

Trend Study 1-5-06

Study site name: Devil's Playground.

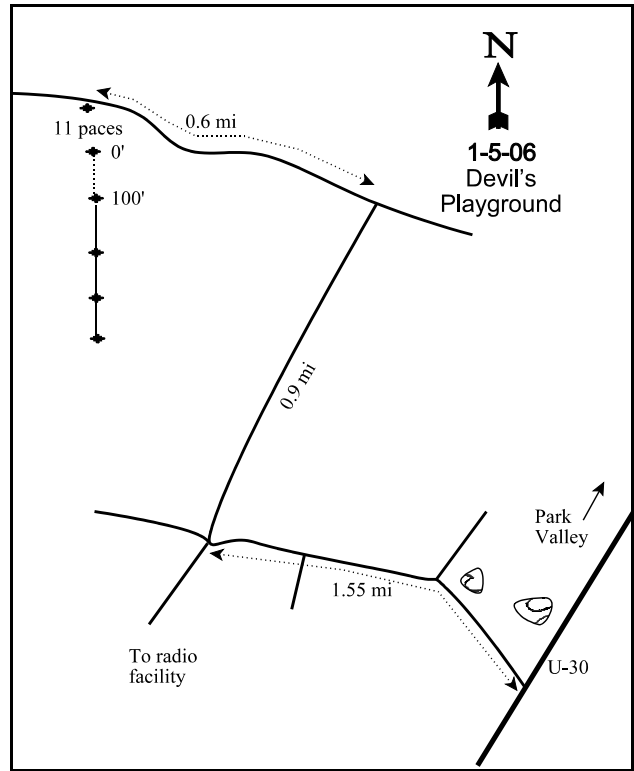
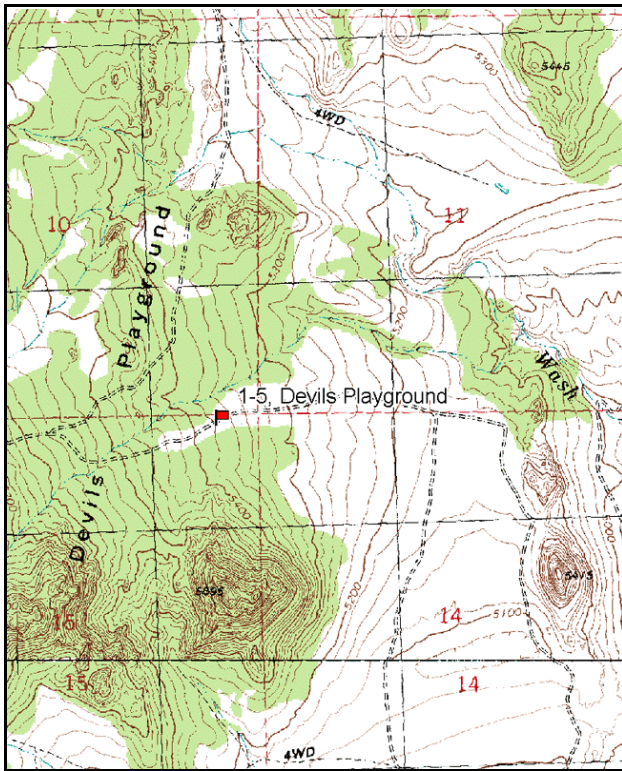
Vegetation type: Black Sagebrush.

Compass bearing: frequency baseline 173 degrees magnetic.

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

LOCATION DESCRIPTION

Proceed toward Elko, Nevada on U-30 to mile marker 24 and turn right (west). Travel 1.55 miles to a fork and bear right. Bear right and travel 0.9 miles. Turn left (west) and travel 0.6 miles to rock pile and witness post on left side of road. Walk 11 paces southwest from the rock pile to the 0-foot stake of the frequency baseline. The baseline is marked by a red browse tag #708. The azimuth of the baseline is 173 degrees magnetic.



Map Name: Emigrant Pass

Diagrammatic Sketch

Township 9N, Range 16W, Section 15

UTM NAD 27, UTM 12T 4598420 N, 278270 E

DISCUSSION

Devils Playground - Trend Study No. 1-5

Study Information

The Devils Playground study samples an area considered critical deer winter range (elevation: 5,390 feet, slope: 5-10%, aspect: east). The vegetation is dominated by juniper-pinyon woodland with numerous and various sized openings occupied by black sagebrush and Wyoming big sagebrush. Further to the east the vegetation becomes increasingly dominated by black sagebrush in the more shallow soils. To the west and at a higher elevation, juniper-pinyon woodland is associated with significant amounts of sagebrush and bitterbrush. Deer and sheep are the primary forage users. A pellet group transect estimated 15 deer days use/acre (36 ddu/ha) in 2001 and 27 deer, 1 elk, and 5 cow days use/acre (68 ddu/ha, 3 edu/ha, and 13 cdu/ha) in 2006. This area is within the BLM White Lake allotment which allows 1,500 sheep to use the area from December 1 through March 31.

Soil

The soil is in the Scalade series, which consists of shallow soil over a duripan, well drained, moderately permeable soils formed in alluvium derived dominantly from granite, limestone and quartzite with a component of loess and volcanic ash (USDA-NRCS 2006). There are many large granite outcrops. The soil is a coarse textured sandy loam which is light colored on the surface, but much darker below. The soil is moderately alkaline (8.0 pH). Average effective rooting depth was estimated at 27 inches. Phosphorus is low at only 3.5 ppm and may limit plant growth and development (Tiedemann and Lopez 2004). Ground cover from vegetation and litter is moderately poor and there are extensive areas of pavement and bare ground between shrubs and trees. The soil appears highly erodible and erosion would increase if the terrain was steeper. The erosion condition class was determined to be slight in both 2001 and 2006. There are some signs of soil pedestalling and an active gully between lines 2 and 3.

Browse

Browse composition consists chiefly of black sagebrush, interspersed by smaller amounts of narrowleaf low rabbitbrush, prickly phlox, and Wyoming sagebrush. Also present are scattered individuals of Nevada ephedra and spiny hopsage. The black sagebrush density slowly increased from 1984 to 2001, from 4,266 plants/acre to 6,380 plants/acre. In 2006, density had declined to 4,620 plants/acre. Utilization was noted as heavy in 1984 when 80% of the population displayed heavy use. This is probably one of the factors responsible for partial crown death observed in many of the sagebrush, along with winter injury which occurred to most populations of sagebrush during the heavy winters of the early to mid 1980's. Use has been mostly light to moderate since 1990. Percent decadence has moderated somewhat since the initial highs in 1984 and 1990 (56% and 82% respectively) to 29% in 2001 and 33% in 2006. Drought combined with the moderately high density of black sagebrush and excessively drained (xeric) characteristics of the soil are likely responsible for this decadence. Seedlings were very abundant in 2006.

Wyoming big sagebrush has also been sampled. It shows signs of hybridization with black sagebrush. Narrowleaf low rabbitbrush, showed moderate to heavy use in 1984. All other readings show only light use of this less preferred shrub. A few spiny hopsage occur on the site, but none were sampled within the shrub density strips. These shrubs were heavily hedged.

Herbaceous Understory

The herbaceous understory is fairly diverse, but not abundant. Five species of perennial grasses combined to produce about 5% cover in 1996, 8% cover in 2001, and 5% cover in 2006. Dominant species include: bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail. Cheatgrass has increased in abundance and cover with each reading since it was first sampled in 1996. Cover was less than 1% in 1996, increased to 5% in 2001 and 8% in 2006. This could become a fire hazard and create competition for important browse species. Perennial forbs are diverse yet only produce only about 1% cover or less. Most of

these are low growing and of little forage value.

1990 TREND ASSESSMENT

Black sagebrush has increased slightly in density. Recent use was light, compared to heavy use by sheep and deer in previous years. This sagebrush population contains a very high number of decadent plants (82%). It still provides most of the cover on the study, where there is a relatively low density of pinyon and juniper. Surrounding areas support a much higher density of trees, but not usually a closed canopy. There is a vigorous stand of native grasses for a black sagebrush range type. Three out of five perennial grasses increased significantly in nested frequency. Forb frequency decreased, but no one species had a significant decrease.

browse - up (+2)

grass - up (+2)

forb - slightly down (-1)

1996 TREND ASSESSMENT

The browse trend for the key species, black sagebrush is slightly up. Decadence has declined from an extremely high 82% in 1990 to 26%. Utilization is moderate with heavy use reported on only 14% of the population. Narrowleaf low rabbitbrush, an increaser, appears to have a stable trend. Spiny hopsage, likely the most preferred browse on the site, occurs in small numbers. Trend for grasses is down due to decline in the sum of nested frequency of perennial species. However, only two species declined significantly, bottlebrush squirreltail and Thurber needlegrass. The most abundant perennial species, Sandberg bluegrass, declined slightly in nested frequency but the change was not significant. Cheatgrass abundance was low, but no data was collected for annuals in prior readings. Trend for forbs is up with an increase in diversity and sum of nested frequency of perennial species. The Desirable Components Index (see methods) rated this site as fair.

winter range condition (DC Index) - fair (42) Lower potential scale

browse - slightly up (+1)

grass - down (-2)

forb - up (+2)

2001 TREND ASSESSMENT

The browse trend for the key species, black sagebrush, is stable. Percent decadence has remained relatively low since 1996. Utilization is light to moderate with heavy use reported on only 17% of the population. Vigor is good. The grass trend is slightly down. Trend for perennial grasses is fairly stable, but cheatgrass abundance and cover increased significantly. The trend for perennial forbs is down.

winter range condition (DC Index) - fair (42) Lower potential scale

browse - stable (0)

grass - slightly down (-1)

forb - down (-2)

2006 TREND ASSESSMENT

The browse trend is slightly down. Black sagebrush density decreased by 28% and percent decadence increased slightly to 33%. Few young plants were sampled, but seedlings were numerous. Wyoming big sagebrush density has been low but increased by over six times. It appears that many of these plants are a hybrid of black and Wyoming big sagebrush. The combined density of black sagebrush and Wyoming big sagebrush had a 19% decline from 2001-2006. The grass trend is down. Cheatgrass once again increased significantly and cover was nearly 8%, which was more than half of the total grass cover. This could create a fire hazard which would destroy the important browse species. Bluebunch wheatgrass and Thurber needlegrass had lower nested frequencies. The forb trend is also down. Longleaf phlox is one of the few perennials and it had a significantly lower sum of nested frequency. The increase of cheatgrass lowered the DCI score, but it is still fair.

winter range condition (DC Index) - fair (34) Lower potential scale

browse - slightly down (-1)

grass - down (-2)

forb - down (-2)

HERBACEOUS TRENDS --
Management unit 01 , Study no: 5

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	<i>Agropyron spicatum</i>	ab ²⁸	c ⁵⁶	bc ⁴⁶	abc ³⁵	a ¹⁹	1.00	2.26	1.11
G	<i>Bromus tectorum</i> (a)	-	-	a ⁹⁷	b ²⁸⁴	c ³¹⁸	.37	5.21	7.93
G	<i>Oryzopsis hymenoides</i>	a ⁴	b ¹⁷	ab ¹⁸	ab ⁵	ab ¹⁰	.66	.09	.33
G	<i>Poa secunda</i>	a ⁵³	c ¹⁶²	bc ¹⁴⁸	bc ¹⁴²	b ¹²⁷	2.90	3.42	2.58
G	<i>Sitanion hystrix</i>	b ¹¹⁴	b ¹⁰⁰	a ⁵⁶	a ⁴³	a ³⁷	.66	.40	.72
G	<i>Stipa comata</i>	-	-	-	-	-	-	-	.00
G	<i>Stipa thurberiana</i>	b ¹¹	bc ²²	a ⁻	c ³⁴	b ¹⁴	-	1.71	.66
G	<i>Vulpia octoflora</i> (a)	-	-	b ⁷⁸	c ¹⁴⁵	a ¹⁷	.16	.52	.04
Total for Annual Grasses		0	0	175	429	335	0.53	5.74	7.97
Total for Perennial Grasses		210	357	268	259	207	5.23	7.89	5.43
Total for Grasses		210	357	443	688	542	5.76	13.63	13.40
F	<i>Agoseris glauca</i>	a ⁻	a ⁻	b ¹⁷	a ⁻	b ⁹	.03	-	.05
F	<i>Arabis</i> sp.	-	-	-	-	3	-	-	.00
F	<i>Astragalus beckwithii</i>	2	7	3	4	-	.04	.15	-
F	<i>Aster</i> sp.	a ⁻	a ⁻	b ⁷⁶	a ⁻	a ⁻	.16	-	-
F	<i>Astragalus utahensis</i>	10	14	11	2	4	.08	.06	.01
F	<i>Castilleja chromosa</i>	b ¹¹	ab ¹	ab ⁷	a ⁻	a ⁻	.06	-	-
F	<i>Chaenactis douglasii</i>	b ²²	ab ⁴	b ²⁸	a ³	a ⁶	.08	.00	.01
F	<i>Collinsia parviflora</i> (a)	-	-	-	3	7	-	.00	.01
F	<i>Crepis acuminata</i>	-	-	3	-	1	.03	-	.03
F	Cruciferae	a ⁻	a ⁻	b ³¹	a ⁻	a ⁻	.07	-	-
F	<i>Cryptantha</i> sp.(a)	-	-	b ¹⁰²	a ³¹	a ²¹	.43	.08	.04
F	<i>Cryptantha</i> sp.	a ⁻	a ⁴	b ⁹³	a ⁻	a ⁻	.36	-	-
F	<i>Delphinium nuttallianum</i>	-	-	3	2	-	.00	.03	-
F	<i>Descurainia pinnata</i> (a)	-	-	ab ⁴	b ¹¹	a ⁻	.01	.03	-
F	<i>Eriogonum cernuum</i> (a)	a ¹	ab ⁶	b ¹⁰	a ⁻	a ⁻	.02	-	-
F	<i>Eriogonum ovalifolium</i>	a ⁻	a ⁻	b ¹³	a ⁻	a ⁻	.05	-	-
F	<i>Eriastrum sparsiflorum</i> (a)	-	-	c ⁷⁸	a ⁻	b ²⁵	.17	-	.05
F	<i>Galium aparine</i> (a)	-	-	-	3	-	-	.00	-
F	<i>Gayophytum ramosissimum</i> (a)	-	-	35	18	17	.09	.04	.03
F	<i>Gilia</i> sp. (a)	-	-	b ²¹	b ³⁰	a ⁻	.04	.08	-
F	<i>Lappula occidentalis</i> (a)	-	-	a ⁻	b ⁸	ab ¹⁰	-	.02	.02
F	<i>Lomatium</i> sp.	-	-	4	4	-	.00	.16	-
F	<i>Lygodesmia spinosa</i>	-	-	-	-	-	.00	-	-
F	<i>Monoptylon belliodies</i> (a)	-	-	-	-	3	-	-	.01

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Phlox hoodii	-	8	4	1	-	.03	.03	-
F	Phlox longifolia	_{ab} 35	_a 23	_{ab} 35	_b 49	_a 21	.10	.40	.05
F	Townsendia sp.	-	2	-	-	-	-	-	-
F	Tragopogon dubius	_b 13	_a -	_a 2	_a -	_a -	.03	-	-
Total for Annual Forbs		1	6	250	104	83	0.77	0.27	0.17
Total for Perennial Forbs		93	63	330	65	44	1.17	0.83	0.16
Total for Forbs		94	69	580	169	127	1.94	1.10	0.33

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

BROWSE TRENDS --

Management unit 01 , Study no: 5

T y p e	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia nova	86	85	79	11.55	13.55	12.93
B	Artemisia tridentata wyomingensis	7	5	16	.60	.15	1.71
B	Chrysothamnus viscidiflorus stenophyllus	50	45	38	1.50	2.54	1.97
B	Juniperus osteosperma	3	7	6	4.88	3.77	11.05
B	Leptodactylon pungens	10	12	12	.16	.03	.05
B	Opuntia polyacantha	1	3	3	-	.01	.03
B	Pinus monophylla	2	1	3	.00	.38	.63
B	Symphoricarpos oreophilus	1	1	0	-	-	-
Total for Browse		160	159	157	18.70	20.45	28.38

CANOPY COVER, LINE INTERCEPT --
 Management unit 01 , Study no: 5

Species	Percent Cover	
	'01	'06
Artemisia nova	-	13.21
Artemisia tridentata wyomingensis	-	1.96
Chrysothamnus viscidiflorus stenophyllus	-	2.61
Juniperus osteosperma	13.19	11.21
Leptodactylon pungens	-	.10
Pinus monophylla	-	.20

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 01 , Study no: 5

Species	Average leader growth (in)	
	'01	'06
Artemisia nova	1.4	0.6

POINT-QUARTER TREE DATA --
 Management unit 01 , Study no: 5

Species	Trees per Acre		Average diameter (in)	
	'01	'06	'01	'06
Juniperus osteosperma	76	43	7.0	8.6
Pinus monophylla	49	35	2.1	2.4

BASIC COVER --
 Management unit 01 , Study no: 5

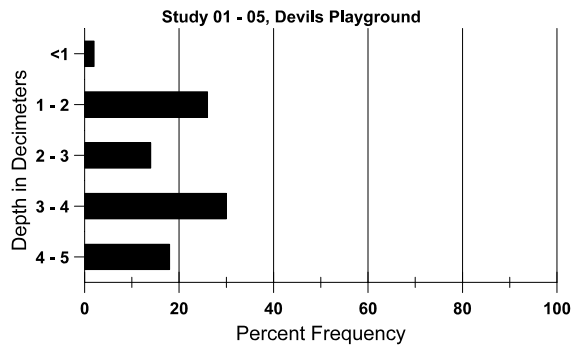
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	2.50	8.25	25.64	38.59	38.29
Rock	.25	.50	1.48	.38	.12
Pavement	20.75	25.00	27.95	32.52	28.31
Litter	39.75	33.00	27.04	29.48	26.11
Cryptogams	1.25	1.50	.72	1.59	.53
Bare Ground	35.50	31.75	19.56	16.53	22.20

SOIL ANALYSIS DATA --

Herd Unit 01, Study no: 05, Devils Playground

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
26.2	59.6 (19.7)	8.0	65.7	17.0	17.3	0.98	3.5	92.8	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 01 , Study no: 5

Type	Quadrat Frequency		
	'96	'01	'06
Sheep	-	1	-
Rabbit	32	7	65
Elk	2	-	-
Deer	44	24	24
Cattle	-	-	-

Days use per acre (ha)	
'01	'06
-	
-	
-	1 (3)
15 (36)	27 (68)
-	5 (13)

BROWSE CHARACTERISTICS --

Management unit 01 , 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)
Artemisia nova												
84	4266	-	466	1400	2400	-	17	80	56	-	20	9/16
90	5266	66	-	933	4333	-	1	0	82	6	22	10/15
96	5960	100	440	3960	1560	740	72	14	26	6	6	9/23
01	6440	60	120	4480	1840	580	35	17	29	9	11	10/21
06	4620	3040	100	3000	1520	680	6	3	33	22	22	10/22

		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>												
84	332	66	66	66	200	-	80	20	60	-	0	20/25
90	332	-	66	66	200	-	40	0	60	-	0	21/29
96	260	-	-	220	40	20	62	0	15	-	0	21/39
01	100	-	-	100	-	-	0	0	0	-	0	35/41
06	660	340	-	520	140	100	12	3	21	12	12	20/32
<i>Chrysothamnus viscidiflorus stenophyllus</i>												
84	1932	133	533	1066	333	-	31	38	17	-	3	10/11
90	2332	-	1200	1066	66	-	3	0	3	-	0	15/19
96	1680	-	140	1540	-	-	6	0	0	-	0	9/13
01	1560	-	100	1140	320	20	4	0	21	4	4	9/14
06	1460	-	120	1300	40	20	4	3	3	-	0	10/16
<i>Ephedra nevadensis</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	16/17
01	0	-	-	-	-	-	0	0	-	-	0	15/10
06	0	-	-	-	-	-	0	0	-	-	0	18/23
<i>Grayia spinosa</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	31/35
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	27/31
<i>Juniperus osteosperma</i>												
84	0	66	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	60	-	-	60	-	-	0	0	-	-	0	-/-
01	160	-	40	120	-	-	0	0	-	-	0	-/-
06	120	-	20	100	-	-	0	0	-	-	0	-/-
<i>Leptodactylon pungens</i>												
84	532	-	466	66	-	-	0	0	0	-	0	4/4
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	360	-	80	240	40	-	0	0	11	-	0	9/11
01	520	-	-	420	100	-	0	0	19	-	0	9/12
06	260	80	-	240	20	-	0	0	8	-	0	6/9

		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)
Opuntia polyacantha												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	66	-	66	-	-	-	0	0	-	-	0	-/-
96	20	-	-	20	-	-	0	0	-	-	0	5/7
01	120	-	-	120	-	-	0	0	-	-	0	7/9
06	60	-	20	40	-	-	0	0	-	-	0	4/9
Pinus monophylla												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	40	20	20	20	-	-	0	0	-	-	0	-/-
01	20	100	20	-	-	-	0	0	-	-	0	10/10
06	60	60	40	20	-	-	0	0	-	-	0	-/-
Symphoricarpos oreophilus												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	20	-	-	20	-	-	100	0	-	-	0	16/23
01	40	-	-	40	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	-/-