

MAHOGANY HILLS - TREND STUDY NO. 6-10-11

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: [Mountain Loam \(Oak\), R047XA446UT](#)

Land Ownership: Private

Elevation: 7,020 ft (2,140 m)

Aspect: Southeast

Slope: 12-15%

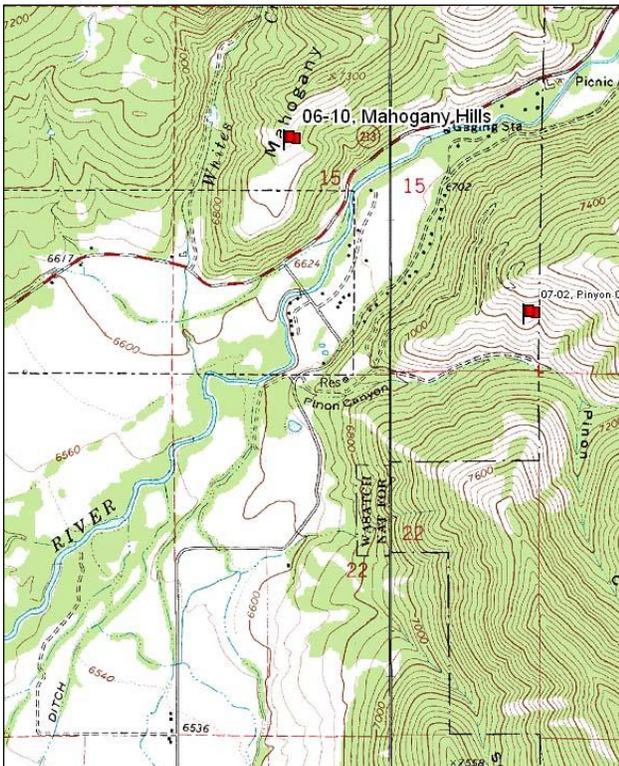
Transect bearing: 162° magnetic

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

Directions:

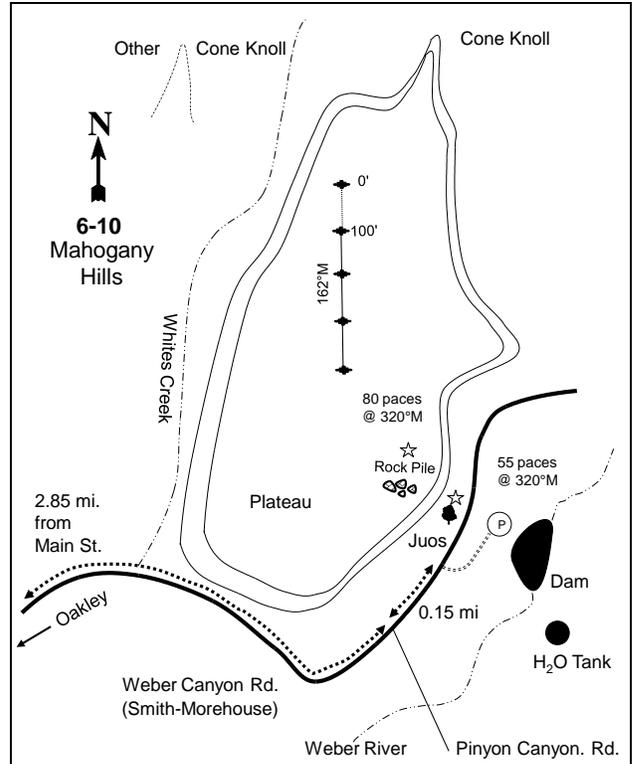
From Oakley, proceed up Weber Canyon watching for Pinyon Canyon Lane which is a right turn. From this road proceed 0.15 miles farther up Weber Canyon and park opposite a small irrigation canal dam. The main river dam to supply the canal is 100 yards upstream. From the river diversion, walk up the steep slope at 273 degrees magnetic to a large, lone juniper and mahogany. From the lone juniper and mahogany, a rock pile can be found 55 paces at 320 degrees magnetic. From the rock pile, the 0-foot baseline stake is approximately 80 paces at a bearing of 320 degrees magnetic. The 0-foot stake is marked by with browse tag #7952. To triangulate on the 0-foot stake when in the middle of plateau: from the stake to a cone-knoll to the north is 7 degree magnetic, from the stake to a water tank on the right at the mouth of Pinyon Canyon is 150 degrees magnetic.

Map Name: Kamas



Township: 1S Range: 6E Section: 15

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 478363 E 4509507 N

MAHOGANY HILLS - TREND STUDY NO. 6-10

Site Information

Site Description: The study is located on private land, on a ridge at the mouth of the Upper Weber River Canyon. The area has a lot of recreational development, with newer cabins and summer homes in the general vicinity of the site. The vegetation is a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), other mountain brush, and grass community. Elk pellet groups have been sampled in high abundance since 2001. Deer pellet groups have fluctuated in abundance throughout the sample years with low abundance in 2001, high abundance in 2006, and moderate abundance in 2011. There has been no evidence of livestock sign (Table - Pellet Group Data).

Browse: There is a good mixture of mountain brush species on the site, but mountain big sagebrush and mountain snowberry (*Symphoricarpos oreophilus*) dominate the browse component. There was a large decrease in mountain big sagebrush cover (Table - Browse Trends) and density in 2001. Sagebrush density has remained similar since 2001. The sagebrush population has displayed high decadence and moderate to heavy utilization since the outset of the study. Recruitment of young sagebrush plants into the population has been poor. Due to the poor recruitment and heavy competition from the grass species smooth brome (*Bromus inermis*); the sagebrush density may continue to decrease. Snowberry has a moderately dense, healthy population, but receives little use. Other valuable browse species that contribute to the community include Saskatoon serviceberry (*Amelanchier alnifolia*), true mountain mahogany (*Cercocarpus montanus*), and antelope bitterbrush (*Purshia tridentata*). These less prevalent species, display moderate to heavy use, but with low decadence and normal vigor. True mountain mahogany occurs primarily around the upper third of the sample transect. Gambel oak (*Quercus gambelii*) is also on the site, but is isolated around the first sample belt. Utilization of oak has been mostly moderate. A late snow storm and cold temperatures in June 2001 killed many of the leaf and meristematic biomass of the oak in the 2001 sampling. Also present are some less desirable shrubs such as stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and gray horsebrush (*Tetradymia canescens*) (Table - Browse Characteristics).

Herbaceous Understory: Perennial grasses are an important component and have provided the majority of the vegetation cover on the site since 2001. Smooth brome is the dominant grass and has increased in abundance since 1984. Smooth brome is a shade tolerant, sod-forming species which can, in mountain brush communities, dominate and outcompete many herbaceous understory species and browse seedlings, especially sagebrush. Sandberg bluegrass (*Poa secunda*), Kentucky bluegrass (*P. pratensis*), mutton bluegrass (*P. fendleriana*), and prairie junegrass (*Koeleria cristata*) are also fairly abundant. Other perennial species are diverse, but are not abundant. Forbs also have a diverse composition and include several palatable and valuable species. Desirable forb species on the site include arrowleaf balsamroot (*Balsamorhiza sagittata*), one-flowered helianthella (*Helianthella uniflora*), low penstemon (*Penstemon humilis*), and redroot eriogonum (*Eriogonum racemosum*) (Table - Herbaceous Trends).

Soil: The soil is in the Agassiz series, which occurs on mountain slopes. Parent material consists of colluviums derived from limestone (Soil Survey Staff 2011). The soil texture is a loam with a neutral soil reaction (pH 6.7) (Table - Soil Analysis Data). This area has a diverse plant composition, especially among grasses. Vegetation and litter cover are very high, with little bare ground 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 of mountain big sagebrush decreased by 21% from 4,132 plants/acre to 3,265 plants/acre. However, decadence of sagebrush decreased from 82% to 45%, and

poor vigor decreased from 27% to 16%. Both measurements are still considered to be high. Both serviceberry and bitterbrush also decreased in density.

- **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. There was little change in the decadence, vigor, or the recruitment of young plants in the sagebrush population. Decadence and poor vigor decreased in the small serviceberry population, but decadence is still considered to be high at 32%.
- **1996 to 2001 - down (-2):** Mountain big sagebrush density decreased by 31% from 2,780 plants/acre to 1,920 plants/acre, and cover decreased from 16% to 11%. Decadence and poor vigor of sagebrush remained high, and recruitment of young plants remained poor. Density of serviceberry increased 57% from 560 plants/acre to 880 plants/acre, but cover remained similar at 3%. The small density of mahogany remained similar, but cover decreased from 1% to near 0%.
- **2001 to 2006 - stable (0):** The density and cover of mountain big sagebrush remained similar at 1,960 plants/acre and 12%, respectively. Serviceberry decreased 30% to 620 plants/acre, and cover decreased to 2%. The small populations of mahogany and bitterbrush remained similar.
- **2006 to 2011 - stable (0):** Mountain big sagebrush density increased by 9% to 2,140 plants/acre, but cover decreased to 8%. The other preferred browse species populations remained similar.

Grass:

- **1984 to 1990 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though there was a significant increase in the nested frequency of the dominant grass species smooth brome.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 16%, with a significant increase in the nested frequency of the dominant grass species smooth brome.
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 13%, but cover increased slightly from 33% to 35%. There was a significant decrease in the nested frequency of the desirable species bluebunch wheatgrass (*Agropyron spicatum*), which became rare on the site.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 11%, but cover increased slightly to 36%. Much of the increase in cover was due to a significant increase in the nested frequency of the weedy species bulbous bluegrass (*Poa bulbosa*).
- **2006 to 2011 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased slightly to 37%.

Forb:

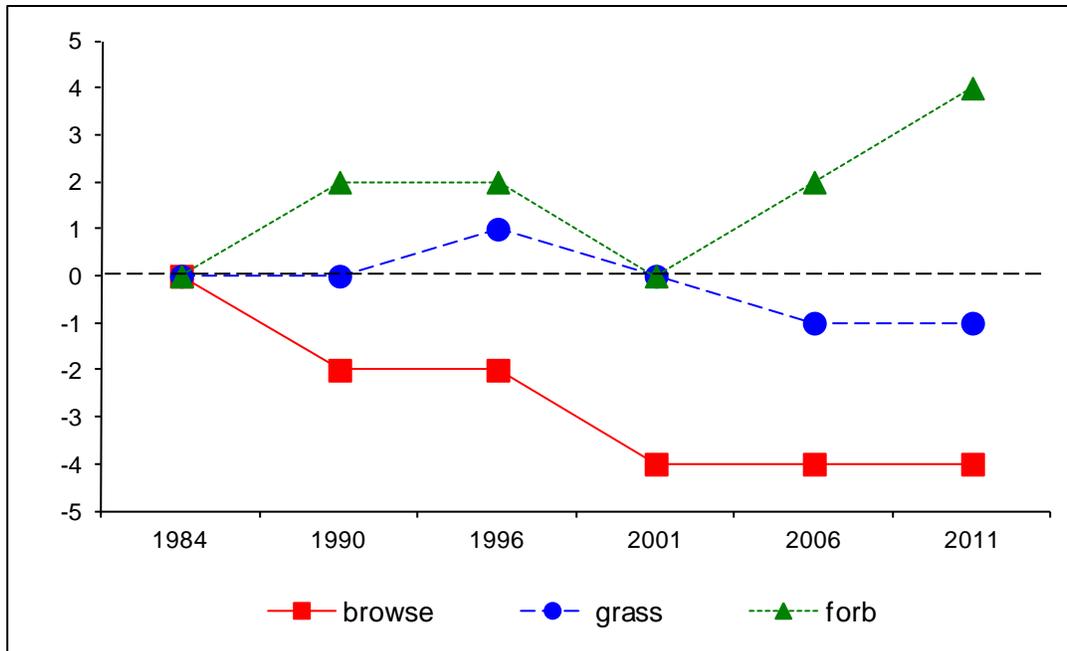
- **1984 to 1990 - up (+2):** The sum of nested frequency of perennial forbs increased by 66%. Forbs are diverse, and there are several palatable species for deer that inhabit the area year-round.
- **1990 to 1996 - stable (0):** There was little change in the sum of nested frequency of perennial forbs.
- **1996 to 2001 - down (-2):** The sum of nested frequency of perennial forbs decreased by 21%, and cover decreased slightly from 6% to 5%.
- **2001 to 2006 - up (+2):** There was a 49% increase in the sum of nested frequency of perennial forbs, and cover increased to 9%.
- **2006 to 2011 - up (+2):** The sum of nested frequency of perennial forbs increased 48%, and cover increased to 10%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 6, study no: 10

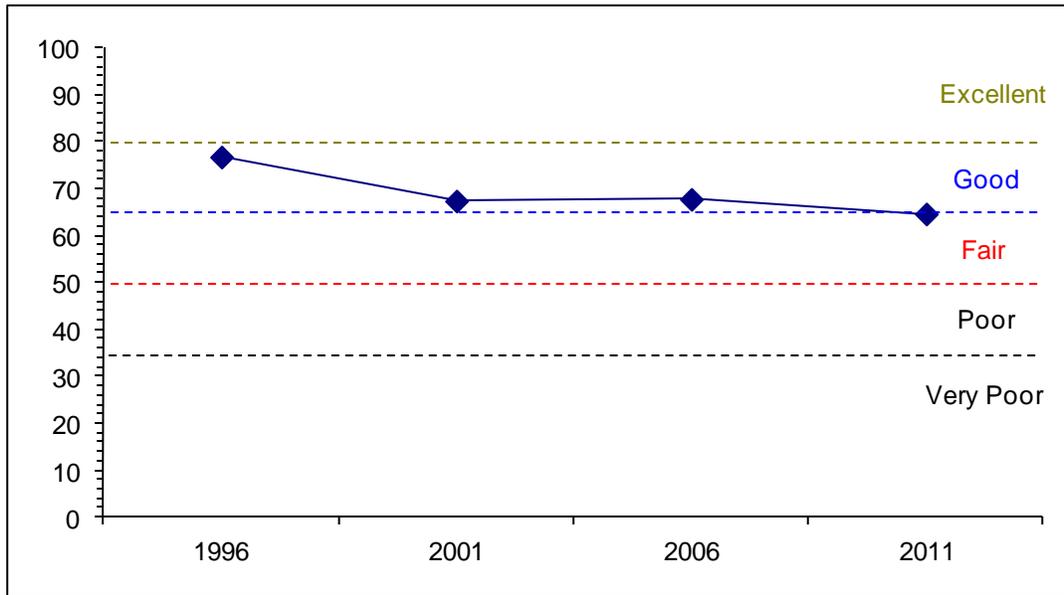
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	30.0	5.4	1.4	30.0	0.0	10.0	0.0	76.8	Good
01	21.4	4.4	1.6	30.0	0.0	10.0	0.0	67.4	Good
06	20.2	4.0	3.5	30.0	0.0	10.0	0.0	67.7	Good
11	16.4	4.3	4.0	30.0	0.0	10.0	0.0	64.6	Fair-Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 6 Study no: 10



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 6, Study no: 10



HERBACEOUS TRENDS--
 Management unit 06, Study no: 10

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	11	7	8	5	4	5	.27	.03	.00	.03
G	Agropyron dasystachyum	b13	ab8	a2	b17	a-	ab9	.00	.52	-	.04
G	Agropyron spicatum	b97	b120	b85	a37	a23	a14	2.52	.98	.43	.24
G	Bromus inermis	a159	b217	c278	c293	c295	c310	19.99	25.12	24.01	29.56
G	Bromus tectorum (a)	-	-	-	2	-	-	-	.00	-	-
G	Carex sp.	-	-	-	-	2	5	-	-	.15	.01
G	Dactylis glomerata	1	-	5	1	-	-	.15	.00	-	-
G	Koeleria cristata	a-	a-	b33	b19	c76	b42	.82	.83	6.19	1.43
G	Melica bulbosa	-	-	7	-	1	-	.01	-	.00	.00
G	Phleum pratense	2	-	-	-	-	-	-	-	-	-
G	Poa bulbosa	a-	a8	ab9	a3	bc31	c28	.33	.06	1.14	.81
G	Poa fendleriana	ab55	ab35	b65	b76	ab33	a24	2.61	2.40	1.07	.56
G	Poa pratensis	b80	b76	b115	ab70	a34	ab56	3.40	1.42	.34	1.75
G	Poa secunda	a129	ab133	ab117	b129	a79	ab113	2.68	3.29	2.91	2.42
G	Stipa columbiana	b40	b25	a-	a-	a-	a-	-	-	-	-
G	Stipa comata	ab8	b12	ab22	a1	a-	a-	.58	.03	-	-
Total for Annual Grasses		0	0	0	2	0	0	0	0.00	0	0
Total for Perennial Grasses		595	641	746	651	578	606	33.41	34.70	36.30	36.89
Total for Grasses		595	641	746	653	578	606	33.41	34.71	36.30	36.89
F	Achillea millefolium	7	2	1	-	3	2	.00	-	.15	.15
F	Agoseris glauca	a-	a-	a-	a6	a5	b27	-	.01	.01	.19
F	Allium sp.	a-	b28	a3	a4	c65	d139	.01	.01	.33	1.06
F	Alyssum alyssoides (a)	-	-	a14	a23	a32	b81	.05	.27	.09	.69

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	<i>Antennaria rosea</i>	1	-	1	-	-	-	.03	-	-	-
F	<i>Arabis</i> sp.	ab8	a1	b17	a-	ab9	a-	.04	-	.05	-
F	<i>Arenaria</i> sp.	-	4	-	-	-	16	-	-	-	.07
F	<i>Artemisia ludoviciana</i>	-	-	3	3	3	4	.38	.15	.38	.38
F	<i>Astragalus convallarius</i>	a4	b32	ab61	ab53	b34	c62	1.10	.84	.61	1.27
F	<i>Balsamorhiza sagittata</i>	10	4	5	9	13	17	.57	.92	2.14	2.18
F	<i>Calochortus nuttallii</i>	a-	a5	a-	a-	b27	ab14	-	-	.09	.06
F	<i>Castilleja linariaefolia</i>	6	3	11	2	10	8	.52	.12	.27	.33
F	<i>Cirsium undulatum</i>	3	4	6	5	-	-	.07	.15	-	-
F	<i>Collinsia parviflora</i> (a)	-	-	a24	a17	a15	b56	.12	.06	.06	.27
F	<i>Collomia linearis</i> (a)	-	-	-	-	-	3	-	-	-	.00
F	<i>Comandra pallida</i>	-	2	10	2	5	11	.08	.16	.56	.13
F	<i>Cordylanthus ramosus</i> (a)	-	-	a1	ab7	b16	b17	.00	.04	.34	.31
F	<i>Crepis acuminata</i>	a-	c97	b59	b56	b68	b72	.56	.60	1.47	1.55
F	<i>Descurainia</i> sp. (a)	-	-	a-	a-	a-	b38	-	-	-	.38
F	<i>Draba</i> sp. (a)	-	-	a-	a-	a4	b30	-	-	.01	.22
F	<i>Erigeron pumilus</i>	3	4	5	5	4	-	.04	.01	.06	-
F	<i>Eriogonum racemosum</i>	7	11	10	9	2	-	.24	.13	.01	-
F	<i>Eriogonum umbellatum</i>	-	-	6	5	8	14	.12	.06	.33	.51
F	<i>Hackelia patens</i>	d88	c38	bc22	ab4	a-	a2	.24	.03	.00	.01
F	<i>Helianthella uniflora</i>	a-	a-	bc29	b18	bc26	c30	1.39	1.51	1.60	1.61
F	<i>Holosteum umbellatum</i> (a)	-	-	11	3	-	3	.05	.00	-	.01
F	<i>Lappula occidentalis</i> (a)	-	-	-	-	6	-	-	-	.01	-
F	<i>Lithospermum ruderales</i>	3	-	7	6	3	3	.21	.12	.21	.15
F	<i>Lomatium</i> sp.	-	-	-	-	11	2	-	-	.07	.01
F	<i>Lupinus argenteus</i>	-	-	-	-	-	1	-	-	-	.03
F	<i>Microsteris gracilis</i> (a)	-	-	a-	b15	b12	c42	-	.13	.03	.31
F	<i>Penstemon humilis</i>	11	13	5	-	-	-	.06	-	-	-
F	<i>Phlox longifolia</i>	-	3	-	3	-	-	-	.00	-	-
F	<i>Polygonum douglasii</i> (a)	-	-	15	-	13	13	.04	-	.04	.05
F	<i>Ranunculus testiculatus</i> (a)	-	-	a-	a-	a1	b7	-	-	.00	.02
F	<i>Schoenocrambe linifolia</i>	-	-	2	1	-	-	.00	.03	-	-
F	<i>Senecio integerrimus</i>	a-	a-	a-	b15	b14	c39	-	.10	.15	.58
F	<i>Zigadenus paniculatus</i>	-	-	3	3	2	-	.01	.03	.00	-
Total for Annual Forbs		0	0	65	65	99	290	0.28	0.51	0.59	2.28
Total for Perennial Forbs		151	251	266	209	312	463	5.73	5.02	8.51	10.32
Total for Forbs		151	251	331	274	411	753	6.01	5.53	9.10	12.61

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

BROWSE TRENDS--

Management unit 06, Study no: 10

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Amelanchier alnifolia	24	31	24	26	3.34	2.84	1.99	1.77
B	Artemisia tridentata vaseyana	80	69	68	65	16.30	11.05	11.46	7.88
B	Cercocarpus montanus	1	3	1	3	1.31	.18	.15	.18
B	Chrysothamnus depressus	4	6	7	4	.30	.27	.71	.21
B	Chrysothamnus viscidiflorus viscidiflorus	39	50	41	46	2.55	1.41	2.56	1.77
B	Gutierrezia sarothrae	0	0	1	0	-	-	-	-
B	Purshia tridentata	9	10	11	12	1.49	1.10	.60	.91
B	Quercus gambelii	7	7	6	7	.91	1.08	.91	1.95
B	Symphoricarpos oreophilus	54	46	51	52	10.48	6.54	7.14	8.47
B	Tetradymia canescens	4	5	5	6	.18	.18	.15	.15
Total for Browse		222	227	215	221	36.89	24.68	25.70	23.31

CANOPY COVER, LINE INTERCEPT--

Management unit 06, Study no: 10

Species	Percent Cover	
	'06	'11
Amelanchier alnifolia	3.96	4.68
Artemisia tridentata vaseyana	9.46	7.61
Cercocarpus montanus	-	.18
Chrysothamnus depressus	.10	-
Chrysothamnus viscidiflorus viscidiflorus	2.88	3.15
Purshia tridentata	2.00	2.06
Quercus gambelii	1.03	2.34
Symphoricarpos oreophilus	9.10	11.36
Tetradymia canescens	.30	.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 06, Study no: 10

Species	Average leader growth (in)		
	'01	'06	'11
Amelanchier alnifolia	2.6	4.1	4.7
Artemisia tridentata vaseyana	1.8	1.7	1.8
Cercocarpus montanus	2.4	2.7	4.1
Purshia tridentata	-	3.3	2.9

BASIC COVER--

Management unit 06, Study no: 10

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	5.00	16.50	61.87	61.94	66.13	65.62
Rock	.50	0	.05	.03	.01	.01
Pavement	.50	0	.09	.14	.07	0
Litter	80.50	76.00	75.13	70.69	58.55	63.47
Cryptogams	.50	.75	.74	.19	.06	.19
Bare Ground	13.00	6.75	5.88	3.95	5.35	5.69

SOIL ANALYSIS DATA --

Management unit 06, Study no: 10, Study Name: Mahogany Hills

Effective rooting depth (in)	pH	Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.7	6.7	38.9	35.1	26.0	3.7	32.5	195.2	0.6

PELLET GROUP DATA--

Management unit 06, Study no: 10

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	-	-	1	-	-	-	-
Elk	22	17	14	12	41 (101)	59 (146)	42 (103)
Deer	12	3	11	12	11 (26)	48 (119)	23 (58)

BROWSE CHARACTERISTICS--

Management unit 06, Study no: 10

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Amelanchier alnifolia									
84	399	17	0	83	-	0	100	67	-/-
90	265	25	0	75	-	75	25	25	-/-
96	560	0	68	32	-	64	25	4	33/39
01	880	5	80	16	-	23	34	0	33/36
06	620	13	81	6	-	48	35	3	36/32
11	620	10	77	13	-	55	39	0	37/36
Artemisia tridentata vaseyana									
84	4132	0	18	82	-	34	61	27	32/41
90	3265	2	53	45	-	76	4	16	27/30
96	2780	4	56	40	-	60	32	17	28/39
01	1920	1	51	48	-	56	21	18	26/34
06	1960	4	48	48	-	43	27	21	26/33
11	2140	9	54	36	140	54	19	20	29/37

		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 ledifolius										
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	63/49	
Cercocarpus montanus										
84	0	0	0	0	-	0	0	0	-/-	
90	132	50	0	50	-	0	50	50	-/-	
96	20	0	100	0	-	0	0	0	54/63	
01	60	33	67	0	-	0	67	0	40/37	
06	40	0	100	0	-	0	100	0	46/59	
11	80	25	75	0	-	0	75	0	37/43	
Chrysothamnus depressus										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	220	0	100	-	-	0	0	0	7/10	
01	200	0	100	-	-	0	0	0	8/9	
06	340	35	65	-	-	53	0	0	8/13	
11	200	20	80	-	-	0	0	0	8/16	
Chrysothamnus viscidiflorus viscidiflorus										
84	398	17	17	67	-	0	0	0	10/13	
90	66	0	100	0	-	0	0	0	13/3	
96	1740	1	99	0	-	0	0	1	14/16	
01	1680	1	99	0	40	0	0	0	12/15	
06	1500	4	96	0	-	4	0	0	14/19	
11	2000	0	100	0	-	4	0	0	13/16	
Gutierrezia sarothrae										
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	20	0	100	-	-	0	0	0	8/8	
11	0	0	0	-	-	0	0	0	-/-	
Opuntia sp.										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	6/9	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	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)	
<i>Purshia tridentata</i>										
84	466	0	100	-	-	0	100	43	23/39	
90	266	0	100	-	-	75	0	0	25/40	
96	240	0	100	-	-	42	42	0	16/36	
01	280	7	93	-	-	7	64	0	14/34	
06	360	11	89	-	-	28	28	0	18/34	
11	340	6	94	-	-	6	76	0	15/43	
<i>Quercus gambelii</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	460	0	100	0	-	83	4	0	32/22	
01	1120	9	79	13	-	68	4	70	22/18	
06	1180	22	68	10	-	34	0	10	23/11	
11	1260	79	21	0	-	76	24	0	30/22	
<i>Symphoricarpos oreophilus</i>										
84	1265	5	90	5	-	5	0	0	20/30	
90	1265	26	32	42	-	26	5	26	22/37	
96	3380	15	84	1	100	18	0	0	19/32	
01	1860	3	92	4	-	4	0	0	18/36	
06	3720	6	94	0	60	0	0	0	18/27	
11	2700	17	83	0	-	7	0	0	21/39	
<i>Tetradymia canescens</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	80	0	100	0	-	25	0	0	17/18	
01	100	0	100	0	-	0	0	0	15/22	
06	100	0	100	0	-	40	0	0	14/18	
11	120	17	50	33	-	17	0	0	18/28	