

MEADOWVILLE - TREND STUDY NO. 2-17-11

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Substantial Elk Winter

NRCS Ecological Site Description: [Upland Shallow Loam \(Black Sagebrush\), R047XA316UT](#)

Land Ownership: Private

Elevation: 6,400 ft (1,951 m)

Aspect: South

Slope: 24%

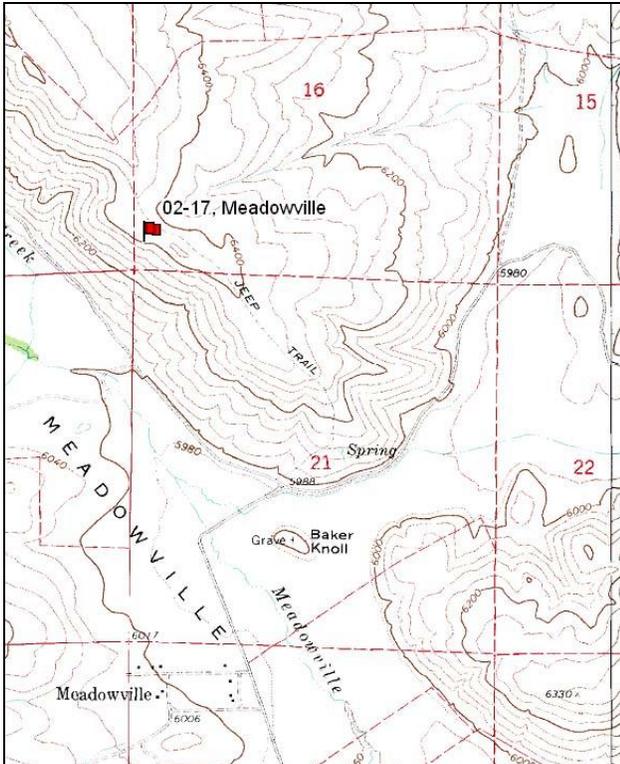
Transect bearing: 161° magnetic

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

Directions:

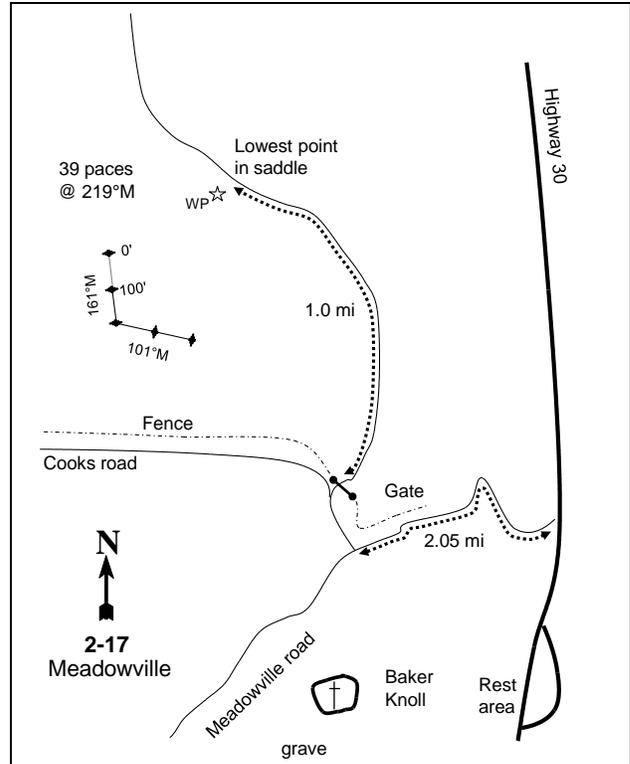
At the intersection of Highway 30 and Meadowville Road, turn west on Meadowville Road and proceed 2.05 miles. Turn right (north) onto Cook's Road and turn immediately right through a large gate. Proceed 1.1 miles, passing a spring on the right and following the ridgetop, to the witness post in the low spot of a small saddle. Walk 39 paces at 219 degrees magnetic from the witness post to the 0-foot baseline stake. The 0-foot stake of the baseline is marked by browse tag # 7939. The 0-foot state is also approximately 75 yards form a fence to the west. The base line runs 161 degrees magnetic. Line 3 and 4 dogleg and run parallel to the fence at a bearing of 101 degrees magnetic.

Map Name: Meadowville



Township: 13N Range: 5E Section: 16

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 466749 E 4634613 N

MEADOWVILLE - TREND STUDY NO. 2-17

Site Information

Site Description: This study is located on the private land Hideaway Ranch, which overlooks the north end of the Meadowville Valley. The site is in a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community. The area is considered crucial deer winter range. Pellet groups were reported to be abundant from 1984 to 1990. Pellet groups were sampled in high abundance for deer and low abundance for elk in 2001. In 2006, deer and elk pellet groups were moderately abundant. In 2011, deer pellet groups were sampled in low abundance, and elk pellet groups were moderately abundant. Deer shed antlers were found in 1984, and deer carcasses were found in 1984 and 2006. Sampled cattle sign has been minimal since 2001 (Table - Pellet Group Data).

Browse: Mountain big sagebrush and antelope bitterbrush (*Purshia tridentata*) are the key browse species. The sagebrush population has consistently declined with each reading since 1984. The entire sagebrush population was classified as decadent in 1984 and remained high through 2001, but has been low since 2006. Recruitment of young sagebrush has been minimal for the duration of the study, though in 2011, recruitment of young sagebrush was good. Antelope bitterbrush is a sparse, stable population that is centered within the mature age class. Recruitment of young bitterbrush plants has been mostly good over the course of the study with the exception of the 2001 and 2011 sample years. Bitterbrush has been moderately to heavily utilized by wildlife over the course of the study. Saskatoon serviceberry (*Amelanchier alnifolia*) is a highly preferred species and is very sparse on the site. The dominant shrub found on site is stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). Broom snakeweed (*Gutierrezia sarothrae*) is also abundant, but has declined in density over the duration of the study (Table - Browse Characteristics).

Herbaceous Understory: The most abundant perennial grasses are bluebunch wheatgrass (*Agropyron spicatum*), Indian ricegrass (*Oryzopsis hymenoides*), and Sandberg bluegrass (*Poa secunda*). In 1984, all of the previously mentioned grass species showed evidence of light to moderate utilization by cattle. The weedy annual species cheatgrass is widely distributed and abundant, which can be detrimental to sagebrush recruitment. Forb growth is sparse and generally low in stature. The most numerous perennial forbs are Utah milkvetch (*Astragalus utahensis*), arrowleaf balsamroot (*Balsamorhiza sagittata*), thistle (*Cirsium* sp.), and wayside gromwell (*Lithospermum ruderale*) (Table - Herbaceous Trends).

Soil: The soil is in the Solak series. The soils occur on hillslopes and ridges; with parent material consisting of colluvium and/or alluvium over residuum derived from conglomerate (Soil Survey Staff 2011). The soil has a clay loam texture with a neutral soil reaction (pH 7.1) (Table - Soil Analysis Data). Bare ground cover is moderate, while protective ground cover is provided by a high amount of vegetation, litter, and pavement (Table - Basic Cover). The soil erosion condition was classified as slight in 2006, but stable in 2001 and 2011.

Trend Assessments

Browse:

- **1984 to 1990 - slightly down (-1):** The density for mountain big sagebrush decreased 34% from 1,466 plants/acre to 964 plants/acre. Decadence of sagebrush plants decreased from 100% to 69%, and poor vigor decreased from 48% to 28% of the sagebrush population. Recruitment of young sagebrush plants increased from 0% to 10% of the population. Antelope bitterbrush increased over two-fold in density from 165 plants/acre to 431 plants/acre. Decadence of bitterbrush plants increased from 0% to 15%, but poor vigor decreased from 20% to 0% of the population. Young bitterbrush comprised 60% 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 for sagebrush decreased to 69% of the population, and poor vigor decreased to 28%. The recruitment of young sagebrush was

good at 10%. Decadence for bitterbrush increased to 15%, and poor vigor was not observed within the bitterbrush population.

- **1996 to 2001 - down (-2):** The density for sagebrush decreased 40% from 860 plants/acre to 520 plants/acre. The health of the sagebrush population was mixed with decadence decreasing to 60%, but poor vigor increasing to 58% of the population. Bitterbrush displayed no change in density. Decadence and poor vigor was not observed within the bitterbrush population.
- **2001 to 2006 - slightly down (-1):** The density for sagebrush decreased 23% to 400 plants/acre. Decadence decreased to 10%, and poor vigor decreased to 5%. The density for bitterbrush increased two-fold from 200 plants/acre to 400 plants/acre. Decadence and poor vigor was not observed within the population.
- **2006 to 2011 - slightly down (-1):** The sagebrush population exhibited no change in density. Decadence and poor vigor was maintained at 10% and 5%, respectively. Bitterbrush decreased in density by 45% to 220 plants/acre. Decadence and poor vigor was not observed within the population.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 33%. Sandberg bluegrass had a significant increase in nested frequency.
- **1990 to 1996 - stable (0):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass had a significant decrease in nested frequency, and had a cover of 2%. Out of the perennial species, bluebunch wheatgrass provided the largest amount of cover at 7%. Annual species were included in the sample for the first time in 1996. The weedy species cheatgrass was very prolific and widespread and had a cover of 20%.
- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial grasses increased 16%. Sandberg bluegrass increased significantly in nested frequency, and cover remained similar at 1%. The weedy annual species cheatgrass decreased significantly in nested frequency, and decreased in cover to 7%.
- **2001 to 2006 - stable (0):** The sum of nested frequency remained similar. Bluebunch wheatgrass had a significant increase in nested frequency, and increased in cover to 12%.
- **2006 to 2011 - slightly down (-1):** The sum of nested frequency for perennial grasses remained similar. No significant change in nested frequency was observed for perennial grasses. The annual species cheatgrass had a significant increase in nested frequency, and increased in cover from 8% to 23%.

Forb:

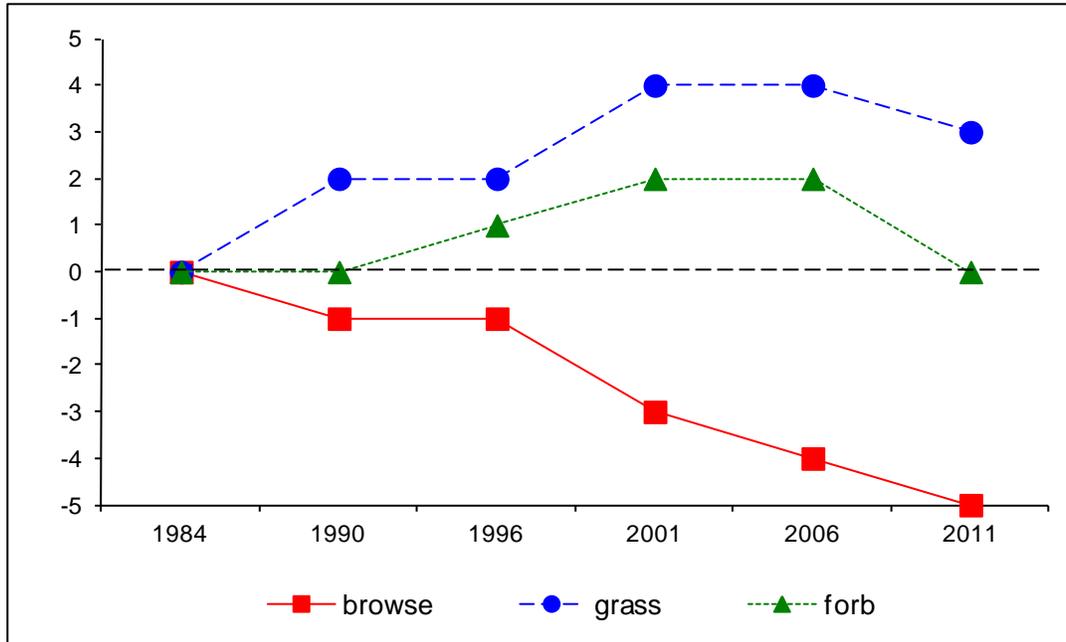
- **1984 to 1990 - stable (0):** The sum of nested frequency for perennial forbs remained similar. Forbs are a minor component of the herbaceous understory.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 18%. The perennial species Lewis flax (*Linum lewisii*) was observed for the first time. Annual species were included in the sample for the first time in 1996. Pale allysum (*Alyssum alyssoides*) was prolific and widespread on the study site, and had a cover of 2%.
- **1996 to 2001 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 13%. The perennial longleaf phlox (*Phlox longifolia*) had a significant increased 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. The annual species pale allysum decreased significantly in nested frequency.
- **2006 to 2011 - down (-2):** The sum of nested frequency for perennial forbs decreased 25%. Pale agoseris decreased significantly in nested frequency, and had minimal cover. The annual species pale allysum increased significantly in nested frequency, and increased in cover from 1% to 9%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 2, study no: 17

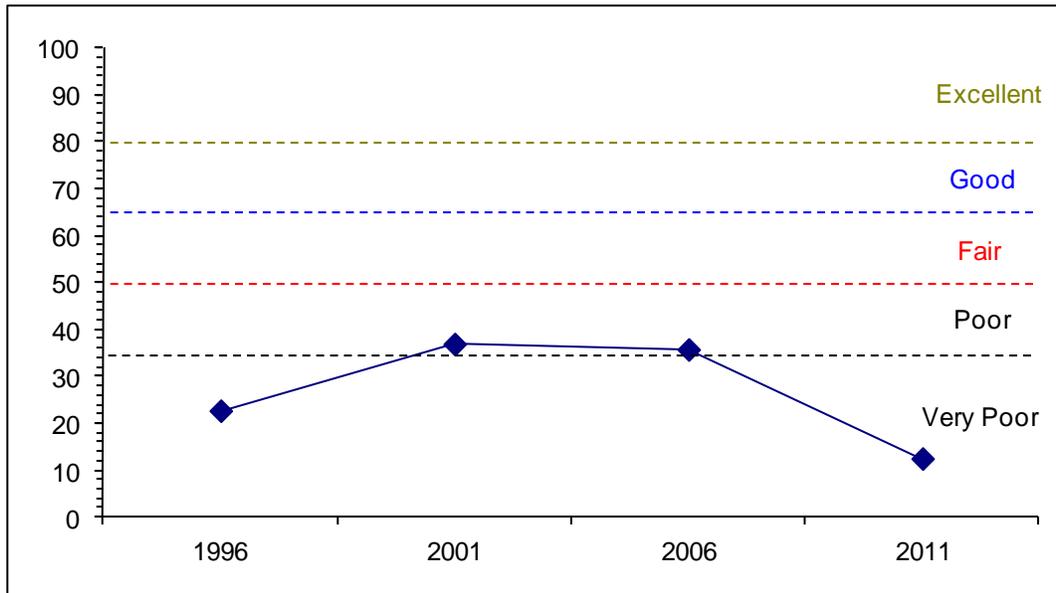
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	7.5	0.0	0.0	23.8	-14.7	6.2	0.0	22.7	Very Poor
01	5.9	0.0	0.0	28.5	-5.1	7.6	0.0	36.9	Very Poor-Poor
06	4.2	0.0	0.0	30.0	-6.1	7.8	0.0	35.8	Very Poor-Poor
11	7.0	0.0	0.0	17.1	-17.5	6.0	0.0	12.5	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 2 Study no: 17



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 2, Study no: 17



HERBACEOUS TRENDS--
 Management unit 02, Study no: 17

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron dasystachyum	5	-	-	-	-	-	-	-	-	-
G	Agropyron spicatum	a ⁹⁵	ab ¹²⁰	bc ¹⁴⁶	bc ¹⁵⁶	c ¹⁸⁷	bc ¹⁶²	6.50	7.13	11.75	4.29
G	Bromus tectorum (a)	-	-	367	294	307	354	19.65	6.85	8.19	23.37
G	Oryzopsis hymenoides	ab ⁶¹	ab ⁶¹	b ⁷³	b ⁷¹	ab ⁴⁶	a ³⁷	3.82	5.69	1.89	.80
G	Poa bulbosa	-	-	-	-	4	5	-	-	.01	.04
G	Poa pratensis	3	-	3	1	15	6	.03	.03	.97	.06
G	Poa secunda	a ⁸³	b ¹⁵²	a ⁸⁹	b ¹³⁸	ab ¹²⁷	b ¹⁶⁰	1.50	1.41	1.83	3.40
G	Sitanion hystrix	5	3	4	-	2	-	.03	-	.03	-
Total for Annual Grasses		0	0	367	294	307	354	19.65	6.85	8.19	23.37
Total for Perennial Grasses		252	336	315	366	381	370	11.90	14.27	16.50	8.60
Total for Grasses		252	336	682	660	688	724	31.56	21.13	24.69	31.97
F	Achillea millefolium	-	-	5	6	7	6	.04	.06	.06	.06
F	Agoseris glauca	a ⁻	a ⁴	a ⁻	a ⁻	b ²¹	a ⁸	-	-	.10	.01
F	Allium sp.	-	-	-	-	-	1	-	-	-	.00
F	Alyssum alyssoides (a)	-	-	b ²⁹²	b ²⁹³	a ¹⁸⁷	a ³¹⁹	2.44	2.25	.61	8.87
F	Astragalus sp.	-	-	-	-	4	-	-	-	.06	-
F	Astragalus utahensis	d ⁵⁶	cd ⁵¹	cbd ³⁴	ab ¹⁷	a ¹³	abc ²⁰	.48	.17	.14	.15
F	Balsamorhiza sagittata	2	6	4	13	15	16	.39	.30	.83	.70
F	Camelina microcarpa (a)	-	-	2	2	4	2	.01	.00	.01	.00
F	Castilleja chromosa	8	1	4	-	3	-	.01	-	.00	-
F	Chaenactis douglasii	1	8	5	-	4	2	.04	-	.01	.03
F	Cirsium sp.	-	-	-	-	1	-	-	-	.03	-
F	Cirsium undulatum	ab ²²	b ¹⁹	b ²⁵	ab ¹⁹	a ⁵	ab ⁵	.39	.55	.04	.06

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	<i>Collinsia parviflora</i> (a)	-	-	a3	ab9	b16	a2	.00	.04	.08	.01
F	<i>Collomia linearis</i> (a)	-	-	-	10	-	-	-	.02	-	-
F	<i>Comandra pallida</i>	1	-	-	10	2	8	-	.10	.01	.02
F	<i>Crepis acuminata</i>	-	-	-	7	9	2	-	.21	.30	.06
F	<i>Descurainia pinnata</i> (a)	-	-	15	14	5	2	.03	.03	.01	.00
F	<i>Draba</i> sp. (a)	-	-	-	1	3	-	-	.00	.01	-
F	<i>Holosteum umbellatum</i> (a)	-	-	-	-	3	-	-	-	.00	-
F	<i>Lactuca serriola</i> (a)	-	-	-	2	3	3	-	.00	.03	.01
F	<i>Linum lewisii</i>	-	-	b10	ab5	a2	ab3	.02	.06	.00	.01
F	<i>Lithospermum ruderales</i>	a11	ab16	ab22	ab22	ab20	b27	1.00	1.33	1.13	1.45
F	<i>Lomatium</i> sp.	-	-	-	-	-	-	-	-	-	.01
F	<i>Microsteris gracilis</i> (a)	-	-	-	3	7	-	-	.03	.01	-
F	<i>Navarretia intertexta</i> (a)	-	-	3	-	-	1	.00	-	-	.00
F	<i>Oenothera</i> sp.	-	-	-	-	-	-	-	.00	-	-
F	<i>Phlox hoodii</i>	8	4	16	18	9	7	.16	.28	.27	.20
F	<i>Phlox longifolia</i>	a-	a3	ab11	b36	bc23	ab8	.02	.35	.32	.01
F	<i>Polygonum douglasii</i> (a)	-	-	3	3	-	-	.00	.00	-	-
F	<i>Sisymbrium altissimum</i> (a)	-	-	a3	a-	b12	ab10	.03	-	.51	.09
F	<i>Tragopogon dubius</i> (a)	ab26	a19	b49	ab43	b48	ab25	.54	.38	.44	.16
F	Unknown forb-perennial	-	3	-	-	-	-	-	-	-	-
F	<i>Zigadenus paniculatus</i>	a-	a-	a-	a-	b12	a-	-	-	.05	-
Total for Annual Forbs		26	19	370	380	288	364	3.07	2.78	1.73	9.16
Total for Perennial Forbs		109	115	136	153	150	113	2.55	3.43	3.40	2.80
Total for Forbs		135	134	506	533	438	477	5.63	6.22	5.14	11.97

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

BROWSE TRENDS--

Management unit 02, Study no: 17

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	<i>Amelanchier alnifolia</i>	0	1	2	2	-	-	-	.00
B	<i>Artemisia tridentata vaseyana</i>	35	18	14	17	4.47	2.40	.66	1.16
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	44	43	43	43	3.99	2.88	4.51	5.80
B	<i>Eriogonum microthecum</i>	3	1	4	6	.15	-	.00	.06
B	<i>Gutierrezia sarothrae</i>	24	20	12	7	.32	.36	.21	.15
B	<i>Opuntia</i> sp.	7	10	11	8	.27	.46	.91	.45
B	<i>Purshia tridentata</i>	9	9	10	10	1.14	1.93	2.22	3.64
B	<i>Tetradymia canescens</i>	21	18	20	19	.60	.97	1.67	2.50
Total for Browse		143	120	116	112	10.96	9.04	10.21	13.78

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 17

Species	Percent Cover	
	'06	'11
Amelanchier alnifolia	-	.31
Artemisia tridentata vaseyana	.81	1.79
Chrysothamnus viscidiflorus viscidiflorus	8.21	7.31
Eriogonum microthecum	-	.41
Gutierrezia sarothrae	.31	.28
Opuntia sp.	.18	.15
Purshia tridentata	3.23	3.59
Tetradymia canescens	1.00	2.00

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 17

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	1.2	2.8	3.6
Purshia tridentata	4.6	6.1	4.3

BASIC COVER--

Management unit 02, Study no: 17

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	2.50	11.50	53.66	41.42	40.98	54.68
Rock	10.00	9.00	10.95	8.15	8.44	6.65
Pavement	13.75	16.25	3.86	17.51	11.26	14.46
Litter	66.25	45.00	52.17	38.69	43.56	39.38
Cryptogams	.25	1.75	.09	.18	.19	.22
Bare Ground	7.25	16.50	4.17	10.99	12.70	5.80

SOIL ANALYSIS DATA --

Management unit 02, Study no: 17, Study Name: Meadowville

Effective rooting depth (in)	pH	Sandy Clay Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.7	7.0	46.2	20.0	33.8	2.2	14.2	192.0	0.7

PELLET GROUP DATA--

Management unit 02, Study no: 17

Type	Quadrat Frequency			
	'96	'01	'06	'11
Rabbit	3	2	6	8
Elk	7	4	8	15
Deer	15	25	16	7
Cattle	2	1	3	3

Days use per acre (ha)		
'01	'06	'11
-	-	-
3 (7)	19 (46)	19 (48)
56 (139)	24 (60)	7 (18)
4 (9)	6 (14)	6 (14)

BROWSE CHARACTERISTICS--

Management unit 02, Study no: 17

		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>Amelanchier alnifolia</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	33	0	0	100	-	0	100	0	-/-	
96	0	0	0	0	40	0	0	0	-/-	
01	20	0	100	0	-	0	0	0	17/19	
06	40	50	50	0	-	50	0	0	28/38	
11	40	50	50	0	-	100	0	0	33/44	
<i>Artemisia tridentata vaseyana</i>										
84	1466	0	0	100	-	9	91	48	-/-	
90	964	10	21	69	99	24	7	28	24/22	
96	860	9	30	60	60	28	28	58	25/33	
01	520	4	50	46	-	38	4	42	21/34	
06	400	0	90	10	-	25	0	5	15/23	
11	400	25	65	10	20	50	0	5	18/31	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
84	232	14	86	0	-	0	0	0	9/11	
90	133	0	100	0	-	0	0	0	10/10	
96	1900	2	95	3	40	0	0	0	13/24	
01	1960	2	80	18	20	0	0	2	11/20	
06	1720	3	90	7	-	3	1	3	13/24	
11	1640	10	90	0	-	1	1	0	14/23	
<i>Eriogonum microthecum</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	100	20	80	-	-	0	0	0	12/11	
01	20	0	100	-	-	0	0	0	14/17	
06	120	0	100	-	-	0	0	0	15/24	
11	140	0	100	-	-	14	0	14	9/15	
<i>Gutierrezia sarothrae</i>										
84	7598	49	49	2	-	0	0	0	7/11	
90	11931	78	20	2	1399	2	0	.27	9/11	
96	1400	11	86	3	120	0	0	1	7/10	
01	820	2	98	0	40	0	0	0	5/8	
06	480	4	92	4	-	0	0	0	6/11	
11	260	31	69	0	-	0	0	0	10/14	

		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>Opuntia sp.</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	180	44	56	-	20	0	0	0	5/12	
01	300	7	93	-	-	0	0	0	5/11	
06	320	19	81	-	-	0	0	0	5/14	
11	280	0	100	-	-	0	0	0	4/15	
<i>Purshia tridentata</i>										
84	165	60	40	0	-	40	20	20	11/49	
90	431	39	46	15	-	23	62	0	13/21	
96	200	30	60	10	-	30	40	10	14/44	
01	200	0	100	0	-	50	50	0	21/48	
06	400	10	90	0	-	30	0	0	25/54	
11	220	0	100	0	-	27	73	0	28/58	
<i>Symphoricarpos oreophilus</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	-	-	0	0	0	34/72	
<i>Tetradymia canescens</i>										
84	132	0	75	25	-	0	0	0	7/12	
90	99	0	67	33	-	0	0	0	8/15	
96	600	17	73	10	-	10	10	3	11/17	
01	820	7	80	12	40	2	0	2	9/14	
06	860	9	88	2	-	16	0	0	10/19	
11	720	25	75	0	-	0	0	0	11/20	