

DISCUSSION

Table Mountain - Trend Study 24-6

Study Information

This study is located on key elk and deer summer habitat that consists of a prescribed burn on Table Mountain [elevation: 9,500 feet (2,896 m), slope: 7%, aspect: southeast]. The site supports an extensive stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), but the density was low at the outset of this study in 1987 and is beginning to reestablish itself on the site. A variety of grasses now dominate and provide good ground cover. Adjacent stands of aspen (*Populus tremuloides*) provide escape cover for big game that use this area. Deer use was estimated to be moderately heavy in 1997 (53 ddu/acre:131 ddu/ha), light in 2003 (16 ddu/acre:40 ddu/ha), and moderately heavy in 2008 (54 ddu/acre:89 ddu/ha). Elk use was similar with moderately heavy use estimated in 1997 (61 edu/acre:151 edu/ha), minimal use in 2003 (3 edu/acre:7 edu/ha), and moderate use in 2008 (43 edu/acre:106 edu/ha). Cow use was light to moderate in 1997, 2003, and 2008 (10 cdu/acre:25 cdu/ha, 13 cdu/acre:32 cdu/ha, and 20 cdu/acre:50 cdu/ha, respectively). This is a sheep allotment and this unit was in non-use status for a time, but sheep were in the area during the 2003 reading on August 7. Sheep had heavily utilized the site in 2003 (84 sdu/acre:207 sdu/ha), but use had declined significantly in 2008 (17 sdu/acre:43 sdu/ha). The age of pellets counted in 2008 indicated grazing had occurred in the previous grazing season (2007).

Soil

Soil has a loam texture and is moderately acidic in reaction (pH 6.1). It is deep, rocky, and derived from volcanic parent material. The soil is well drained and not compacted with an effective rooting depth estimated at almost 15 inches. The vegetation is continuous and intact, leaving little bare ground unprotected. Relative combined vegetation and litter cover was 78% in 1997 and 2008, and 55% in 2003. Relative combined rock and pavement cover was 17% in 1997, 31% in 2003, and 18% in 2008. Relative bare ground cover was 5% in 1997, 14% in 2003, and 4% in 2008. Erosion is not a problem on the site and the erosion condition rating was classified as stable in 2003 and 2008.

Browse

Oregon grape (*Mahonia repens*) and snowberry (*Symphoricarpos oreophilus*) sprouted after the fire and they dominated the browse composition in 1987 and 1991. Oregon grape has since declined representing only 3%-4% of the browse since 1997. Snowberry has made up an average of 50% of the browse since 1997. Mountain big sagebrush was sparsely distributed over the burn, at a density of only 33 plants/acre in 1987 and 66 in 1991. The larger sample area used in 1997 estimated 1,620 sagebrush plants/acre, 62% of which were young plants. Density of mountain big sagebrush increased slightly in 2003 to 1,760 plants/acre and increased dramatically to 9,180 plants/acre in 2008. Average cover of mountain sagebrush has tripled from 3% in 1997 to 9% in 2008. Mature plants are large and vigorous with their height averaging 27 inches in 2003 and 20 inches in 2008.

Snowberry appears to have stabilized at around 1,500 plants/acre. Average cover has remained similar at 6% in 1997, 5% in 2003, and 9% in 2008. Utilization of snowberry has been moderate to heavy during most years likely due to sheep use. Vigor has remained good and decadence low. Other shrubs found on the site include small numbers of currant (*Ribes cereum* ssp. *inebrians*) and Woods rose (*Rosa woodsii*).

Herbaceous Understory

The herbaceous understory dominates the site with 14 perennial grass species providing an average 20% cover from 1997 to 2008 and 25 species of forbs producing an additional 13% cover in those years. The most abundant grass is Letterman needlegrass (*Stipa lettermani*) which provided nearly 48% of the grass cover in 1997, 74% in 2003, but decreased to only 29% of grasses in 2008. Needle-and-thread (*Stipa comata*) was more abundant in 2008, representing 37% of the grass cover for that year. Bluebunch wheatgrass (*Agropyron*

spicatum), mutton bluegrass (*Poa fenderiana*), bottlebrush squirreltail (*Sitanion hystrix*), and slender wheatgrass (*Agropyron trachycaulum*) are also common. The forb composition is dominated by silvery lupine (*Lupinus argenteus*) which produced 53% of the forb cover in 1997, 76% in 2003, and 48% in 2008. The only other abundant forbs include a phlox (*Phlox pulvinata*) and dandelion (*Taraxacum officinale*). Some misidentification between the *Poa* species (*Poa fendleriana*, *Poa pratensis* and *Poa secunda*) appears to have occurred in 1987 causing large changes in nested and quadrat frequencies. In addition, identification problems in 2003 due to heavy sheep use may have underestimated mutton bluegrass and overestimated Letterman needlegrass.

1991 TREND ASSESSMENT

For the browse, normally the key species would be mountain big sagebrush, but with only 66 plants/acre it cannot be counted on very much. Snowberry on this site is heavily used. Its density has decreased by 5% with a slight increase in decadence. Trend is improving but still poor since the prescribed burn. The trend for the grasses is slightly up and for forbs is stable. The herbaceous understory is, for the most part improving, however, most of the species for both grasses and forbs are increaser's in habit, which is not an ideal situation.

browse - slightly up (+1)

grass - slightly up (+1)

forb - stable (0)

1997 TREND ASSESSMENT

Trend for browse is stable. Density differences of browse species may be related to the larger sample area used in 1997, therefore, trend for browse was determined using other parameters. The proportion of young mountain big sagebrush plants in the population has increased since 1991. Vigor of sagebrush was good with few decadent plants. The snowberry appears to have a stable, lightly utilized population. Trend for the grasses and forbs is slightly down with a decline in the sum of nested frequency for both perennial grasses and perennial forbs. Looking at the photo point comparisons between years, it appears that the decline in nested frequency of herbaceous species is a natural thinning process after a flush of growth following the burn. Grasses and forbs are very abundant and produce 37% cover on the site.

browse - stable (0)

grass - slightly down (-1)

forb - slightly down (-1)

2003 TREND ASSESSMENT

Trend for browse is stable but shrubs are not the most important aspect considering this site is summer range. The fire eliminated most of the shrubs on the site prior to the 1987 reading, but shrubs have come back and currently provide 30% of the total vegetative cover. Mountain big sagebrush accounts for 54% of the total browse cover with a density of 1,760 plants/acre. Density of snowberry has increased slightly since 1997. The key component of the site is the herbaceous understory which is diverse and productive but the composition could be better. The trend for grasses is down. Thirteen species of perennial grasses were encountered on the site in 1997 and 9 species were sampled in 2003. Sum of nested frequency of perennial grasses declined 30% since 1997. Nested frequency of bluebunch wheatgrass and mutton bluegrass declined significantly. Significant drops in nested frequency were also seen in sedge (*Carex sp.*) and bottlebrush squirreltail. Some of the changes in cover and frequency of mutton bluegrass and Letterman needlegrass may be due to difficulty identifying these grasses due to heavy sheep use. The trend for forbs is down. The forb composition is also diverse but only a few species, silvery lupine, phlox, and dandelion, are common. Sum of nested frequency of perennial forbs has declined 42% since 1997. Average cover of forbs also declined from 16% in 1997 to 10% in 2003.

browse - stable (0)

grass - down (-2)

forb - down (-2)

2008 TREND ASSESSMENT

Trend for browse is up, but shrubs are not the most important aspect considering this site is summer range. Mountain sagebrush density increased by 81% from 2003 to 9,180 plants/acre. Sagebrush had good vigor, low

decadence, and good recruitment with young plants comprising 41% of the sagebrush population. Snowberry density decreased slightly from 2003, but it's average cover increased to 9%. The line intercept cover of both sagebrush and snowberry increased (10% to 18% and 6% to 15%, respectively) from 2003. The trend for grasses is up. The composition increased to 13 species encountered, up from 9 in 2003. The nested frequency increased significantly for slender wheatgrass, mutton bluegrass, and needle-and-thread grass. The nested frequency of Letterman needlegrass has decreased significantly, but is still high. Grasses comprise 22% of the average cover on the site. Trend for forbs is up. The sum of nested frequency for perennial forbs increased by two-fold. There were 18 perennial forbs species encountered, up from 12 in 2003, and they comprised 14% of the average cover on the site. There was a slight increase in the nested frequency of annual forbs on the site, specifically, the weedy species lambsquarter goosefoot (*Chenopodium album*).

browse - up (+2)

grass - up (+2)

forb - up (+2)

HERBACEOUS TRENDS --

Management unit 24 , Study no: 6

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'97	'03	'08	'97	'03	'08
G	<i>Agropyron dasystachyum</i>	c ₅₇	ab ₁₁	ab ₁₃	a ⁻	b ₁₆	.15	-	.22
G	<i>Agropyron spicatum</i>	a ₃₉	b ₇₉	b ₁₀₃	a ₆	a ₃₆	3.33	.18	.70
G	<i>Agropyron trachycaulum</i>	b ₆₄	b ₅₂	a ₃	a ₄	b ₅₇	.03	.03	1.16
G	<i>Bromus anomalus</i>	ab ₁₄	b ₂₉	a ₃	a ⁻	ab ₁₉	.02	-	.24
G	<i>Carex sp.</i>	ab ₁₇	ab ₂₆	b ₃₃	a ⁻	a ₄	.56	-	.03
G	<i>Festuca ovina</i>	b ₁₅₅	a ₈	a ₁₇	a ⁻	a ⁻	.22	-	-
G	<i>Koeleria cristata</i>	a ₅	b ₁₁₂	a ₂₇	a ₁₇	a ₁₉	.24	.07	.31
G	<i>Poa fendleriana</i>	ab ₆₀	c ₁₄₈	b ₈₆	a ₄₁	b ₁₀₇	1.69	.62	3.12
G	<i>Poa pratensis</i>	a ₇	b ₉₁	a ₄	a ₁₀	a ₁₀	.06	.18	.15
G	<i>Poa secunda</i>	b ₁₄₆	a ₈	a ⁻	a ₅	a ₂	-	.18	.03
G	<i>Sitanion hystrix</i>	b ₅₅	b ₅₄	b ₄₆	a ⁻	b ₅₃	.95	-	1.09
G	<i>Stipa columbiana</i>	a ⁻	a ⁻	b ₁₅	b ₂₄	ab ₁₀	.78	.71	.33
G	<i>Stipa comata</i>	a ₅	b ₇₇	b ₉₁	b ₉₁	c ₁₆₆	2.86	2.82	8.03
G	<i>Stipa lettermani</i>	a ₁₆₃	c ₂₆₆	bc ₁₇₈	bc ₂₄₂	a ₁₈₉	9.94	13.35	6.26
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		787	961	619	440	688	20.88	18.16	21.71
Total for Grasses		787	961	619	440	688	20.88	18.16	21.71
F	<i>Achillea millefolium</i>	7	6	3	-	5	.03	.00	.18
F	<i>Agoseris glauca</i>	a ⁻	a ₁	b ₃₉	a ⁻	c ₇₁	.09	-	.36
F	<i>Antennaria rosea</i>	2	3	-	-	-	-	-	-
F	<i>Androsace septentrionalis (a)</i>	-	-	-	-	7	-	-	.06
F	<i>Arabis pulchra</i>	b ₁₆₆	a ₁	a ₁	a ₁	a ₁	.00	.00	.01
F	<i>Astragalus convallarius</i>	a ⁻	c ₄₈	b ₂₃	a ₁	bc ₃₇	.21	.03	1.00
F	<i>Aster sp.</i>	-	-	-	1	-	-	.00	-

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'97	'03	'08	'97	'03	'08
F	Astragalus sp.	-	-	1	-	5	.00	-	.03
F	Calochortus nuttallii	_a -	_a -	_a 4	_a -	_b 14	.01	-	.03
F	Chenopodium album (a)	-	-	_a 14	_a 15	_b 38	.04	.09	.10
F	Crepis acuminata	-	-	5	-	2	.06	-	.00
F	Erigeron eatonii	_a -	_b 15	_a 6	_a 6	_b 19	.03	.01	.14
F	Eriogonum flavum	-	6	-	-	-	-	-	-
F	Eriogonum racemosum	5	10	13	4	17	.11	.01	.16
F	Lappula occidentalis (a)	-	-	-	-	1	-	-	.03
F	Lupinus argenteus	_{ab} 97	_{ab} 95	_{ab} 105	_a 79	_b 126	8.69	7.74	6.82
F	Lychnis drummondii	_a -	_c 86	_a -	_a -	_b 25	-	-	.11
F	Lygodesmia spinosa	-	-	4	-	-	.01	-	-
F	Mentha sp.	-	-	-	-	4	-	-	.03
F	Penstemon sp.	_b 107	_a 21	_a 7	_a 8	_a -	.06	.02	.00
F	Phlox longifolia	-	-	-	-	3	-	-	.00
F	Phlox pulvinata	_b 145	_b 156	_a 65	_a 47	_a 63	4.34	.48	2.39
F	Potentilla concinna	6	3	6	4	-	.06	.06	-
F	Potentilla diversifolia	_a -	_a 4	_b 12	_a -	_{ab} 2	.06	-	.03
F	Senecio multilobatus	8	-	16	-	-	.06	-	-
F	Stellaria jamesiana	-	-	-	-	3	-	-	.03
F	Taraxacum officinale	_c 303	_b 228	_a 139	_a 115	_a 146	2.26	1.68	2.24
F	Thermopsis montana	-	-	2	-	-	.03	-	-
F	Tragopogon dubius	6	6	9	1	31	.07	.03	.28
F	Unknown forb-perennial	7	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	14	15	46	0.04	0.09	0.20
Total for Perennial Forbs		859	689	460	267	574	16.23	10.09	13.90
Total for Forbs		859	689	474	282	620	16.27	10.18	14.10

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

BROWSE TRENDS --

Management unit 24 , Study no: 6

Type	Species	Strip Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
B	<i>Artemisia tridentata vaseyana</i>	38	44	89	3.08	6.41	9.05
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	1	0	2	0.0	-	0.0
B	<i>Mahonia repens</i>	11	12	11	.34	.34	.52
B	<i>Ribes cereum inebrians</i>	2	2	2	.15	.03	.66
B	<i>Rosa woodsii</i>	2	2	2	.03	.03	.38
B	<i>Symphoricarpos oreophilus</i>	43	47	46	5.71	5.15	9.30
Total for Browse		97	107	152	9.31	11.98	19.91

CANOPY COVER, LINE INTERCEPT --

Management unit 24 , Study no: 6

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	10.13	17.70
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	.25
<i>Mahonia repens</i>	.08	.25
<i>Ribes cereum inebrians</i>	.38	1.35
<i>Rosa woodsii</i>	.01	.08
<i>Symphoricarpos oreophilus</i>	5.48	14.46

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 24 , Study no: 6

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	2.2	1.8

BASIC COVER --

Management unit 24 , Study no: 6

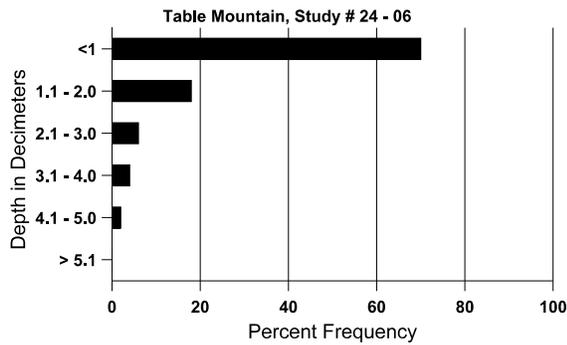
Cover Type	Average Cover %				
	'87	'91	'97	'03	'08
Vegetation	11.75	13.50	52.29	42.05	63.02
Rock	7.75	6.25	7.28	23.31	17.02
Pavement	19.75	19.75	10.85	9.54	3.84
Litter	48.50	52.00	33.23	15.77	23.39
Cryptogams	0	0	.39	0	0
Bare Ground	12.25	8.50	5.76	14.65	4.23

SOIL ANALYSIS DATA --

Management unit 24, Study no: 6, Study Name: Table Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
14.8	58.3 (12.5)	6.1	38.4	35.1	26.6	5.0	47.1	454.4	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 24 , Study no: 6

Type	Quadrat Frequency		
	'97	'03	'08
Sheep	-	24	1
Rabbit	4	-	18
Elk	15	8	15
Deer	18	2	14
Cattle	2	4	5

Days use per acre (ha)		
'97	'03	'08
-	84 (206)	17 (43)
-	-	-
61 (151)	3 (7)	43 (106)
53 (131)	16 (40)	36 (89)
10 (25)	13 (32)	17 (43)

BROWSE CHARACTERISTICS --
Management unit 24 , Study no: 6

		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)
<i>Artemisia tridentata vaseyana</i>												
87	33	33	33	-	-	-	100	0	0	-	0	-/-
91	66	66	33	33	-	-	50	0	0	-	0	10/14
97	1620	760	1000	620	-	300	6	0	0	-	0	22/38
03	1760	60	300	1400	60	80	3	0	3	-	1	27/37
08	9180	2780	4360	4600	220	40	7	.87	2	.65	.65	20/28
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
87	33	-	-	-	33	-	0	100	100	61	100	-/-
91	66	-	-	66	-	-	0	100	0	-	0	6/6
97	20	-	-	20	-	-	0	0	0	-	0	13/14
03	0	-	-	-	-	-	0	0	0	-	0	16/35
08	40	-	-	40	-	-	0	50	0	-	0	15/29
<i>Mahonia repens</i>												
87	7065	1699	2699	4366	-	-	.94	0	0	-	0	4/4
91	12198	133	4766	7366	66	-	3	1	1	-	0	3/3
97	1940	-	100	1840	-	-	0	0	0	-	0	4/6
03	1840	-	-	1840	-	-	0	0	0	-	0	2/4
08	2440	-	280	2160	-	-	0	0	0	-	0	3/4
<i>Pseudotsuga menziesii</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
97	0	-	-	-	-	20	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Ribes cereum inebrians</i>												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
91	66	-	-	66	-	-	50	0	0	-	0	18/19
97	40	-	-	40	-	-	0	0	0	-	0	42/55
03	40	-	-	40	-	-	50	0	0	-	0	55/69
08	40	-	-	-	40	-	0	0	100	50	50	48/63

		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)
Rosa woodsii												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
97	220	-	100	120	-	-	0	0	0	-	0	8/9
03	160	-	40	100	20	-	75	0	13	13	13	11/9
08	280	-	20	260	-	-	0	0	0	-	0	10/14
Symphoricarpos oreophilus												
87	2832	266	1299	1533	-	-	5	95	0	-	16	18/20
91	2698	-	633	1799	266	-	56	20	10	-	4	14/24
97	1260	40	120	1000	140	20	14	5	11	3	3	17/36
03	1740	-	140	1540	60	20	38	43	3	1	1	19/37
08	1360	40	20	1180	160	40	4	6	12	1	1	19/41