

DISCUSSION

Geertsen Canyon - Trend Study No. 3-18

Study Information

This study samples a mountain big sagebrush/grass community located on a hillside north of the mouth of Geertsen Canyon (elevation 5,600 feet, slope 25%, aspect southwest). This study is on the Wolf Creek conservation easement that is managed by the DWR for wildlife and recreation. The area has been heavily grazed by horses and cattle in the past, but livestock use has been light since 2001. The Geertsen Hollow area is known for a concentrations of wintering deer. The permanent nearby pellet group transect has measured high levels of use in the past. The average from 1980-85 was 39 deer days use/acre (97 ddu/ha), the highest on the herd unit (Jense et al. 1985). Two deer antlers and one large elk antler were found during the 1985 reading. In 1996, elk pellet frequencies were moderate (27% quadrat frequency), while those of deer were low (4%). Pellet group data in 2001 was estimated at 13 elk, 15 deer, and 3 cow days use/acre (31 edu/ha, 36 ddu/ha, and 7 cdu/ha). Wild turkeys were seen on the hike into the study in 2001. Pellet group data from 2006 was estimated at 5 elk, 25 deer, and 13 cow days use/acre (13edu/ha, 61 ddu/ha, and 32 cdu/ha).

Soil

The soil is classified in the Yeates Hollow series, which consists of deep, well drained, slowly permeable soils that formed in alluvium, colluvium and residuum from conglomerate, sandstone and quartzite. These soils are on fan remnants, hills, and mountain slopes (USDA-NRCS 2006). Soils are extremely rocky on the surface and throughout the profile. Rocks average 15% of the surface cover. Due to the rocky nature of the soil, effective rooting depth was estimated at less than 6 inches. The soil has a sandy clay loam to clay loam texture and is slightly acidic in reactivity (pH of 6.2). The hazard of erosion is high if unprotected, but the area has an adequate covering of vegetation and litter. An erosion condition classification determined soils to be in stable condition in 2001 and 2006. The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground is high at 8 to 1.

Browse

Mountain big sagebrush is the only key browse species and has averaged just over 2% cover since 1996. Density for mature and decadent plants increased from 720 plant/acre in 1996 to 1,020 plants/acre in 2001 and had a very abundant young population in 1996. Density remained similar in 2006, but 35% of the population was classified as decadent and dying. These high values may lower sagebrush densities in the future, unless young recruitment increases to offset the possible loss. Young recruitment in 2001 and 2006 was low at less than 4% of the population. Sagebrush reproduction may be difficult with shallow-rocky soils and with competition with weedy annuals. Use has been light to moderate since 1996 with good vigor, until 2006 when 41% of the population displayed poor vigor. The mountain big sagebrush exhibits a rather low growth form, most likely due to the shallow-rocky soils. Mature sagebrush have averaged 1.5 feet tall by 2 feet wide. Average leader growth was 2.5 inches in 2001 and 3 inches in 2006.

Oak and maple are found further up the slope and along the creek. Some of the oak and junipers nearby have been high-lined. Broom snakeweed was sampled in 1996 with the larger sample size.

Herbaceous Understory

The herbaceous vegetation accounts for most of the cover on the site. However, composition is extremely poor. Bulbous bluegrass has been the most abundant perennial grass since 1985. In 1985, cover averaged 32% and increased to 42% in 2001 and 2006. This species alone accounts for over half of the vegetation cover. Bulbous bluegrass can provide early spring forage and fair erosion control. Like cheatgrass, it dries up early in the season and can form a dense mat when abundant. It can become highly competitive and exclude desirable perennial grasses and forbs, including shrubs. Other, more high-yielding, long-lived perennial species are few. These include: bluebunch wheatgrass, thickspike wheatgrass, Kentucky bluegrass, and Letterman needlegrass. Japanese brome has been very abundant since 1996, while cheatgrass has remained

low.

Forb composition is extremely poor. Many of the common forbs are considered weeds, although they may provide some big game forage in the spring. Weedy increasers include ragweed, pacific aster, tarweed, curlycup gumweed, yellow salsify, and moth Mullen. The noxious weed, Dyer's woad, is present in small numbers. Annual forbs are very abundant, especially storksbill, which reached a high in 2001 at 16% cover. Tarweed was abundant in 1996 and 2006, but had significantly decreased in 2001. Tarweed produces toxic agents that reduce grass seed germination (Goodrich 1999). It was reported in the summer of 1985 that caterpillars and grasshoppers did considerable damage to the herbaceous vegetation. In 1996, some of the yellow salsify was utilized, most likely by elk.

1990 TREND ASSESSMENT

Mountain big sagebrush has a downward trend. Compared to 1985, there are substantially fewer young sagebrush and a large increase in decadent plants, which has gone from 10% to 77% of the population. Increased decadence, reduced vigor, and low growth is due mostly to moisture stress. Trend for grasses is stable. Bulbous bluegrass forms a dense mat and almost completely covers the ground. Other grasses are relatively uncommon. Trend for forbs is stable. Nested frequency remained similar to 1985, when the unknown perennial forb is removed. The unknown perennial forb is believed to be tarweed, an annual. Data collected in 1990 did not include sampling annual species.

browse - down (-2)

grasses - stable (0)

forbs - stable (0)

1996 TREND ASSESSMENT

Trend for mountain big sagebrush is up due to an increase in density, a decline in decadence, and an improvement in vigor. The stand contains an adequate number of seedlings and abundant young plants. Utilization is currently light to moderate. Trend for grasses is stable. However, composition is extremely poor. The grass component is dominated by bulbous bluegrass and annual brome grasses which combine to produce 97% of the grass cover. Sum of nested frequency for perennial grasses is similar to 1990 estimates. Trend for forbs is slightly down. Two perennial species that increased significantly were yellow salsify and hoary aster. The forb composition is poor with undesirable weeds dominating the understory. It appears that tarweed was present in 1985, but was identified as an unknown forb. In 1990, tarweed was likely present but not counted because it is an annual. Sum of nested frequency of perennial forbs has increased dramatically, but most are undesirable weeds including ragweed, curlycup gumweed, and pacific aster. The Desirable Components Index rated this site as very poor with a score of 8 due to low browse cover, low perennial grass cover excluding bulbous bluegrass, and moderate annual grass cover.

winter range condition (DC Index) - very poor (8) Mid Potential scale

browse - up (+2)

grasses - stable (0)

forbs - slightly down (-1)

2001 TREND ASSESSMENT

Trend for the key browse, mountain big sagebrush, is slightly down. Recruitment from young plants decreased from 61% in 1996 to 0% in 2001. Strip frequency of sagebrush decreased from 41% to 30%, and percent decadence increased slightly to 16%. A decline in strip frequency is due most likely to the loss of young plants in the population which is a result of drought and high competition from the abundant and weedy understory. Better precipitation in the future may help increase the number of young plants somewhat, but the young plants will likely have a difficult time persisting due to the dominance of bulbous bluegrass. Trend for the grasses is stable, but remains in poor condition as bulbous bluegrass continues to dominate the site. Desired perennial grasses are present in low numbers and will likely not increase. Trend for forbs is slightly up. Forbs are dominated by annuals and weedy perennials. Perennial forbs decreased in sum of nested frequency, which included yellow salsify and pacific aster. Tarweed also decreased significantly. The Desirable Components Index rated this site as very poor with a score of 15 due to low browse cover, low

perennial grass cover excluding bulbous bluegrass, and moderate annual grass cover.

winter range condition (DC Index) - very poor (15) Mid Potential scale
browse - slightly down (-1) grasses - stable (0) forbs - slightly up (+1)

2006 TREND ASSESSMENT

Trend for the key browse mountain big sagebrush is slightly down. Density of sagebrush remained similar to 2001, although dying plants increased from 6% in 2001 to 35% of population in 2006. Young recruitment stayed low at 4% of the population and is not enough to replace those plants that were classified as dying. Trend for grasses is stable. Bulbous bluegrass continues to dominate the herbaceous understory. Other higher value perennial grasses are few in number. Trend for forbs is slightly down. Perennial forb sum of nested frequency increased, but was most due to tarweed and ragweed, two weedy species. Tarweed also increased significantly. The Desirable Components Index rated this site as very poor with a score of 17 due to low browse cover, low perennial grass cover excluding bulbous bluegrass, and moderate annual grass and forb cover.

winter range condition (DC Index) - very poor (17) Mid Potential scale
browse - slightly down (-1) grasses - stable (0) forbs - slightly down (-1)

HERBACEOUS TRENDS --
 Management unit 03 , Study no: 18

T y p e	Species	Nested Frequency					Average Cover %		
		'85	'90	'96	'01	'06	'96	'01	'06
G	Agropyron dasystachyum	3	-	1	-	2	.00	-	.00
G	Agropyron spicatum	a ⁻	b ¹¹	ab ²	ab ⁵	ab ⁸	.18	.44	.59
G	Bromus inermis	-	-	-	-	5	-	-	.18
G	Bromus japonicus (a)	-	-	c ³²⁸	a ²¹¹	b ²⁶⁹	8.00	3.34	5.65
G	Bromus tectorum (a)	-	-	29	9	25	.29	.07	.11
G	Danthonia californica	-	-	-	4	4	-	.06	.18
G	Danthonia unispicata	-	-	-	-	4	-	-	.15
G	Melica bulbosa	-	-	-	-	4	-	-	.03
G	Poa bulbosa	366	355	365	361	354	32.20	42.65	41.71
G	Poa pratensis	a ⁻	a ⁻	a ⁵	b ¹⁵	ab ¹¹	.03	.08	.06
G	Poa secunda	5	14	14	18	10	.02	.40	.12
G	Stipa lettermani	a ⁻	a ⁻	b ²⁸	ab ¹¹	b ¹⁸	.96	.42	.74
Total for Annual Grasses		0	0	357	220	294	8.29	3.42	5.77
Total for Perennial Grasses		374	380	415	414	420	33.41	44.06	43.79
Total for Grasses		374	380	772	634	714	41.71	47.48	49.57
F	Achillea millefolium	a ¹²	ab ¹³	b ³²	ab ¹⁴	a ⁷	.38	.31	.51
F	Agoseris glauca	1	5	3	1	6	.00	.00	.05
F	Allium sp.	b ¹²	a ⁻	a ⁻	a ⁻	ab ²	-	-	.00
F	Ambrosia psilostachya	b ⁹⁷	a ¹¹	b ¹²⁵	b ¹⁰²	c ²³⁹	2.45	1.58	9.12
F	Artemisia ludoviciana	39	24	35	41	24	.79	1.74	1.08

Type	Species	Nested Frequency					Average Cover %		
		'85	'90	'96	'01	'06	'96	'01	'06
F	<i>Astragalus beckwithii</i>	-	-	-	-	3	-	-	.18
F	<i>Aster chilensis</i>	a ⁻	b ¹²¹	c ¹⁹⁹	bc ¹⁷⁰	c ²⁰⁵	4.63	3.09	7.36
F	<i>Calochortus nuttallii</i>	-	-	-	-	-	-	.00	-
F	<i>Cirsium</i> sp.	-	-	2	-	-	.00	-	-
F	<i>Collomia linearis</i> (a)	-	-	10	6	1	.21	.04	.03
F	<i>Comandra pallida</i>	-	-	-	3	-	-	.03	-
F	<i>Crepis acuminata</i>	-	-	-	-	-	-	.03	-
F	<i>Epilobium brachycarpum</i> (a)	-	-	a ⁻	b ⁴¹	c ¹⁶³	-	.10	1.10
F	<i>Erodium cicutarium</i> (a)	b ¹⁹	a ⁻	b ²⁹	d ³⁰¹	c ¹⁷⁶	.23	16.00	1.84
F	<i>Erigeron strigosus</i>	ab ¹⁰	a ⁻	ab ³	b ¹⁰	ab ³	.03	.05	.15
F	<i>Eriogonum umbellatum</i>	-	1	-	-	-	-	-	-
F	<i>Galium</i> sp.	-	-	-	-	2	-	-	.00
F	<i>Grindelia squarrosa</i>	a ⁻	a ¹	b ³⁰	a ⁻	b ⁴⁰	.50	-	1.54
F	<i>Helianthus annuus</i> (a)	-	-	-	-	3	-	-	.00
F	<i>Isatis tinctoria</i>	-	-	1	-	3	.06	-	.03
F	<i>Lappula occidentalis</i> (a)	-	-	b ¹⁹	a ⁻	ab ⁸	.21	-	.02
F	<i>Lactuca serriola</i>	a ⁻	a ⁻	c ⁴⁵	c ⁶⁶	b ²⁰	.20	1.44	.27
F	<i>Lomatium ambiguum</i>	a ⁻	ab ⁵	a ¹	ab ⁶	b ¹⁴	.00	.18	1.17
F	<i>Machaeranthera canescens</i>	a ⁻	a ⁻	b ¹⁹⁰	a ⁻	a ⁻	1.07	-	-
F	<i>Madia glomerata</i> (a)	-	-	b ²⁶⁹	a ⁵⁵	b ²³¹	3.99	.24	7.11
F	<i>Melilotus officinalis</i>	-	-	-	3	5	-	.03	.15
F	<i>Navarretia intertexta</i> (a)	-	-	-	-	2	-	-	.00
F	<i>Phlox longifolia</i>	-	-	-	2	-	-	.00	-
F	<i>Polygonum douglasii</i> (a)	-	-	2	-	3	.00	-	.00
F	<i>Ranunculus testiculatus</i> (a)	-	-	-	2	-	-	.00	-
F	<i>Rumex crispus</i>	-	-	2	1	-	.03	.04	-
F	<i>Taraxacum officinale</i>	-	-	-	4	-	-	.01	-
F	<i>Tragopogon dubius</i>	b ²⁶	a ⁵	c ¹²⁶	ab ¹²	ab ³³	1.43	.11	.29
F	Unknown forb-perennial 2	b ¹⁶⁶	a ⁻	a ⁻	a ⁻	a ⁻	-	-	-
F	Unknown forb-perennial	b ¹⁷¹	a ⁻	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Veronica biloba</i> (a)	-	-	-	-	4	-	-	.33
F	<i>Verbascum blattaria</i>	a ³	a ⁻	b ³³	ab ¹⁶	ab ²¹	.79	.20	.91
Total for Annual Forbs		19	0	329	405	591	4.65	16.39	10.46
Total for Perennial Forbs		537	186	827	451	627	12.40	8.88	22.89
Total for Forbs		556	186	1156	856	1218	17.06	25.28	33.35

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

BROWSE TRENDS --

Management unit 03 , Study no: 18

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
		B	Artemisia tridentata vaseyana	41	30	26	2.25
B	Gutierrezia sarothrae	12	0	6	.24	-	.53
Total for Browse		53	30	32	2.49	2.86	2.46

CANOPY COVER, LINE INTERCEPT --

Management unit 03 , Study no: 18

Species	Percent Cover
	'06
Artemisia tridentata vaseyana	3.68
Gutierrezia sarothrae	.16

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 03 , Study no: 18

Species	Average leader growth (in)	
	'01	'06
	Artemisia tridentata vaseyana	2.5

BASIC COVER --

Management unit 03 , Study no: 18

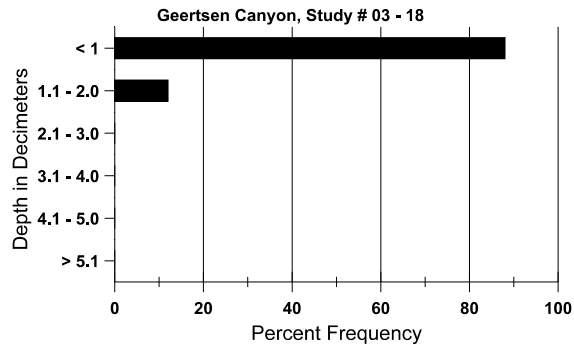
Cover Type	Average Cover %				
	'85	'90	'96	'01	'06
Vegetation	16.75	7.75	62.06	70.66	73.15
Rock	11.25	10.25	11.92	13.47	16.10
Pavement	4.25	4.25	.96	.93	.66
Litter	48.50	65.50	35.29	32.29	19.60
Cryptogams	1.00	.25	.04	0	.23
Bare Ground	18.25	12.00	1.08	1.07	1.68

SOIL ANALYSIS DATA --

Herd Unit 03, Study no: 18, Geertsen Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
5.6	79.8 (4.22)	6.2	44.7	27.0	28.3	3.0	14.5	153.6	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 03 , Study no: 18

Type	Quadrat Frequency				
	'85	'90	'96	'01	'06
Elk	-	-	27	2	5
Deer	-	-	4	11	4
Cattle	-	-	4	7	4

Days use per acre (ha)	
'01	'06
13 (31)	5 (13)
15 (36)	25 (61)
3 (7)	13 (32)

BROWSE CHARACTERISTICS --

Management unit 03 , Study no: 18

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Amelanchier alnifolia</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	58/75
<i>Artemisia tridentata vaseyana</i>												
85	1999	66	533	1266	200	-	3	0	10	-	3	19/22
90	1132	-	133	133	866	-	24	0	77	21	71	12/16
96	1860	140	1140	600	120	260	22	3	6	2	6	18/38
01	1020	-	-	860	160	100	57	2	16	6	6	17/24
06	980	40	40	600	340	360	31	16	35	35	41	16/26

		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>Gutierrezia sarothrae</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	740	60	180	560	-	-	0	0	-	-	0	11/16
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	120	-	-	120	-	40	0	0	-	-	0	13/20
<i>Rosa woodsii</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	22/21