Trend Study 25A-13-04

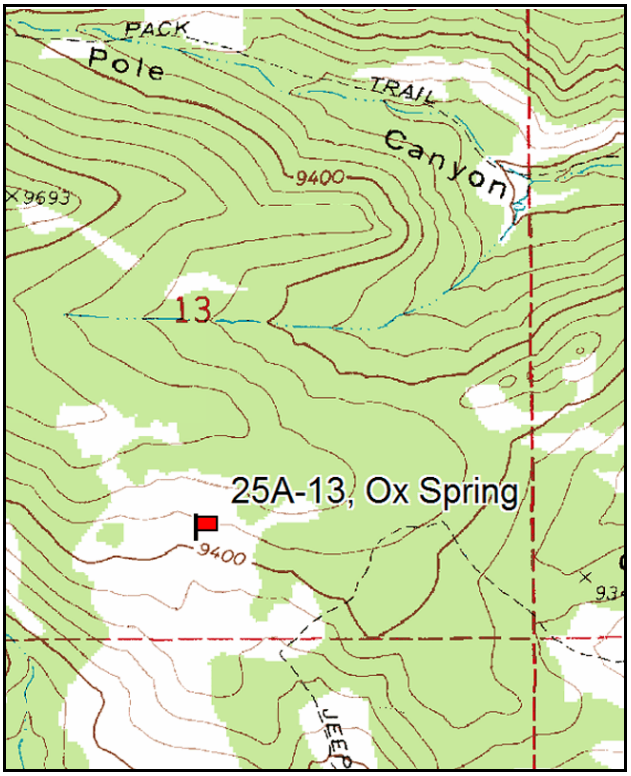
Study site name: Ox Spring . Vegetation type: Burn - Rabbitbrush .

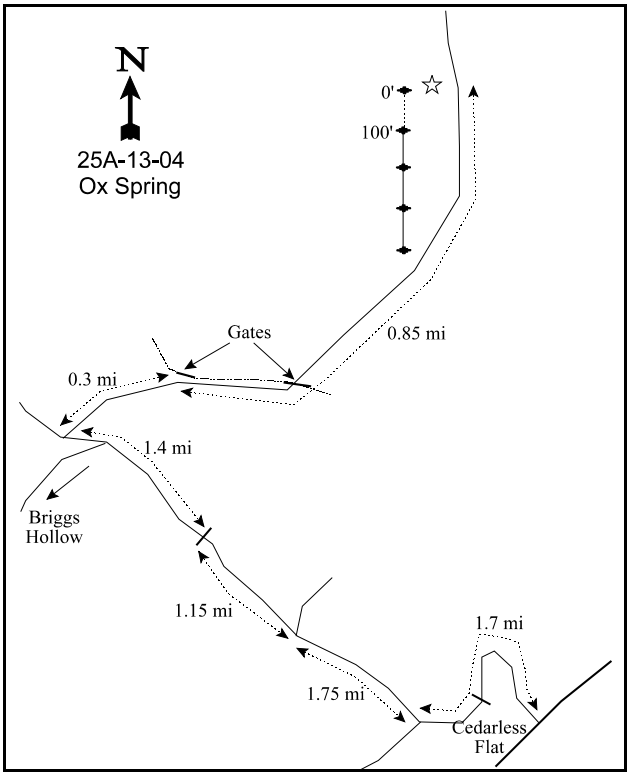
Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

Turn west off of SR 72 onto the Mill Meadow Road north of Fremont. Go past the lake and up the Johnson Reservoir Road for 3.8 miles. Turn west off the paved road and go 1.1 miles to a cattleguard at the head of Cedarless Flat. Continue 0.6 miles to a fork in the road. Go right for 1.75 miles to the Ox Spring trail turnoff. Stay left (on the main road) for 1.15 miles to another cattleguard. Go another 1.05 miles to the Briggs Hollow turnoff. Stay right for 0.35 miles, turn right off the Mytoge Road, and go 0.3 miles. Before the gate turn right and follow the fence line 0.2 miles to another gate. Drive another 0.85 miles (passing through two more gates) to a half high witness post among some rocks,11 paces off the left (west) side of the road. From the witness post, the white-topped 0 foot baseline stake is 7 paces away at an azimuth of 284°M.





Map Name: Fish Lake, Utah

Diagrammatic Sketch

Township 26S , Range 2E , Section 24

GPS: NAD 27, UTM 12S 4266131 N, 444067 E

DISCUSSION

Ox Spring - Trend Study No. 25A-13

This study was established in 1991 and is located about one mile west of Ox Spring. It samples a prescribed burn on a high elevation mountain big sagebrush type with a 10-12% south-facing slope and an elevation of 9,400 feet. The burn occurred in either 1989 or 1990. The land is administered by the U.S. Forest Service. The area is grazed by cattle during the summer as part of the Seven Mile allotment which is used in the spring. Pellet group data from a nearby Division pellet group transect estimated 19 deer and 46 elk days use/acre in 1991 (46 ddu/ha, 114 edu/ha). Elk use appeared heavy in the spring of 1991. An exclosure nearby is used to monitor spring elk utilization. Pellet group data taken along the study site baseline in 1999 estimated 9 deer, 97 elk and 25 cow days use/acre (22 ddu/ha, 240 edu/ha, and 62 cdu/ha). All of the cattle pats appeared to be from the previous season. Most elk pellet groups seemed to be from the spring. In 2004, pellet group data estimated 5 deer and 112 elk days use/acre (13 ddu/ha and 276 edu/ha).

The soil is moderately deep with an effective rooting depth of over 16 inches. It has a loam texture with a neutral pH (7.3). The soil is dark in color and fertile with a relatively high organic matter content of 5.2%. The surface horizon contains a high percentage of gravel sized rock fragments. Litter and pavement cover most of the bare areas leaving little exposed bare ground. Erosion does not appear to be a problem on this site due to uniform distribution of vegetation and litter cover and rock and pavement which armor the soil surface.

Rabbitbrush is the most abundant species. Right after the fire in 1991, density was estimated at 12,466 plants/acre. In 1999 the sample size was greatly increased and density was 7,240 plants/acre. This increased to 9,140 plants/acre in 2004 and cover increased from 14% to 20%. Most plants were young in 1991 and since then the population has been mostly mature. A high number of seedlings were sampled in 2004. Utilization was moderate in 1991, but there was little sign of use in 1999 and 2004. Density of mountain big sagebrush was 160 plants/acre in 1999 and increased to 260 plants/acre in 2004. Rubber rabbitbrush nearly doubled in density from 960 plants/acre in 1999 to 1,740 plants/acre in 2004. Other browse species are mostly sprouting shrubs such as woods rose, Oregon grape, and snowberry.

The site is dominated by native grasses and forbs which provided 72% of the total vegetation cover in 1999, but only 47% in 2004. The most abundant grass is mutton bluegrass. Other common species include bottlebrush squirreltail, prairie junegrass, obtuse sedge, pinewoods needlegrass, and bluebunch wheatgrass. Nested frequency decreased significantly in 2004 for mutton bluegrass, nodding brome, obtuse sedge, prairie junegrass, and bottlebrush squirreltail. There were 25 species of forbs sampled in 1991, 20 in 1999 and 23 in 2004. Common forbs include Watson penstemon, Lupine, aster, and rose pussytoes. Perennial forb cover dropped from 17% in 1999 to only 5% in 2004 and the sum of nested frequency was less reduced by half.

1991 APPARENT TREND ASSESSMENT

Overall, the soil trend appears stable. No recent erosion was evident and no active gullies occur on the site. Vegetation and litter cover appear sufficient to hold the soil in place. The only desirable browse, stickyleaf low rabbitbrush, has a large population with a good percentage of young plants. Native grasses and forbs are diverse and abundant.

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of bare ground has declined but litter cover has also declined. There does not appear to be any problem with erosion on this site. Trend for browse is up slightly. Density of the increaser, stickyleaf low rabbitbrush has declined, while density of the more preferred mountain big sagebrush and white-stemmed rubber rabbitbrush have increased. However, shrubs are not the most important

component on this site. Trend for the herbaceous understory is down slightly overall. Sum of nested frequency for grasses increased slightly, although frequency of forbs declined substantially. It appears that forb abundance is declining after a flush of growth following the fire and associated drought.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly (4)
herbaceous understory - up slightly for grasses, down for forbs, down slightly overall (2)

2004 TREND ASSESSMENT

The soil trend is stable. The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground improved from 1:3.1 to 1:4.2. Bare ground remained stable at about 9%. Vegetation cover is lower, but rock and pavement cover are higher. The browse trend is down. Rabbitbrush density and cover increased. There are no preferred browse species that are abundant on this site, but the herbaceous component is much more important on this transitional/summer range. The herbaceous understory trend is down. Drought conditions 4 of the 5 past years have been detrimental to the understory. Sum of nested frequency for perennial grasses declined 34%. Five perennial grasses species are significantly less abundant than they were in 1999. Perennial forb abundance is half as high it was in 1999.

TREND ASSESSMENT
soil - stable (3)
browse - down slightly (2)
herbaceous understory - down (1)

HERBACEOUS TRENDS --
Management unit 25A, Study no: 13

Type	Species	Nested Frequency			Average Cover %	
		'91	'99	'04	'99	'04
G	Agropyron smithii	$_{b}$110	$_{a}$48	$_{a}$72	.72	1.27
G	Agropyron spicatum	$_{a}$-	$_{b}$85	$_{b}$83	2.27	4.11
G	Bromus anomalus	$_{a}$-	$_{b}$38	$_{a}$1	.60	.00
G	Carex obtusata	$_{b}$75	$_{c}$94	$_{a}$16	2.68	.25
G	Koeleria cristata	$_{b}$129	$_{b}$125	$_{a}$41	2.82	.84
G	Poa fendleriana	$_{b}$258	$_{b}$275	$_{a}$212	10.56	6.57
G	Sitanion hystrix	$_{c}$138	$_{c}$102	$_{b}$57	1.87	1.12
G	Sporobolus cryptandrus	-	1	-	.03	-
G	Stipa comata	-	4	6	.03	.06
G	Stipa pinetorum	$_{b}$78	$_{a}$65	$_{a}$62	1.81	2.01
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		788	837	550	23.44	16.27
Total for Grasses		788	837	550	23.44	16.27
F	Agoseris glauca	$_{b}$74	$_{a}$-	$_{a}$4	-	.03
F	Antennaria rosea	$_{b}$105	$_{b}$124	$_{a}$71	5.07	.99

Type	Species	Nested Frequency			Average Cover %	
		'91	'99	'04	'99	'04
F	Androsace septentrionalis (a)	-	$_{b}$84	$_{a}$-	.44	-
F	Artemisia dracunculus	$_{b}$37	$_{a}$-	$_{a}$-	-	-
F	Arabis drummondi	$_{b}$10	$_{a}$-	$_{a}$-	-	-
F	Astragalus argophyllus	$_{b}$12	$_{a}$-	$_{b}$13	-	.13
F	Aster chilensis	$_{b}$98	$_{b}$52	$_{a}$28	1.57	.22
F	Astragalus serpens	$_{b}$17	$_{a}$-	$_{a}$-	-	-
F	Astragalus spp.	$_{a}$6	$_{b}$38	$_{a}$3	.22	.03
F	Castilleja linariaefolia	10	7	2	.07	.00
F	Chenopodium album (a)	-	-	12	-	.09
F	Chenopodium leptophyllum(a)	-	$_{a}$-	$_{b}$35	-	.23
F	Comandra pallida	-	-	6	-	.01
F	Crepis acuminata	$_{b}$41	$_{a}$5	$_{a}$-	.02	-
F	Erigeron eatonii	$_{b}$18	$_{a}$-	$_{b}$16	-	.08
F	Erigeron pumilus	-	8	4	.09	.01
F	Eriogonum racemosum	57	74	63	1.66	1.62
F	Eriogonum umbellatum	8	6	2	.08	.04
F	Fritillaria atropurpurea	$_{b}$21	$_{a}$-	$_{a}$-	-	-
F	Gayophytum ramosissimum(a)	-	$_{a}$-	$_{b}$19	-	.06
F	Lappula occidentalis (a)	-	-	4	-	.01
F	Lotus utahensis	$_{ab}$13	$_{b}$26	$_{a}$5	.50	.07
F	Lupinus argenteus	$_{b}$116	$_{b}$109	$_{a}$5	3.48	.04
F	Lychnis drummondii	$_{a}$-	$_{b}$9	$_{a}$5	.07	.01
F	Machaeranthera canescens	1	2	-	.03	-
F	Penstemon watsonii	$_{b}$131	$_{a}$63	$_{a}$58	1.88	1.73
F	Phlox austromontana	4	-	3	-	.03
F	Phlox longifolia	$_{b}$97	$_{a}$-	$_{a}$8	-	.07
F	Potentilla concinna	3	9	5	.33	.07
F	Taraxacum officinale	$_{b}$69	$_{b}$79	$_{a}$3	1.31	.03
F	Tragopogon dubius	-	1	-	.03	-
F	Unknown forb-perennial	2	-	-	-	-
F	Viguiera multiflora	-	1	-	.00	-
Total for Annual Forbs		0	84	70	0.43	0.40
Total for Perennial Forbs		950	613	304	16.46	5.25
Total for Forbs		950	697	374	16.90	5.66

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

BROWSE TRENDS --
Management unit 25A, Study no: 13

Type	Species	Strip Frequency '99	Strip Frequency '04	Average Cover % '99	Average Cover % '04
B	Artemisia tridentata vaseyana	5	9	-	.60
B	Chrysothamnus nauseosus	24	38	.87	1.68
B	Chrysothamnus viscidiflorus viscidiflorus	88	92	13.89	20.17
B	Mahonia repens	2	2	.06	.15
B	Rosa woodsii	6	4	.09	.03
B	Symphoricarpos oreophilus	13	13	1.01	1.27
Total for Browse		138	158	15.93	23.93

CANOPY COVER, LINE INTERCEPT --
Management unit 25A, Study no: 13

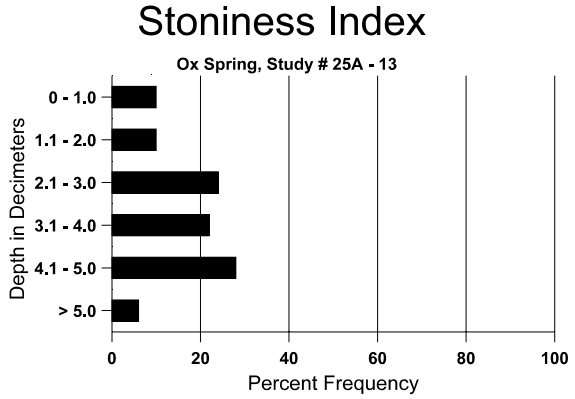
Species	Percent Cover '04
Artemisia tridentata vaseyana	.55
Chrysothamnus nauseosus	1.36
Chrysothamnus viscidiflorus viscidiflorus	24.70
Mahonia repens	.05
Symphoricarpos oreophilus	1.71

BASIC COVER --
Management unit 25A, Study no: 13

Cover Type	Average Cover % '91	Average Cover % '99	Average Cover % '04
Vegetation	17.00	56.81	44.18
Rock	7.00	5.75	7.89
Pavement	14.50	12.86	24.80
Litter	45.25	35.65	25.22
Cryptogams	0	0	.03
Bare Ground	16.25	9.22	9.74

SOIL ANALYSIS DATA --
Management unit 25A, Study no: 13, Study Name: Ox Spring

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
16.5	49.5 (17.5)	7.3	33.3	43.4	23.3	5.2	20.5	428.8	0.7



PELLET GROUP DATA --
Management unit 25A, Study no: 13

Type	Quadrat Frequency '99	Quadrat Frequency '04	Days use per acre (ha) '99	Days use per acre (ha) '04
Rabbit	4	6	-	-
Horse	1	-	-	-
Elk	57	61	97 (240)	112 (276)
Deer	7	3	9 (22)	5 (13)
Cattle	8	1	25 (62)	-

BROWSE CHARACTERISTICS --
Management unit 25A, Study no: 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)
Artemisia frigida												
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	14/15
Artemisia tridentata vaseyana												
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**160**	-	80	80	-	3260	0	0	-	-	0	22/38
04	**260**	820	120	140	-	20	38	0	-	-	0	14/20
Chrysothamnus nauseosus												
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**960**	-	-	960	-	-	4	0	-	-	0	9/14
04	**1740**	-	20	1720	-	-	2	0	-	-	0	8/12

		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 viscidiflorus viscidiflorus												
91	**12466**	-	6933	5400	133	-	43	8	1	-	0	5/10
99	**7240**	-	920	6200	120	-	0	0	2	1	1	13/21
04	**9140**	1300	740	8260	140	-	.21	0	2	.65	.65	11/19
Cowania mexicana stansburiana												
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	9/17
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Mahonia repens												
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**260**	-	100	160	-	-	0	0	-	-	0	3/6
04	**280**	-	220	60	-	-	0	0	-	-	0	4/3
Rosa woodsii												
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**260**	-	80	180	-	-	0	0	0	-	0	9/9
04	**220**	-	80	100	40	-	0	0	18	18	18	6/4
Symphoricarpos oreophilus												
91	**666**	-	466	200	-	-	70	20	0	-	0	6/10
99	**440**	-	120	300	20	-	0	0	5	-	0	19/32
04	**360**	-	20	300	40	-	6	6	11	11	11	15/26
Tetradymia canescens												
91	**66**	-	66	-	-	-	100	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	10/15