

TWIN CREEK - TREND STUDY NO. 2-38-11

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 6,500 ft (1,981 m)

Aspect: South

Slope: 35%

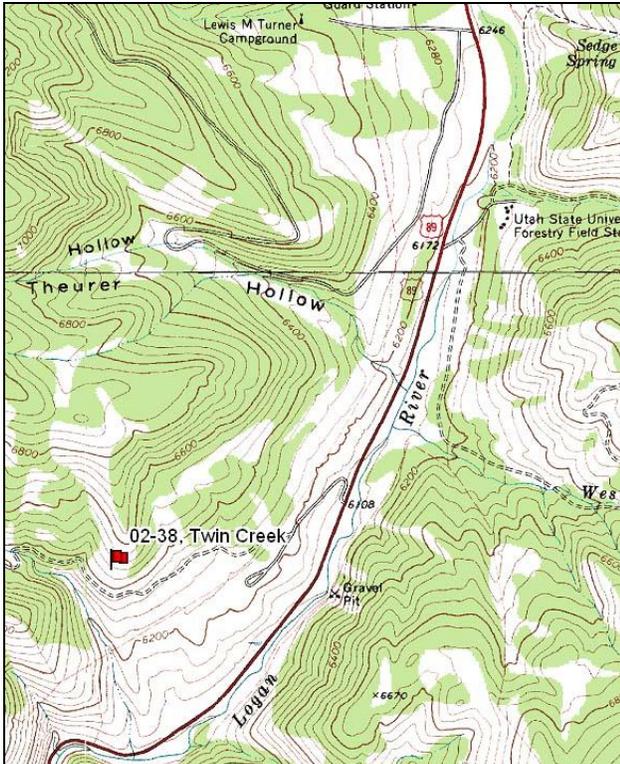
Transect bearing: 9° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft)

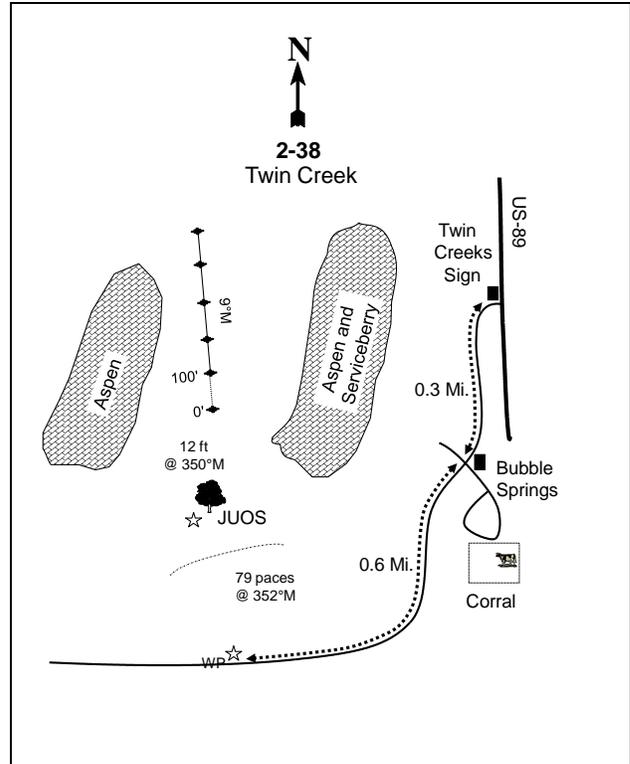
Directions:

Take the Twin Creek turnoff off of U.S. 89 and proceed 0.3 miles to the Bubble Springs turn. Go right for 0.6 miles to a witness post. From the witness post walk 74 paces at a bearing of 352 degrees magnetic to a lone juniper. From the juniper, the 0-foot baseline stake is 12 feet away at a bearing of 350 degrees magnetic. The baseline runs up the slope at 9 degrees magnetic.

Map Name: Temple Creek



Diagrammatic Sketch:



Township: 13N Range: 3E Section: 3

GPS: NAD 83, UTM 12S 451639 E 4634743 N

## Site Information

Site Description: This study is located in Logan Canyon, just east of the Twin Creek corrals on land administered by the United States Forest Service (USFS). The study was established to monitor elk concentrations during the winter months. Signs of cattle, sheep, and deer have also been encountered. Elk pellet groups were sampled in high abundance in 2001, but low abundance in 2006 and 2011. Deer and cattle sign has been minimal since 2001 (Table - Pellet Group Data). Moose pellet groups have been observed on the study, but were not sampled within the pellet group transect.

Browse: A variety of palatable and preferred shrubs provide forage for wildlife, which include Saskatoon serviceberry (*Amelachier alnifolia*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), chokecherry (*Prunus virginiana*), and antelope bitterbrush (*Purshia tridentata*). Of these species, only mountain big sagebrush and bitterbrush are abundant. Mountain big sagebrush is a moderately dense, mostly mature population. The decadence of sagebrush has historically been low, but has steadily increased over the course of the study. The sagebrush population has had light to moderate utilization over the course of the study. The Mountain big sagebrush population has displayed good vigor for the duration of the study. The recruitment of young sagebrush plants has fluctuated over the course of the study, but was considered good in 1996 and 2011. The highly preferred shrubs bitterbrush and serviceberry are found in small numbers and have been heavily hedged throughout the study years. Antelope bitterbrush density is somewhat sparse and is centered within the mature demographic. The bitterbrush population has displayed good vigor, notwithstanding the heavy hedging. The Saskatoon serviceberry population is very sparse in density. Serviceberry was observed on the site in 1996 and 2001, but was not sampled in 2006 and 2011. In 1996, the serviceberry population was heavily hedged (Table - Browse Characteristics), and their leaves were covered with a rust fungus.

Herbaceous Understory: The herbaceous understory is abundant and diverse. Grasses and forbs combined produced half of the vegetation cover in 2001, 2006 and 2011. Bluebunch wheatgrass (*Agropyron spicatum*) and Kentucky bluegrass (*Poa pratensis*) are the most abundant perennial grass species found on the study site. Other perennial grass species found on the site include Sandberg bluegrass (*P. secunda*), bulbous bluegrass (*P. bulbosa*), slender wheatgrass (*Agropyron trachycaulum*), oniongrass (*Melica bulbosa*), mountain brome (*Bromus carinatus*), and Great Basin wildrye (*Elymus cinereus*). Bulbous bluegrass is present and has maintained a stable population from 1996 through 2006, but had a significant increase in nested frequency and cover in 2011. Cheatgrass (*Bromus tectorum*) and Japanese chess (*B. japonicus*) have been rarely encountered and provided very little cover. Forbs are diverse, but unfortunately weedy species dominate the composition. Perennials include mulesears wyethia (*Wyethia amplexicaulis*), aster (*Aster sp.*), and bastard toadflax (*Comandra pallida*), and arrowleaf balsamroot (*Balsamorhiza sagittata*). The annual/biannual species yellow salsify (*Tragopogon dubius*) is also abundant (Table - Herbaceous Trends).

Soil: NRCS soil data was not available for this site. Soil texture is a loam with a slightly acidic soil reaction (pH 6.3). Organic matter is high at 6.5% (Table - Soil Analysis Data). Bare ground cover is low and is present primarily due to burrowing rodent activity. Protective ground cover is provided by high amounts of vegetation and litter cover (Table - Basic Cover). Vegetation and litter cover is plentiful and well dispersed, which effectively limits soil erosion. The soil erosion condition has been classified as stable since 2001.

## Trend Assessments

### Browse:

- **1996 to 2001 - slightly down (-1):** The density for mountain big sagebrush decreased 14% from 1,460 plants/acre to 1,260 plants/acre. Decadence within the sagebrush population increased from 3% to 8%. However, the sagebrush population decreased in poor vigor from 10% to 2%. Recruitment of young sagebrush plants decreased within the population from 18% to 3%. Antelope bitterbrush did

not change in density, however, decadence within the population increased from 11% to 22%, and poor vigor increased from 0% to 22% within the population.

- **2001 to 2006 - stable (0):** The density for mountain big sagebrush remained similar at 1,280 plants/acre. Decadence within the sagebrush population increased to 11%. The sagebrush population increased in poor vigor to 9%. Recruitment of young sagebrush increased and comprised 8% of the population. Antelope bitterbrush had no change in density. Decadence and poor vigor decreased and were not observed within the bitterbrush population.
- **2006 to 2011 - up (+2):** The density for mountain big sagebrush increased 55% to 1,980 plants/acre. Decadence within the sagebrush population increased to 20%. The sagebrush population maintained poor vigor at 9%. Young sagebrush recruitment comprised 11% of the population. The density for antelope bitterbrush increased 56% from 180 plants/acre to 280 plants/acre. Decadence within the bitterbrush population increased to 7%. Poor vigor was not observed within the bitterbrush population. Recruitment of young bitterbrush plants comprised 21% of the population.

#### Grass:

- **1996 to 2001 - slightly up (+1):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 13%. Kentucky bluegrass and Sandberg bluegrass increased significantly in nested frequency, and increased in cover from 3% to 7%, and less than 1% to 1%, respectively. Oniongrass increased significantly in nested frequency, and increased in cover from near 0% to 1%. Slender wheatgrass decreased significantly in nested frequency, and decreased in cover from 2% to less than 1%.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, decreased 11%. Bluebunch wheatgrass increased significantly in nested frequency, and increased in cover from 8% to 17%. Oniongrass and Kentucky bluegrass decreased significantly in nested frequency, and decreased in cover to less than 1% and 2%, respectively.
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, remained similar. Bulbous bluegrass increased significantly in nested frequency, and cover increased from 1% to 5%. Bulbous bluegrass became the second most abundant grass species in 2011. Great Basin wildrye increased significantly in nested frequency, and had a cover of 2%.

#### Forb:

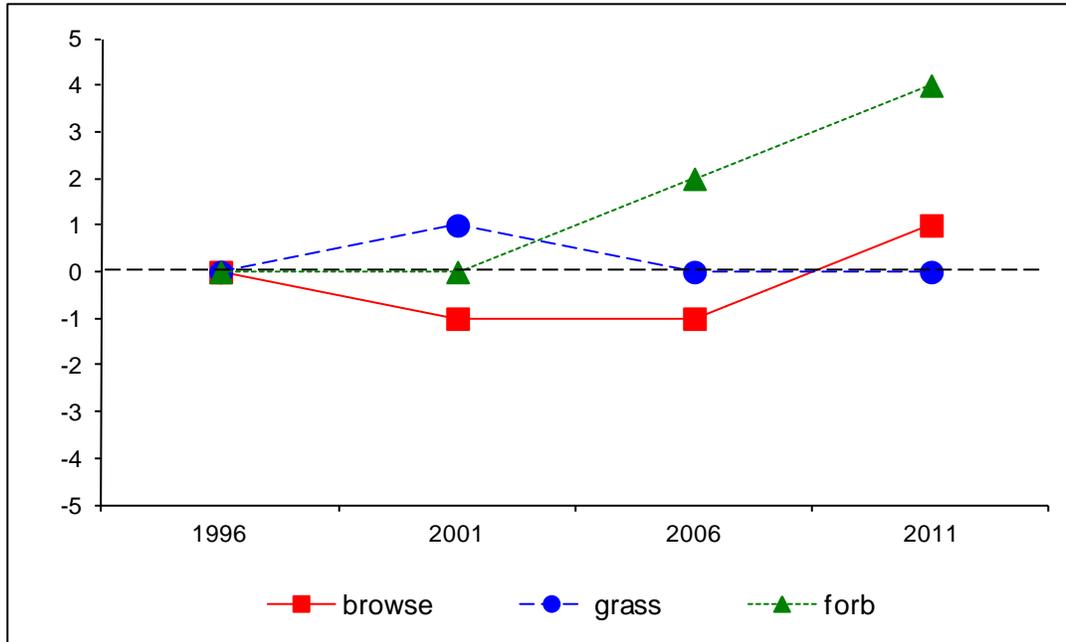
- **1996 to 2001 - stable (0):** The sum for nested frequency for perennial forbs remained similar. The unpalatable forb mulesear wyethia had a significant increase in nested frequency, and increased in cover from 4% to 7%.
- **2001 to 2006 - up (+2):** The sum of nested frequency for perennial forbs increased 40%. Pale agoseris (*Agoseris glauca*) had a significant increase in nested frequency. The sum of nested frequency of annual forbs decreased substantially, and cover decreased from 3% to 1%. The forb composition remained dominated by weedy increasers; however, the community composition is fairly diverse.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial forbs increased 33%. Milkvetch (*Astragalus sp.*) had a significant increase in nested frequency. Yellow salsify increased significantly in nested frequency, and increased in cover from less than 1% to 1%. The forb community maintained high diversity; however, less palatable species remained common.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --  
 Management unit 2, study no: 38

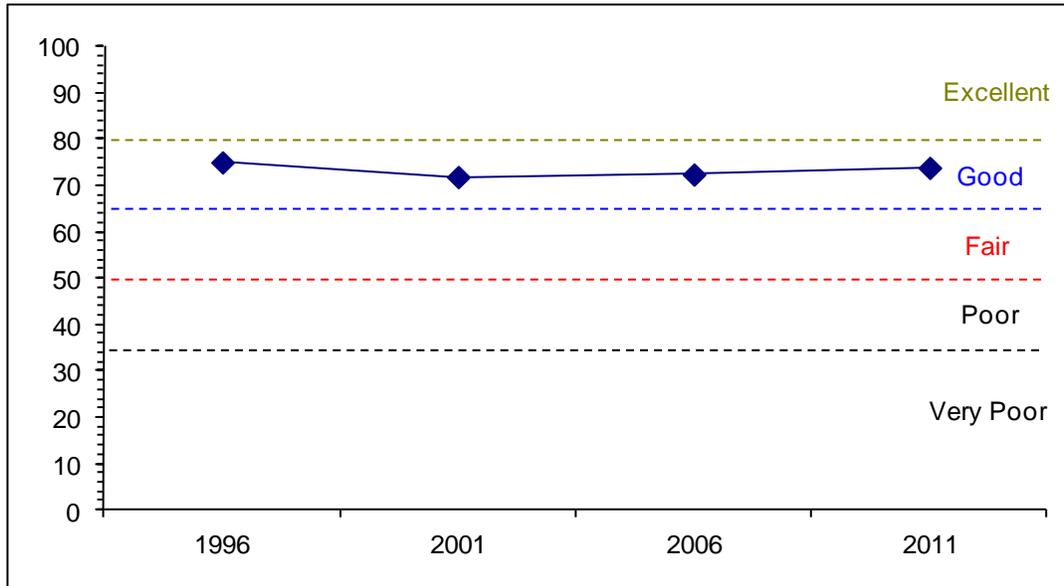
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	12.0	13.6	9.4	30.0	0.0	10.0	0.0	<b>75.0</b>	Good
01	18.3	11.7	1.8	30.0	0.0	10.0	0.0	<b>71.8</b>	Good
06	16.7	12.4	3.4	30.0	0.0	10.0	0.0	<b>72.4</b>	Good
11	17.5	9.7	6.6	30.0	0.0	10.0	0.0	<b>73.8</b>	Good

**Trend Summary**

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 2 Study no: 38



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--  
 Management unit 2, Study no: 38



HERBACEOUS TRENDS--  
 Management unit 02, Study no: 38

Type	Species	Nested Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron spicatum	a265	ab264	c339	bc335	12.38	7.47	17.09	15.50
G	Agropyron trachycaulum	b70	a19	a9	a20	1.93	.53	.21	.85
G	Bromus carinatus	ab40	a25	ab47	b74	.79	.38	.89	1.04
G	Bromus japonicus (a)	-	-	10	19	-	-	.04	.06
G	Bromus tectorum (a)	3	-	4	-	.06	-	.00	-
G	Carex sp.	-	-	-	-	-	.03	-	.00
G	Elymus cinereus	ab23	a9	a10	b32	1.04	.54	1.21	1.71
G	Melica bulbosa	a9	c64	ab27	bc51	.06	.89	.16	.29
G	Poa bulbosa	a33	a50	a46	b197	1.62	1.22	.73	4.99
G	Poa pratensis	b162	c222	ab137	a105	3.42	6.82	1.96	1.05
G	Poa secunda	a27	b67	ab36	a22	.46	.80	.34	.10
G	Stipa columbiana	9	13	-	4	.21	.21	-	.02
G	Stipa lettermani	-	-	-	2	-	-	-	.00
Total for Annual Grasses		3	0	14	19	0.06	0	0.04	0.06
Total for Perennial Grasses		638	733	651	842	21.94	18.93	22.62	25.60
Total for Grasses		641	733	665	861	22.00	18.93	22.66	25.67
F	Achillea millefolium	a16	a10	ab27	b43	.27	.10	.43	1.72
F	Agoseris glauca	a-	a-	b21	a8	-	-	.11	.02
F	Alyssum alyssoides (a)	c173	b117	a35	a55	.85	.28	.07	.10
F	Arabis drummondi	3	-	3	2	.02	.00	.00	.01
F	Aster sp.	9	-	-	5	.71	-	-	.03
F	Astragalus beckwithii	-	-	7	7	-	-	.04	.07
F	Astragalus sp.	a-	a-	a2	b19	-	-	.06	.22
F	Balsamorhiza macrophylla	-	-	1	2	-	-	.38	.41

Type	Species	Nested Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
F	Balsamorhiza sagittata	2	6	13	11	.48	.86	1.12	1.35
F	Calochortus nuttallii	-	-	7	4	-	-	.01	.01
F	Camelina microcarpa (a)	-	4	-	-	-	.01	-	-
F	Chenopodium album (a)	-	-	3	5	-	-	.00	.00
F	Cirsium undulatum	3	-	4	9	.15	.00	.38	.04
F	Collinsia parviflora (a)	106	99	32	19	.30	.52	.07	.06
F	Collomia linearis (a)	a46	b94	b86	ab63	.17	.25	.19	.16
F	Comandra pallida	b22	b14	a11	a20	.48	.09	.15	.43
F	Crepis acuminata	5	7	7	4	.03	.19	.10	.04
F	Delphinium nuttallianum	10	3	-	-	.02	.01	-	-
F	Descurainia pinnata (a)	-	6	-	2	-	.01	-	.00
F	Draba sp. (a)	3	-	-	-	.01	-	-	-
F	Epilobium brachycarpum (a)	b99	a53	a62	a37	.66	.12	.17	.22
F	Galium aparine (a)	a4	a2	a1	b59	.03	.00	.03	.95
F	Gayophytum ramosissimum(a)	-	-	1	-	-	-	.00	-
F	Hackelia patens	-	3	-	13	-	.00	-	.10
F	Helianthella uniflora	5	9	21	15	.36	.27	1.57	1.43
F	Lactuca serriola (a)	18	3	1	-	.08	.03	.00	-
F	Lappula occidentalis (a)	8	3	3	14	.07	.00	.01	.10
F	Linum lewisii	-	-	1	4	-	-	.00	.04
F	Lithospermum ruderales	ab14	b19	ab10	a4	.24	.83	.42	.30
F	Lupinus argenteus	b20	ab9	ab9	a3	.38	.25	.20	.36
F	Lupinus sp.	-	-	-	18	-	-	-	.43
F	Microsteris gracilis (a)	bc46	c54	a22	b28	.21	.22	.04	.05
F	Phlox longifolia	-	-	2	-	-	-	.00	-
F	Polygonum douglasii (a)	b69	a22	b68	ab51	.22	.10	.16	.20
F	Senecio multilobatus	5	9	-	2	.03	.04	.00	.00
F	Taraxacum officinale	4	-	-	8	.01	-	-	.04
F	Thlaspi montanum	1	-	-	-	.00	-	.00	-
F	Tragopogon dubius (a)	c88	bc94	a17	b64	1.08	1.20	.13	.52
F	Verbascum blattaria	8	-	17	3	.07	-	.03	.00
F	Veronica biloba (a)	b132	a18	a3	a21	1.38	.04	.01	.11
F	Wyethia amplexicaulis	a31	b58	ab42	b69	3.81	6.89	4.64	4.47
Total for Annual Forbs		792	569	334	418	5.09	2.80	0.93	2.50
Total for Perennial Forbs		158	147	205	273	7.10	9.57	9.69	11.58
Total for Forbs		950	716	539	691	12.20	12.38	10.63	14.09

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

BROWSE TRENDS--

Management unit 02, Study no: 38

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Amelanchier alnifolia	1	1	0	0	.38	.15	-	.03
B	Artemisia tridentata vaseyana	52	50	48	66	6.65	11.47	10.26	11.32
B	Chrysothamnus viscidiflorus viscidiflorus	57	62	56	52	7.40	6.65	4.82	3.92
B	Eriogonum heracleoides	22	25	22	25	2.15	2.32	1.96	2.37
B	Prunus virginiana	5	6	6	9	.09	.33	.51	.36
B	Purshia tridentata	8	9	8	12	2.02	2.21	2.13	1.93
B	Symphoricarpos oreophilus	30	38	32	40	5.64	7.69	6.46	6.13
Total for Browse		175	191	172	204	24.35	30.85	26.17	26.08

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 38

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	18.50	21.45
Chrysothamnus viscidiflorus viscidiflorus	7.41	6.41
Eriogonum heracleoides	2.46	2.96
Prunus virginiana	.18	.21
Purshia tridentata	1.85	2.70
Symphoricarpos oreophilus	9.31	12.98

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 38

Species	Average leader growth (in)		
	'01	'06	'11
Amelanchier alnifolia	3.7	-	2.5
Artemisia tridentata vaseyana	2.0	2.9	2.4
Purshia tridentata	3.1	4.3	3.4

BASIC COVER--

Management unit 02, Study no: 38

Cover Type	Average Cover %			
	'96	'01	'06	'11
Vegetation	53.65	58.72	58.75	64.75
Rock	5.68	2.70	3.68	2.14
Pavement	2.76	5.84	5.72	3.99
Litter	55.04	42.15	33.81	41.30
Cryptogams	.58	.55	.01	.15
Bare Ground	5.33	11.01	18.77	4.68

SOIL ANALYSIS DATA --

Management unit 02, Study no: 38, Study Name: Twin Creek

Effective rooting depth (in)	pH	Loam			%OM	PPM P	PPM K	ds/m
		% sand	% silt	% clay				
13.0	6.3	42.9	32.1	25.0	6.5	38.4	278.4	0.5

PELLET GROUP DATA--

Management unit 02, Study no: 38

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Sheep	2	-	-	2	-	-	-
Elk	28	18	2	6	42 (1030)	10 (25)	12 (30)
Deer	4	5	4	2	6 (15)	14 (35)	2 (5)
Cattle	2	-	7	2	3 (7)	13 (32)	12 (30)
Horse	-	-	-	-	-	-	1 (1)

BROWSE CHARACTERISTICS--

Management unit 02, Study no: 38

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier alnifolia</b>									
96	20	0	100	0	-	0	100	0	35/25
01	20	0	0	100	-	0	100	0	33/27
06	0	0	0	0	-	0	0	0	43/43
11	0	0	0	0	-	0	0	0	39/40
<b>Artemisia tridentata vaseyana</b>									
96	1460	18	79	3	280	51	4	10	27/43
01	1260	3	89	8	20	11	5	2	33/49
06	1280	8	81	11	600	3	0	9	30/50
11	1980	11	69	20	460	16	0	9	26/42
<b>Chrysothamnus nauseosus</b>									
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	41/74
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
96	2180	3	96	1	-	0	0	2	16/26
01	2260	7	88	5	20	0	0	.88	15/26
06	1740	2	97	1	-	0	0	1	14/25
11	1800	1	92	7	-	0	0	1	14/22
<b>Eriogonum heracleoides</b>									
96	860	0	98	2	-	0	0	0	8/22
01	1060	0	98	2	-	0	0	2	8/21
06	840	0	100	0	-	7	0	0	9/21
11	840	0	100	0	-	0	0	0	5/21

		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>Prunus virginiana</i>										
96	<b>140</b>	86	14	-	-	43	0	0	13/9	
01	<b>260</b>	54	46	-	-	0	0	0	22/25	
06	<b>400</b>	10	90	-	-	0	90	0	11/15	
11	<b>520</b>	42	58	-	40	23	8	0	20/13	
<i>Purshia tridentata</i>										
96	<b>180</b>	22	67	11	-	44	44	0	21/41	
01	<b>180</b>	0	78	22	-	0	89	22	25/35	
06	<b>180</b>	0	100	0	-	22	67	0	25/46	
11	<b>280</b>	21	71	7	-	21	14	0	27/50	
<i>Symphoricarpos oreophilus</i>										
96	<b>1220</b>	10	84	7	20	10	18	13	29/46	
01	<b>1060</b>	0	92	8	-	0	0	0	32/49	
06	<b>1000</b>	8	92	0	-	0	0	0	30/46	
11	<b>1480</b>	5	95	0	-	3	0	0	26/44	