

CEDAR HOLLOW - TREND STUDY NO. 7-6-11

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 7,320 ft (2,231 m)

Aspect: South

Slope: 15%

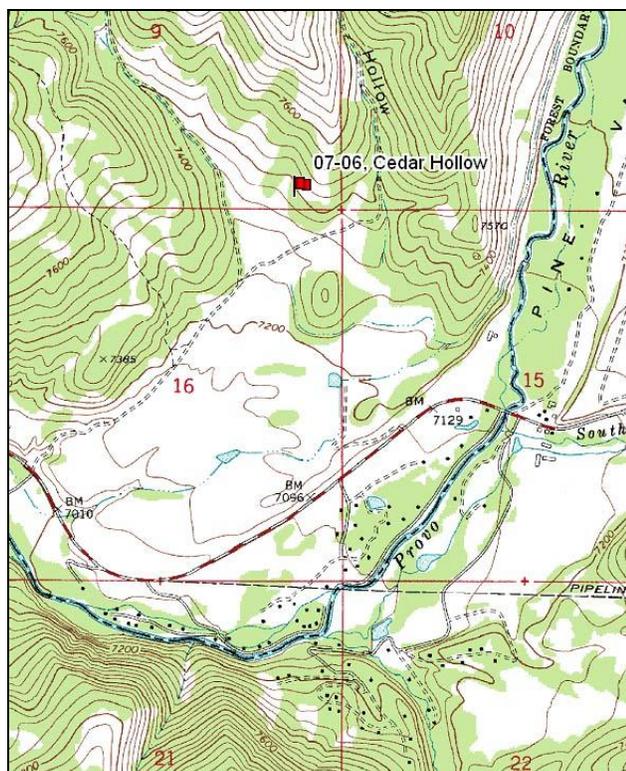
Transect bearing: 166° magnetic

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

Directions:

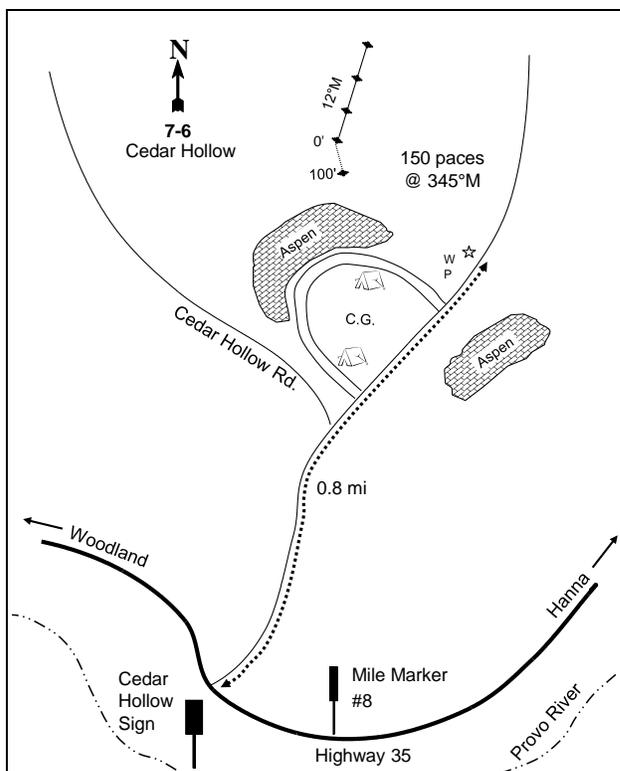
Travel eastbound on Highway 35 from Woodland and turn left (north) at the Cedar Hollow sign. If you pass mile-marker 8 you have gone too far. Travel 0.8 miles on the main dirt road passing two left turns, and stop next to a small witness post on the left side of the road. There is a small stand of aspen on the right. From the witness post walk at a bearing of 345 degrees magnetic for 150 paces to the 0-foot baseline stake. The 0-foot stake is marked by browse tag #416.

Map Name: Woodland



Township: 3S Range: 7E Section: 16

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 487388 E 4490657 N

CEDAR HOLLOW - TREND STUDY NO. 7-6

Site Information

Site Description: The study is located on a hillside above Cedar Hollow, about a half mile west of Pine Valley and the Provo River. The hillside is intermixed with areas of quaking aspen (*Populus tremuloides*), Gambel oak (*Quercus gambelii*), and open areas of mixed mountain brush communities. The study samples one of the areas dominated by mixed mountain brush. The area is administered by the U.S. Forest Service as part of the Uintah-Cache-Wasatch National Forest. Deer, elk, and cattle pellet groups have been sampled in low abundance since 2001. Moose pellet groups were sampled in low abundance in 2001 (Table - Pellet Group Data).

Browse: Gambel oak occurs frequently in the study area, but consists of clumps of mature plants that are partially unavailable because of their height. The most important species based on abundance, cover, and relative palatability is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Mountain big sagebrush consists of a moderately dense stand of mostly light to moderately used plants. There was a large decrease in density in 2006. Decadence of sagebrush has been highly variable through the years with very high decadence in 1984, but more moderate to low decadence in other sample years. Recruitment of young sagebrush plants has been fairly poor over the sample period. Saskatoon serviceberry (*Amelanchier alnifolia*) and antelope bitterbrush (*Purshia tridentata*) provide additional preferred forage, but both species occur in low densities. Both species have shown moderate to heavy use over the sample period. Over the sample years, serviceberry density has fluctuated with changes in the recruitment of young plants. Density of bitterbrush has steadily increased since it was first sampled with the increased sample area in 1996. Mountain snowberry (*Symphoricarpos oreophilus*) is the most numerous species on the site, but has displayed mostly light use (Table - Browse Characteristics).

Herbaceous Understory: This site has a fair herbaceous understory component. Grass composition is diverse, but also includes several aggressive increaser species. A sedge species (*Carex* sp.), several bluegrass species (*Poa* spp.), and bluebunch wheatgrass (*Agropyron spicatum*) are the most abundant grasses. The weedy increaser species bulbous bluegrass (*P. bulbosa*) increased substantially in cover in 2011. Forb species are diverse and are primarily composed of perennials. Cover of perennial forbs has steadily increased since 1996 (Table - Herbaceous Trends).

Soil: Soil texture is classified as a clay loam with a neutral soil reaction (7.0 pH) (Table - Soil Analysis Data). Bare ground cover is low on the site, with a large amount of vegetation, litter, rock, and pavement providing protective ground cover (Table - Basic Cover). However, there are interspaces where the soil appears compacted where noticeable erosion has occurred in the past. The soil erosion condition has been classified as stable since 2001.

Trend Assessments

Browse:

- **1984 to 1990 - stable (0):** Density of mountain big sagebrush decreased by 15% from 1,332 plants/acre to 1,132 plants/acre, but decadence also decreased from 75% to 41%. Recruitment of young sagebrush plants increased from 0% to 12% of the population. Density of serviceberry increased substantially from 66 plants/acre to 731 plants/acre, with a large increase in the recruitment of young serviceberry plants at 82% of the population.
- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence of sagebrush decreased substantially to 19%, and poor vigor decreased from 18% to 5% of the population. Recruitment of young sagebrush decreased to 7%.

- **1996 to 2001 - slightly up (+1):** Sagebrush density remained similar decreasing slightly from 1,900 plants/acre to 1,800 plants/acre. Cover of sagebrush remained similar. Serviceberry increased in density 58% from 380 plants/acre to 600 plants/acre, mostly due to an increase in the recruitment of young plants. The density of bitterbrush increased 19% from 320 plants/acre to 380 plants/acre.
- **2001 to 2006 - down (-2):** The density of mountain big sagebrush decreased by 48% to 940 plants/acre, and cover decreased to 6%. Decadence of sagebrush increased from 29% to 43%, but poor vigor remained similar at 15%. Serviceberry density decreased 53% to 280 plants/acre, which was due to a decrease in the recruitment of young plants. Bitterbrush density increased 11% to 420 plants/acre.
- **2006 to 2011 - slightly up (+1):** Density of sagebrush remained similar at 980 plants/acre, but decadence and poor vigor decreased to 10% and 8%, respectively. The density of serviceberry increased 71% to 480 plants/acre, and decadence poor vigor decreased from 29% to 0% and 14% to 0%, respectively. Bitterbrush density increased by 24% to 520 plants/acre.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency of perennial grasses increased 47%.
- **1990 to 1996 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency of perennial grasses remained similar, but the weedy, exotic species bulbous bluegrass increased significantly in nested frequency. More desirable native species such as bluebunch wheatgrass and Sandberg bluegrass decreased.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency of perennial grasses remained similar, but composition changed slightly. There was a significant decrease in the nested frequency of bulbous bluegrass and a significant increase in the nested frequency of bluebunch wheatgrass. Despite the decrease in nested frequency, cover of bulbous bluegrass increased from 5% to 6%.
- **2006 to 2011 - slightly down (-1):** There was little change in the sum of nested frequency of perennial grasses, but bulbous bluegrass again increased significantly in nested frequency. Cover of bulbous bluegrass also increased to 11% and dominated the cover of grasses on the site.

Forb:

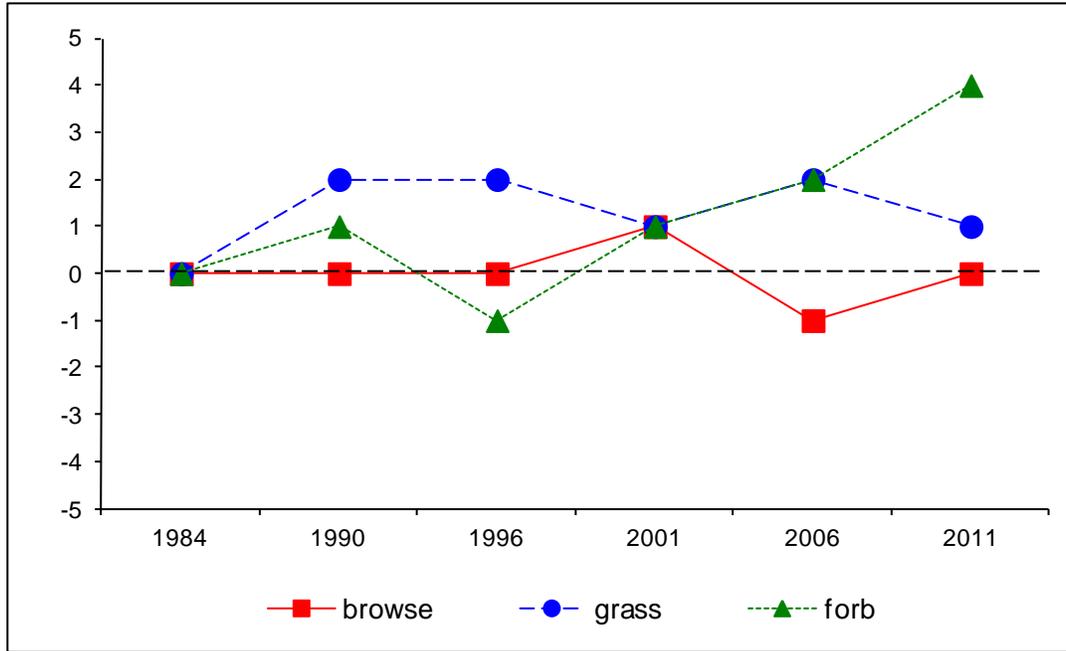
- **1984 to 1990 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 13%.
- **1990 to 1996 - down (-2):** There was a 38% decrease in the sum of nested frequency of perennial forbs.
- **1996 to 2001 - up (+2):** The sum of nested frequency of perennial forbs increased by 49%, and cover increased from 2% to 5%.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 15%, and cover increased to 7%.
- **2006 to 2011 - up (+2):** The sum of nested frequency of perennial forbs increased 51%, and cover increased to 13%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --
Management unit 7, study no: 6

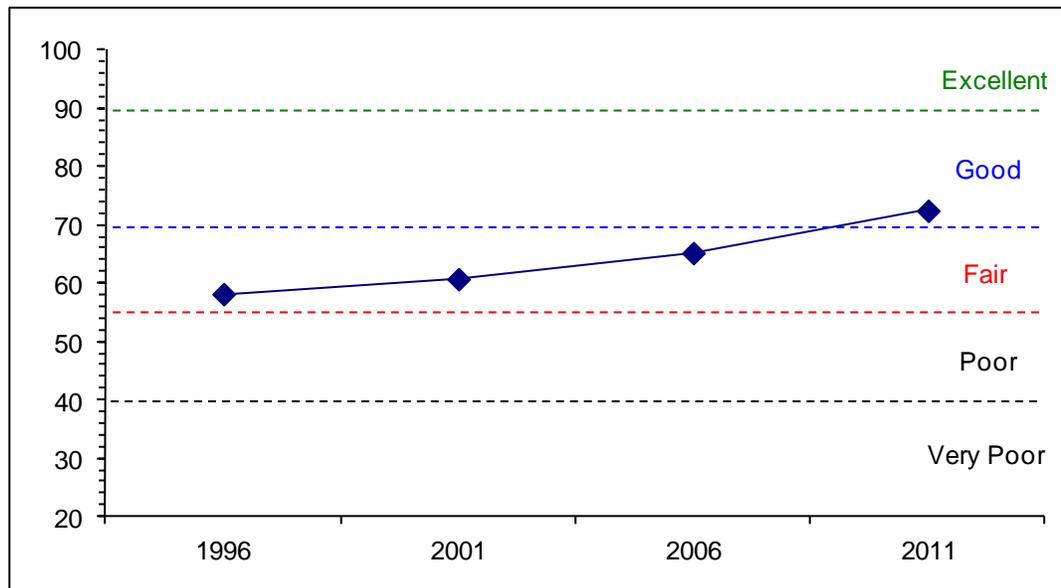
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	16.4	11.3	3.2	22.4	0.0	4.8	0.0	58.2	Fair
01	18.9	9.1	1.2	21.6	0.0	10.0	0.0	60.7	Fair
06	17.4	8.2	1.9	27.8	0.0	10.0	0.0	65.2	Fair
11	15.4	13.4	3.6	30.0	0.0	10.0	0.0	72.4	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 7 Study no: 6



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
 Management unit 7, Study no: 6



HERBACEOUS TRENDS--
Management unit 07, Study no: 6

Type	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron dasystachyum	-	-	-	2	-	-	-	.00	-	-
G	Agropyron spicatum	b152	ab151	ab145	a107	b163	b152	2.03	2.06	5.82	5.13
G	Bromus carinatus	a-	a6	a-	b23	ab6	a3	-	.20	.09	.15
G	Bromus inermis	-	12	-	-	4	6	-	-	.06	.06
G	Bromus tectorum (a)	-	-	1	-	4	-	.00	-	.00	-
G	Carex sp.	73	92	68	78	47	53	4.08	4.29	2.37	4.03
G	Festuca sp.	-	-	3	-	-	-	.00	-	-	-
G	Koeleria cristata	a-	a-	a-	a2	a4	b38	-	.03	.06	.79
G	Melica bulbosa	a-	a-	a3	a1	b18	a3	.00	.03	.33	.00
G	Poa bulbosa	a-	b79	b107	d199	c161	d218	3.57	4.99	6.28	10.98
G	Poa fendleriana	b97	bc130	bc105	c140	bc126	a46	1.47	2.79	2.07	1.11
G	Poa pratensis	a46	ab83	b107	a48	a63	a51	2.80	.81	1.31	1.96
G	Poa secunda	abc31	ab19	c56	a23	bc49	abc49	.71	.33	1.54	2.04
G	Stipa lettermani	ab9	b28	a9	a7	a9	a-	.09	.21	.21	-
Total for Annual Grasses		0	0	1	0	4	0	0.00	0	0.00	0
Total for Perennial Grasses		408	600	603	630	650	619	14.79	15.77	20.16	26.30
Total for Grasses		408	600	604	630	654	619	14.80	15.77	20.17	26.30
F	Agoseris glauca	a-	a4	a-	a4	ab12	b17	-	.01	.07	.12
F	Allium sp.	a-	a-	a5	a24	b59	c96	.01	.10	.20	.53
F	Antennaria rosea	-	-	-	-	1	3	-	-	.03	.15
F	Arabis sp.	-	-	-	-	3	-	-	-	.00	-
F	Aster chilensis	b105	b121	a48	a35	a45	a58	.47	.44	1.04	1.99
F	Astragalus beckwithii	a-	a-	a-	a-	b12	a-	-	-	.30	-
F	Astragalus sp.	a-	a-	a2	b65	b54	b80	.01	.84	.95	2.53
F	Balsamorhiza sagittata	a7	a16	a11	a14	ab24	b46	.54	1.64	2.16	5.08
F	Calochortus nuttallii	a-	a2	a3	a4	a5	b29	.00	.01	.01	.14
F	Castilleja linariaefolia	3	1	6	6	12	6	.04	.21	.22	.09
F	Chenopodium fremontii (a)	-	-	-	-	-	1	-	-	-	.00
F	Cirsium undulatum	ab14	b17	ab8	ab8	ab5	a4	.07	.09	.33	.06
F	Collinsia parviflora (a)	-	-	-	8	12	18	-	.02	.05	.04
F	Collomia linearis (a)	-	-	a12	bc39	ab19	c56	.02	.16	.05	.36
F	Comandra pallida	c80	c83	abc58	bc69	a36	ab45	.29	.78	.43	.33
F	Crepis acuminata	-	1	3	-	1	1	.00	-	.03	.00
F	Epilobium brachycarpum (a)	-	-	a-	b26	a1	ab17	-	.05	.00	.06
F	Eriogonum racemosum	1	8	12	7	9	15	.16	.04	.21	.19
F	Eriogonum umbellatum	-	4	-	6	3	5	-	.21	.15	.06
F	Erythronium grandiflorum	-	-	-	-	9	3	-	-	.04	.15
F	Gayophytum ramosissimum(a)	-	-	-	-	7	-	-	-	.03	-
F	Hackelia patens	10	-	-	-	5	1	-	-	.06	.15
F	Holosteum umbellatum (a)	-	-	2	2	-	7	.00	.00	-	.02
F	Ligusticum sp.	-	5	-	-	-	-	-	-	-	-
F	Lithophragma sp.	-	-	-	-	-	8	-	-	-	.06
F	Lupinus argenteus	-	8	-	7	1	3	.03	.21	.03	.06

T y p e	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	<i>Machaeranthera canescens</i>	b30	a6	a-	a-	a-	a-	-	-	-	-
F	<i>Microsteris gracilis</i> (a)	-	-	a-	b7	ab5	ab6	.00	.02	.01	.01
F	<i>Penstemon leonardi</i>	-	17	26	18	11	5	.65	.34	.10	.07
F	<i>Phlox longifolia</i>	a-	b32	ab15	a10	ab25	a7	.04	.05	.10	.02
F	<i>Polygonum douglasii</i> (a)	-	-	ab8	a-	b15	a1	.01	-	.03	.00
F	<i>Senecio integerrimus</i>	a-	a1	ab7	b21	ab13	c57	.07	.18	.13	1.14
F	<i>Solidago</i> sp.	b41	a-	a-	a-	a-	a-	-	-	-	-
F	<i>Streptanthus cordatus</i>	1	2	-	3	-	2	-	.00	-	.00
F	<i>Tragopogon dubius</i> (a)	-	-	a1	b7	a-	a-	.00	.01	-	-
F	<i>Viola</i> sp.	a-	a-	a-	a-	a-	b11	-	-	-	.03
F	<i>Zigadenus paniculatus</i>	a-	a3	a-	a3	a5	b28	-	.00	.09	.33
Total for Annual Forbs		0	0	23	89	59	106	0.04	0.28	0.19	0.49
Total for Perennial Forbs		292	331	204	304	350	530	2.42	5.22	6.76	13.33
Total for Forbs		292	331	227	393	409	636	2.47	5.50	6.95	13.83

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

BROWSE TRENDS--

Management unit 07, Study no: 6

T y p e	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	<i>Amelanchier alnifolia</i>	19	20	13	17	.22	.87	.56	.36
B	<i>Artemisia tridentata vaseyana</i>	59	58	39	38	8.10	8.01	6.19	5.99
B	<i>Ceanothus velutinus</i>	2	2	2	0	-	.15	.03	.41
B	<i>Chrysothamnus depressus</i>	0	1	1	2	-	-	-	.15
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	51	53	52	40	1.85	1.98	2.29	2.87
B	<i>Eriogonum heracleoides</i>	0	4	6	5	-	.06	.23	.71
B	<i>Eriogonum microthecum</i>	17	0	0	0	.22	-	-	-
B	<i>Juniperus scopulorum</i>	0	0	0	0	-	-	.03	.00
B	<i>Mahonia repens</i>	65	60	69	62	1.16	2.63	1.69	2.93
B	<i>Opuntia</i> sp.	3	3	2	3	.03	-	.15	.00
B	<i>Pachistima myrsinites</i>	4	0	3	5	.03	-	-	.00
B	<i>Purshia tridentata</i>	15	16	17	19	2.93	3.94	5.09	4.55
B	<i>Quercus gambelii</i>	3	5	4	4	1.25	1.63	1.16	.56
B	<i>Symphoricarpos oreophilus</i>	67	65	68	60	4.55	7.30	7.58	7.12
Total for Browse		305	287	276	255	20.35	26.61	25.04	25.69

CANOPY COVER, LINE INTERCEPT--

Management unit 07, Study no: 6

Species	Percent Cover		
	'01	'06	'11
Amelanchier alnifolia	-	.61	1.31
Artemisia tridentata vaseyana	-	6.30	7.43
Ceanothus velutinus	-	.41	-
Chrysothamnus viscidiflorus viscidiflorus	-	3.59	3.56
Eriogonum heracleoides	-	.48	.13
Mahonia repens	-	1.89	1.29
Opuntia sp.	-	.08	.06
Purshia tridentata	-	4.75	4.98
Quercus gambelii	3.40	2.33	3.06
Symphoricarpos oreophilus	-	10.25	10.68

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 07, Study no: 6

Species	Average leader growth (in)		
	'01	'06	'11
Amelanchier alnifolia	1.8	3.0	1.6
Artemisia tridentata vaseyana	1.8	1.8	1.9
Purshia tridentata	2.0	2.8	1.2

BASIC COVER--

Management unit 07, Study no: 6

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	3.75	16.50	39.31	51.52	44.29	55.95
Rock	12.00	12.25	15.11	14.48	14.86	11.75
Pavement	7.00	11.75	4.56	7.09	7.96	8.45
Litter	60.00	46.75	42.47	35.27	25.93	31.86
Cryptogams	.25	0	.53	.21	.55	.47
Bare Ground	17.00	12.75	11.13	17.47	21.65	13.23

SOIL ANALYSIS DATA --

Management unit 07, Study no: 6, Study Name: Cedar Hollow

Effective rooting depth (in)	pH	Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.6	7.0	40.2	30.4	29.4	4.9	11.5	166.4	0.6

PELLET GROUP DATA--

Management unit 07, Study no: 6

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	-	-	9	2	-	-	-
Moose	-	2	1	-	1 (2)	-	-
Elk	5	-	1	2	5 (12)	2 (5)	1 (2)
Deer	7	11	22	12	20 (50)	12 (30)	7 (18)
Cattle	1	2	1	1	-	4 (9)	2 (4)

BROWSE CHARACTERISTICS--

Management unit 07, Study no: 6

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Amelanchier alnifolia									
84	66	0	0	100	-	0	100	0	-/-
90	731	82	9	9	333	9	18	18	89/71
96	380	26	63	11	-	63	5	11	30/32
01	600	40	23	37	-	17	27	13	43/31
06	280	29	43	29	-	14	43	14	29/33
11	480	25	75	0	-	0	13	0	21/22
Artemisia tridentata vaseyana									
84	1332	0	25	75	66	45	55	15	23/35
90	1132	12	47	41	-	29	0	18	26/28
96	1900	7	74	19	-	32	1	5	21/33
01	1800	0	71	29	-	20	10	17	25/37
06	940	2	55	43	80	13	0	15	22/36
11	980	8	82	10	-	45	4	8	22/36
Ceanothus velutinus									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	40	0	100	-	-	0	0	0	24/90
01	80	0	100	-	-	0	0	0	19/50
06	40	0	100	-	-	100	0	0	23/78
11	0	0	0	-	-	0	0	0	14/29
Chrysothamnus depressus									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	0	0	0	-	-	0	0	0	-/-
01	20	0	100	-	-	0	0	0	-/-
06	20	0	100	-	-	0	0	0	6/14
11	40	0	100	-	-	0	0	0	5/15
Chrysothamnus viscidiflorus viscidiflorus									
84	199	0	0	100	-	67	0	0	-/-
90	798	8	50	42	-	8	0	33	12/9
96	2120	7	93	0	-	94	0	0	12/16
01	1980	2	88	10	-	3	0	0	10/16
06	1860	6	87	6	-	2	0	1	11/18
11	1400	14	86	0	-	0	0	0	10/16

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Eriogonum heracleoides</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	0	0	0	0	-	0	0	0	-/-	
01	80	0	100	0	-	0	0	0	10/10	
06	140	14	71	14	-	0	0	0	5/10	
11	100	0	100	0	-	0	0	0	9/17	
<i>Eriogonum microthecum</i>										
84	665	30	70	-	-	10	0	0	5/6	
90	0	0	0	-	-	0	0	0	-/-	
96	360	6	94	-	-	0	0	0	7/12	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
<i>Juniperus scopulorum</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	20	0	0	0	-/-	
<i>Mahonia repens</i>										
84	20599	96	4	0	-	0	0	0	6/4	
90	61799	54	46	0	3533	.10	0	0	6/4	
96	9660	26	74	0	-	0	0	0	4/6	
01	14260	0	100	0	-	0	0	.14	4/5	
06	14500	7	92	1	240	0	0	.27	3/5	
11	9860	6	94	0	-	0	0	0	4/4	
<i>Opuntia sp.</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	60	0	100	-	-	0	0	0	4/11	
01	180	11	89	-	-	0	0	0	4/10	
06	40	0	100	-	-	0	0	0	6/13	
11	60	0	100	-	-	0	0	0	6/18	
<i>Pachistima myrsinites</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	200	40	60	-	-	0	0	0	12/36	
01	0	0	0	-	-	0	0	0	-/-	
06	180	0	100	-	-	0	0	0	5/6	
11	200	10	90	-	-	0	0	0	21/77	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Purshia tridentata										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	320	6	94	0	-	56	13	0	15/60	
01	380	0	95	5	-	11	32	0	16/70	
06	420	0	100	0	40	10	90	0	18/54	
11	520	4	96	0	20	0	62	0	12/52	
Quercus gambelii										
84	466	71	29	0	-	0	14	0	67/57	
90	2465	43	51	5	333	3	0	0	72/23	
96	60	0	100	0	20	0	0	0	77/98	
01	900	0	100	0	-	0	9	100	-/-	
06	340	18	71	12	260	0	0	6	49/23	
11	480	13	88	0	-	0	0	0	-/-	
Rosa woodsii										
84	332	60	40	-	-	0	40	20	25/5	
90	266	50	50	-	-	0	0	0	18/7	
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
Symphoricarpos oreophilus										
84	2931	48	41	11	-	39	5	5	23/36	
90	7131	31	64	6	533	31	.93	18	18/24	
96	2640	14	84	2	80	2	0	5	17/28	
01	2100	0	97	3	-	5	0	0	16/28	
06	3740	16	83	1	20	0	0	0	16/27	
11	4820	10	90	0	20	1	0	0	15/25	