

CLAY VALLEY - TREND STUDY NO. 3-3-11

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Stony Loam \(Mountain Big Sagebrush\), R047XA461UT](#)

Land Ownership: Private

Elevation: 6,420 ft (1,957 m)

Aspect: Southeast

Slope: 28%

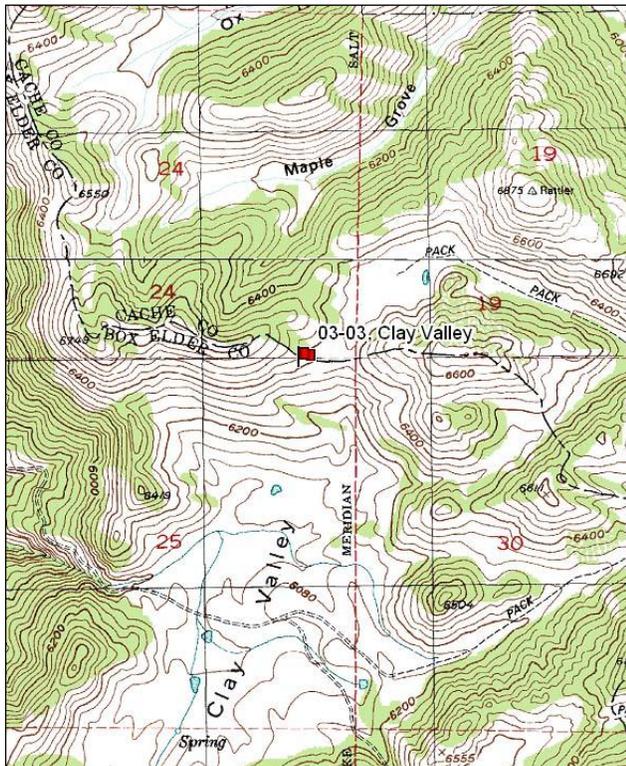
Transect bearing: 163° magnetic

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

Directions:

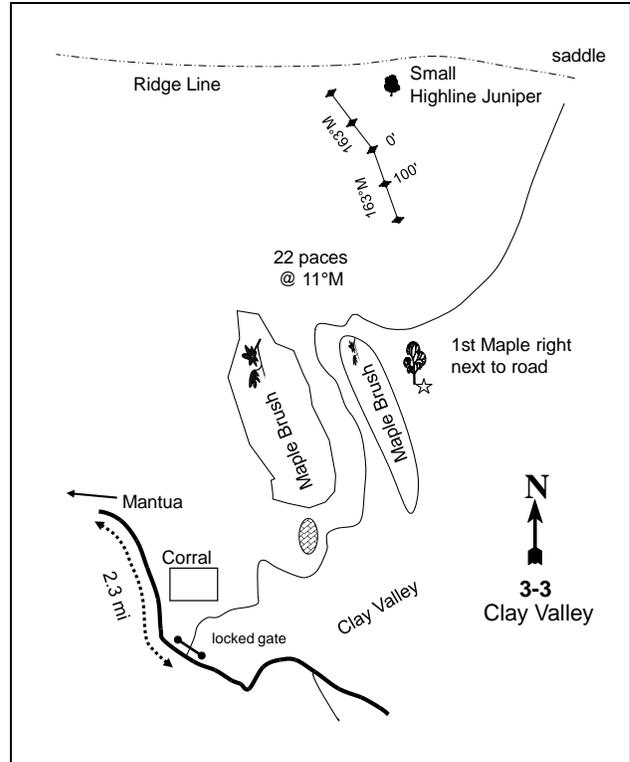
From the Mantua Hatchery, proceed 0.65 mile (towards Mantua) to first possible right turn. Turn right and proceed 2.3 miles up the canyon to Clay Valley and stop at a locked gate on the east end of the corral. Cross the gate and begin walking down the road in a northern direction. You will pass a stock pond on the left side of the road. After approximately 0.75 miles, the road will pass through a dense stand of maples. Hook sharply to the right and break out of the maples. Proceed 54 paces past the switchback to the first lone maple on the right side of the road. From the maple, walk approximately 22 paces on a bearing of 11 degrees magnetic to the 200-foot stake of the baseline. The 0-foot baseline stake is 200 feet at a bearing of 343 degrees magnetic and is marked by browse tag #7997. The first 200 feet of the baseline run 163 degrees magnetic. The second 200 feet run off the 0-foot baseline stake at a bearing of 282 degrees magnetic.

Map Name: Mantua



Township: 9N Range: 1W Section: 25

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 425363 E 4594164 N

Site Information

Site Description: The study is located in the foothills above Clay Valley, east of Mantua. The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community. The area is privately owned and is considered crucial winter range. The area is grazed by sheep from May to early June to control dyer's woad. Cattle graze the property, but typically stay at lower elevations. Although the area is within the limits of deer winter range, there were few signs of any significant deer use from 1984-1996. A deer fence was installed along Highway 89 in Sardine Canyon between 1996 and 2001 that forces the deer to winter more in the area. Since then, deer presence has been higher on the site. Deer pellet groups were sampled in high abundance in 2001, moderate abundance in 2006, and low abundance in 2011. Deer presence was likely lighter in 2011 due to the severe winter of 2010-2011, which forced deer to lower elevations. Elk pellet groups have been sampled in low abundance since 2001. Sampled cattle and sheep sign has been minimal since 2001 (Table - Pellet Group Data).

Browse: The key browse species is mountain big sagebrush, which provides nearly all of the browse cover on the site (Table - Browse Trends). The sagebrush is a moderately dense population of mostly lightly to moderately used plants. There was a large decrease in density in 2006, but the remaining population appeared healthy. Decadence has been mostly low to moderate, and poor vigor has been low in the population. Decadence appears to be highest farther up the hillside along the transect. Recruitment of young plants has been mostly good over the course of the study. Mountain snowberry (*Symphoricarpos oreophilus*) is scattered over the site, but has increased in abundance since 1996. Other shrubs such as white rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *albicaulis*), stickyleaf low rabbitbrush (*C. viscidiflorus* ssp. *viscidiflorus*), and broom snakeweed (*Gutierrezia sarothrae*) are sparsely distributed throughout the area (Table - Browse Characteristics). There is a dense stand of bigtooth maple (*Acer grandidentatum*) trees at the base of the hill from the study.

Herbaceous Understory: Perennial grasses are diverse and abundant on the site. The two most abundant species are bluebunch wheatgrass (*Agropyron spicatum*) and the weedy species bulbous bluegrass (*Poa bulbosa*). Other less abundant perennial species include Sandberg bluegrass (*P. secunda*), Kentucky bluegrass (*P. pratensis*), and oniongrass (*Melica bulbosa*). Two annual brome species, cheatgrass (*Bromus tectorum*) and Japanese chess (*B. japonicus*), also occur on the site. Annual grass cover was very high in 1996, but has been more moderate since 2001. Slightly lower on the slope is a large abundance of slender wheatgrass (*Agropyron trachycaulum*), crested wheatgrass (*A. cristatum*), mountain brome (*Bromus carinatus*), smooth brome (*B. inermis*), subalpine needlegrass (*Stipa columbiana*), and Great Basin wildrye (*Elymus cinereus*). Grasses show evidence of light to negligible grazing use. Forbs are diverse and have increased in abundance over the course of the study. Weedy forb species are common, but the perennial forb silvery lupine (*Lupinus argenteus*) has provided the majority of forb cover since 2001. The noxious weed dyer's woad (*Isatis tinctoria*) is found on the site. However over the last 15 years the land owners have forced sheep into patches of dyer's woad, which has kept it from greatly expanding (Table - Herbaceous Trends).

Soil: The soil is in the Yeates Hollow-Goring association, which occurs on mountains and alluvial fans. Parent material consists of alluvium, colluvium, and residuum derived from sandstone and quartzite (Soil Survey Staff 2011). The soils have a clay loam texture and a soil reaction that is slightly acidic (pH 6.3). Organic matter is relatively high at over 5% (Table - Soil Analysis Data). Gravel is abundant throughout the profile. Protective cover provided by vegetation and litter is abundant and prevents all but minor erosion. Bare ground is rare and usually associated with cattle trails (Table - Basic Cover). The soil erosion condition has been classified as stable since 2001.

Trend Assessments

Browse:

- **1984 to 1990 - stable (0):** There was a slight increase in the density of mountain big sagebrush from 3,531 plants/acre to 3,798 plants/acre. Poor vigor remained low at 4%, but decadence increased from 11% to 42%.
- **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 mountain big sagebrush decreased to 18%, similar to 1984 values. Plants displaying poor vigor remained similar at 2%. Recruitment of young sagebrush plants increased from 0% to 23% of the population.
- **1996 to 2001 - stable (0):** The density of mountain big sagebrush decreased by 10% from 2,900 plants/acre to 2,620 plants/acre, but cover increased from 17% to 24%. Most of the decrease in density was due to a decrease in the recruitment of young plants, which decreased to 2%. Decadence remained the same at 18%, and poor vigor increased slightly to 5%.
- **2001 to 2006 - down (-2):** Mountain big sagebrush density decreased by 38% to 1,620 plants/acre, and cover decreased to 10%. There were also a large number of dead plants sampled. Recruitment of young plants increased to 20% of the population. Decadence increased slightly to 23%, and poor vigor increased to 11%.
- **2006 to 2011 - stable (0):** Density of mountain big sagebrush remained similar at 1,580 plants/acre, though cover increased slightly to 11%. Recruitment of young sagebrush plants increased to 29% of the population. There appeared to be more recruitment on the belts lower on the hillside. Decadence decreased to 13%, but poor vigor remained similar at 11%. Decadence was more prevalent in the plants on the belts higher on the hill.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency of perennial grasses increased two-fold. There was a significant increase in the nested frequency of bluebunch wheatgrass and Sandberg bluegrass.
- **1990 to 1996 - slightly down (-1):** The perennial grass sum of nested frequency, excluding bulbous bluegrass, decreased by 15%. There was a significant increase in the nested frequency of the weedy species bulbous bluegrass, which dominated the site in cover in 1996. The annual species Japanese chess and cheatgrass were included in the sample for the first time in 1996, and were also prevalent. Bluebunch wheatgrass also increased significantly in nested frequency, but is not as abundant as the less desirable species.
- **1996 to 2001 - slightly up (+1):** The perennial grass sum of nested frequency, excluding bulbous bluegrass, increased by 11%, and cover increased from 12% to 16%. The weedy species bulbous bluegrass had a significant increase in nested frequency, and cover increased from 13% to 19%. The weedy annual species Japanese chess decreased significantly in nested frequency, and cover decreased from 13% to 1%.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency of perennial grasses, excluding bulbous bluegrass, increased 15%, and cover increased to 19%. There was a significant decrease in the nested frequency of bulbous bluegrass, and cover decreased to 8%. Japanese chess and cheatgrass both increased significantly in nested frequency, and cover of annual grasses increased from 2% to 6%.
- **2006 to 2011 - stable (0):** The sum of nested frequency of perennial grasses, excluding bulbous bluegrass, decreased by 24%, but cover increased to 27%. Most of the decrease in frequency of perennial grasses was due to a significant decrease in the nested frequency of Sandberg bluegrass. Bluebunch wheatgrass has increased significantly since 2001, and provided the majority of the grass cover in 2011.

Forb:

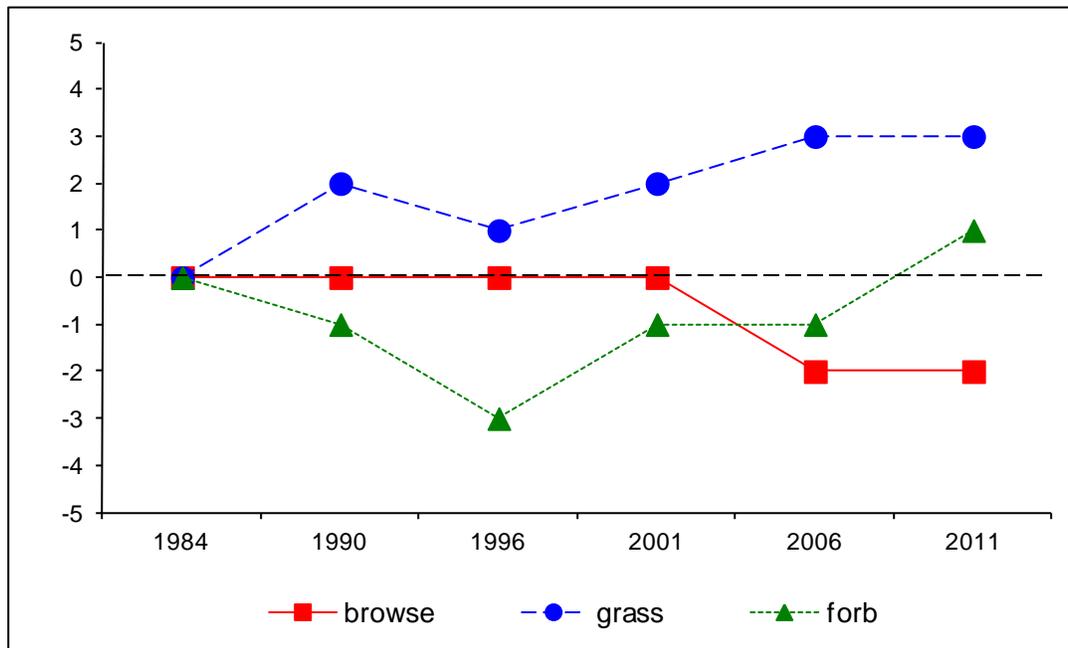
- **1984 to 1990 - slightly down (-1):** The sum of nested frequency of perennial forbs increased by 28%, but most of the increase was due to a significant increase in the noxious weed dyer's woad. The annual forb sum of nested frequency also increased substantially.
- **1990 to 1996 - down (-2):** The perennial forb sum of nested frequency decreased by 72%, though dyer's woad decreased significantly. Annual forbs remained prevalent on the site.
- **1996 to 2001 - up (+2):** The sum of nested frequency of perennial forbs increased two-fold, and cover increased from 2% to 10%. Much of this increase was due to a significant increase in the nested frequency of silvery lupine. Silvery lupine became the dominant forb on the site.
- **2001 to 2006 - stable (0):** The sum of nested frequency of perennial forbs remained similar, though cover increased to 14%. There was a significant increase in the nested frequency of silvery lupine, with a subsequent increase in cover. The noxious weed dyer's woad also increased significantly, but cover remained low at 1%.
- **2006 to 2011 - up (+2):** The sum of nested frequency of perennial forbs increased by 27%, and cover increased to 16%. The annual forb sum of nested frequency and cover also increased substantially.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 3, study no: 3

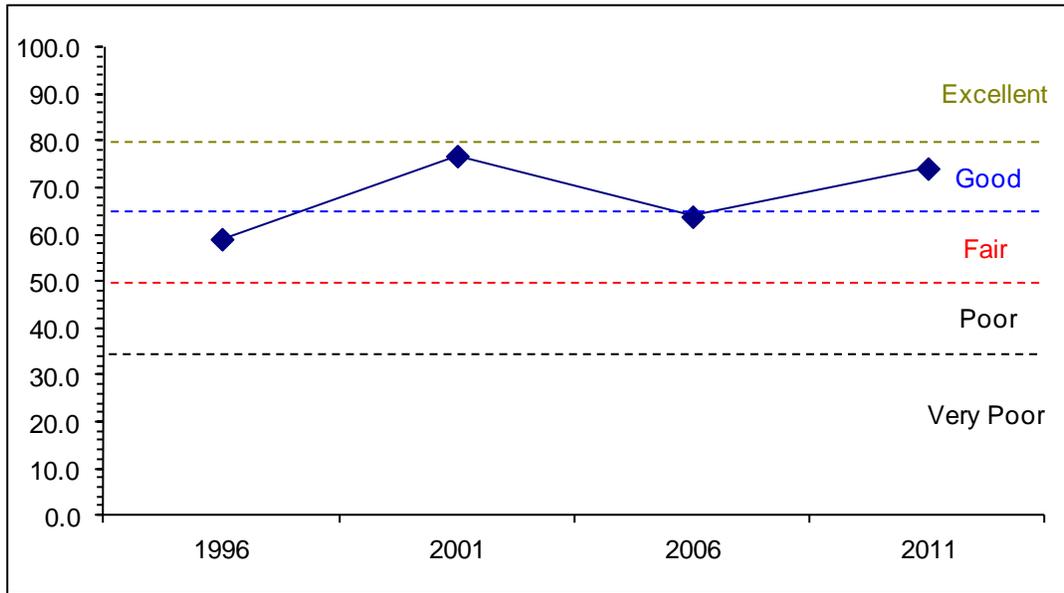
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	20.8	9.6	11.5	24.3	-9.6	4.5	-2.0	59.1	Fair
01	29.3	9.6	1.0	30.0	-1.1	10.0	-2.0	76.8	Good
06	12.5	8.1	10.0	30.0	-4.8	10.0	-2.0	63.9	Fair-Good
11	13.8	11.1	14.5	30.0	-3.2	10.0	-2.0	74.1	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 3 Study no: 3



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 3, Study no: 3



HERBACEOUS TRENDS--
Management unit 03, Study no: 3

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron spicatum	a28	b87	c156	c176	cd182	d211	8.15	11.82	13.86	25.30
G	Agropyron trachycaulum	2	2	-	1	-	6	-	.00	.00	.24
G	Bromus carinatus	-	3	-	-	-	7	-	-	-	.18
G	Bromus japonicus (a)	-	-	c293	a64	b176	b185	12.51	.86	3.59	2.40
G	Bromus tectorum (a)	-	-	a25	a29	b103	a39	.31	.64	2.76	1.92
G	Koeleria cristata	1	-	-	-	2	1	-	-	.06	.03
G	Melica bulbosa	ab44	ab36	a15	a28	b63	ab37	.22	.17	2.33	.35
G	Poa bulbosa	a18	a63	b213	c307	b202	b196	12.98	19.38	7.78	9.21
G	Poa pratensis	bcd79	d97	ab44	cd86	abc50	a17	1.30	3.42	1.33	.50
G	Poa secunda	a20	b129	b87	a41	b89	a14	2.44	.68	1.47	.25
G	Stipa columbiana	-	-	-	3	-	-	-	.15	.01	-
Total for Annual Grasses		0	0	318	93	279	224	12.83	1.50	6.36	4.32
Total for Perennial Grasses		192	417	515	642	588	489	25.12	35.64	26.87	36.08
Total for Grasses		192	417	833	735	867	713	37.95	37.15	33.24	40.40
F	Achillea millefolium	c99	bc87	ab51	abc51	a43	a42	.89	1.21	1.51	1.70
F	Agoseris glauca	b50	b37	a10	ab32	a8	b34	.02	.26	.03	.13
F	Allium acuminatum	b44	a14	a-	a3	a11	a4	-	.03	.03	.05
F	Alyssum alyssoides (a)	-	-	ab25	a11	b36	c92	.05	.06	.12	.44
F	Arabis sp.	-	-	-	-	-	-	-	.00	-	-
F	Aster sp.	1	-	-	-	-	-	-	-	-	-
F	Astragalus sp.	b20	b28	a-	a-	a-	a6	-	-	-	.01
F	Calochortus nuttallii	5	6	-	-	-	3	-	-	-	.01
F	Camelina microcarpa (a)	-	-	3	-	12	8	.00	-	.10	.04

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	<i>Cirsium undulatum</i>	a3	b23	ab16	ab11	a8	a5	.77	.30	.10	.06
F	<i>Collinsia parviflora</i> (a)	-	-	a1	a9	b59	a15	.00	.01	.15	.17
F	<i>Collomia linearis</i> (a)	-	-	b28	a1	c83	c110	.08	.00	.41	4.40
F	<i>Crepis acuminata</i>	3	-	1	-	-	-	.00	-	-	-
F	<i>Cryptantha</i> sp.	a-	a-	a3	a3	b25	a12	.03	.00	.16	.07
F	<i>Cryptantha</i> sp.(a)	-	-	a-	a-	b43	b52	-	-	.24	.26
F	<i>Descurainia pinnata</i> (a)	-	-	a-	a-	a3	b17	-	-	.00	.20
F	<i>Draba</i> sp. (a)	-	-	a1	ab10	ab15	b18	.00	.02	.03	.04
F	<i>Epilobium brachycarpum</i> (a)	-	-	ab39	a6	bc55	c86	.35	.04	.20	.89
F	<i>Erodium cicutarium</i> (a)	-	-	-	5	15	-	-	.06	.13	-
F	<i>Galium aparine</i> (a)	-	-	b11	a-	b14	c90	.10	-	.08	3.05
F	<i>Geranium</i> sp.	3	-	3	-	-	-	.01	-	-	-
F	<i>Gilia</i> sp. (a)	-	-	-	1	-	4	-	.00	-	.00
F	<i>Grindelia squarrosa</i>	-	2	-	4	-	-	-	.53	-	-
F	<i>Hackelia patens</i>	-	-	-	-	2	6	-	-	.03	.06
F	<i>Helianthus annuus</i> (a)	-	5	13	3	-	14	.10	.00	-	.37
F	<i>Holosteum umbellatum</i> (a)	-	-	a41	a35	b84	c130	.22	.15	.16	.96
F	<i>Isatis tinctoria</i>	ab9	c109	ab6	a5	b31	ab14	.04	.03	1.04	.36
F	<i>Lactuca serriola</i> (a)	a-	c75	a1	a3	b32	d194	.00	.00	.17	4.69
F	<i>Lappula occidentalis</i> (a)	-	-	1	1	-	-	.00	.00	-	-
F	<i>Lupinus argenteus</i>	a23	a33	a21	b118	c186	c152	.47	7.05	11.05	12.86
F	<i>Madia glomerata</i> (a)	a-	ab11	ab19	a3	ab12	b28	.21	.00	.07	.46
F	<i>Microsteris gracilis</i> (a)	a9	a-	a6	a-	b56	a6	.03	-	.14	.04
F	<i>Phlox longifolia</i>	-	2	-	-	-	-	-	-	-	-
F	<i>Polygonum douglasii</i> (a)	-	-	35	-	26	25	.10	-	.10	.09
F	<i>Senecio multilobatus</i>	b53	a7	a-	a8	a9	a5	-	.02	.02	.10
F	<i>Taraxacum officinale</i>	3	13	1	-	9	6	.00	-	.01	.06
F	<i>Tragopogon dubius</i> (a)	a11	c117	a13	b63	a14	b46	.08	1.63	.16	.57
F	Unknown forb-annual (a)	-	-	-	-	5	-	-	-	.01	-
F	Unknown forb-perennial	a-	b25	a-	a-	a-	a-	-	-	-	-
F	<i>Verbascum thapsus</i>	-	-	-	-	-	2	-	-	-	.03
F	<i>Veronica biloba</i> (a)	-	-	a-	a-	b17	c54	-	-	.09	2.11
F	<i>Vicia americana</i>	-	-	-	-	-	4	-	-	-	.03
F	<i>Viola</i> sp.	a-	b19	a-	a-	a-	a-	-	-	-	-
Total for Annual Forbs		20	208	237	151	581	989	1.36	2.02	2.42	18.85
Total for Perennial Forbs		316	405	112	235	332	295	2.26	9.46	14.00	15.56
Total for Forbs		336	613	349	386	913	1284	3.62	11.48	16.42	34.42

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

BROWSE TRENDS--

Management unit 03, Study no: 3

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Acer grandidentatum	1	1	1	1	.03	.15	.15	.15
B	Artemisia tridentata vaseyana	78	73	58	45	16.62	23.46	10.02	11.02
B	Chrysothamnus nauseosus albicaulis	2	2	1	1	.03	-	.00	.03
B	Chrysothamnus viscidiflorus viscidiflorus	2	3	3	1	.03	.00	-	.15
B	Gutierrezia sarothrae	1	0	0	2	-	-	-	.03
B	Juniperus osteosperma	1	1	1	1	.53	.03	.15	.06
B	Symphoricarpos oreophilus	6	9	14	13	.21	1.50	3.45	3.67
Total for Browse		91	89	78	64	17.45	25.14	13.78	15.11

CANOPY COVER, LINE INTERCEPT--

Management unit 03, Study no: 3

Species	Percent Cover		
	'01	'06	'11
Acer grandidentatum	.60	.36	.80
Artemisia tridentata vaseyana	-	12.38	10.01
Chrysothamnus nauseosus albicaulis	-	.31	.45
Juniperus osteosperma	1.39	1.26	1.96
Symphoricarpos oreophilus	-	3.08	4.75

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 03, Study no: 3

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	2.1	3.0	1.2

BASIC COVER--

Management unit 03, Study no: 3

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	3.00	14.25	58.50	67.65	65.38	71.15
Rock	3.75	1.75	.58	.28	.28	.13
Pavement	3.50	10.75	3.86	1.87	1.83	.76
Litter	76.25	61.50	66.88	55.39	46.95	52.42
Cryptogams	.50	0	.07	.15	.04	0
Bare Ground	13.00	11.75	2.17	5.49	10.38	4.75

SOIL ANALYSIS DATA --

Management unit 03, Study no: 3, Study Name: Clay Basin

Effective rooting depth (in)	pH	Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.3	6.3	28.7	42.0	29.3	5.3	29.3	240.0	0.5

PELLET GROUP DATA--

Management unit 03, Study no: 3

Type	Quadrat Frequency			
	'96	'01	'06	'11
Sheep	1	-	2	-
Elk	3	-	-	4
Deer	7	22	16	1
Cattle	4	1	2	1

Days use per acre (ha)		
'01	'06	'11
-	12 (30)	-
3 (8)	1 (3)	2 (5)
61 (150)	32 (78)	3 (8)
2 (5)	2 (4)	2 (4)

BROWSE CHARACTERISTICS--

Management unit 03, Study no: 3

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Acer grandidentatum</i>									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	20	100	0	-	-	0	0	0	22/29
01	20	0	100	-	-	0	0	0	-/-
06	20	100	0	-	-	0	0	0	-/-
11	20	0	100	-	-	0	0	0	54/52
<i>Artemisia tridentata vaseyana</i>									
84	3531	2	87	11	-	34	13	4	29/43
90	3798	0	58	42	-	12	2	4	39/38
96	2900	23	59	18	100	7	0	2	22/41
01	2620	2	81	18	40	18	0	5	27/42
06	1620	20	57	23	760	33	7	11	28/43
11	1580	29	58	13	1400	9	1	11	21/37
<i>Chrysothamnus nauseosus albicaulis</i>									
84	0	0	0	0	-	0	0	0	-/-
90	0	0	0	0	-	0	0	0	-/-
96	40	0	50	50	-	0	0	0	32/60
01	40	0	50	50	-	0	0	50	29/41
06	40	0	100	0	-	0	0	0	26/43
11	20	0	100	0	-	0	0	0	20/32
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
84	0	0	0	0	-	0	0	0	-/-
90	0	0	0	0	-	0	0	0	-/-
96	40	0	50	50	-	0	0	50	12/24
01	80	0	75	25	-	0	0	25	15/24
06	60	0	100	0	-	0	0	0	13/23
11	40	50	50	0	-	0	0	0	20/27

		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>Gutierrezia sarothrae</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	0	100	-	-	0	0	0	13/20	
01	0	0	0	-	-	0	0	0	8/118	
06	0	0	0	-	-	0	0	0	11/14	
11	120	0	100	-	-	0	0	0	10/10	
<i>Juniperus osteosperma</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	0	100	-	-	0	0	0	-/-	
01	20	0	100	-	-	0	0	0	-/-	
06	20	0	100	-	-	0	0	0	-/-	
11	20	0	100	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	140	0	57	43	-	14	14	29	22/47	
01	240	0	100	0	-	25	0	0	61/48	
06	380	0	100	0	-	5	0	0	28/55	
11	380	11	89	0	-	5	0	0	29/53	