

Trend Study 20-7-08

Study site name: South Spring .

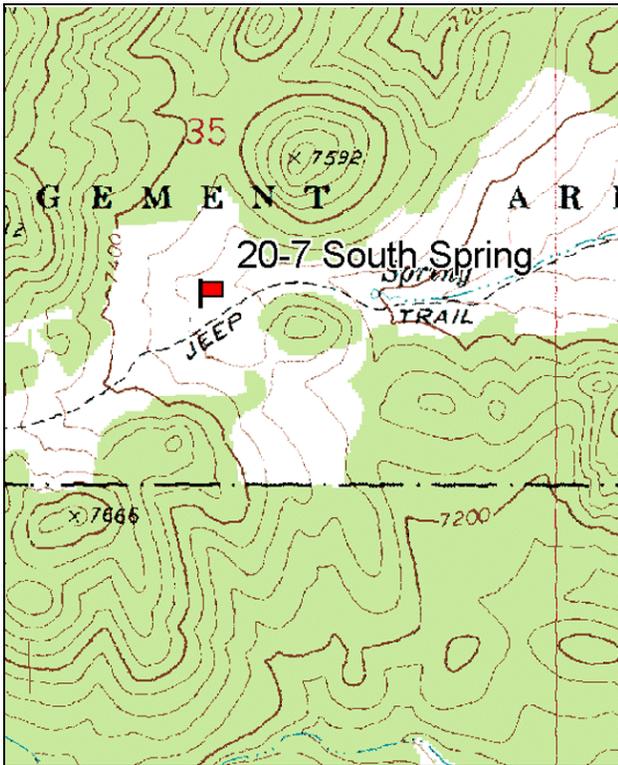
Vegetation type: Mountain Big Sagebrush .

Compass bearing: frequency baseline 307 degrees magnetic.

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

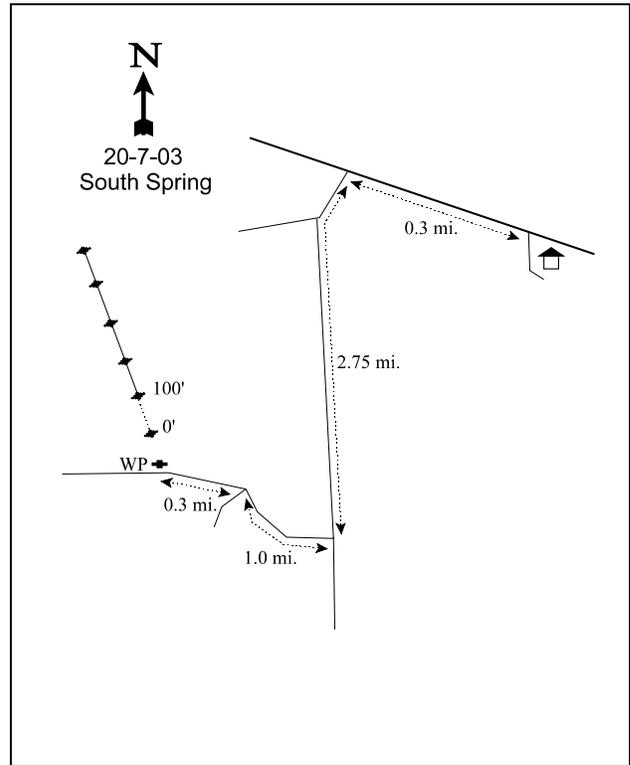
LOCATION DESCRIPTION

From the Indian Peaks Cabin, go 0.3 miles to an intersection west of the cabin. At the intersection, turn left and drive 2.75 miles to another right (closed road). Follow this for 1.0 miles to a fork near a spring with a trough. Take a right and drive 0.3 miles into a sagebrush/grass flat and to the witness post on the right (north) side of the road. The 0-foot stake is 8 paces at 303 degrees magnetic from the witness post.



Map Name: Pinto Spring

Township 29S, Range 18W, Section 35



Diagrammatic Sketch

GPS: NAD 83, UTM 12S 252367 E, 4236143 N

DISCUSSION

South Spring - Trend Study No. 20-7

Study Information

This study was established in 1999 to monitor the effects of a controlled burn on a sagebrush community and subsequent wildlife use in the area. It samples a small valley that originally supported a population of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with a good understory of grass [elevation: 7,310 feet (2,228 m), slope: 10%, aspect: east]. The area was supposed to be burned in fall 1999, but may have been burned the following year. It had also been chained in the early 1960s. Pellet group transect data estimated deer use at 15 days use/acre (36 ddu/ha) in 1999, 13 days use/acre (31 ddu/ha) in 2003, and 20 days use/acre (50 ddu/ha) in 2008. Elk use was estimated at 74 days use/acre (184 edu/ha) in 1999, 89 days use/acre (220 edu/ha) in 2003, and 28 days use/acre (69 edu/ha) in 2008. Cattle use was estimated at 4 days use/acre (9 cdu/ha) in 1999 and 2 days use/acre (5 cdu/ha) in 2003. Several wild horses were observed along the treeline northwest of the study in 2008, and horse use was estimated at 15 days use/acre (37 hdu/ha).

Soil

The soil is a sandy loam with a slightly acidic reaction (pH 6.4). Relative combined vegetation and litter cover was 84% in 1999, 37% in 2003 after the fire, and 70% in 2008. Relative pavement cover was 7% in 1999, 49% in 2003, and 15% in 2008. Relative bare ground cover increased from 8% in 1999 to 15% by 2008. The soil surface is fairly loose with few rocks. The soil erosion condition was classified as stable in 2003 and 2008.

Browse

Total browse quadrat cover was 15% in 1999, 3% in 2003 following the burn, and 17% in 2008. However, the browse component has changed from 93% mountain big sagebrush in 1999 to 90% rabbitbrush (*Chrysothamnus* sp.) by 2008. Sagebrush density decreased from 4,100 plants/acre in 1999 to 40 plants/acre in 2003, then increased to 620 plants/acre in 2008. Decadent plants comprised 29% of the population in 1999, and none have been sampled since the burn. Few young plants and no seedlings have been sampled since the study was established. Fifteen percent of the population displayed poor vigor in 1999, and all of the sampled plants were vigorous in 2003 and 2008. Browse use was light-moderate in 1999 and 2003, and light in 2008.

A small population of heavily-browsed antelope bitterbrush (*Purshia tridentata*) was present in 1999. Density was 140 plants/acre, but no bitterbrush were sampled within the density strips in 2003 or 2008.

Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) quadrat cover increased from less than 1% in 1999 to 5% in 2008. Density steadily increased from 580 plants/acre in 1999 to 8,000 plants/acre in 2008. Graystem rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) was not sampled in 1999 and provided little cover in 2003, but increased to 10% quadrat cover by 2008. Density increased from 120 plants/acre in 2003 to 5,780 plants/acre in 2008.

Herbaceous Understory

Total grass cover was 18% in 1999, 8% in 2003, and 16% in 2008. Prior to the burn, the grass component was dominated by introduced perennial species such as crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Agropyron intermedium*), and smooth brome (*Bromus inermis*), which together provided 90% of the total grass cover. After the burn, crested wheatgrass and smooth brome cover decreased substantially, while intermediate wheatgrass cover increased from 2% in 1999 to 4% in 2003 and 6% in 2008. Other perennials present in all sample years included blue grama (*Bouteloua gracilis*), Indian ricegrass (*Oryzopsis hymenoides*), and needle-and-thread (*Stipa comata*). Cheatgrass (*Bromus tectorum*) was also sampled each year and provided 1% cover in 1999, 2% in 2003, and 7% in 2008.

Forb cover was 3% in 1999, 13% in 2003, and 5% in 2008. Silvery lupine (*Lupinus argenteus*) provided over 90% of the forb cover in all sample years. Longleaf phlox (*Phlox longifolia*) was also relatively abundant in 2003 and 2008.

1999 Desirable Components Index

The 1999 winter range condition, determined by the Desirable Components Index (DCI), was rated as fair due to moderate preferred browse cover with high decadence and low recruitment, but high perennial grass cover and moderate perennial forb cover.

winter range condition (DCI) - fair (58) Mid-level potential scale

2003 Trend Assessment

The browse trend is down. Mountain big sagebrush, which provided the majority of the preferred browse, was almost completely eliminated by the burn. Antelope bitterbrush was also eliminated. The only browse species sampled were stickyleaf low rabbitbrush, graystem rabbitbrush, and gray horsebrush (*Tetradymia canescens*), all of which have little browse value. The trend for grass is down. The sum of nested frequency for perennial grasses decreased 66%. Crested wheatgrass and smooth brome decreased significantly in nested frequency, while cheatgrass nested frequency also decreased significantly. The trend for forbs is stable. Few forb species were sampled in 1999 or 2003. Silvery lupine increased significantly in nested frequency. The 2003 DCI declined to very poor due to the loss of preferred browse and perennial grass cover.

winter range condition (DCI) - very poor (22) Mid-level potential scale
browse - down (-2) grass - down (-2) forb - stable (0)

2008 Trend Assessment

The browse trend is stable. Mountain big sagebrush density increased from 40 plants/acre to 620 plants/acre. However, stickyleaf low rabbitbrush and graystem rabbitbrush densities also increased substantially, and these two species dominated the browse component. The trend for grass is slightly up. The sum of nested frequency for perennial grasses increased two-fold. Crested wheatgrass, intermediate wheatgrass, smooth brome, and needle-and-thread increased significantly in nested frequency. However, cheatgrass also increased in nested frequency, and quadrat frequency increased from 23% to 89%. The trend for forbs is stable. The sum of nested frequency for perennial forbs increased slightly, but the forb component was still dominated by silvery lupine. The DCI rating remained very poor.

winter range condition (DCI) - very poor (24) Mid-level potential scale
browse - stable (0) grass - slightly up (+1) forb - stable (0)

HERBACEOUS TRENDS --
Management unit 20 , Study no: 7

T y p e	Species	Nested Frequency			Average Cover %		
		'99	'03	'08	'99	'03	'08
G	Agropyron cristatum	c297	a9	b40	11.23	.22	.57
G	Agropyron dasystachyum	a-	b61	b69	-	1.56	.97
G	Agropyron intermedium	a52	a70	b124	2.17	4.23	5.55
G	Bouteloua gracilis	2	2	4	.03	.03	.00
G	Bromus inermis	c118	a10	b42	2.78	.07	.89

Type	Species	Nested Frequency			Average Cover %		
		'99	'03	'08	'99	'03	'08
		G	Bromus tectorum (a)	_b 117	_a 59	_c 359	1.16
G	Elymus cinereus	-	-	2	-	.03	.15
G	Elymus junceus	-	-	-	-	-	.00
G	Oryzopsis hymenoides	15	5	23	.55	.19	.27
G	Sitanion hystrix	6	-	7	.01	-	.09
G	Stipa columbiana	-	-	3	-	-	.15
G	Stipa comata	_a 2	_a 9	_b 36	.00	.17	.43
Total for Annual Grasses		117	59	359	1.16	1.80	6.81
Total for Perennial Grasses		492	166	350	16.78	6.52	9.09
Total for Grasses		609	225	709	17.95	8.33	15.90
F	Amaranthus sp.	-	-	-	-	.00	-
F	Astragalus sp.	2	1	6	.03	.00	.03
F	Collinsia parviflora (a)	-	-	5	-	-	.01
F	Cymopterus sp.	-	-	2	-	-	.00
F	Descurainia pinnata (a)	_a -	_a -	_b 21	-	-	.23
F	Eriogonum racemosum	-	-	-	.03	-	-
F	Gilia sp. (a)	_a -	_a -	_b 18	-	-	.04
F	Lithospermum ruderales	-	-	-	-	.00	-
F	Lupinus argenteus	_a 83	_b 118	_b 131	2.51	12.23	4.94
F	Lygodesmia spinosa	-	-	2	-	.01	.00
F	Navaretia intertexta (a)	-	-	-	-	.30	-
F	Phlox longifolia	_a -	_b 23	_b 32	-	.05	.17
F	Sisymbrium altissimum (a)	-	-	2	-	-	.03
F	Sphaeralcea coccinea	-	2	-	-	.03	-
Total for Annual Forbs		0	0	46	0	0.30	0.32
Total for Perennial Forbs		85	144	173	2.57	12.33	5.16
Total for Forbs		85	144	219	2.57	12.64	5.49

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

BROWSE TRENDS --

Management unit 20 , Study no: 7

Type	Species	Strip Frequency			Average Cover %		
		'99	'03	'08	'99	'03	'08
B	<i>Artemisia tridentata vaseyana</i>	81	2	19	13.75	.15	.81
B	<i>Chrysothamnus nauseosus hololeucus</i>	0	5	53	-	.00	10.32
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	21	35	50	.45	2.51	5.19
B	<i>Juniperus osteosperma</i>	1	0	0	.00	-	-
B	<i>Pinus monophylla</i>	2	0	0	.00	-	-
B	<i>Purshia tridentata</i>	6	0	0	.03	-	-
B	<i>Tetradymia canescens</i>	7	11	10	.53	.30	.74
Total for Browse		118	53	132	14.77	2.97	17.07

CANOPY COVER, LINE INTERCEPT --

Management unit 20 , Study no: 7

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	-	.55
<i>Chrysothamnus nauseosus hololeucus</i>	.26	10.98
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	3.36	6.81
<i>Tetradymia canescens</i>	.71	.40

POINT-QUARTER TREE DATA --

Management unit 20 , Study no: 7

Species	Trees per Acre		
	'99	'03	'08
<i>Juniperus osteosperma</i>	48	<18	<18
<i>Pinus monophylla</i>	76	<18	<18

Average diameter (in)		
'99	'03	'08
1.4	0.0	0.0
3.2	0.0	0.0

BASIC COVER --

Management unit 20 , Study no: 7

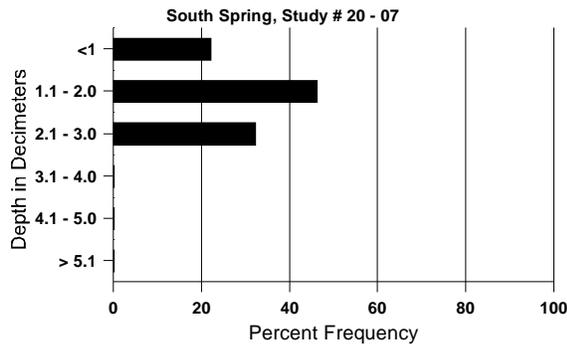
Cover Type	Average Cover %		
	'99	'03	'08
Vegetation	36.65	22.70	41.91
Rock	.08	.10	.32
Pavement	8.43	53.25	16.69
Litter	58.56	17.32	36.11
Cryptogams	.18	0	0
Bare Ground	8.90	15.23	16.56

SOIL ANALYSIS DATA --

Management unit 20, Study no: 7, Study Name: South Spring

Effective rooting depth (in)	Temp °F (depth)	pH	Sandy Loam			%OM	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
15.7	68.0 (15.8)	6.4	72.0	15.4	12.6	2.5	12.3	256.0	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 20 , Study no: 7

Type	Quadrat Frequency		
	'99	'03	'08
Rabbit	8	46	85
Horse	-	-	12
Elk	28	83	59
Deer	8	9	8
Cattle	2	-	1

Days use per acre (ha)		
'99	'03	'08
-	-	-
-	-	15 (37)
74 (183)	89 (220)	18 (69)
15 (36)	13 (31)	20 (50)
4 (9)	2 (5)	-

BROWSE CHARACTERISTICS --
Management unit 20 , Study no: 7

		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 tridentata vaseyana												
99	4100	-	40	2860	1200	740	38	1	29	13	15	28/33
03	40	-	20	20	-	-	50	0	0	-	0	11/12
08	620	-	60	560	-	-	3	0	0	-	0	13/17
Chrysothamnus nauseosus												
99	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	20/31
08	0	-	-	-	-	-	0	0	-	-	0	22/31
Chrysothamnus nauseosus hololeucus												
99	0	-	-	-	-	-	0	0	0	-	0	-/-
03	120	-	60	60	-	-	0	0	0	-	0	17/23
08	5780	-	320	5320	140	-	2	1	2	.34	6	15/21
Chrysothamnus viscidiflorus viscidiflorus												
99	580	-	100	440	40	-	0	3	7	-	0	17/17
03	1200	20	40	1160	-	-	5	0	0	-	0	14/20
08	8000	820	4440	3040	520	-	0	0	7	.50	.50	14/21
Juniperus osteosperma												
99	20	-	20	-	-	60	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Pinus monophylla												
99	40	-	40	-	-	20	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Purshia tridentata												
99	140	-	20	80	40	-	14	71	29	29	29	15/28
03	0	-	-	-	-	-	0	0	0	-	0	-/-
08	0	-	-	-	-	-	0	0	0	-	0	7/13
Tetradymia canescens												
99	280	-	-	280	-	-	0	0	0	-	0	15/17
03	340	100	-	340	-	-	0	6	0	-	0	10/16
08	360	-	-	140	220	-	33	50	61	6	11	8/18