

LAKETOWN CANYON - TREND STUDY NO. 2-27-11

Vegetation Type: Mountain Mahogany

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Upland Shallow Loam \(Utah Juniper\), R025XY324UT](#)

Land Ownership: BLM

Elevation: 6,300 ft (1,920 m)

Aspect: West

Slope: 40%

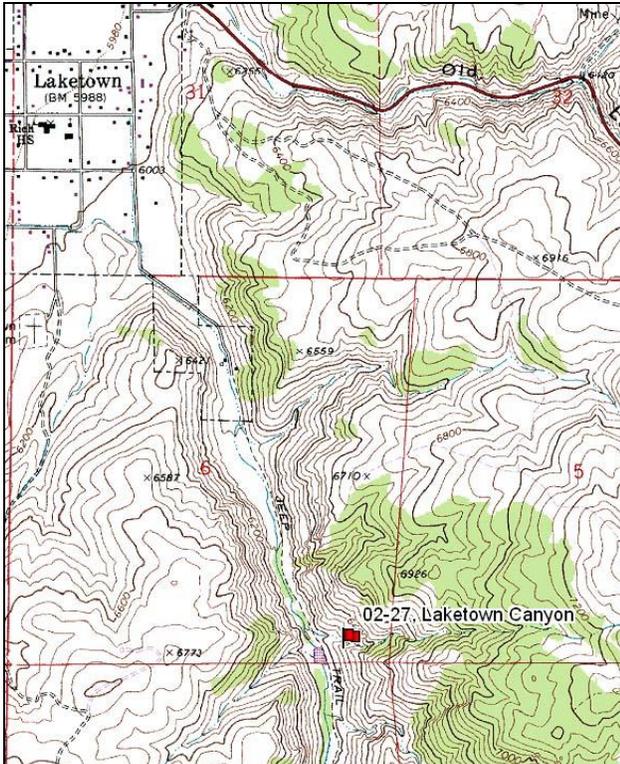
Transect bearing: 162° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). No rebar placement.

Directions:

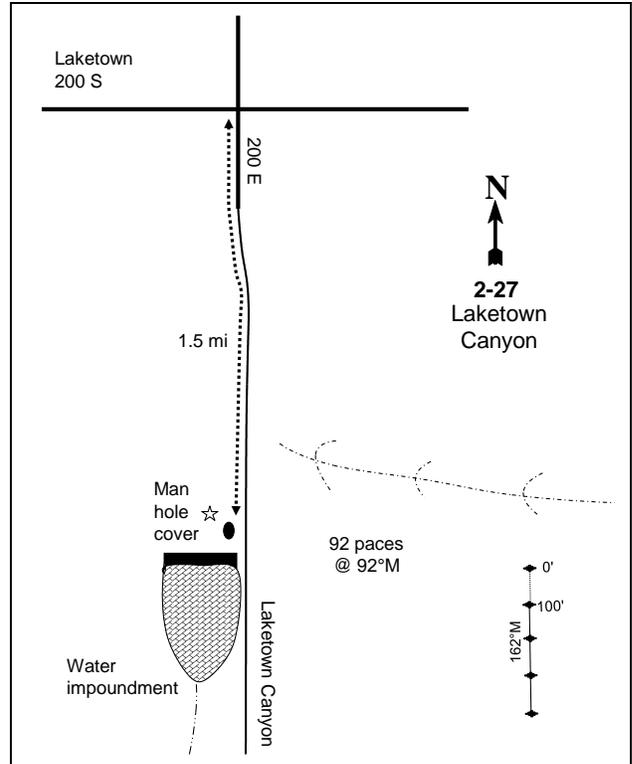
From 200 East 200 South in Laketown, proceed south into Laketown Canyon 1.5 miles stopping at a stockpond dam. Walk to the manhole cover on the northeast corner of the dam. Take an azimuth of 92 degrees magnetic and walk 92 paces up the ridge to the 0-foot baseline stake. The 0-foot stake is marked with browse tag #7937.

Map Name: Laketown



Township: 12N Range: 6E Section: 7

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 474591 E 4627863 N

LAKETOWN CANYON - TREND STUDY NO. 2-27

Site Information

Site Description: This study is located south of Bear Lake in Laketown Canyon. The land is administered by the Bureau of Land Management (BLM) as part of the Laketown allotment. It samples a true mountain mahogany (*Cercocarpus montanus*) stand within crucial deer winter range. In 1984, deer and domestic sheep pellet groups, tracks, and other signs were very common. Deer pellet group quadrat frequency was low in 1996. Deer pellet groups were sampled in high abundance in 2001, but low abundance in 2006 and 2011. Elk are known to occupy this general area, but elk pellet groups have been sampled in low abundance since 2001. Cattle sign occurs primarily at the bottom of the slope around a nearby stock pond, but not on the steep slopes where the study is located. Cattle pats were sampled in low abundance in 2006. Moose pellet groups were low in abundance in 2006 (Table - Pellet Group Data). A few moose pellet groups were also seen near the study in other sample years, but were not encountered within the pellet group transect.

Browse: Browse composition includes several co-dominant shrubs true mountain mahogany and black sagebrush (*Artemisia nova*). True mountain mahogany is a highly preferred browse species with a sparse, mature population, but dominates the upper browse canopy. Utilization has been moderate to heavy, and has produced clubbed and armored plants. Despite the heavy utilization, the mountain mahogany population has had good vigor and low decadence over the course of the study years. Recruitment of mountain mahogany has minimal over the course of the study. Black sagebrush is a preferred browse species with a sparse, mature population. Density has slowly declined over the duration of the study. Utilization within the black sagebrush population has been light to moderate. The black sagebrush has had high decadence and moderate amounts of poor vigor over the course of the study. Recruitment of young black sagebrush has been poor over the sample years, though recruitment was good in 2006. Other less common preferred browse species found on the site are mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), curleaf mountain mahogany (*Cercocarpus ledifolius*), and mountain snowberry (*Symphoricarpos oreophilus*). Less desirable shrubs include green rubber rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), threadleaf rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *consimilis*), broom snakeweed (*Gutierrezia sarothrae*), gray horsebrush (*Tetradymia canescens*), and Utah juniper (*Juniperus osteosperma*) (Table - Browse Characteristics).

Herbaceous Understory: Herbaceous understory plants are composed of the weedy annual species cheatgrass (*Bromus tectorum*) intermixed with the perennial species Sandberg bluegrass (*Poa secunda*), bluebunch wheatgrass (*Agropyron spicatum*), and Indian ricegrass (*Oryzopsis hymenoides*). Forbs occur infrequently and only provide a minor component of the herbaceous understory.

Soil: The soil is in the Lundy, dry-rock outcrop complex, likely as part of the Lundy dry component. This component is on mountainsides and canyons. The parent material consists of colluvium over residuum weathered from limestone (Soil Survey Staff 2011). The soil texture is a loam that is strongly calcareous and moderately alkaline (pH 7.6). Phosphorous may have limited availability for plant growth and development at 5.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Some bare ground is exposed mainly along trails that follow the contour of the hillside. Adequate protective ground cover is provided by high amounts of rock, vegetation, and litter (Table - Basic Cover). Some soil erosion and pedestalling has occurred, therefore, the soil erosion condition was determined to be slight in 2001 and 2006, but stable in 2011.

Trend Assessments

Browse:

- **1984 to 1990 - down (-2):** The density for true mountain mahogany decreased 31% from 432 plants/acre to 299 plants/acre. Decadence increased from 0% to 44% of the true mountain mahogany population. Poor vigor was not observed within the true mountain mahogany population. The density of black sagebrush decreased 54% from 1,298 plants/acre to 599 plants/acre. Decadence within the

black sagebrush population increased from 67% to 94%. Poor vigor within the black sagebrush population increased from 0% to 17%.

- **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 true mountain mahogany decreased to 0%. Vigor of true mountain mahogany remained good within the population. Decadence within the black sagebrush population decreased to 34%, but is still considered to be high. Poor vigor for black sagebrush decreased slightly to 16% of the population.
- **1996 to 2001 - stable (0):** The density for true mountain mahogany increased 20% from 200 plants/acre to 240 plants/acre. Decadence and poor vigor were not observed within the true mountain mahogany population. Black sagebrush decreased in density by 21% from 1,460 plants/acre to 1,160 plants/acre. Black sagebrush decadence decreased to 19%, and poor vigor for black sagebrush decreased to 5% of the total population.
- **2001 to 2006 - down (-2):** The density for true mountain mahogany decreased 25% to 180 plants/acre. Decadence and poor vigor were not observed within the mountain mahogany population. Black sagebrush decreased in density 24% to 880 plants/acre. Decadence in the black sagebrush population increased to 36%, and poor vigor increased to 14% of the black sagebrush population.
- **2006 to 2011 - up (+2):** The density for true mountain mahogany increased 33% to 240 plants/acre. Decadence and poor vigor were not observed within the true mountain mahogany population. Black sagebrush increased in density 16% to 1,020 plants/acre. Decadence for black sagebrush decreased to 25%, and poor vigor decreased to 10% in the black sagebrush population.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 62%. The perennial species Sandberg bluegrass (*Poa secunda*) increased significantly in nested frequency, and was directly related to the increase in the sum of nested frequencies.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency for perennial grasses increased 20%. The increase is directly associated with the significant increase in nested frequency for bluebunch wheatgrass (*Agropyron spicatum*), which had a cover of 6%. Sandberg bluegrass remained the most common perennial grass, and had a cover of 7%. Annual grasses were included in the sample for the first time in 1996. The weedy species cheatgrass was the most abundant grass, and had a cover of 9%.
- **1996 to 2001 - stable (0):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass decreased significantly in nested frequency, and decreased in cover to 2%. Bluebunch wheatgrass increased in occurrence, and increased in cover to 8%. The weedy annual species cheatgrass decreased significantly in nested frequency, and decreased in cover to 5%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial grasses remained similar. The perennial species Sandberg bluegrass increased significantly in nested frequency, and increased in cover to 6%. The population of bluebunch wheatgrass remained stable. The weedy annual species cheatgrass increased significantly in nested frequency, and maintained cover at 5%.
- **2006 to 2011 - slightly down (-1):** The sum of nested frequency for perennial grasses decreased 17%. Sandberg bluegrass decreased significantly in nested frequency, and decreased in cover to 2%. Bluebunch wheatgrass was the most dominant perennial grass, and increased in cover to 9%. The weedy annual cheatgrass occurred most frequently out of all the grasses, and had a cover of 7%.

Forb:

- **1984 to 1990 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 49%, but perennial forbs were already rare on the site. The decrease is not due to any one specific species, and is likely due to small, accumulative decreases in nested frequency across the perennial forb community.
- **1990 to 1996 - up (+2):** The sum of nested frequency for perennial forbs increased over three-fold. Cryptantha (*Cryptantha sp.*) and lobeleaf groundsel (*Senecio multilobatus*) both had a significant increase in nested frequency, and had covers of 1% and less than 1%, respectively.

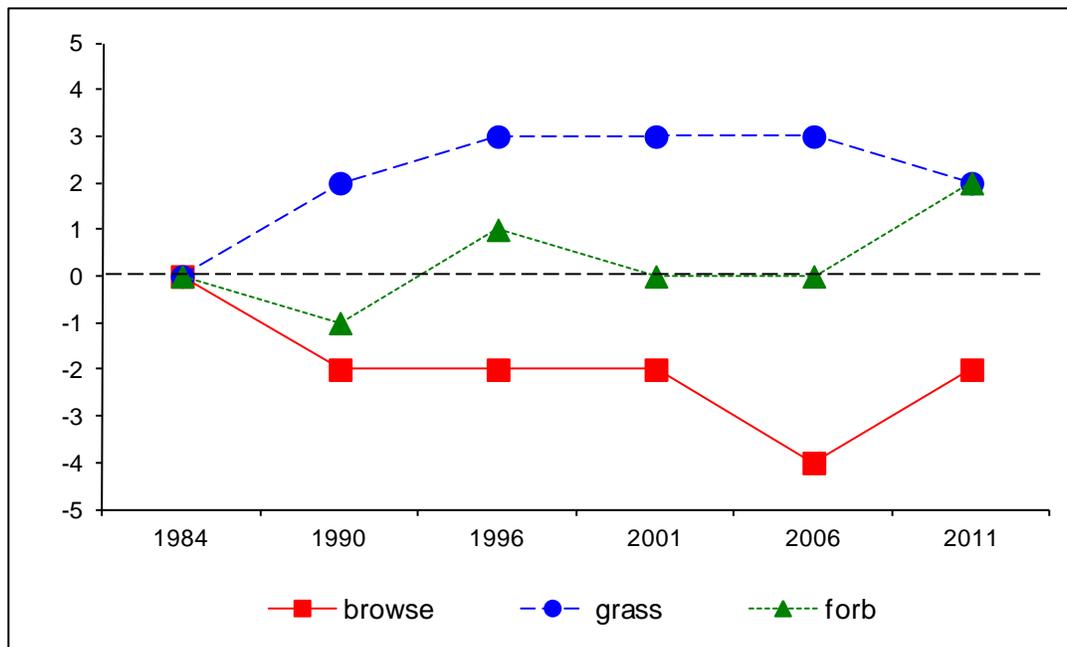
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 30%, but cover remained similar at 2%. Cryptantha increased in cover to 2%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial forbs increased 12%, but cover remained similar at 2%. The forb community remains a minor component. Pale alyssum (*Alyssum alyssoides*) was the most frequently occurring forb, while Cryptantha maintained the highest cover of the forb community.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial forbs increased 43%, though cover remained similar at 2%. Lobeleaf groundsel increased significantly in nested frequency.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 2, study no: 27

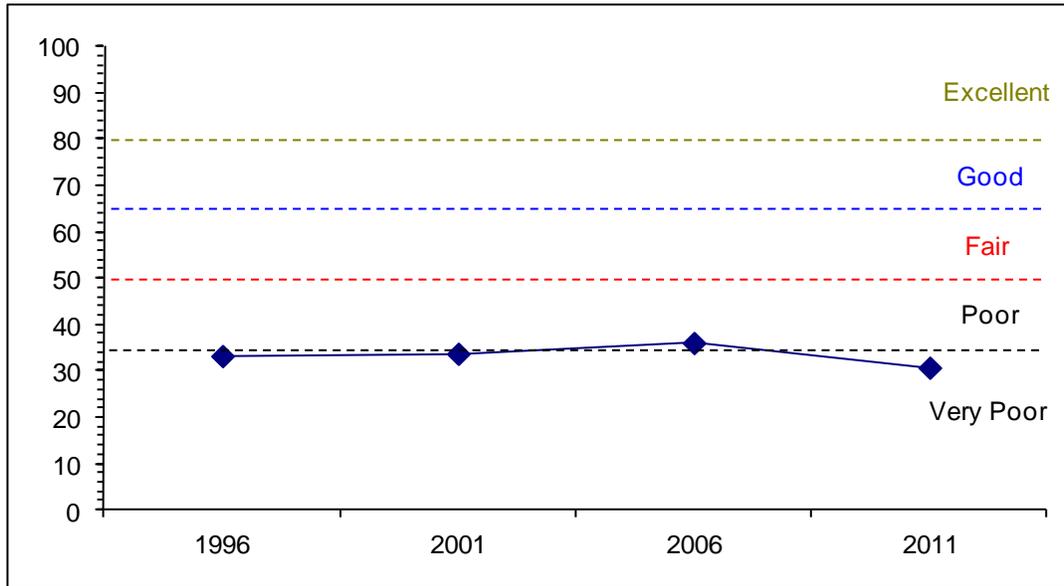
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	6.2	0.0	0.0	30.0	-6.4	3.6	0.0	33.5	Very Poor-Poor
01	4.8	0.0	0.0	29.6	-4.3	3.6	0.0	33.7	Very Poor-Poor
06	6.0	0.0	0.0	29.5	-3.7	4.2	0.0	36.1	Very Poor-Poor
11	6.0	0.0	0.0	28.6	-8.4	4.5	0.0	30.7	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 2 Study no: 27



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 2, Study no: 27



HERBACEOUS TRENDS--
Management unit 02, Study no: 27

Type	Species	Nestled Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron spicatum	a30	a37	b80	bc111	c122	c131	6.01	7.86	6.53	8.76
G	Bromus brizaeformis (a)	-	-	a9	ab32	b36	c111	.04	.67	.20	3.40
G	Bromus japonicus (a)	-	-	a3	a4	c31	c56	.00	.00	.06	.88
G	Bromus tectorum (a)	-	-	c315	a163	b245	b257	8.50	5.09	4.66	6.89
G	Carex sp.	-	-	-	4	-	-	-	.03	-	-
G	Koeleria cristata	-	-	2	4	1	-	.06	.03	.15	-
G	Oryzopsis hymenoides	37	40	40	56	28	34	2.66	3.91	2.05	1.81
G	Poa secunda	ab136	c270	c276	b182	c243	a133	6.79	1.93	5.61	1.95
G	Stipa comata	ab13	a3	ab21	bc30	ab15	c43	.85	1.02	.42	1.75
Total for Annual Grasses		0	0	327	199	312	424	8.54	5.77	4.92	11.17
Total for Perennial Grasses		216	350	419	387	409	341	16.38	14.81	14.77	14.28
Total for Grasses		216	350	746	586	721	765	24.93	20.58	19.70	25.46
F	Agoseris glauca	-	-	-	-	2	3	-	-	.01	.00
F	Alyssum alyssoides (a)	-	-	a28	a49	b88	c174	.10	.11	.19	.66
F	Arabis sp.	4	-	4	6	11	12	.01	.01	.02	.02
F	Artemisia ludoviciana	-	-	-	-	4	6	-	-	.00	.30
F	Astragalus convallarius	-	-	3	-	-	2	.01	-	.06	.03
F	Astragalus utahensis	-	-	-	-	-	4	-	-	-	.03
F	Balsamorhiza sagittata	-	-	-	-	-	-	-	-	.03	.03
F	Calochortus nuttallii	-	-	-	1	-	-	-	.00	-	-
F	Camelina microcarpa (a)	-	-	1	4	2	-	.00	.07	.00	-
F	Chaenactis douglasii	3	3	4	-	1	3	.01	-	.00	.03
F	Cirsium undulatum	b19	ab5	a4	a-	a2	a1	.06	-	.03	.00
F	Crepis acuminata	-	-	-	6	2	1	-	.06	.18	.09

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Cryptantha sp.	a4	ab15	c44	bc49	bc41	bc38	.93	1.55	.50	.47
F	Descurainia pinnata (a)	-	-	a-	a8	a13	b32	-	.02	.02	.10
F	Draba sp. (a)	-	-	-	3	5	27	-	.01	.01	.06
F	Epilobium brachycarpum (a)	-	-	8	-	11	11	.02	-	.17	.07
F	Eriogonum umbellatum	-	-	-	2	-	10	-	.00	-	.05
F	Hackelia patens	-	17	12	10	11	4	.14	.02	.43	.03
F	Holosteum umbellatum (a)	-	-	-	-	1	-	-	-	.00	-
F	Lappula occidentalis (a)	-	-	-	9	3	-	-	.04	.00	-
F	Machaeranthera grindelioides	-	-	3	3	-	1	.03	.03	-	.00
F	Microsteris gracilis (a)	-	-	a-	a1	b21	a-	-	.00	.05	-
F	Penstemon humilis	-	-	15	8	6	12	.27	.01	.27	.48
F	Phlox hoodii	-	-	4	7	9	15	.04	.06	.19	.25
F	Phlox longifolia	-	-	-	-	-	2	-	-	-	.00
F	Ranunculus testiculatus (a)	-	-	-	-	3	2	-	-	.00	.00
F	Senecio multilobatus	ab12	a-	b28	a-	a4	b32	.18	-	.06	.41
F	Tragopogon dubius (a)	14	-	1	-	4	-	.00	-	.07	-
F	Verbascum thapsus	8	-	10	1	3	3	.10	.03	.15	.00
Total for Annual Forbs		14	0	38	74	151	246	0.13	0.26	0.55	0.90
Total for Perennial Forbs		50	40	131	93	96	149	1.81	1.80	1.96	2.27
Total for Forbs		64	40	169	167	247	395	1.94	2.06	2.51	3.17

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

BROWSE TRENDS--

Management unit 02, Study no: 27

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Amelanchier alnifolia	0	0	0	0	-	-	-	.38
B	Artemisia nova	30	28	21	25	3.37	2.23	1.68	1.76
B	Artemisia tridentata vaseyana	9	5	3	1	.18	-	.63	.38
B	Cercocarpus ledifolius	0	0	0	1	-	-	-	.15
B	Cercocarpus montanus	8	8	9	8	1.20	1.36	2.07	1.68
B	Chrysothamnus nauseosus consimilis	19	14	19	15	3.09	3.56	3.62	2.79
B	Chrysothamnus viscidiflorus viscidiflorus	12	12	10	13	.72	.49	.73	.57
B	Eriogonum microthecum	0	1	2	0	.00	-	.03	-
B	Gutierrezia sarothrae	57	53	45	36	1.58	2.03	1.24	1.06
B	Juniperus osteosperma	1	1	1	1	.00	-	-	-
B	Symphoricarpos oreophilus	2	2	2	2	-	.06	.53	.15
B	Tetradymia canescens	10	8	9	13	.39	.48	1.37	.45
B	Yucca sp.	0	0	0	0	-	-	-	.15
Total for Browse		148	132	121	115	10.56	10.23	11.92	9.55

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 27

Species	Percent Cover	
	'06	'11
Artemisia nova	3.79	2.26
Artemisia tridentata vaseyana	.38	.41
Cercocarpus montanus	3.68	6.25
Chrysothamnus nauseosus consimilis	3.93	4.18
Chrysothamnus viscidiflorus viscidiflorus	.85	.60
Gutierrezia sarothrae	1.23	.46
Juniperus osteosperma	.20	-
Purshia tridentata	-	.31
Symphoricarpos oreophilus	1.41	.40
Tetradymia canescens	.26	1.29

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 27

Species	Average leader growth (in)		
	'01	'06	'11
Cercocarpus montanus	2.2	3.6	3.1

BASIC COVER--

Management unit 02, Study no: 27

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	2.75	9.50	37.45	34.99	39.90	34.52
Rock	33.25	30.75	26.56	24.75	25.67	24.74
Pavement	7.00	11.25	6.03	8.76	8.51	3.76
Litter	38.00	25.25	30.82	32.23	24.31	29.63
Cryptogams	13.75	10.75	2.84	2.50	2.57	3.51
Bare Ground	5.25	12.50	7.39	14.36	14.98	13.55

SOIL ANALYSIS DATA --

Management unit 02, Study no: 27, Study Name: Laketown Canyon

Effective rooting depth (in)	pH	Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11.8	7.6	39.2	37.4	23.4	2.4	5.6	153.6	0.8

PELLET GROUP DATA--

Management unit 02, Study no: 27

Type	Quadrat Frequency			
	'96	'01	'06	'11
Rabbit	6	-	4	-
Moose	-	-	2	-
Elk	1	-	-	2
Deer	9	5	4	4
Cattle	-	-	2	-

Days use per acre (ha)		
'01	'06	'11
-	-	-
-	2 (4)	-
-	-	3 (7)
42 (103)	5 (12)	19 (46)
-	5 (13)	-

BROWSE CHARACTERISTICS--

Management unit 02, Study no: 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>Amelanchier alnifolia</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	21/22
<i>Artemisia nova</i>									
84	1298	8	26	67	233	5	95	0	7/8
90	599	0	6	94	33	44	0	17	10/16
96	1460	3	63	34	20	3	0	16	15/28
01	1160	5	76	19	20	16	2	5	11/19
06	880	2	61	36	60	30	0	14	15/29
11	1020	0	75	25	20	4	0	10	15/29
<i>Artemisia tridentata vaseyana</i>									
84	299	0	11	89	-	22	78	33	16/18
90	33	0	0	100	-	0	0	0	-/-
96	200	0	30	70	-	50	20	80	18/31
01	100	20	60	20	-	0	0	20	31/37
06	60	0	100	0	20	0	0	33	27/39
11	20	0	100	0	-	0	0	0	22/36
<i>Cercocarpus ledifolius</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	40/43
06	0	0	0	-	-	0	0	0	40/56
11	20	100	0	-	-	0	0	0	34/33

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Cercocarpus montanus										
84	432	23	77	0	333	8	92	0	48/59	
90	299	0	56	44	-	71	0	0	40/45	
96	200	20	80	0	-	80	20	0	38/56	
01	240	0	100	0	-	67	0	0	51/72	
06	180	0	100	0	20	22	44	0	45/68	
11	240	8	92	0	-	8	83	0	47/59	
Chrysothamnus nauseosus consimilis										
84	332	20	0	80	-	70	0	0	-/-	
90	399	0	83	17	-	0	0	0	32/26	
96	620	3	81	16	-	0	0	23	26/41	
01	420	0	62	38	-	0	0	0	31/44	
06	520	8	42	50	-	23	0	19	25/43	
11	400	0	60	40	-	0	0	10	27/45	
Chrysothamnus viscidiflorus viscidiflorus										
84	498	40	60	0	-	0	0	0	13/27	
90	199	0	100	0	-	0	0	0	10/14	
96	400	5	80	15	-	0	0	15	14/22	
01	340	0	59	41	-	6	0	0	15/20	
06	220	9	64	27	-	9	0	36	13/24	
11	440	5	95	0	-	0	0	0	16/17	
Eriogonum microthecum										
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	20	0	0	100	-	0	0	0	-/-	
06	40	0	100	0	-	50	50	0	13/24	
11	0	0	0	0	-	0	0	0	-/-	
Gutierrezia sarothrae										
84	4765	44	56	0	-	0	0	0	8/9	
90	1998	58	25	17	733	0	0	4	13/12	
96	3420	20	80	0	100	0	0	0	10/11	
01	3180	1	99	1	-	0	0	0	8/12	
06	1520	9	74	17	20	1	0	7	8/12	
11	1640	2	95	2	80	0	0	0	9/11	
Juniperus osteosperma										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	100	0	-	-	0	0	0	-/-	
01	20	0	100	-	-	0	0	0	-/-	
06	20	100	0	-	-	0	0	0	-/-	
11	20	100	0	-	-	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)	
Leptodactylon pungens										
84	66	0	100	-	-	0	0	0	4/4	
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	-/-	
Ribes sp.										
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	30/35	
11	0	0	0	-	-	0	0	0	23/34	
Symphoricarpos oreophilus										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	80	50	50	0	-	50	0	100	17/28	
01	40	0	50	50	-	0	0	0	11/13	
06	140	14	71	14	-	0	0	0	35/50	
11	120	0	100	0	-	0	0	0	25/41	
Tetradymia canescens										
84	66	50	50	0	-	0	0	0	9/10	
90	99	0	100	0	-	0	0	0	7/7	
96	280	7	79	14	-	0	0	50	11/20	
01	300	0	33	67	20	0	0	0	10/17	
06	300	20	53	27	-	33	7	7	10/17	
11	420	10	90	0	20	0	0	0	11/20	