

SECOND DAM BLACKSMITH FORK - TREND STUDY NO. 2-12-11

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 5,600 ft (1,707 m)

Aspect: Southwest

Slope: 36%

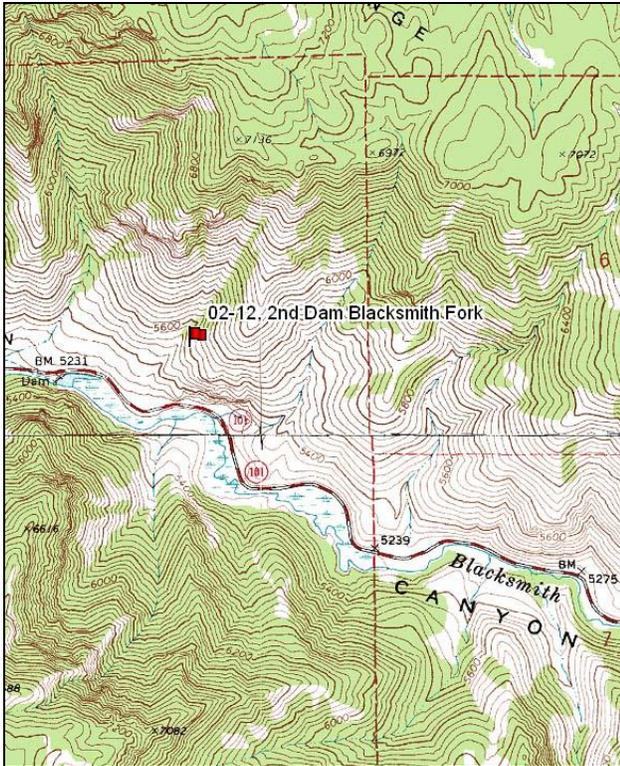
Transect bearing: 151° magnetic

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

Directions:

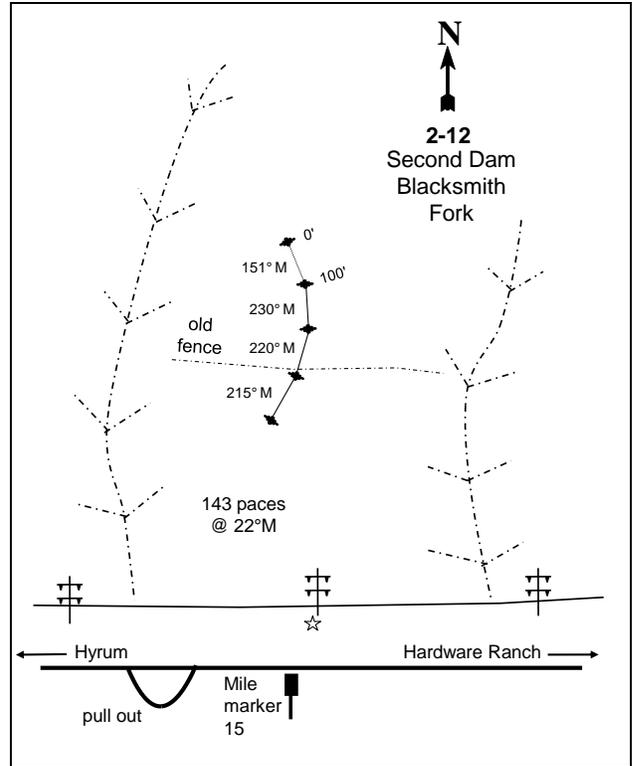
In Hyrum, proceed east up Blacksmith Fork Canyon (U-101) to mile marker 15. Continue 200 feet to the pull-out before mile marker 15. Look for a power pole north of the east of the pull-out. From the pole, take a azimuth of 22 degrees magnetic and walk 143 paces to the 400-foot baseline stake marked by browse tag #7985. The baseline bearing is 151 degrees magnetic. Note: due to the rocky terrain the 100-foot stake is actually at the 95 foot mark; adjust the tape and belts accordingly. Line 2 runs 230 degrees magnetic. Line three runs 220 degrees magnetic. Line 4 runs 215 degrees magnetic.

Map Name: Logan Peak



Township: 10N Range: 2E Section: 1

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 444088 E 4608732 N

SECOND DAM BLACKSMITH FORK - TREND STUDY NO. 2-12

Site Information

Site Description: This study samples crucial deer winter range north of the second reservoir in Blacksmith Fork Canyon. The study is dominated by a mountain big sagebrush (*Artemisia tridentata*) and bitterbrush (*Purshia tridentata*) community with scattered Rocky Mountain junipers (*Juniperus scopulorum*). Deer occupy the area during all but the most severe winters. It was noted that prior to 1984, the preferred browse species were heavily hedged, but have since only received light to moderate use. Deer and elk pellet groups have been sampled in low abundance since 2001 (Table - Pellet Group Data).

Browse: Browse composition consists of mountain big sagebrush and antelope bitterbrush populations, both of which are sparse in density. There is very little young mountain big sagebrush recruitment. Mature sagebrush comprises only a moderate amount of the population. The majority of sagebrush population is comprised mainly of senescing and dead individuals. Generally, the mature and decadent plants are lightly to moderately hedged, with the mature population appearing normal and vigorous, while the decadent population contains mostly chlorotic and diseased individuals (Table - Browse Characteristics).

Antelope bitterbrush is sparse, but has had a fairly stable population since 1984. There has been little recruitment of young bitterbrush to the population, yet the population is centered within the mature age class. Decadence was high in 1984, 1990 and 2001, but has been low in the other sample years. Poor vigor was low throughout the early part of the study, but increased substantially in 2011 (Table - Browse Characteristics).

Other browse species in the area include Saskatoon serviceberry (*Amelanchier alnifolia*), blueberry elder (*Sambucus cerulea*), Woods rose (*Rosa woodsii*), Rocky Mountain maple (*Acer glabrum*), and curleaf mountain mahogany (*Cercocarpus ledifolius*) which provide a desirable variety of forage, but are of minor importance because of their limited abundance. Rocky Mountain juniper trees are located mostly in the drainage bottoms which provide good escape cover for big game.

Herbaceous Understory: The dominant perennial grasses found on the site are Bluebunch wheatgrass (*Agropyron spicatum*) and Sandberg bluegrass (*Poa secunda*). Other perennial grasses include prairie junegrass (*Koeleria cristata*), Kentucky bluegrass (*P. pratensis*), and the weedy species bulbous bluegrass (*P. bulbosa*). The dominant annual grasses found on the site are Japanese brome (*Bromus japonicus*), cheatgrass (*B. tectorum*), and rattlesnake brome (*B. brizaeformis*). Cheatgrass comprises the majority of the herbaceous cover and is widely distributed across the site (Table - Herbaceous Trends).

Forbs are diverse on the site; however, contain few valuable perennial species. The majority are annuals or weedy perennials. Common species include pale alyssum (*Alyssum alyssoides*), arrowleaf balsamroot (*Balsamorhiza sagittata*), rock goldenrod (*Petradoria pumila*), Gray lomatium (*Lomatium grayi*), and yellow salsify (*Tragopogon dubius*). Dyer's woad (*Isatis tinctoria*) is a state listed noxious weed and has been sampled in low abundance for the duration of the study (Table - Herbaceous Trends).

Soil: Natural Resources Conservation Service (NRCS) soil data was not available for this site. The texture of the soil is a clay loam with a slightly alkaline soil reaction (7.4 pH) (Table - Soil Analysis Data). Bare ground cover is low. Protective ground cover is provided by high amounts of vegetation and rock, which provide adequate cover from erosion (Table - Basic Cover). Soils show little development and tend to erode easily. 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 by 32% from 932 plants/acre to 632 plants/acre. Decadence in the sagebrush population increased from 64% to 69%; however, poor vigor decreased from 29% to 5% of the population. Recruitment of young sagebrush plants remained poor at 5%. The density for antelope bitterbrush displayed no change at 199 plants/acre. Decadence for bitterbrush decreased from 67% to 33% of the population. Poor vigor was not observed within the population.
- **1990 to 1996 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence for sagebrush has decreased to 53% of the population, but is still considered very high. Poor vigor increased to 16% of the population. Bitterbrush decreased in decadence with no decadence being observed within the population for 1996.
- **1996 to 2001 - down (-2):** The density for sagebrush decreased by 21% from 380 plants/acre to 300 plants/acre. Decadence within the population remained at 53%. Poor vigor increased to 20% of the population. Density for bitterbrush decreased by 44% from 180 plants/acre to 100 plants/acre. Bitterbrush decadence increased to 40% of the population.
- **2001 to 2006 - down (-2):** Sagebrush density decreased by 47% to 160 plants/acre. Sagebrush decadence and poor vigor both increased to 63% of the population. Bitterbrush density did not change. Decadence and poor vigor were not observed within the bitterbrush population.
- **2006 to 2011 - stable (0):** Density of sagebrush decreased by 13% to 140 plants/acre. Both decadence and poor vigor decreased to 57% of the population. Recruitment of young sagebrush comprised 14% of the population. Density of bitterbrush increased just over two-fold. The increase in density is due to the increase in young bitterbrush. Bitterbrush decadence increased to 8% of the population, while 25% of the population displayed poor vigor.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 49%. The increase is largely due to an increase in the preferred grass Sandberg bluegrass.
- **1990 to 1996 - stable (0):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass decreased significantly in nested frequency. Annual species were included in the sample for the first time in 1996. Japanese brome and cheatgrass both had high nested frequencies.
- **1996 to 2001 - slightly down (-1):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass had a significant increase in nested frequency. Cheatgrass increased significantly in nested frequency and cover increased from 4% to 19%. Japanese chess and rattlesnake brome decreased significantly in nested frequency.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass decreased significantly in nested frequency. The preferred species bluebunch wheatgrass had a slight increase in nested frequency and increased in cover from 7% to 11%. Both Japanese brome and cheatgrass decreased significantly in nested frequency. Cheatgrass decreased in cover to 8%.
- **2006 to 2011 - down (-2):** The sum of nested frequency for perennial grasses decreased 32%. Sandberg bluegrass decreased significantly in nested frequency and is directly associated with the decrease in the sum of nested frequency, though cover increased from 2% to 6%.

Forb:

- **1984 to 1990 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 18%. The forb community on the site is fairly diverse; however, few perennial species are considered valuable to big game.

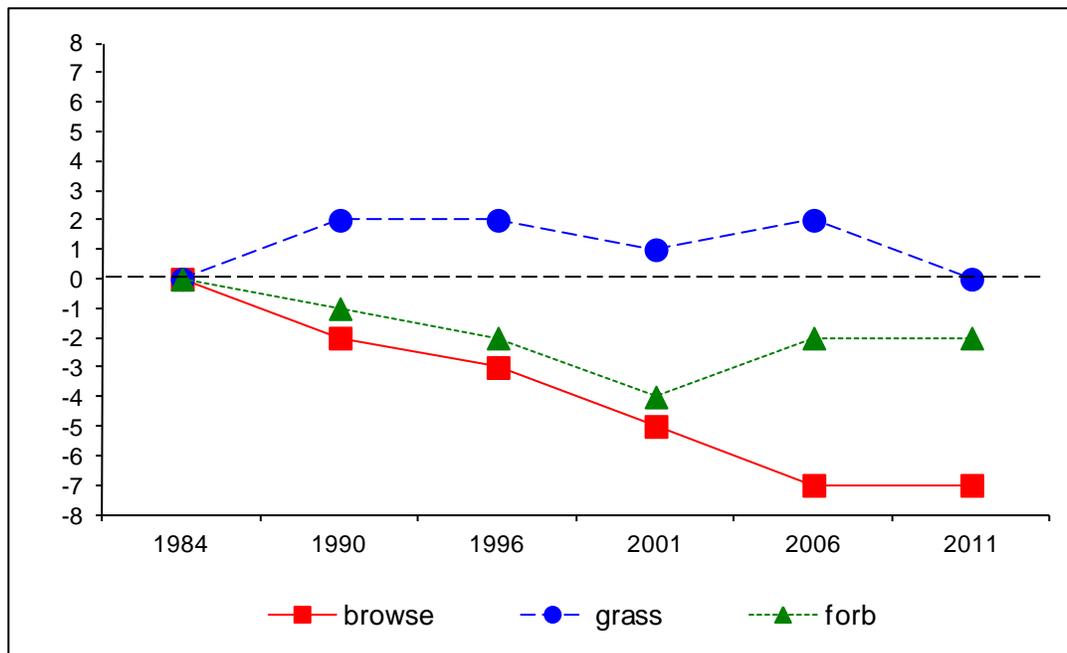
- **1990 to 1996 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 15%. The forb community maintained fair diversity, but few useful perennial forbs.
- **1996 to 2001 - down (-2):** The sum of nested frequency for perennial forbs decreased 29%.
- **2001 to 2006 - up (+2):** The sum of nested frequency for perennial forbs increased 78%. The increase is directly associated with the significant increase in nested frequencies for pale agoseris (*Agoseris glauca*) and Gray lomatium.
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial forbs remained similar. Tapertip onion (*Allium acuminatum*) had a significant increase in nested frequency.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 2, study no: 12

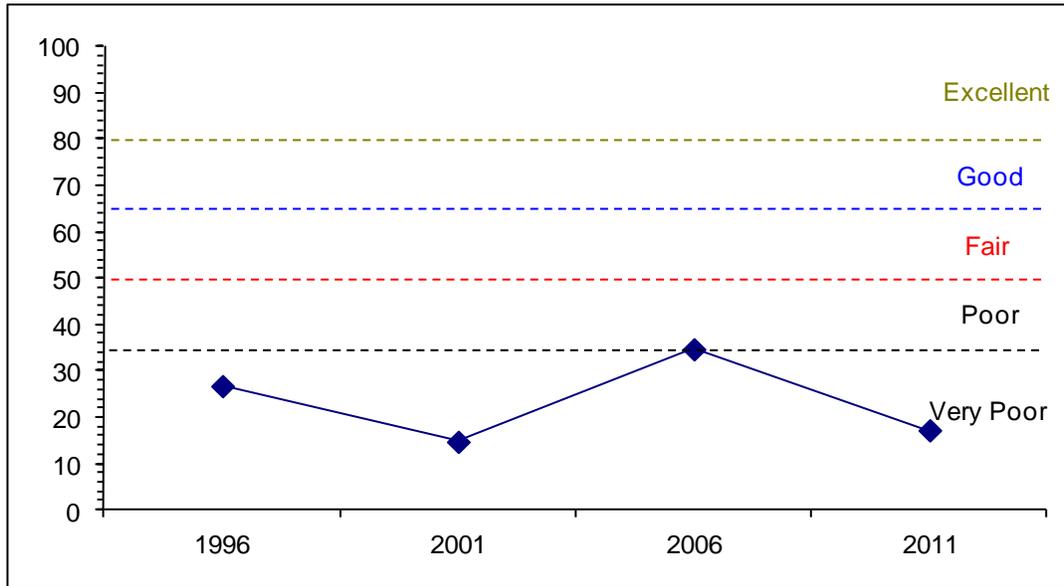
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	7.0	0.0	0.0	20.6	-7.2	8.4	-2.0	26.7	Very Poor
01	4.5	0.0	0.0	19.1	-15.5	6.6	0.0	14.7	Very Poor
06	5.1	0.0	0.0	28.0	-6.5	10.0	-2.0	34.7	Very Poor-Poor
11	6.6	0.0	0.0	23.4	-19.6	8.8	-2.0	17.2	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 2 Study no: 12



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 2, Study no: 12



HERBACEOUS TRENDS--
 Management unit 02, Study no: 12

Type	Species	Nestled Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron smithii	-	-	-	-	3	-	-	-	.15	-
G	Agropyron spicatum	151	176	154	168	180	147	6.40	6.50	11.37	5.44
G	Bromus brizaeformis (a)	-	-	a11	b49	b77	c175	.03	.35	.56	7.55
G	Bromus japonicus (a)	-	-	c280	b95	a45	b90	5.56	1.16	.34	1.43
G	Bromus tectorum (a)	-	-	a213	c347	ab268	b261	4.00	19.09	7.70	17.11
G	Koeleria cristata	18	8	11	9	5	4	.21	.11	.03	.15
G	Poa bulbosa	-	-	4	8	10	21	.01	.18	.07	.10
G	Poa fendleriana	-	-	-	-	2	2	-	-	.03	.00
G	Poa pratensis	-	4	-	-	11	-	-	-	.11	-
G	Poa secunda	a66	c162	ab158	c164	b121	a52	3.68	2.92	2.30	6.11
Total for Annual Grasses		0	0	504	491	390	526	9.60	20.61	8.61	26.11
Total for Perennial Grasses		235	350	327	349	332	226	10.30	9.72	14.08	11.81
Total for Grasses		235	350	831	840	722	752	19.91	30.33	22.69	37.93
F	Achillea millefolium	6	1	-	-	-	-	-	-	.00	-
F	Agoseris glauca	a-	a1	a3	a9	b32	a4	.00	.16	.19	.01
F	Allium acuminatum	b60	a3	a28	a24	a13	b92	2.14	.09	.08	.60
F	Alyssum alyssoides (a)	-	-	a227	b286	a212	b282	.89	4.43	1.34	7.35
F	Astragalus sp.	-	-	-	-	1	-	-	-	.03	-
F	Astragalus utahensis	2	4	1	-	-	-	.03	-	-	-
F	Balsamorhiza sagittata	a17	b24	a12	a11	a7	a8	.43	1.60	1.19	1.73
F	Calochortus nuttallii	2	1	3	-	6	3	.00	-	.01	.01
F	Camelina microcarpa (a)	-	-	-	1	6	4	-	.00	.01	.18
F	Castilleja linariaefolia	-	-	-	1	-	-	-	.03	-	-
F	Cirsium undulatum	2	4	5	-	4	6	.19	.12	.24	.24

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	<i>Collinsia parviflora</i> (a)	-	-	a7	a5	b28	a8	.01	.01	.09	.04
F	<i>Collomia linearis</i> (a)	ab7	a-	a1	ab6	b12	ab11	.00	.01	.04	.05
F	<i>Comandra pallida</i>	b35	a2	ab17	a10	a3	a8	.07	.09	.03	.05
F	<i>Crepis acuminata</i>	a5	b28	a17	a8	a12	a13	.25	.19	.31	.35
F	<i>Delphinium nuttallianum</i>	-	-	-	-	2	-	-	-	.00	-
F	<i>Descurainia pinnata</i> (a)	-	-	-	3	-	-	-	.00	-	-
F	<i>Draba sp.</i> (a)	-	-	-	3	2	-	-	.00	.01	-
F	<i>Epilobium brachycarpum</i> (a)	-	-	b11	a-	c49	c35	.02	-	.51	.39
F	<i>Eriogonum umbellatum</i>	1	2	2	5	-	-	.15	.03	-	-
F	<i>Erodium cicutarium</i> (a)	-	-	a-	a5	b46	b42	-	.06	1.37	.26
F	<i>Galium aparine</i> (a)	-	-	ab3	a3	b24	ab14	.01	.03	.04	.08
F	<i>Hackelia patens</i>	-	-	-	2	3	4	-	.00	.04	.01
F	<i>Holosteum umbellatum</i> (a)	-	a-	a10	c161	b55	a30	.05	.81	.17	.11
F	<i>Isatis tinctoria</i>	a-	bc13	c19	a-	a-	ab3	.07	-	.00	.15
F	<i>Lactuca serriola</i> (a)	a-	bc15	b5	d58	c25	bc16	.06	.62	.19	.21
F	<i>Lappula occidentalis</i> (a)	-	-	-	-	9	-	-	-	.02	-
F	<i>Linum lewisii</i>	2	1	3	-	-	5	.03	-	-	.18
F	<i>Lithospermum arvense</i> (a)	-	-	-	-	1	9	-	-	.01	.06
F	<i>Lithospermum ruderales</i>	2	-	-	5	5	-	.03	.06	.18	.06
F	<i>Lomatium grayi</i>	ab13	bc27	a4	ab5	c59	ab15	.01	.01	2.56	.23
F	<i>Medicago sativa</i>	-	-	-	-	-	-	-	-	-	.03
F	<i>Melilotus officinalis</i>	-	5	1	-	3	-	.00	-	.00	-
F	<i>Microsteris gracilis</i> (a)	-	-	-	-	8	2	-	-	.02	.01
F	<i>Oenothera sp.</i>	-	-	-	-	1	-	-	-	.00	-
F	<i>Penstemon sp.</i>	-	-	3	-	-	-	.03	-	-	-
F	<i>Petroradia pumila</i>	bc34	c34	a9	ab10	a9	a6	.71	.89	1.31	.71
F	<i>Ranunculus testiculatus</i> (a)	-	-	a13	a31	b76	a6	.02	.07	.42	.01
F	<i>Senecio sp.</i>	1	-	-	-	-	-	-	-	-	-
F	<i>Tragopogon dubius</i> (a)	a18	a53	d175	b98	bc112	cd149	2.85	1.29	3.09	3.89
F	<i>Veronica biloba</i> (a)	-	-	a46	a54	b97	a40	.15	.67	.43	.21
Total for Annual Forbs		25	68	498	714	762	648	4.09	8.06	7.79	12.89
Total for Perennial Forbs		182	150	127	90	160	167	4.18	3.30	6.21	4.39
Total for Forbs		207	218	625	804	922	815	8.28	11.36	14.01	17.28

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

BROWSE TRENDS--

Management unit 02, Study no: 12

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata vaseyana	19	13	8	7	3.20	1.74	.74	.45
B	Chrysothamnus nauseosus hololeucus	2	2	3	3	.76	1.96	.76	.30
B	Chrysothamnus viscidiflorus viscidiflorus	5	4	3	3	.06	.23	.31	.00
B	Eriogonum heracleoides	1	0	0	0	-	-	-	
B	Gutierrezia sarothrae	25	26	16	5	.65	.66	.39	-
B	Purshia tridentata	9	5	5	7	1.99	1.41	2.67	3.88
B	Rosa woodsii	0	2	2	2	-	.15	.15	.15
Total for Browse		61	52	37	27	6.67	6.17	5.03	4.79

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 12

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	.83	.85
Chrysothamnus nauseosus hololeucus	2.16	1.43
Chrysothamnus viscidiflorus viscidiflorus	.83	.01
Gutierrezia sarothrae	.90	.13
Purshia tridentata	5.56	6.33
Rosa woodsii	.41	.41

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 12

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	2.8	2.9	3.6
Purshia tridentata	3.9	3.8	4.3

BASIC COVER--

Management unit 02, Study no: 12

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	1.25	9.75	33.04	52.43	34.54	50.87
Rock	43.00	39.00	31.60	29.89	36.88	35.43
Pavement	12.25	8.25	3.85	2.98	6.91	7.90
Litter	26.25	25.00	31.88	36.83	30.38	25.27
Cryptogams	4.25	1.75	4.36	3.26	1.75	2.53
Bare Ground	13.00	16.25	4.64	4.52	9.03	5.32

SOIL ANALYSIS DATA --

Management unit 02, Study no: 12, Study Name: Second Dam Blacksmith Fork

Effective rooting depth (in)	pH	Clay Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
8.2	7.4	36.6	35.1	28.4	3.4	10.0	176.0	0.7

PELLET GROUP DATA--

Management unit 02, Study no: 12

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	-	-	4	-	-	-	-
Elk	6	1	5	2	6 (15)	16 (40)	3 (8)
Deer	8	4	11	5	12 (30)	16 (40)	10 (25)
Cattle	-	-	1	-	-	-	-

BROWSE CHARACTERISTICS--

Management unit 02, Study no: 12

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Amelanchier alnifolia										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	54/47	
01	0	0	0	-	-	0	0	0	51/52	
06	0	0	0	-	-	0	0	0	36/43	
11	0	0	0	-	-	0	0	0	48/49	
Artemisia tridentata vaseyana										
84	932	0	36	64	-	18	82	29	34/30	
90	632	0	31	69	-	0	0	5	30/31	
96	380	5	42	53	-	21	5	16	30/47	
01	300	0	47	53	20	80	0	20	29/40	
06	160	0	38	63	20	25	25	63	30/42	
11	140	14	29	57	-	29	29	57	29/44	
Chrysothamnus nauseosus hololeucus										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	40	0	100	0	-	0	0	0	47/72	
01	40	0	100	0	-	0	0	0	33/44	
06	60	0	67	33	-	0	0	0	27/34	
11	60	0	100	0	-	0	0	0	29/71	

		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>Chrysothamnus viscidiflorus viscidiflorus</i>										
84	132	25	50	25	-	0	0	0	15/10	
90	99	0	100	0	-	0	0	0	18/23	
96	140	14	86	0	-	0	0	0	18/30	
01	100	0	100	0	-	0	0	0	15/25	
06	80	0	75	25	-	0	0	0	16/32	
11	80	0	100	0	-	0	0	0	20/30	
<i>Eriogonum heracleoides</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	0	100	-	-	0	0	0	3/4	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	1260	35	65	0	60	0	0	0	10/16	
01	1080	0	100	0	-	0	0	0	9/13	
06	500	0	92	8	-	0	0	4	11/16	
11	100	0	100	0	-	0	0	0	11/12	
<i>Purshia tridentata</i>										
84	199	0	33	67	-	0	100	0	28/36	
90	199	0	67	33	-	17	0	0	24/30	
96	180	11	89	0	-	44	0	0	33/76	
01	100	0	60	40	-	60	20	0	39/76	
06	100	0	100	0	-	20	80	0	38/71	
11	240	50	42	8	40	42	8	25	42/70	
<i>Rosa woodsii</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	10/6	
01	40	100	0	-	-	0	0	0	-/-	
06	180	11	89	-	-	0	0	0	16/11	
11	180	33	67	-	-	0	0	0	18/15	
<i>Sambucus racemosa</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	62/95	
11	0	0	0	-	-	0	0	0	60/90	

		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>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	22/26	
<i>Tetradymia canescens</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	34/47	