

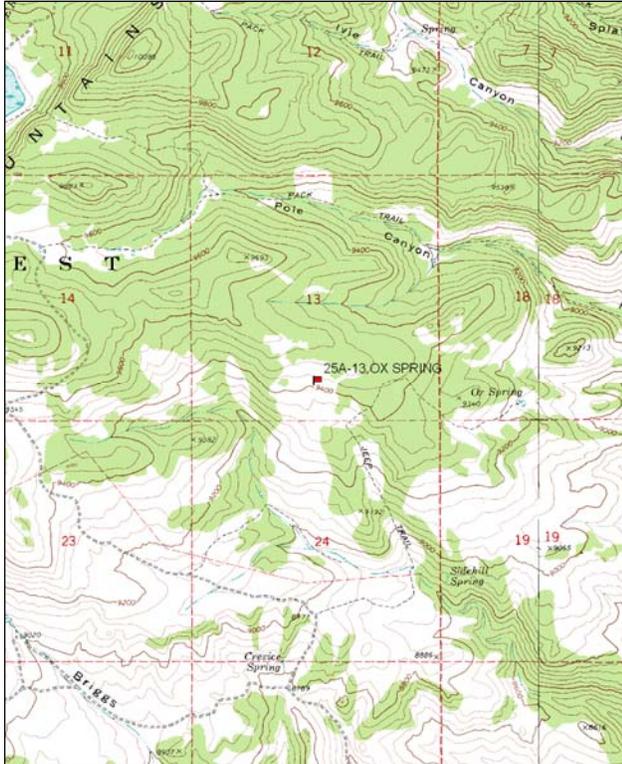
OX SPRING - TREND STUDY NO. 25A-13-09

Vegetation Type: Burned Mountain Big Sagebrush
Range Type: Crucial Deer Summer, Substantial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 9,400 ft (2,865 m)
Aspect: South
Slope: 10%-12%
Transect bearing: 165 degrees magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

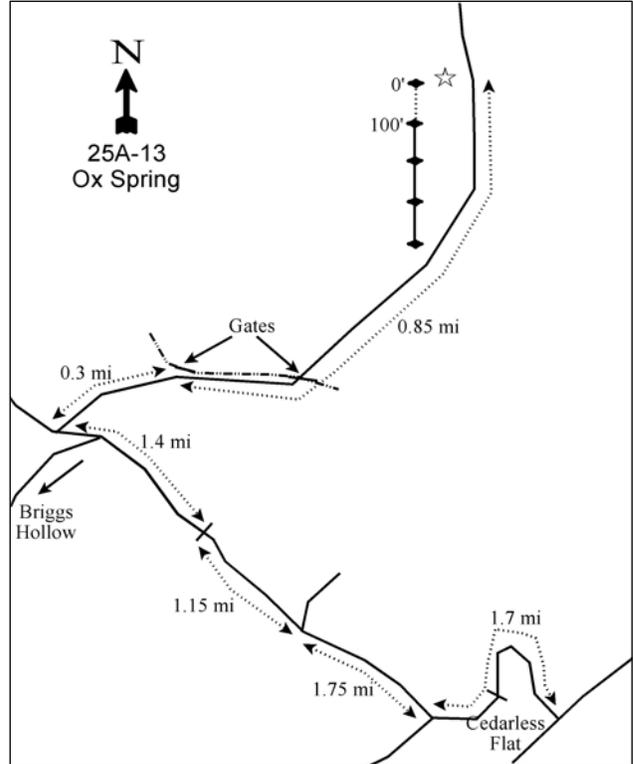
Turn west off of SR 72 onto the Mill Meadow Road north of Fremont. Go past the lake and up the Johnson Reservoir Road for 3.8 miles. Turn west off the paved road and go 1.1 miles to a cattleguard at the head of Cedarless Flat. Continue 0.6 miles to a fork in the road. Go right for 1.75 miles to the Ox 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



Township: 26S, Range: 2E, Section: 24

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 444004 E 4266336 N

OX SPRING - TREND STUDY NO. 25A-13

Site Information

Site Description: The study is located about one mile west of Ox Spring in a prescribed burn on a high elevation mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community. The burn occurred in either 1989 or 1990. The land is administered by the U.S. Forest Service as part of the Seven Mile allotment. Pellet group data from a nearby Utah Division of Wildlife Resources pellet group transect estimated 19 deer and 46 elk days use/acre in 1991 (46 ddu/ha, 114 edu/ha). An enclosure nearby is used to monitor spring elk utilization. Pellet group data taken along the study site baseline has estimated heavy elk use and light deer and cattle use since 1999 (Table - Pellet Group Data).

Browse: The less desirable species stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) is the most abundant browse species on the site, and provides the majority of the browse cover (Table - Browse Trends). The density of low rabbitbrush has steadily increased since 1999. The population is mostly mature and has been mostly healthy in the past, but decadence and poor vigor increased substantially in 2009. Density of mountain big sagebrush has been low, but increased substantially in 2009 with high recruitment of young plants. The mountain big sagebrush population is mostly healthy with no decadence and very good vigor. Utilization of mountain big sagebrush has been mostly light over the study years. Other browse species on the site include rubber rabbitbrush (*Chrysothamnus nauseosus*), Woods rose (*Rosa woodsii*), and snowberry (*Symphoricarpos oreophilus*) (Table - Browse Characteristics).

Herbaceous Understory: Native grasses are diverse and prevalent on the site, but there was a large decrease in the sum of nested frequency of grasses between 1999 and 2004. The most abundant grass is mutton bluegrass (*Poa fendleriana*) with other common species including bottlebrush squirreltail (*Sitanion hystrix*), prairie junegrass (*Koeleria cristata*), pinewoods needlegrass (*Stipa pinetorum*), and bluebunch wheatgrass (*Agropyron spicatum*). Native forbs were diverse and abundant at the outset of the study, but have steadily decreased in sum of nested frequency and cover, and were only moderately abundant in 2009. Common forbs include Watson penstemon (*Penstemon watsonii*), lupine (*Lupinus sp.*), aster (*Aster sp.*), and rose pussytoes (*Antennaria rosea*) (Table - Herbaceous Trends).

Soil: The soil has a loam texture with a neutral pH (7.3). The soil is dark in color with a relatively high organic matter content (Table - Soil Analysis Data). The surface has a high percentage of pavement and rock cover with low amounts of exposed bare ground cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1991 to 1999 - stable (0):** Differences in density may be related to the larger sample area used in 1999; therefore, trend was determined using other parameters. There was little change in the browse community. However, mountain big sagebrush was sampled for the first time with the larger sample area.
- **1999 to 2004 - slightly down (-1):** The density of stickyleaf low rabbitbrush increased by 45% and cover increased from 14% to 20%. Mountain big sagebrush also increased in density and cover, but is still not abundant on the site.
- **2004 to 2009 - stable (0):** The density of stickyleaf low rabbitbrush continued to increase by 31%, but cover decreased to 14%. The density of the more desirable species, mountain big sagebrush, also increased in density by six-fold, though cover is still less than 1%.

Grass:

- **1991 to 1999 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.

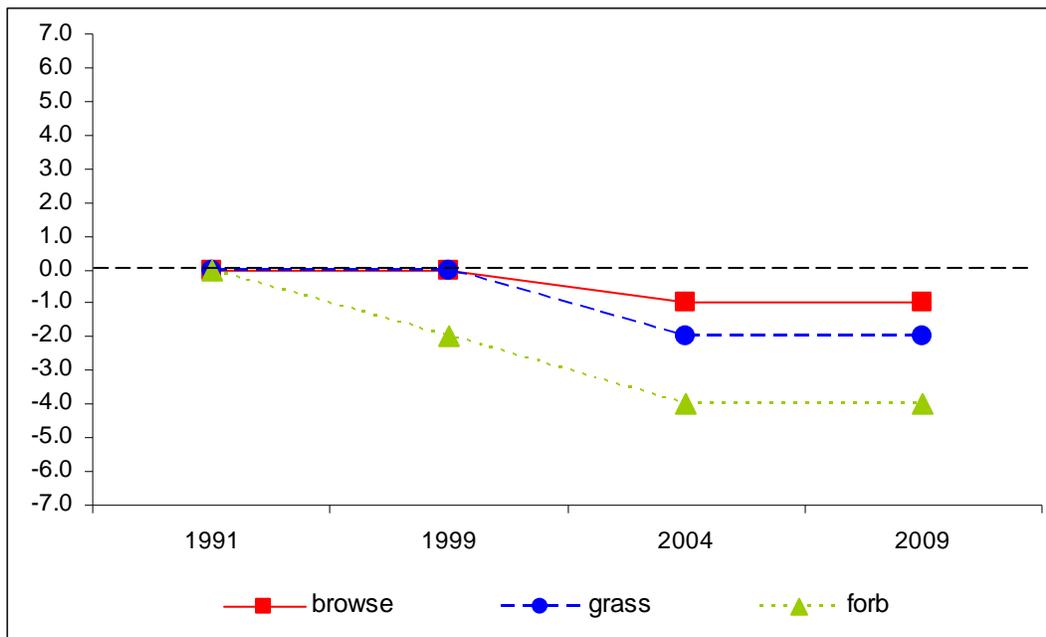
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased by 34% and cover decreased from 23% to 16%. There was a significant decrease in the nested frequency of all of the grass species except for bluebunch wheatgrass and pinewoods needlegrass.
- **2004 to 2009 - stable (0):** Perennial grass sum of nested frequency changed little, though cover decreased to 11%.

Forb:

- **1991 to 1999 - down (-2):** Perennial forb sum of nested frequency decreased by 36%.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial forbs continued to decrease by 50% and cover decreased from 16% to 5%.
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover decreased to 4%.

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 25A Study no: 13



HERBACEOUS TRENDS--

Management unit 25A, Study no: 13

Type	Species	Nested Frequency				Average Cover %		
		'91	'99	'04	'09	'99	'04	'09
G	Agropyron smithii	b ¹¹⁰	a ⁴⁸	ab ⁷²	b ⁹²	.72	1.27	.42
G	Agropyron spicatum	a ⁻	b ⁸⁵	b ⁸³	b ⁹³	2.27	4.11	2.69
G	Bromus anomalus	a ⁻	b ³⁸	a ¹	a ⁻	.60	.00	-
G	Carex obtusata	b ⁷⁵	c ⁹⁴	a ¹⁶	a ³	2.68	.25	.07
G	Koeleria cristata	b ¹²⁹	b ¹²⁵	a ⁴¹	a ¹⁵	2.82	.84	.10
G	Poa fendleriana	bc ²⁵⁸	c ²⁷⁵	a ²¹²	ab ²²⁰	10.56	6.57	4.54
G	Sitanion hystrix	c ¹³⁸	c ¹⁰²	b ⁵⁷	a ²⁰	1.87	1.12	.25
G	Sporobolus cryptandrus	-	1	-	-	.03	-	-

Type	Species	Nested Frequency				Average Cover %		
		'91	'99	'04	'09	'99	'04	'09
G	<i>Stipa comata</i>	-	4	6	-	.03	.06	-
G	<i>Stipa pinetorum</i>	_a 78	_{ab} 65	_a 62	_b 94	1.81	2.01	2.83
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		788	837	550	537	23.44	16.27	10.92
Total for Grasses		788	837	550	537	23.44	16.27	10.92
F	<i>Agoseris glauca</i>	_b 74	_a -	_a 4	_a 7	-	.03	.04
F	<i>Androsace septentrionalis</i> (a)	-	_b 84	_a -	_a -	.44	-	-
F	<i>Antennaria rosea</i>	_b 105	_b 124	_a 71	_a 63	5.07	.99	1.47
F	<i>Arabis drummondii</i>	_b 10	_a -	_a -	_a -	-	-	-
F	<i>Artemisia dracunculus</i>	_b 37	_a -	_a -	_a -	-	-	-
F	<i>Aster chilensis</i>	_c 98	_c 52	_b 28	_a -	1.57	.22	-
F	<i>Astragalus argophyllus</i>	_b 12	_a -	_b 13	_a -	-	.13	-
F	<i>Astragalus serpens</i>	_b 17	_a -	_a -	_a -	-	-	-
F	<i>Astragalus</i> sp.	_a 6	_b 38	_a 3	_{bc} 15	.22	.03	.06
F	<i>Castilleja linariaefolia</i>	10	7	2	-	.07	.00	-
F	<i>Chenopodium album</i> (a)	-	-	12	4	-	.09	.00
F	<i>Chenopodium leptophyllum</i> (a)	-	_a -	_b 35	_b 23	-	.23	.05
F	<i>Comandra pallida</i>	_a -	_a -	_a 6	_b 34	-	.01	.19
F	<i>Crepis acuminata</i>	_b 41	_a 5	_a -	_a -	.02	-	-
F	<i>Erigeron eatonii</i>	_b 18	_a -	_b 16	_b 26	-	.08	.33
F	<i>Erigeron flagellaris</i>	-	-	-	3	-	-	.03
F	<i>Erigeron pumilus</i>	-	8	4	16	.09	.01	.10
F	<i>Eriogonum racemosum</i>	57	74	63	62	1.66	1.62	.82
F	<i>Eriogonum umbellatum</i>	8	6	2	9	.08	.04	.12
F	<i>Fritillaria atropurpurea</i>	_b 21	_a -	_a -	_a -	-	-	-
F	<i>Gayophytum ramosissimum</i> (a)	-	_a -	_b 19	_b 10	-	.06	.02
F	<i>Lappula occidentalis</i> (a)	-	-	4	-	-	.01	-
F	<i>Lotus utahensis</i>	_{ab} 13	_b 26	_a 5	_a 8	.50	.07	.02
F	<i>Lupinus argenteus</i>	_b 116	_b 109	_a 5	_a 3	3.48	.04	.03
F	<i>Lychnis drummondii</i>	-	9	5	-	.07	.01	-
F	<i>Machaeranthera canescens</i>	1	2	-	1	.03	-	.00
F	<i>Penstemon watsonii</i>	_c 131	_b 63	_{ab} 58	_a 31	1.88	1.73	.43
F	<i>Phlox austromontana</i>	4	-	3	1	-	.03	.00
F	<i>Phlox longifolia</i>	_b 97	_a -	_a 8	_a 7	-	.07	.01
F	<i>Potentilla concinna</i>	3	9	5	-	.33	.07	-
F	<i>Taraxacum officinale</i>	_b 69	_b 79	_a 3	_a -	1.31	.03	-
F	<i>Tragopogon dubius</i>	-	1	-	-	.03	-	-
F	Unknown forb-perennial	2	-	-	-	-	-	-
F	<i>Viguiera multiflora</i>	-	1	-	-	.00	-	-
Total for Annual Forbs		0	84	70	37	0.43	0.40	0.08
Total for Perennial Forbs		950	613	304	286	16.46	5.25	3.71
Total for Forbs		950	697	374	323	16.90	5.66	3.80

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

BROWSE TRENDS--

Management unit 25A, Study no: 13

Type	Species	Strip Frequency			Average Cover %		
		'99	'04	'09	'99	'04	'09
B	Amelanchier utahensis	0	0	1	-	-	.00
B	Artemisia tridentata vaseyana	5	9	16	.00	.60	.91
B	Chrysothamnus nauseosus	24	38	34	.87	1.68	1.41
B	Chrysothamnus viscidiflorus viscidiflorus	88	92	94	13.89	20.17	13.79
B	Mahonia repens	2	2	1	.06	.15	.15
B	Rosa woodsii	6	4	5	.09	.03	.06
B	Symphoricarpos oreophilus	13	13	17	1.01	1.27	1.56
Total for Browse		138	158	168	15.93	23.93	17.90

CANOPY COVER, LINE INTERCEPT--

Management unit 25A, Study no: 13

Species	Percent Cover	
	'04	'09
Artemisia tridentata vaseyana	.55	1.39
Chrysothamnus nauseosus	1.36	2.70
Chrysothamnus viscidiflorus viscidiflorus	24.70	14.93
Mahonia repens	.05	-
Symphoricarpos oreophilus	1.71	2.15

BASIC COVER--

Management unit 25A, Study no: 13

Cover Type	Average Cover %			
	'91	'99	'04	'09
Vegetation	17.00	56.81	44.18	36.27
Rock	7.00	5.75	7.89	3.42
Pavement	14.50	12.86	24.80	23.11
Litter	45.25	35.65	25.22	33.93
Cryptogams	0	0	.03	0
Bare Ground	16.25	9.22	9.74	11.45

SOIL ANALYSIS DATA --

Management unit 25A, Study no: 13, Study Name: Ox Spring

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.5	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			Days use per acre (ha)		
	'99	'04	'09	'99	'04	'09
Rabbit	4	6	49	-	-	-
Horse	1	-	-	-	-	-
Elk	57	61	60	97 (240)	112 (276)	91 (225)
Deer	7	3	7	9 (22)	5 (13)	11 (26)
Cattle	8	1	5	25 (62)	-	14 (34)

BROWSE CHARACTERISTICS--

Management unit 25A, Study no: 13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
91	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	0	100	0	8/13
<i>Artemisia frigida</i>									
91	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	14/15
09	0	0	0	-	-	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>									
91	0	0	0	-	-	0	0	0	-/-
99	160	50	50	-	-	0	0	0	22/38
04	260	46	54	-	3140	38	0	0	14/20
09	1580	51	49	-	460	6	1	0	10/15
<i>Chrysothamnus nauseosus</i>									
91	0	0	0	0	-	0	0	0	-/-
99	960	0	100	0	-	4	0	0	9/14
04	1740	1	99	0	-	2	0	0	8/12
09	1520	8	86	7	-	0	4	11	7/12
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
91	12465	56	43	1	-	43	8	0	5/10
99	7240	13	86	2	-	0	0	1	13/21
04	10520	9	90	1	8740	.19	0	.57	11/19
09	13800	20	48	32	940	0	0	37	8/16
<i>Cowania mexicana stansburiana</i>									
91	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	9/17
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Mahonia repens</i>										
91	0	0	0	-	-	0	0	0	-/-	
99	260	38	62	-	-	0	0	0	3/6	
04	900	24	76	-	-	0	0	0	4/3	
09	160	0	100	-	-	0	0	0	3/2	
<i>Rosa woodsii</i>										
91	0	0	0	0	-	0	0	0	-/-	
99	260	31	69	0	-	0	0	0	9/9	
04	220	36	45	18	-	0	0	18	6/4	
09	320	25	75	0	20	0	0	0	7/4	
<i>Symphoricarpos oreophilus</i>										
91	665	70	30	0	-	70	20	0	6/10	
99	440	27	68	5	-	0	0	0	19/32	
04	360	6	83	11	-	6	6	11	15/26	
09	460	9	91	0	-	9	30	22	15/28	
<i>Tetradymia canescens</i>										
91	66	100	0	-	-	100	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	10/15	
09	0	0	0	-	-	0	0	0	5/8	