0	1	9	-	0	25/27
Juniperus osteosperma												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
94	0	-	-	-	-	-	0	0	0	-	0	-/-
99	0	-	-	-	-	100	0	0	0	-	0	-/-
04	20	20	-	-	20	-	0	0	100	-	100	-/-
Pinus edulis												
87	166	-	66	100	-	-	0	0	-	-	0	64/55
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	60	-	20	40	-	-	0	0	-	-	0	-/-
04	20	20	-	20	-	20	0	0	-	-	0	-/-
Ribes cereum cereum												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	20	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	68/68
04	0	-	-	-	-	-	0	0	-	-	0	62/74
Rosa woodsii												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	13/9
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	0	-	-	-	-	-	0	0	-	-	0	37/19

		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												
87	166	33	100	66	-	-	0	100	-	-	0	13/24
94	40	-	40	-	-	-	0	0	-	-	0	18/33
99	40	-	20	20	-	-	0	0	-	-	0	13/21
04	100	-	60	40	-	-	0	0	-	-	0	17/31