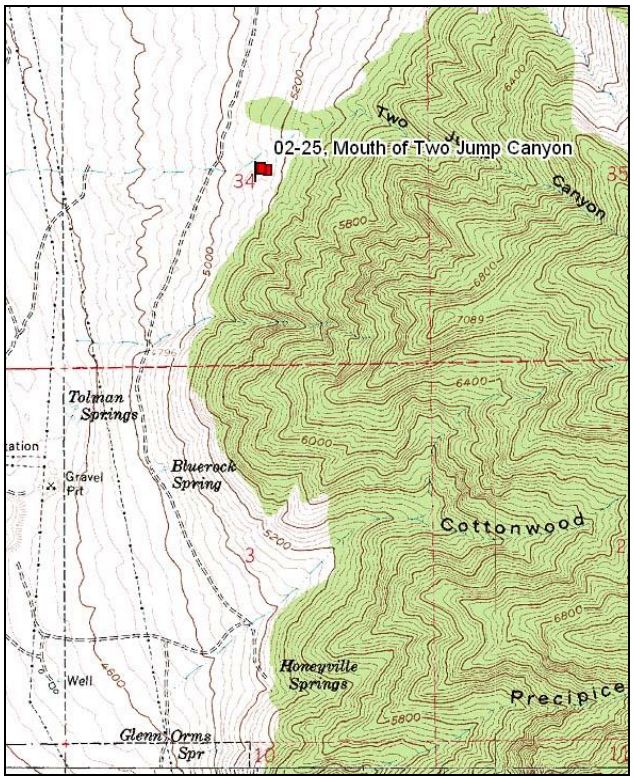
MOUTH OF TWO JUMP CANYON - TREND STUDY NO. 2-25-11

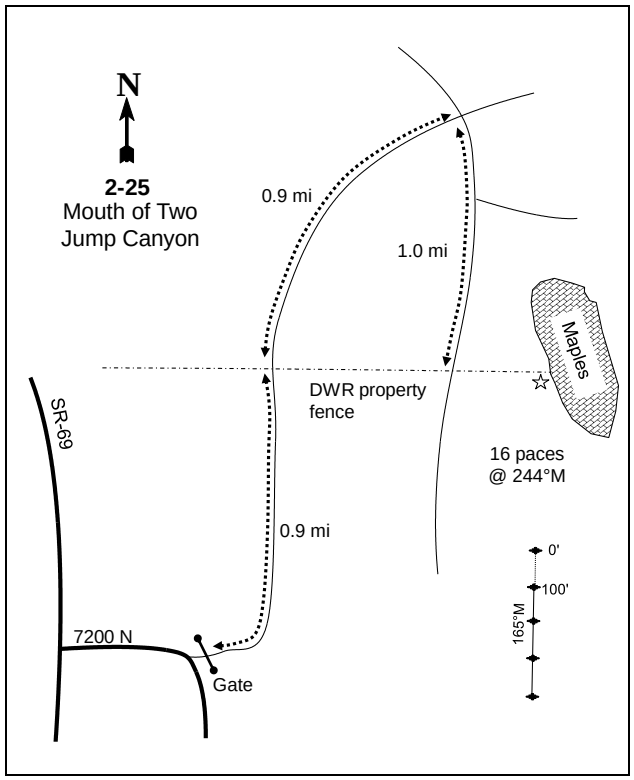
Vegetation Type: Mountain Big Sagebrush
Range Type: Crucial Deer Winter, Substantial Elk Year-long
NRCS Ecological Site Description: Upland Stony Loam (Mountain Big Sagebrush), R028AY334UT
Land Ownership: USFS
Elevation: 5,100 ft (1,555 m)
Aspect: West
Slope: 24%
Transect bearing: 165° magnetic
Belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft)

Directions:
From the junction of 7200 North and U-69 in Honeyville, proceed east and north for 0.55 miles to a gate. Proceed 0.9 miles to the north to a fence. Continue another 0.9 miles and turn right (south) and travel 1.0 mile to a fence running east and west. Walk east along the fence (approximately 200 yards) past one maple stand, and stopping at the second which the fence passes through. From where the fence enters the maples walk 16 paces at 244 degrees magnetic to the 0-foot stake of the baseline marked with browse tag #7923.

Map Name: Honeyville



Diagrammatic Sketch:



Township: 11N Range: 2W Section: 34

GPS: NAD 83, UTM 12S 412139 E 4611222 N

MOUTH OF TWO JUMP CANYON - TREND STUDY NO. 2-25

Site Information

Site Description: This study is located east of Honeyville, just south of Two Jump Canyon. It samples one of the better mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) communities in the unit. It was noted that the area received heavy winter use by deer in 1984 and 1990. Deer pellet groups were sampled in high abundance in 2001 and moderate abundance in 2006 and 2011. Elk pellet groups were sampled in low abundance in 2001 and 2011. Cattle pats were sampled in low abundance in 2001 and 2011 (Table - Pellet Group Data).

Browse: The preferred browse species is mountain big sagebrush, which has a moderate population size. The sagebrush is a mature population with fairly good recruitment of young plants to the population over the sample years. Over the course of the study sagebrush have received light to moderate use. Decadence was high between 1990 and 2001. There were elevated numbers of dead sagebrush between the 1996 and 2006 sample years. Young and mature sagebrush have displayed good vigor over the course of the study. Over the duration of the study, decadent sagebrush has had a moderate amount of chlorotic and dying plants within the demographic. The weedy increaser species broom snakeweed (*Gutierrezia sarothrae*) is the most abundant shrub. The density of broom snakeweed has been high over the course of the study, and increased in density from 1984 to 2001. Since 2001, broom snakeweed has decreased substantially in density. A few other shrub species are rare and are patchy. They include slenderbush eriogonum (*Eriogonum microthecum*), bigtooth maple (*Acer grandidentatum*), Rocky Mountain smooth sumac (*Rhus glabra* ssp. *cismontana*), and Utah juniper (*Juniperus osteosperma*) (Table - Browse Characteristics).

Herbaceous Understory: The weedy annual grass species rattlesnake brome (*Bromus brizaeformis*), Japanese chess (*B. japonicus*), and cheatgrass (*B. tectorum*) dominate the herbaceous understory. Perennial grasses are represented in moderate amounts by Sandberg bluegrass (*Poa secunda*) and bluebunch wheatgrass (*Agropyron spicatum*). Bulbous bluegrass (*Poa bulbosa*) is a weedy, mat-forming grass that has increased significantly in occurrence and increased substantially in cover since 2001. Forbs are diverse and contain some desirable species, which include arrowleaf balsamroot (*Balsamorhiza sagittata*), Wyoming painted-cup (*Castilleja linariaefolia*), Utah locoweed (*Astragalus utahensis*), Gray lomatium (*Lomatium grayi*), and sulfur eriogonum (*Eriogonum umbellatum*) (Table - Herbaceous Trends).

Soil: The soil is part of the Sterling component, which is found on mountain slopes and alluvial fans. The parent material consists of alluvium, colluvium, and lacustrine deposits derived from limestone, dolomite sandstone, and quartzite (Soil Survey Staff 2011). Soil texture is a gravelly loam with a soil reaction that is moderately alkaline (pH 7.9) (Table - Soil Analysis Data). Rock is common on the surface and throughout the soil profile. Bare ground cover is low, while protective ground cover effectively limits erosion by high amounts of vegetation and litter cover (Table - Basic Cover). The soil erosion condition has been classified as stable since 2001.

Trend Assessments

Browse:

- **1984 to 1990 - down (-2):** The density for mountain big sagebrush decreased 29% from 2,065 plants/acre to 1,465 plants/acre. Sagebrush decadence increased from 26% to 73%. Poor vigor increased from 6% to 45% of the population.
- **1990 to 1996 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Sagebrush decadence decreased to 41% and poor vigor decreased to 15% of the population. Decadence is still considered to be very high. Recruitment of young sagebrush plants increased from 5% to 18% of the population.

- **1996 to 2001 - down (-2):** The density for sagebrush decreased 22% from 1,860 plants/acre to 1,460 plants/acre. Sagebrush decadence increased to 52% of the population, and poor vigor increased to 21%. Recruitment of young sagebrush plants remained good at 18% of the population.
- **2001 to 2006 - stable (0):** The density for sagebrush decreased 10% to 1,320 plants/acre. Decadence decreased to 24% of the sagebrush population, while poor vigor decreased to 17% of the population. Recruitment of young sagebrush plants decreased to 6% of the population.
- **2006 to 2011 - up (+2):** The density for sagebrush increased 24% to 1,640 plants/acre. Decadence decreased to 11% of the sagebrush population, and poor vigor decreased to 10% of the total population. Recruitment of young sagebrush plants increased to 12% of the population.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased over two-fold. The increase is directly related to the significant increase in the nested frequency for Sandberg bluegrass, which was the most abundant perennial grass sampled on the site.
- **1990 to 1996 - stable (0):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 9%. Prairie junegrass (*Koeleria cristata*) and bulbous bluegrass were measured for the first time, but with low nested frequencies. Annual species were included in the sample for the first time. The weedy species cheatgrass and rattlesnake brome dominated the herbaceous understory, and had covers of 20% and 4%, respectively.
- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 43%. Sandberg bluegrass was directly associated with this increase with a significant increase in nested frequency. Sandberg bluegrass also increased in cover from 4% to 6%. The weedy, annual species cheatgrass and rattlesnake brome decreased significantly in nested frequency, and cover decreased to 15% and 1%, respectively.
- **2001 to 2006 - down (-2):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, decreased 20%. Sandberg bluegrass decreased significantly in nested frequency, and decreased in cover from 6% to 2%. The weedy perennial species bulbous bluegrass increased significantly in nested frequency, and increased in cover from less than 1% to 7%. The weedy annual species cheatgrass decreased significantly in nested frequency, and decreased in cover to 7%. The weedy annual species rattlesnake brome increased significantly in nested frequency, and increased in cover to 3%
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 19%. However, the weedy perennial species bulbous bluegrass increased significantly in nested frequency, and increased in cover to 13%. The annual species cheatgrass decreased significantly in nested frequency, and decreased in cover to 2%.

Forb:

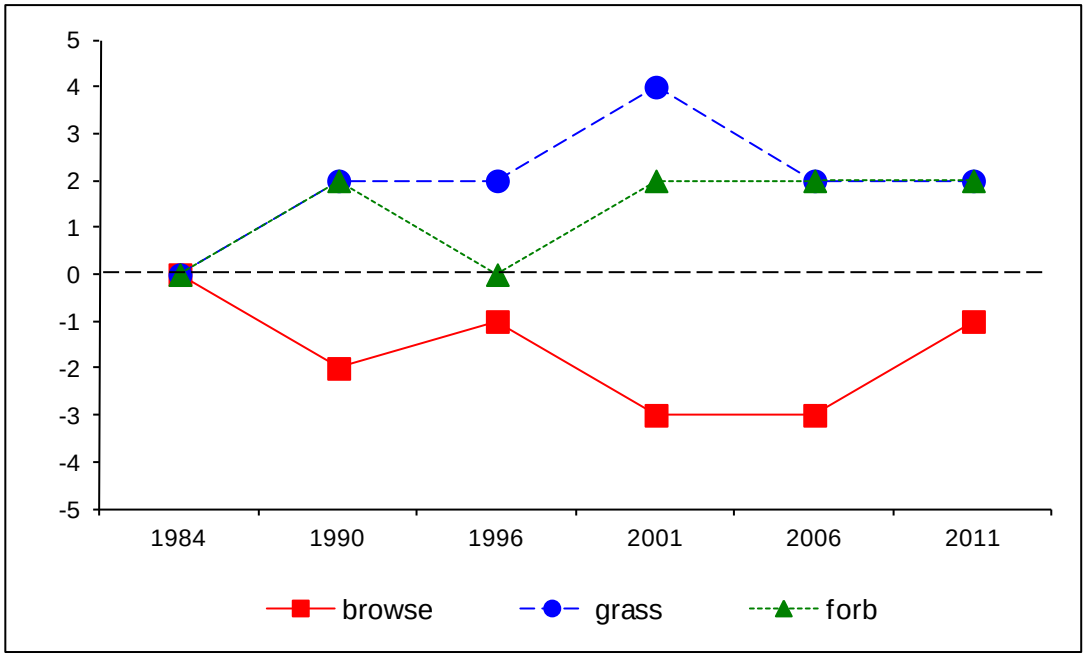
- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial forbs increased two-fold. This increase is directly due to the significant increase in nested frequencies for arrowleaf balsamroot and Gray lomatium.
- **1990 to 1996 - down (-2):** The sum of nested frequency for perennial forbs decreased 25%. Annual forbs were included in the sample for the first time in 1996. Pale alyssum was the most common annual forb.
- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial forbs increased 56%. The weedy, perennial wild onion (*Allium sp.*) increased significantly in nested frequency, but had a cover of less than 1%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial forbs remained similar. However, the weedy species western ragweed increased in cover from less than 1% to 2%.
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial forbs remained similar. The noxious weed Dyer's woad (*Isatis tinctoria*) was observed for the first time, but with no substantial frequency or cover.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 2, study no: 25

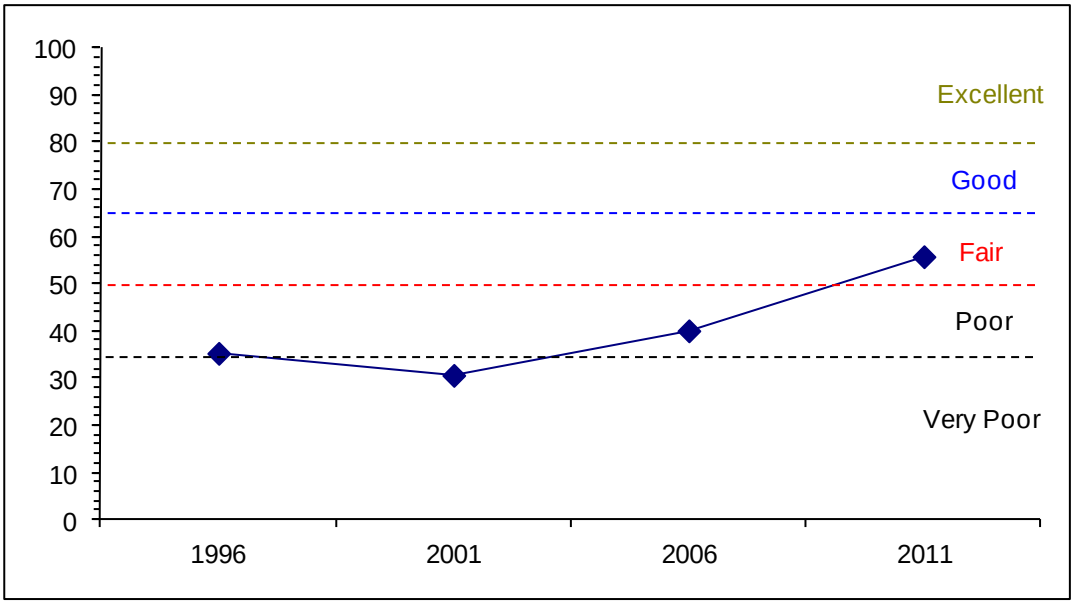
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
96	16.9	3.9	8.1	16.4	-20.0	10.0	0.0	**35.3**	Very Poor-Poor
01	9.4	-0.6	7.5	17.2	-12.9	10.0	0.0	**30.6**	Very Poor
06	9.4	8.6	2.7	17.2	-7.8	10.0	0.0	**40.1**	Poor
11	12.7	11.7	6.0	23.1	-5.8	10.0	-2.0	**55.8**	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 2 Study no: 25



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 2, Study no: 25



HERBACEOUS TRENDS--
Management unit 02, Study no: 25

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron spicatum	a43	ab65	a39	a43	b98	b85	3.73	2.10	6.35	7.26
G	Bromus brizaeformis (a)	-	-	c267	a174	b219	bc234	4.28	1.18	2.80	3.24
G	Bromus japonicus (a)	-	-	a67	a72	a49	b151	1.12	.83	.71	2.82
G	Bromus tectorum (a)	-	-	d373	c334	b263	a92	20.85	15.16	6.76	1.65
G	Festuca myuros (a)	-	-	b47	a-	a8	a5	1.13	-	.07	.04
G	Koeleria cristata	-	-	5	6	-	5	.09	.15	-	.30
G	Poa bulbosa	-	-	a6	a26	b161	c198	.04	.24	6.85	12.93
G	Poa fendleriana	a-	a-	a-	a-	a3	b10	-	-	.03	.07
G	Poa secunda	a24	b100	b136	c208	b105	b145	4.36	6.32	2.19	3.92
Total for Annual Grasses		0	0	754	580	539	482	27.40	17.17	10.36	7.76
Total for Perennial Grasses		67	165	186	283	367	443	8.22	8.83	15.43	24.50
Total for Grasses		67	165	940	863	906	925	35.63	26.00	25.80	32.26
F	Achillea millefolium	12	16	11	8	11	5	.33	.06	.24	.21
F	Agoseris glauca	-	-	-	-	3	7	-	-	.00	.04
F	Allium sp.	a-	a2	a7	b73	a12	b45	.07	.20	.06	.33
F	Alyssum alyssoides (a)	-	-	a152	b260	a171	b236	1.00	1.56	.32	4.86
F	Ambrosia psilostachya	27	39	31	33	56	40	.62	.38	1.66	1.43
F	Apocynum androsaemifolium pumilum	a-	b10	a-	b15	b14	b27	-	.18	.43	.62
F	Arabis sp.	-	1	1	-	-	-	.00	-	-	-
F	Arenaria fendleri	-	-	-	2	-	3	-	.03	-	.00
F	Artemisia ludoviciana	a22	ab24	a16	ab29	ab28	b43	.52	.38	1.39	3.29
F	Astragalus sp.	1	-	5	3	-	-	.04	.03	-	-

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Astragalus utahensis	-	-	5	6	6	2	.18	.45	.30	.15
F	Balsamorhiza sagittata	a33	b73	b64	ab67	ab57	ab59	5.22	4.31	6.48	8.42
F	Calochortus nuttallii	-	-	-	5	3	7	-	.01	.00	.02
F	Castilleja linariaefolia	-	-	3	-	-	-	.03	-	-	-
F	Cirsium undulatum	-	1	1	4	11	13	.04	.06	.54	.89
F	Comandra pallida	a-	a2	a6	a6	b29	ab12	.09	.04	.37	.08
F	Cryptantha sp.	-	5	3	3	8	8	.03	.00	.29	.07
F	Cymopterus sp.	-	-	-	-	5	4	-	-	.30	.03
F	Draba sp. (a)	-	-	a-	c48	bc32	b19	-	.14	.05	.04
F	Epilobium brachycarpum (a)	-	-	ab1	ab3	b13	a1	.00	.00	.05	.00
F	Eriogonum umbellatum	a5	a6	ab16	b25	ab16	ab17	.40	.15	.54	.45
F	Erodium cicutarium (a)	-	-	2	-	-	-	.06	-	-	-
F	Gilia sp. (a)	-	-	-	4	-	-	-	.00	-	-
F	Hackelia patens	a-	b18	ab11	a3	a2	a2	.25	.00	.01	.00
F	Hedysarum boreale	a-	b12	a-	ab1	ab8	ab4	.06	.15	.48	.18
F	Holosteum umbellatum (a)	-	-	a17	c113	b65	bc85	.03	.22	.16	1.55
F	Isatis tinctoria	-	-	-	-	-	1	-	-	-	.00
F	Lactuca serriola (a)	-	-	1	-	4	-	.00	-	.01	-
F	Lithospermum ruderale	a4	ab4	ab19	ab22	a4	b24	.64	.70	.36	1.14
F	Lomatium grayi	a-	c64	a8	ab21	bc49	a10	.07	.58	.73	.19
F	Machaeranthera canescens	a-	a-	a-	a2	b12	a3	-	.00	.37	.03
F	Machaeranthera grindelioides	-	-	-	2	-	-	-	.00	-	-
F	Melilotus officinalis	-	-	-	-	5	-	-	-	.03	-
F	Microsteris gracilis (a)	-	-	a-	b12	b18	a-	-	.04	.04	-
F	Penstemon sp.	b7	ab1	a-	ab3	a-	a-	.00	.00	-	-
F	Petradoria pumila	-	-	-	-	2	-	-	-	.00	-
F	Phacelia sp.	c32	b3	b7	a-	a-	a-	.12	-	-	-
F	Phlox longifolia	-	6	2	4	4	3	.03	.06	.04	.00
F	Polygonum douglasii (a)	-	-	2	-	3	-	.00	-	.00	-
F	Ranunculus testiculatus (a)	-	-	-	2	-	-	-	.00	-	-
F	Tragopogon dubius (a)	a1	a7	a7	b34	bc51	c59	.10	.49	.62	.76
F	Veronica biloba (a)	-	-	-	-	8	-	-	-	.01	-
F	Zigadenus paniculatus	a-	a-	a-	a-	a1	b9	-	-	.00	.08
Total for Annual Forbs		1	7	182	476	365	400	1.21	2.48	1.27	7.22
Total for Perennial Forbs		143	287	216	337	346	348	8.80	7.84	14.69	17.73
Total for Forbs		144	294	398	813	711	748	10.01	10.32	15.97	24.95

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

BROWSE TRENDS--
Management unit 02, Study no: 25

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata vaseyana	63	55	49	51	12.42	7.53	6.60	10.19
B	Eriogonum microthecum	1	0	0	1	-	-	-	-
B	Gutierrezia sarothrae	75	83	57	48	3.33	4.02	1.79	1.84
B	Purshia tridentata	0	0	3	0	-	-	.78	-
B	Rhus glabra cismontana	0	0	0	0	1.37	-	-	-
Total for Browse		139	138	109	100	17.13	11.56	9.18	12.03

CANOPY COVER, LINE INTERCEPT--
Management unit 02, Study no: 25

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	10.26	13.28
Gutierrezia sarothrae	2.65	3.59

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 02, Study no: 25

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	1.3	1.8	1.8

BASIC COVER--
Management unit 02, Study no: 25

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	1.50	7.00	56.31	56.03	50.77	57.59
Rock	18.00	16.75	14.04	12.02	12.39	13.68
Pavement	21.25	13.75	3.66	3.74	4.63	7.71
Litter	57.50	55.75	65.69	49.71	43.88	48.75
Cryptogams	.50	.25	.70	.48	.93	3.03
Bare Ground	1.25	6.50	.44	.28	4.53	2.54

SOIL ANALYSIS DATA --
Management unit 02, Study no: 25, Study Name: Mouth of Two Jump Canyon

Effective rooting depth (in)	pH	Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.8	7.9	43.4	33.4	23.3	3.5	13.3	70.4	0.6

PELLET GROUP DATA--
Management unit 02, Study no: 25

Type	Quadrat Frequency			
	'96	'01	'06	'11
Rabbit	1	6	18	16
Elk	-	-	4	-
Deer	7	14	12	6
Cattle	2	-	1	-

Days use per acre (ha)		
'01	'06	'11
-	-	-
1 (3)	-	3 (7)
45 (111)	29 (71)	24 (60)
3 (70	-	1 (2)

BROWSE CHARACTERISTICS--
Management unit 02, Study no: 25

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Acer grandidentatum									
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	-/-
Artemisia tridentata vaseyana									
84	**2065**	3	71	26	266	23	77	6	42/43
90	**1465**	5	23	73	66	41	23	45	27/33
96	**1860**	18	41	41	200	32	2	15	27/41
01	**1460**	15	33	52	100	12	0	21	26/35
06	**1320**	6	70	24	840	5	0	17	28/41
11	**1640**	12	77	11	120	5	0	10	24/41
Chrysothamnus nauseosus albicaulis									
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	-	-	0	0	0	32/53
Eriogonum microthecum									
84	**0**	0	0	-	-	0	0	0	-/-
90	**0**	0	0	-	-	0	0	0	-/-
96	**40**	0	100	-	-	0	0	0	18/22
01	**0**	0	0	-	-	0	0	0	-/-
06	**0**	0	0	-	-	0	0	0	9/20
11	**20**	0	100	-	-	0	0	0	-/-

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Gutierrezia sarothrae									
84	**3066**	0	100	0	-	0	0	0	13/10
90	**9665**	55	40	5	66	0	0	2	11/12
96	**5580**	25	75	0	3820	0	0	0	11/14
01	**7460**	1	88	11	20	0	0	16	11/13
06	**3120**	8	83	9	100	10	6	3	9/12
11	**2040**	11	89	0	-	0	0	0	14/15
Purshia tridentata									
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	**80**	0	100	-	-	100	0	0	32/72
11	**0**	0	0	-	-	0	0	0	-/-
Rhus glabra cismontana									
84	**0**	0	0	-	-	0	0	0	-/-
90	**0**	0	0	-	-	0	0	0	-/-
96	**0**	0	0	-	420	0	0	0	70/107
01	**0**	0	0	-	-	0	0	0	-/-
06	**0**	0	0	-	-	0	0	0	-/-
11	**0**	0	0	-	-	0	0	0	-/-