

Trend Study 28-5-08

Study site name: Swayback Knoll.

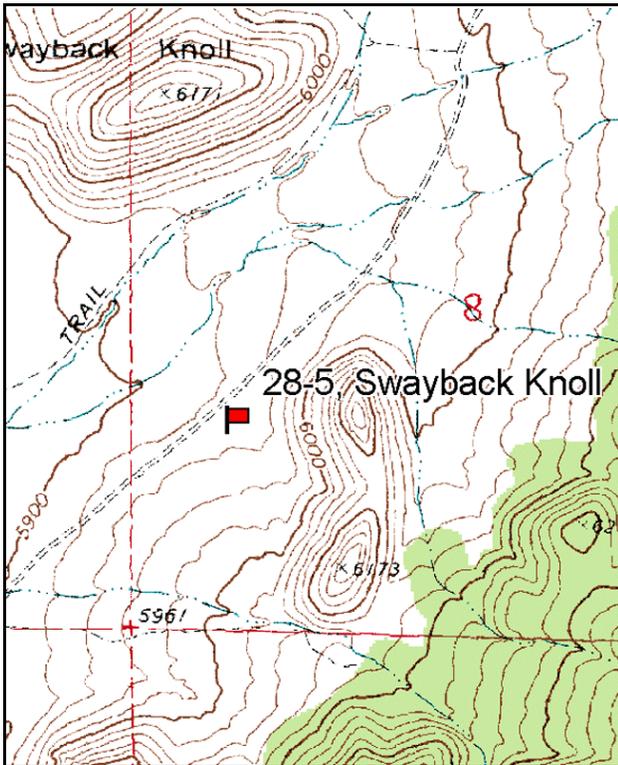
Vegetation type: Wyoming Big Sagebrush.

Compass bearing: frequency baseline 164 degrees magnetic.

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

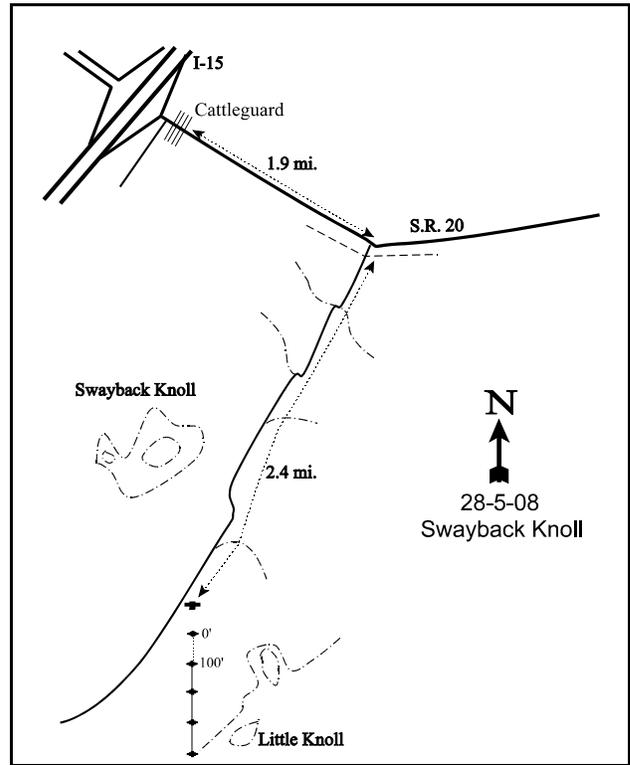
LOCATION DESCRIPTION

From the cattleguard off SR 20 and I-15, travel 1.9 miles on SR 20 to a dirt road on the right. Travel south for 2.4 miles to a sage flat west of rocky knolls. There is a witness post on the left (east) side of the road. The 0-foot baseline stake is 200 feet away from the witness post at a bearing of 118 degrees magnetic. The 0-foot stake is marked by browse tag #477.



Map Name: Buckhorn Flat

Township 32S, Range 7W, Section 8



Diagrammatic Sketch

GPS: NAD 83, UTM 12S 352598 E, 4210820 N

DISCUSSION

Swayback Knoll - Trend Study No. 28-5

Study Information

This trend study samples critical deer winter range below the Hurricane Cliffs in the northwest corner of the Panguitch Lake management unit [elevation: 6,000 feet (1,829 m), slope: 6%, aspect: northwest]. The transect lies on BLM administered land on an alluvial fan at the base of the foothills east of I-15 and just south of Highway 20. This study samples one of the key wintering areas for mule deer on the east side of I-15, and has been used by as many as 400 deer during winter months. The range for many miles around is dominated by a depleted Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) type bordered by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) covered hills, which provide the nearest protective cover. Very little other forage is available. Winter range in this particular area is limited by the deer-proof fence along I-15 as well as the predominance of agricultural land which is also being fenced to prevent deer depredation. A pellet group transect read on the site estimated 82 deer days use/acre (203 ddu/ha) in both 1998 and 2003, and 93 days use/acre (230 ddu/ha) in 2008. A single elk pellet group was sampled in 2003. Several dead deer carcasses were found on the site in 1998 and 2003, and a 4-point antler shed was found in 1998.

Soils

Soil analysis indicates a loam texture with a neutral pH (6.7). The average effective rooting depth was almost 12 inches (30 cm) with rock and pavement scattered throughout the soil profile. Two small active gullies are located near the study site. Relative combined average vegetation and litter cover fluctuated from 39% in 1992, increasing to 60% in 1998, decreasing to 47% in 2003, and increasing to 54% in 2008. Relative combined average rock and pavement cover has been moderately high at 25%-34% since 1992. Relative average bare ground cover decreased from 32% in 1992, to 14%-19% since 1998. The erosion condition class assessment rated soils as stable in 2003 and 2008.

Browse

The only browse species encountered on the site consists of a dense stand of Wyoming big sagebrush with a low density of cholla cactus (*Opuntia whipplei*). Wyoming big sagebrush density has been fairly similar in all sample years, ranging from a high of 5,900 plants/acre in 1992, to a low of 4,240 plants/acre in 1998. The stand of sagebrush is mostly mature plants and had moderate decadence (22%-33%) from 1987 to 2003, but decadent plants increased to over half (51%) the population in 2008. Young plants comprised a good proportion of the population from 1987 to 1998, but declined in 2003 and 2008. Vigor in the sagebrush population has been good, but plants displaying poor vigor increased steadily from 1998 to 20% in 2008. Line-intercept canopy cover of sagebrush decreased from 16% in 2003 to 11% in 2008. Utilization of sagebrush has been mostly moderate to heavy in all sample years, with the heaviest use in 1987 and the lightest use in 1998.

Herbaceous Understory

Desirable herbaceous vegetation is very limited and diversity is low, even for a Wyoming big sagebrush type. Only three perennial grasses were encountered in 1987 while no perennial forbs were found. By the 2008 reading, seven perennial grasses were sampled, with bottlebrush squirreltail (*Sitanion hystrix*), galleta (*Hilaria jamesii*), and purple three-awn (*Aristida purpurea*) being the most numerous. Bottlebrush squirreltail has been the most abundant desirable perennial grass on the site in all readings. Two annual grasses, cheatgrass (*Bromus tectorum*) and six weeks fescue (*Vulpia octoflora*), contributed 15% of the herbaceous understory cover in 1992. In 1998, cheatgrass dominated the understory as it provided 85% of the grass cover and 53% of the total vegetation cover. With drought conditions following the 1998 reading, cheatgrass declined significantly in 2003 in both nested frequency and average cover. In 2003, cheatgrass was visibly more abundant on the hillsides that surround the transect, and with normal precipitation patterns, cheatgrass could

again dominate the site. In 2008, cheatgrass had a significant increase in nested frequency and comprised 31% of the grass cover. Perennial forbs have been almost non-existent on the site since it was established. Only 3 perennial forbs were sampled in 2008. Annual forbs steadily decreased on the site since from 1992 to 2003, but increased markedly in 2008 with a burr buttercup (*Ranunculus testiculatus*) being the most abundant.

1992 TREND ASSESSMENT

Trend for browse is stable. Density differences may be related to the larger sample area used in 1992, therefore, the trend for browse was determined using other parameters. Decadence of sagebrush remained moderate at 29%, though vigor declined slightly from 1987 with 9% of the shrubs sampled displaying poor vigor. Recruitment of young sagebrush plants was similar to 1987 with 16% of the population comprised of young plants. The trend for grasses is up. Sum of nested frequency of perennial grasses increased by 35%, and two perennial species, galleta and needle-and-thread (*Stipa comata*), were sampled for the first time. Trend for forbs is stable. The sum of nested frequency of perennial forbs increased slightly, but forbs are very rare on the site.

winter range condition (DCI) - fair (39) Low potential scale
browse - stable (0) grass - up (+2) forb - stable (0)

1998 TREND ASSESSMENT

The browse trend is slightly down. Sagebrush decreased in density by 28% from 1992 to 4,240 plants/acre, though decadence of sagebrush improved slightly to 22%. Recruitment of young sagebrush plants declined slightly to 12% of the population. The trend for grasses is down. The sum of nested frequency of perennial grasses declined by 25%, and production of perennial grasses declined from 6% in 1992 to 3%. There was a significant increase in the nested frequency of cheatgrass and cheatgrass now dominates the site. Cheatgrass comprised 85% of the grass cover and 53% of the vegetative cover. As cheatgrass density and cover increases, there may be a decrease in the number of seedling and young plants of sagebrush encountered due to early spring competition with cheatgrass. Also, as cheatgrass density and cover increases in the future, there is a risk of losing the Wyoming big sagebrush population due to a catastrophic fire. Trend for forbs is stable. Forbs are currently almost non-existent and provide little cover or forage to this site.

winter range condition (DCI) - poor (22) Low potential scale
browse - slightly down (-1) grass - down (-2) forb - stable (0)

2003 TREND ASSESSMENT

Trend for browse is stable. The density estimate for Wyoming big sagebrush is 19% higher since 1998 at 5,220 plants/acre, but decadence has increased to 33%. The proportion of the sagebrush population displaying poor vigor increased to 12%. Recruitment of young sagebrush plants declined to the low since sampling began with comprising only 4% of the population. Trend for grasses is slightly up. Sum of nested frequency of perennial grasses changed little since 1998, but there was a significant decrease in the nested frequency of cheatgrass. Cheatgrass remains fairly abundant on the site comprising 18% of the grass cover, and may dominate the site again with a return to normal precipitation patterns. Trend for forbs is stable. Forbs are rare and perennial forbs are virtually non-existent.

winter range condition (DCI) - fair (35) Low level potential scale
browse - stable (0) grass - slightly up (+1) forb - stable (0)

2008 TREND ASSESSMENT

The trend for browse is slightly down. Density of Wyoming big sagebrush declined 13% from 2003 to 4,520 plants/acre, and decadence has increased from to 51%. Plants displaying poor vigor also increased from 2003 to 20%. Recruitment of young plants improved slightly, but remains low at 7%. The trend for grasses is stable. Sum of nested frequency of perennial grasses increased slightly, but there was also a significant

increase in the nested frequency of cheatgrass. Cheatgrass comprised 31% of the grass cover. Trend for forbs is slightly down. Perennial forbs are almost non-existent on the site while a significant increase in the nested frequency of burr buttercup shows a decrease in the forb community.

winter range condition (DCI) - poor-fair (27) Low level potential scale
browse - slightly down (-1) grass - stable (0) forb - slightly down (-1)

HERBACEOUS TRENDS --
 Management unit 28 , Study no: 5

T y p e	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
G	<i>Aristida purpurea</i>	_a 13	_b 41	_{ab} 28	_{ab} 27	_{ab} 27	1.31	.94	.55	.45
G	<i>Bouteloua gracilis</i>	-	-	3	1	-	-	.15	.00	-
G	<i>Bromus tectorum</i> (a)	-	_b 168	_d 357	_a 101	_c 264	.68	19.37	.98	2.20
G	<i>Hilaria jamesii</i>	_a -	_c 48	_{bc} 32	_b 25	_{bc} 31	.90	.39	.83	1.27
G	<i>Oryzopsis hymenoides</i>	2	5	6	9	2	.09	.23	.18	.02
G	<i>Poa secunda</i>	-	-	-	-	3	-	-	-	.01
G	<i>Sitanion hystrix</i>	_b 127	_a 86	_a 60	_a 59	_a 78	3.43	1.41	1.25	2.89
G	<i>Stipa comata</i>	_a -	_b 11	_b 15	_b 11	_b 10	.15	.25	.36	.13
G	<i>Vulpia octoflora</i> (a)	-	_b 135	_a 59	_b 162	_a 43	.51	.16	1.24	.10
Total for Annual Grasses		0	303	416	263	307	1.19	19.53	2.22	2.30
Total for Perennial Grasses		142	191	144	132	151	5.90	3.39	3.19	4.78
Total for Grasses		142	494	560	395	458	7.09	22.92	5.42	7.09
F	<i>Allium</i> sp.	-	1	-	-	-	.00	-	-	-
F	<i>Calochortus nuttallii</i>	_a -	_{ab} 8	_a 2	_a 3	_b 20	.02	.01	.00	.06
F	<i>Descurainia pinnata</i> (a)	-	_b 16	_a 2	_{ab} 9	_{ab} 7	.04	.03	.05	.02
F	<i>Draba</i> sp. (a)	-	-	3	4	-	-	.00	.01	-
F	<i>Eriogonum cernuum</i> (a)	-	_b 24	_a -	_a 3	_{ab} 13	.06	-	.00	.06
F	<i>Gayophytum ramosissimum</i> (a)	-	-	_a -	_a -	_b 25	-	-	-	.09
F	<i>Gilia</i> sp. (a)	-	_d 160	_a -	_c 61	_b 11	.38	-	.57	.03
F	<i>Hackelia patens</i>	-	4	-	-	-	.01	-	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	_a 1	_a 3	_b 34	-	.00	.01	.08
F	<i>Mentzelia</i> sp.	-	-	-	-	-	-	-	-	.00
F	<i>Microsteris gracilis</i> (a)	-	12	-	-	-	.02	-	-	-
F	<i>Navarretia intertexta</i> (a)	-	-	_a -	_a 3	_b 11	-	-	.00	.02
F	<i>Orobanche fasciculata</i>	-	-	1	-	-	-	.00	-	-
F	<i>Phlox longifolia</i>	-	5	5	-	5	.01	.01	-	.04
F	<i>Plantago patagonica</i> (a)	-	_a 13	_b 52	_a 5	_a 5	.04	.38	.01	.01
F	<i>Ranunculus testiculatus</i> (a)	-	_b 12	_c 45	_a -	_d 276	.04	.35	-	1.84
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	-	8	-	-	-	.07

Type	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
F	<i>Sphaeralcea coccinea</i>	-	6	3	1	4	.01	.06	.00	.03
Total for Annual Forbs		0	237	103	88	390	0.59	0.77	0.66	2.23
Total for Perennial Forbs		0	24	11	4	29	0.06	0.09	0.00	0.14
Total for Forbs		0	261	114	92	419	0.66	0.87	0.67	2.37

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

BROWSE TRENDS --

Management unit 28 , Study no: 5

Type	Species	Strip Frequency				Average Cover %			
		'92	'98	'03	'08	'92	'98	'03	'08
B	<i>Artemisia tridentata wyomingensis</i>	92	92	90	92	11.11	12.46	18.76	12.12
B	<i>Opuntia sp.</i>	0	0	2	2	-	-	.00	.15
B	<i>Opuntia whipplei</i>	16	14	12	12	1.25	.59	1.14	1.77
Total for Browse		108	106	104	106	12.36	13.06	19.89	14.04

CANOPY COVER, LINE INTERCEPT --

Management unit 28 , Study no: 5

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata wyomingensis</i>	16.26	11.06
<i>Opuntia whipplei</i>	1.14	1.10

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 28 , Study no: 5

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata wyomingensis</i>	0.7	0.8

BASIC COVER --

Management unit 28 , Study no: 5

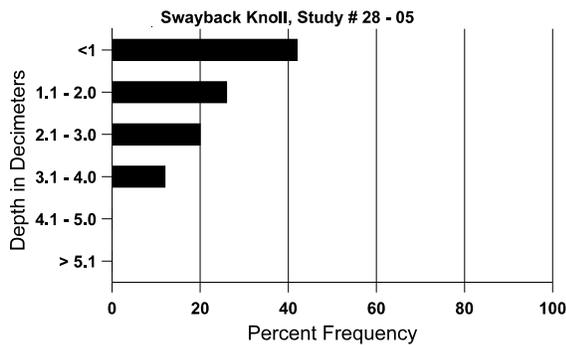
Cover Type	Average Cover %				
	'87	'92	'98	'03	'08
Vegetation	5.00	15.86	34.86	28.36	23.85
Rock	9.50	17.97	8.12	13.06	12.06
Pavement	39.75	9.97	21.18	25.84	18.45
Litter	27.75	22.08	34.52	25.44	35.67
Cryptogams	.25	.22	.51	.06	1.02
Bare Ground	17.75	31.76	16.11	21.64	19.29

SOIL ANALYSIS DATA --

Management unit 28, Study no: 5, Study Name: Swayback Knoll

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
11.9	70.2 (10.9)	6.7	49.8	30.4	19.8	1.1	9.7	67.2	0.4

Stoniness Index



PELLET GROUP DATA --

Management unit 28 , Study no: 5

Type	Quadrat Frequency			
	'92	'98	'03	'08
Rabbit	68	18	30	89
Elk	-	1	1	-
Deer	59	32	38	54

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	1 (2)	-
82 (202)	83 (205)	93 (230)

BROWSE CHARACTERISTICS --
 Management unit 28 , Study no: 5

		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 wyomingensis</i>												
87	4864	466	866	2599	1399	-	23	75	29	1	4	21/20
92	5900	480	940	3240	1720	-	52	22	29	5	9	-/-
98	4240	540	500	2800	940	780	42	8	22	3	3	21/27
03	5220	-	220	3300	1700	560	48	37	33	12	12	20/25
08	4520	1240	300	1900	2320	480	42	44	51	19	20	19/26
<i>Opuntia sp.</i>												
87	532	-	266	133	133	-	0	0	25	4	13	6/13
92	0	-	-	-	-	-	0	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	0	-	0	-/-
03	40	-	-	40	-	-	0	0	0	-	0	4/6
08	40	-	-	-	40	-	0	0	100	-	100	6/15
<i>Opuntia whipplei</i>												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
92	660	100	20	580	60	-	0	0	9	-	0	-/-
98	360	-	20	320	20	60	6	0	6	6	6	13/34
03	320	-	-	240	80	40	0	0	25	6	13	12/27
08	260	-	-	120	140	20	0	0	54	15	23	13/32