

Trend Study 28-5-03

Study site name: Swayback Knoll.

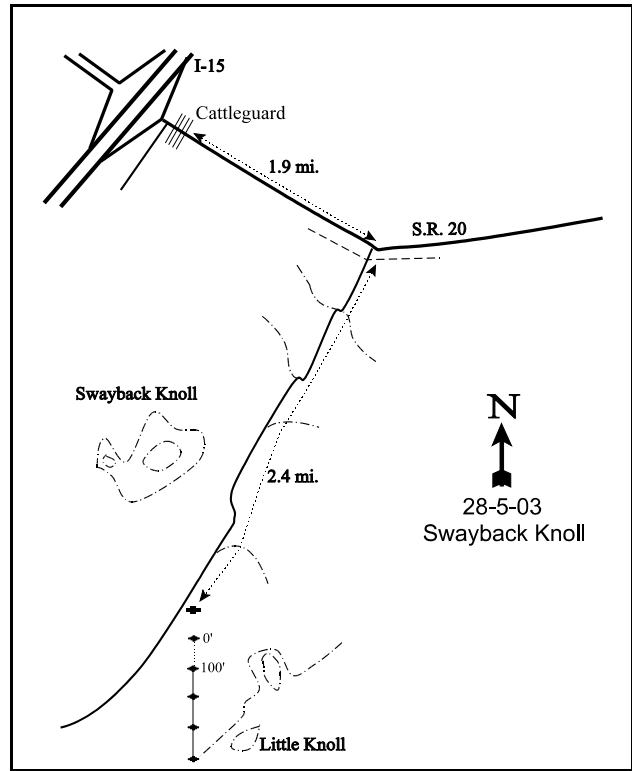
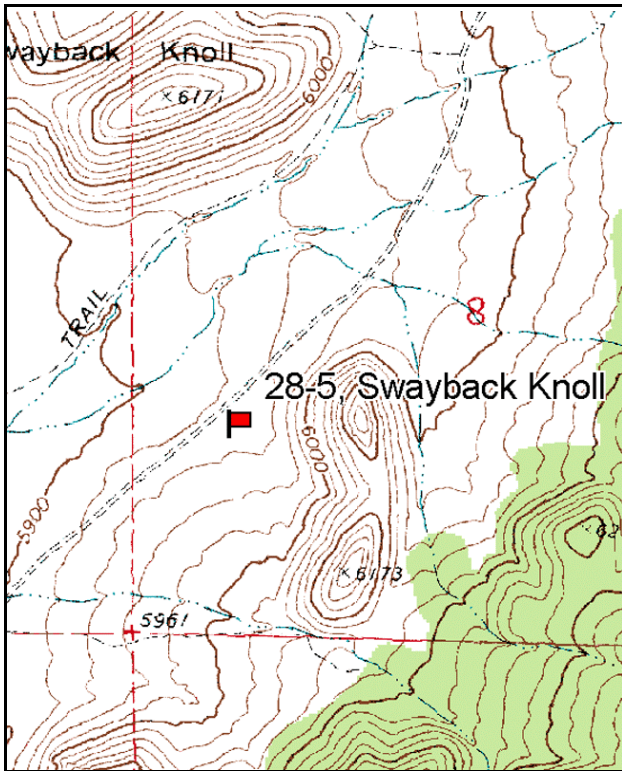
Vegetation type: Wyoming Big Sagebrush.

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

Diagrammatic Sketch

Township 32S, Range 7W, Section 8

GPS: NAD 27, UTM 12S 4210617 N, 352662 E

DISCUSSION

Swayback Knoll - Trend Study No. 28-5

This trend study samples critical deer winter range below the Hurricane Cliffs in the northwest corner of the Panguitch Lake management unit. The transect lies 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 transect is located on land administered by the BLM at an elevation of 6,000 feet. The study site slopes gently to the northwest at 6%. The range for many miles around is dominated by a depleted Wyoming big sagebrush type bordered by pinyon-juniper 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 site in 1998 and 2003 estimated 82 deer days use/acre (203 ddu/ha) in both years. A single elk pellet group was also 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.

Soil analysis indicates a loam texture with a neutral pH (6.7). The average effective rooting depth was almost 12 inches with rock and pavement scattered throughout the soil profile. Some soil loss occurs from the bare interspaces, but erosion is minimal for the most part. The shrub interspaces have a continuous, unbroken surface of rocks and erosion pavement. Rocks are of igneous origin (basalt), which causes higher soil temperatures during the summer months. Soil temperature averaged 66°F at 13 inches in depth in 1998 and 70.2°F in 2003. Two small active gullies are located near the study site. An erosion condition class assessment completed in 2003 gave soils a stable rating. Bare ground has been moderate in all readings ranging from 16%-32%. Vegetation and litter cover, together with the abundance and rock and pavement on the soil surface are adequate to protect against severe erosion.

The only browse species encountered on the site consists of a dense stand of Wyoming big sagebrush with low densities of prickly pear and cholla cactus. Wyoming big sagebrush density was estimated at 5,220 plants/acre in 2003. From 1987-1998, the age structure of the Wyoming big sagebrush population was stable with moderate recruitment by young plants (12-18%) and moderate decadence (22-29%). In 2003, recruitment declined to 4%, while percent decadence increased from 22% to 33%. From 1987-1998, the number of young in the population exceeded the number of decadent plants classified as dying. In 2003, this was not the case as the decadent, dying class of plants was estimated at 38% (~650 plants/acre), a large increase from an average of 15% between 1987-1998. Utilization of sagebrush has been moderate to heavy in all readings, with the heaviest use occurring in 1987 and 2003. Although drought conditions undoubtedly played a role in increased decadence and lower recruitment in the big sagebrush population in 2003, most plants displayed surprisingly good vigor. Canopy cover of Wyoming big sagebrush was estimated at 16% in 2003, and annual leaders had averaged less than 1 inch of growth when the site was sampled in mid-June.

Desirable herbaceous vegetation is very limited and diversity is low, even for a Wyoming big sagebrush type. Only 3 perennial grasses were encountered in 1987 while no perennial forbs were found. During the 1992 reading, 5 perennial grasses were sampled, with bottlebrush squirreltail, galleta, and purple three-awn being the most numerous. Two annual grasses, cheatgrass and six weeks fescue, 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. Due to the fine fuels provided by dried cheatgrass, the site was primed for a major wildfire in 1998. With drought conditions following the 1998 reading, cheatgrass declined significantly in 2003 in both nested frequency and average cover, but was still sampled in 51% of the quadrats. In 2003, cheatgrass was visibly more abundant on the hillsides that surround the transect, and with normal precipitation patterns, cheatgrass will likely again dominate the site. Sum of nested frequency of perennial grasses increased between 1987 and 1992, but has declined with each reading since. Bottlebrush

squirreltail has been the most abundant desirable perennial grass on the site in all readings. Perennial forbs have been almost non-existent on the site since it was established. Only 2 perennial forbs were sampled in 2003. Annual forbs have steadily decreased on the site since 1992 with a *Gilia* being the most abundant.

1987 APPARENT TREND ASSESSMENT

An almost complete ground covering of rock and erosion pavement is interrupted only by litter under the shrubs and occasional bare patches. This amounts to an estimated 50% ground cover from rock and pavement and 18% exposed soil. Basal vegetative cover is low due to the lack of herbaceous vegetation. Sagebrush is heavily hedged, but has good vigor and an adequate number of seedlings and young. Herbaceous vegetation is deficient. Only 3 perennial grasses and no perennial forbs were encountered. High surface temperatures and dry conditions are likely responsible for the lack of herbaceous plants. This trend could reverse itself with increased precipitation.

1992 TREND ASSESSMENT

Soil trend is down. Bare ground has increased, while litter and the combination of rock and pavement have decreased. The soil remains adequately protected by the vegetation canopy and a continuous layer of rock and pavement. Some soil movement was evident this year, likely due to recent high intensity thunderstorms, but erosion on the site is minimal. Trend for sagebrush is stable due to decreased heavy utilization and a stable decadence rate. Vigor, however has declined slightly with 9% of the shrubs sampled displaying poor vigor compared to 4% in 1987. The herbaceous understory has improved considerably since the last reading but composition is poor, especially for forbs.

TREND ASSESSMENT

soil - down (1)

browse - stable (3)

herbaceous understory - up (5)

1998 TREND ASSESSMENT

Soil trend is slightly upward. Although percent bare ground cover has decreased by nearly 50%, and percent vegetative cover has more than doubled, the cover is mostly provided by cheatgrass. Although cheatgrass does provide some soil protection, it is not as effective at protecting the soil from overland flow as perennial grasses or forbs. The browse trend is slightly down with a decreased population density which appeared to have peaked in 1992. The Wyoming big sagebrush population appears more healthy with a fairly good biotic potential (proportion of seedlings). As cheatgrass density and cover increases in the future, there may be a decrease in the number of seedling and young plants encountered due to early spring drying soils from 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. The herbaceous trend is slightly down. Cheatgrass now dominates the site. While individual perennial species nested frequency has not significantly declined since 1992, overall perennial grass sum of nested frequency has declined. Forbs are currently almost non-existent and provide little cover or forage to this site.

TREND ASSESSMENT

soil - slightly upward (4)

browse - slightly down (2)

herbaceous understory - slightly down (2)

2003 TREND ASSESSMENT

Trend for soil is slightly down. Bare ground increased while litter and vegetation cover both decreased. Erosion remains low, but the soil surface is less protected from high intensity thunderstorms. Trend for browse is slightly down. The density estimate for Wyoming big sagebrush is 19% higher since 1998, but recruitment is lower, and the decadence rate as well as the proportion of the decadent age class classified as dying have increased. The proportion of the sagebrush population displaying poor vigor has increased as has the number of plants displaying heavy use. Trend for the herbaceous understory is stable, but in very poor condition. Cheatgrass significantly declined in nested frequency due to drought, but remains moderately abundant and will likely dominate the site again with a return to normal precipitation patterns. Perennial grasses remain limited, and perennial forbs are virtually non-existent.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 28 , Study no: 5

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
G	<i>Aristida purpurea</i>	_a 13	_b 41	_{ab} 28	_{ab} 27	1.31	.94	.55
G	<i>Bouteloua gracilis</i>	-	-	3	1	-	.15	.00
G	<i>Bromus tectorum</i> (a)	-	_b 168	_c 357	_a 101	.68	19.37	.98
G	<i>Hilaria jamesii</i>	_a -	_c 48	_{bc} 32	_b 25	.90	.39	.83
G	<i>Oryzopsis hymenoides</i>	2	5	6	9	.09	.23	.18
G	<i>Sitanion hystrix</i>	_b 127	_a 86	_a 60	_a 59	3.43	1.41	1.25
G	<i>Stipa comata</i>	_a -	_b 11	_b 15	_b 11	.15	.25	.36
G	<i>Vulpia octoflora</i> (a)	-	_b 135	_a 59	_b 162	.51	.16	1.24
Total for Annual Grasses		0	303	416	263	1.19	19.53	2.22
Total for Perennial Grasses		142	191	144	132	5.90	3.39	3.19
Total for Grasses		142	494	560	395	7.09	22.92	5.42
F	<i>Allium</i> spp.	-	1	-	-	.00	-	-
F	<i>Calochortus nuttallii</i>	_a -	_b 8	_{ab} 2	_{ab} 3	.02	.01	.00
F	<i>Descurainia pinnata</i> (a)	-	_b 16	_a 2	_{ab} 9	.04	.03	.05
F	<i>Draba</i> spp. (a)	-	-	3	4	-	.00	.01
F	<i>Eriogonum cernuum</i> (a)	-	_b 24	_a -	_a 3	.06	-	.00
F	<i>Gilia</i> spp. (a)	-	_c 160	_a -	_b 61	.38	-	.57
F	<i>Hackelia patens</i>	-	4	-	-	.01	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	1	3	-	.00	.01
F	<i>Microsteris gracilis</i> (a)	-	12	-	-	.02	-	-
F	<i>Navarretia intertexta</i> (a)	-	-	-	3	-	-	.00

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
F	Orobanche fasciculata	-	-	1	-	-	.00	-
F	Phlox longifolia	-	5	5	-	.01	.01	-
F	Plantago patagonica (a)	-	_a 13	_b 52	_a 5	.04	.38	.01
F	Ranunculus testiculatus (a)	-	_b 12	_c 45	_a -	.04	.35	-
F	Sphaeralcea coccinea	-	6	3	1	.01	.06	.00
Total for Annual Forbs		0	237	103	88	0.59	0.77	0.66
Total for Perennial Forbs		0	24	11	4	0.06	0.09	0.00
Total for Forbs		0	261	114	92	0.66	0.87	0.67

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	'92	'98	'03
B	Artemisia tridentata wyomingensis	92	92	90	11.11	12.46	18.76
B	Opuntia spp.	0	0	2	-	-	-
B	Opuntia whipplei	16	14	12	1.25	.59	1.14
Total for Browse		108	106	104	12.36	13.06	19.89

CANOPY COVER, LINE INTERCEPT --

Management unit 28 , Study no: 5

Species	Percent Cover
	'03
Artemisia tridentata wyomingensis	16.26
Opuntia whipplei	1.14

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 28 , Study no: 5

Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	0.7

BASIC COVER --

Management unit 28 , Study no: 5

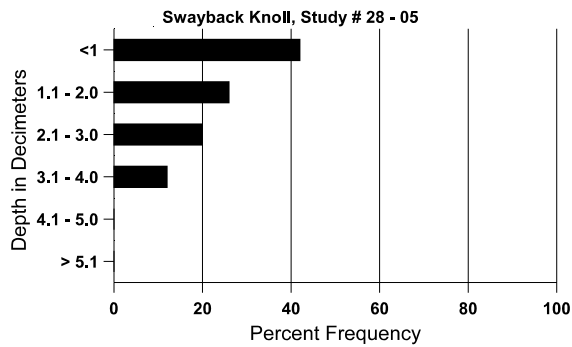
Cover Type	Average Cover %			
	'87	'92	'98	'03
Vegetation	5.00	15.86	34.86	28.36
Rock	9.50	17.97	8.12	13.06
Pavement	39.75	9.97	21.18	25.84
Litter	27.75	22.08	34.52	25.44
Cryptogams	.25	.22	.51	.06
Bare Ground	17.75	31.76	16.11	21.64

SOIL ANALYSIS DATA --

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

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
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
Rabbit	68	18	30
Elk	-	1	1
Deer	59	32	38

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

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	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>											
87	4866	466	866	2600	1400	-	23	75	29	4	21/20
92	5900	480	940	3240	1720	-	52	22	29	9	-/-
98	4240	540	500	2800	940	780	42	8	22	3	21/27
03	5220	-	220	3300	1700	560	48	37	33	12	20/25
<i>Opuntia spp.</i>											
87	532	-	266	133	133	-	0	0	25	13	6/13
92	0	-	-	-	-	-	0	0	0	0	-/-
98	0	-	-	-	-	-	0	0	0	0	-/-
03	40	-	-	40	-	-	0	0	0	0	4/6
<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	13/34
03	320	-	-	240	80	40	0	0	25	13	12/27