

Trend Study 5-3-01

Study site name: East Canyon Reservoir .

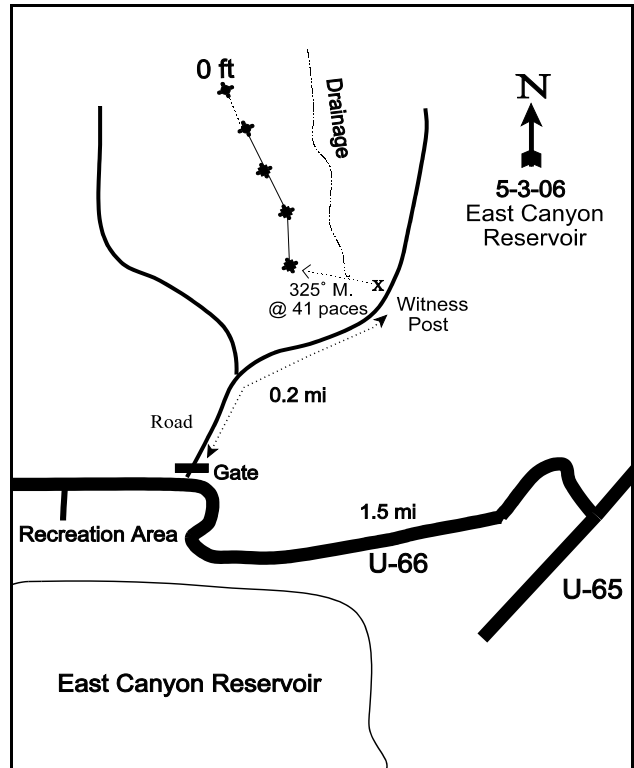
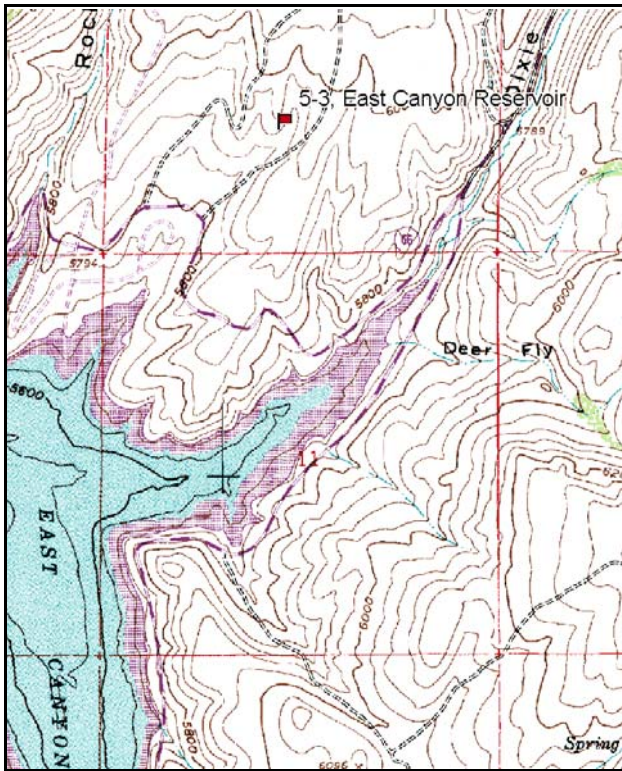
Vegetation type: Big Sagebrush .

Compass bearing: frequency baseline 186 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Begin to note mileage at the junction of U-65 and U-66. Proceed towards Porterville on U-66 1.15 miles to a gate on the right. There should be a picnic/campground area on left side of road. Proceed through gate on foot (gate locked), travel 0.2 miles to the witness post on the left hand side of the road. From the witness post the 400-foot baseline stake is 41 paces at 325 degrees magnetic. The 0-foot baseline stake is 400 feet to the northwest. The 0-foot stake of the baseline is marked by browse tab #7968. The baseline runs 186 degrees. The baseline doglegs at the 300-foot baseline stake and runs 232 degrees magnetic.



Map Name: East Canyon Reservoir

Diagrammatic Sketch

Township 2N, Range 3E, Section 2

UTM NAD 27, UTM 12T 4530848 N 451110 E

## DISCUSSION

### East Canyon Reservoir - Trend Study No. 5-3

#### Study Information

This study is located immediately north of East Canyon Reservoir (elevation: 5,900 feet, slope: 20-30%, aspect: southeast). The vegetation type is mountain big sagebrush-grass with a substantial amount of antelope bitterbrush. Deer pellet groups were abundant in 1996. Three winter-killed deer were noted in 1990 and deer antler sheds were also noted in 2006. Based on a pellet group transect read in 2001, there were an estimated 79 deer days use/acre (195 ddu/ha). Sheep sign was estimated at 15 days use/acre (38 sdu/ha) and a flock of sheep was on site one week prior to the 2001 reading on June 20. Sage grouse scat was also encountered within the pellet group transect. In 2006, estimated pellet groups were 38 elk, 36 deer, and 1 cow days use/acre (93 edu/ha, 89 ddu/ha, and 2 cdu/ha). Both deer and elk pellets were from winter and spring.

#### Soil

The soil classification for this site is similar to that described for Tucson Hollow. Manila Loam is a soil with excellent potential for growth and forage production. It has a rather high potential for erosion and subsurface slippage. Although only slowly permeable to water, the Manila loam soil volume shrinks and swells greatly in response to setting or drying (Carley et al. 1980). The soil has a loam texture and is slightly acidic (6.3 pH). The effective rooting depth was estimated at 11 inches. Litter and vegetation cover are abundant and provide sufficient protective ground cover to prevent most erosion. The erosion condition class was determined as stable in 2001 and 2006.

#### Browse

Mountain big sagebrush and antelope bitterbrush are the key browse species. Since 1996, mountain big sagebrush has been lightly to moderately hedged with good vigor and lower percent decadency than reported in 1984 and 1990. In 2006, sagebrush vigor was very poor and approximately 46% of the population had been infested with the sagebrush defoliator moth (*Aroga websterii*) or were classified as dying. Decadence had also increased to 56% of the population in 2006 (21% in 1996 and 23% in 2001). Sagebrush density remained relatively stable from 1984 to 1996, averaging about 1,800 plants/acre. In 2001, the population density decreased to 1,580 plants/acre, then decreased again to 1,040 plants/acre in 2006. The decrease in density and increase in decadence in 2006 are likely products of the defoliator moth infestation. Reproduction has been marginal with few seedlings encountered in 1996 and none sampled in 2001. Young plants accounted for 15% of the population in 1996, 6% in 2001, and 2% in 2006. The poor recruitment could be due to the dense cheatgrass and bulbous bluegrass cover. Average sagebrush leader growth was 1.3 inches in 2001 and 2.2 inches in 2006.

Antelope bitterbrush has a low density of about 100 plants/acre. Due to their low densities and high preference, use has been heavy during all sampling periods. Recruitment is also poor with no seedlings or young plants encountered in 1996 or 2001. The average bitterbrush leader growth was 1.9 inches in 2001 and 1.5 inches in 2006. Oregon grape was encountered for the first time in 1996. This is due to the greatly increased sample size used which more accurately reflects browse densities. Other browse species occurring in low densities include prickly pear cactus, white rubber rabbitbrush, stickleaf low rabbitbrush, Saskatoon serviceberry, and Wood's rose.

#### Herbaceous Understory

The herbaceous understory is abundant and diverse. However, the composition is dominated by weedy species like cheatgrass, Japanese brome, and bulbous bluegrass. Annual grass nested frequencies and cover values have been decreasing while the nested frequency of bulbous bluegrass has increased. Annual grass cover has decreased from 8% in 1996, to 4% in 2001, to 2% in 2006. Bulbous bluegrass has increased from 8% cover in 1996, to 27% in 2001, to 29% in 2006. Other perennial grass species include Great Basin wildrye, Sandberg bluegrass, intermediate wheatgrass, and Kentucky bluegrass. Great Basin wildrye, intermediate wheatgrass, and bluebunch wheatgrass are the only perennial grass species with substantial cover values. Great Basin

wildrye cover has been 3% since 1996, bluebunch cover has fluctuated around 2%, and intermediate cover has slowly increased to 2% by 2006.

Forbs are very diverse with few species commonly occurring. Many species are small annuals that add very little to the herbaceous cover. Forb composition includes few desirable species, certainly far less than what this site is capable of. Perennial forb cover decreased from 13% in 1996 to 3% in 2001, then to 4% in 2006. The nested frequency of perennial forbs has also decreased consistently since 1996. This decrease coincides with the increase in invasive grass species.

#### 1990 TREND ASSESSMENT

Compared to the heavily hedged, poor condition of the key browse species noticed in 1984, there have been no significant changes in the density of big sagebrush or bitterbrush. Although the percentage of decadent plants, especially sagebrush, is still high, it is lower than in 1984. Bitterbrush retains a heavily hedged growth form, while the sagebrush has a more moderately browsed growth form. Young plants make up a small percentage of both populations. Distribution of perennial grasses was very patchy in 1984. Although annual species remain prevalent, the frequency of perennial grasses, mostly Sandberg bluegrass, have increased. Bulbous bluegrass was sampled for the first time and provided nearly one-third of all perennial grass nested frequency. The grass trend is slightly up. The forb trend is slightly up. The nested frequency of perennial forbs increased 11% from 1984 to 1990. There is thick vegetation and litter cover provided by the herbaceous understory. Soil erosion is minimal.

browse - stable (0)

grass - slightly up (+1)

forb - slightly up (+1)

#### 1996 TREND ASSESSMENT

The density of the key browse species, mountain big sagebrush and antelope bitterbrush, have stayed relatively stable over the years. Decadence has decreased since 1990, but this may be due to the change in sample methods and increase in sample size beginning in 1992. The browse trend is stable. The grass trend is stable. The sum of the nested frequency of perennial grasses increased, but the majority of the increase was a significant increase in bulbous bluegrass. The nested frequency of perennial grasses, excluding bulbous bluegrass, increased 36%. Cheatgrass and bulbous bluegrass are the dominant herbaceous species at this time. With the change in sampling methods in 1992, it is difficult to estimate the abundance of annual grasses on the site in 1990, but the nested frequency of cheatgrass was quite high in 1996. The forb trend is slightly up. The sum of the nested frequency of perennial forbs increased 54% from 1990 to 1996, but part of this increase is due to the increased sample size in 1996. The Desirable Components Index score is fair due to good browse cover, fair browse decadence, moderate perennial grass cover, and moderate annual grass cover.

winter range condition (DC Index) - fair (53) Mid-level potential scale

browse - stable (0)

grass - stable (0)

forb - slightly up (+1)

#### 2001 TREND ASSESSMENT

Trend for browse is slightly down. The density of the key species, mountain big sagebrush, decreased by 17% in 2001. The number of individuals decreased in the young, mature, and decadent age classes. Use is similar and vigor is normal on most plants. Recruitment is poor, but percent decadence remained moderate. The small population of bitterbrush also decreased slightly and decadence increased. The grass trend is up. The nested frequency of perennial grasses, excluding bulbous bluegrass, increased 33%. The nested frequency of annual grasses decreased 40%. Unfortunately, the nested frequency of bluebunch wheatgrass decreased significantly. The bulbous bluegrass nested frequency increased 79%. It appears as though the bulbous bluegrass is out-competing the annual grasses. Japanese brome did not change significantly. The only perennial grass that significantly increased in nested frequency was Kentucky bluegrass, which is an increaser with grazing. The forb trend is down. The nested frequency of perennial forbs decreased by 47% and annual forb nested frequency increased by 91%. Several perennial species showed a significant decrease in nested frequency. The Desirable Components Index score increased due to the increase in browse cover, the increase

in perennial grass cover, and the decrease in annual grass cover.

winter range condition (DC Index) - fair (58) Mid-level potential scale  
browse - slightly down (-1)      grass - up (+2)      forb - down (-2)

2006 TREND ASSESSMENT

The browse trend is down. The key browse species, mountain big sagebrush, density decreased by 34%. The majority of the loss was in the mature age class. A large number of mature individuals had shifted from the mature age class to the decadent class. Decadence was estimated at 56% and plants classified as dying made up 38% of the population. The defoliator moth caused the plants to appear to be dying. Plants classified as infested or dying made up 46% of the population. More individuals were classified as dying or infested than classified as mature and healthy. The small number of bitterbrush individuals were mostly of good vigor, but heavily hedged. The grass trend is stable. The sum of the nested frequency of perennial grasses changed little. The nested frequency and cover of bulbous bluegrass increased slightly and cheatgrass nested frequency also increased slightly. The forb trend is down. The sum of the nested frequency of perennial forbs decreased by 37% and the nested frequency of annual forbs increased 59%. The Desirable Components Index score decreased due to the decrease in browse cover and increase in browse decadence.

winter range condition (DC Index) - poor (44) Mid-level potential scale  
browse - down (-2)      grass - stable (0)      forb - down (-2)

HERBACEOUS TRENDS --  
 Management unit 05 , Study no: 3

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron intermedium	<sub>a</sub> 7	<sub>a</sub> 10	<sub>a</sub> 9	<sub>ab</sub> 22	<sub>b</sub> 33	.18	.91	2.11
G	Agropyron smithii	-	-	-	4	2	-	.53	.03
G	Agropyron spicatum	<sub>a</sub> 3	<sub>ab</sub> 18	<sub>b</sub> 48	<sub>a</sub> 21	<sub>ab</sub> 24	2.04	.34	1.75
G	Bromus japonicus (a)	-	-	41	62	45	.39	.32	.26
G	Bromus tectorum (a)	-	-	<sub>b</sub> 283	<sub>a</sub> 135	<sub>a</sub> 177	7.92	3.98	2.29
G	Carex sp.	-	-	3	7	7	.03	.03	.06
G	Elymus cinereus	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 29	<sub>b</sub> 24	<sub>b</sub> 24	2.53	3.04	2.55
G	Poa bulbosa	<sub>a</sub> -	<sub>b</sub> 41	<sub>c</sub> 149	<sub>d</sub> 267	<sub>d</sub> 292	7.90	26.96	28.90
G	Poa pratensis	<sub>ab</sub> 19	<sub>a</sub> 3	<sub>a</sub> 6	<sub>b</sub> 50	<sub>ab</sub> 19	.04	2.20	.36
G	Poa secunda	<sub>a</sub> 21	<sub>bc</sub> 59	<sub>ab</sub> 27	<sub>abc</sub> 34	<sub>c</sub> 56	.58	.79	.96
G	Vulpia octoflora (a)	-	-	6	1	-	.53	.00	-
Total for Annual Grasses		0	0	330	198	222	8.84	4.31	2.56
Total for Perennial Grasses		50	131	271	429	457	13.33	34.84	36.75
Total for Grasses		50	131	601	627	679	22.17	39.16	39.32

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Achillea millefolium</i>	a <sup>26</sup>	ab <sup>35</sup>	c <sup>62</sup>	bc <sup>53</sup>	a <sup>24</sup>	1.19	.86	1.14
F	<i>Agoseris glauca</i>	-	-	-	1	3	-	.00	.00
F	<i>Alyssum alyssoides</i> (a)	-	-	4	7	12	.01	.04	.03
F	<i>Allium</i> sp.	-	-	1	3	1	.00	.00	.00
F	<i>Arabis</i> sp.	-	-	4	-	-	.03	-	-
F	<i>Artemisia ludoviciana</i>	b <sup>51</sup>	b <sup>45</sup>	a <sup>17</sup>	ab <sup>26</sup>	ab <sup>26</sup>	.51	.73	1.97
F	<i>Aster chilensis</i>	a <sup>38</sup>	a <sup>36</sup>	b <sup>89</sup>	b <sup>89</sup>	a <sup>10</sup>	3.00	.69	.07
F	<i>Astragalus</i> sp.	ab <sup>5</sup>	a <sup>-</sup>	b <sup>12</sup>	a <sup>-</sup>	ab <sup>6</sup>	.52	-	.01
F	<i>Cirsium undulatum</i>	abc <sup>17</sup>	bc <sup>27</sup>	c <sup>41</sup>	ab <sup>9</sup>	a <sup>7</sup>	1.10	.10	.07
F	<i>Collomia linearis</i> (a)	-	-	a <sup>12</sup>	b <sup>30</sup>	a <sup>14</sup>	.03	.10	.04
F	<i>Collinsia parviflora</i> (a)	-	-	a <sup>3</sup>	b <sup>21</sup>	b <sup>39</sup>	.00	.08	.08
F	Cruciferae	-	4	-	-	-	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	-	6	3	-	.04	.00
F	<i>Draba</i> sp. (a)	-	-	a <sup>-</sup>	b <sup>54</sup>	c <sup>84</sup>	-	.15	.17
F	<i>Epilobium brachycarpum</i> (a)	-	-	a <sup>-</sup>	a <sup>8</sup>	b <sup>57</sup>	-	.01	.17
F	<i>Erodium cicutarium</i> (a)	-	-	a <sup>22</sup>	a <sup>33</sup>	b <sup>55</sup>	.16	.80	.27
F	<i>Erigeron pumilus</i>	b <sup>54</sup>	b <sup>51</sup>	c <sup>125</sup>	a <sup>2</sup>	a <sup>22</sup>	3.91	.00	.25
F	<i>Gayophytum ramosissimum</i> (a)	-	-	b <sup>43</sup>	a <sup>-</sup>	a <sup>-</sup>	.15	-	-
F	<i>Haplopappus acaulis</i>	-	-	1	-	-	.00	-	-
F	<i>Hedysarum boreale</i>	-	-	2	1	-	.15	.00	.03
F	<i>Holosteum umbellatum</i> (a)	-	-	a <sup>9</sup>	b <sup>78</sup>	b <sup>93</sup>	.02	.31	.43
F	<i>Lappula occidentalis</i> (a)	-	-	a <sup>6</sup>	a <sup>-</sup>	b <sup>18</sup>	.03	-	.06
F	<i>Lactuca serriola</i>	-	1	1	-	4	.00	-	.01
F	<i>Lithospermum ruderales</i>	b <sup>24</sup>	b <sup>31</sup>	b <sup>16</sup>	a <sup>1</sup>	a <sup>2</sup>	1.06	.00	.03
F	<i>Lomatium</i> sp.	-	-	2	4	1	.00	.01	.00
F	<i>Lupinus argenteus</i>	a <sup>-</sup>	a <sup>-</sup>	b <sup>11</sup>	b <sup>22</sup>	ab <sup>8</sup>	.10	.35	.02
F	<i>Machaeranthera canescens</i>	-	-	-	-	1	-	-	.00
F	<i>Microsteris gracilis</i> (a)	-	-	-	2	1	-	.00	.00
F	<i>Oenothera caespitosa</i>	3	2	3	2	-	.15	.00	-
F	<i>Polygonum douglasii</i> (a)	-	-	b <sup>35</sup>	a <sup>14</sup>	ab <sup>27</sup>	.08	.03	.06
F	<i>Ranunculus testiculatus</i> (a)	-	-	-	3	3	-	.00	.00
F	<i>Sphaeralcea grossulariifolia</i>	-	-	-	-	-	-	-	.00
F	<i>Sphaeralcea munroana</i>	16	13	15	9	7	.55	.05	.26
F	<i>Taraxacum officinale</i>	-	-	2	-	3	.00	-	.00
F	<i>Tragopogon dubius</i>	ab <sup>19</sup>	ab <sup>18</sup>	b <sup>19</sup>	a <sup>4</sup>	a <sup>1</sup>	.25	.01	.00
F	<i>Viguiera multiflora</i>	a <sup>-</sup>	b <sup>17</sup>	ab <sup>7</sup>	ab <sup>1</sup>	b <sup>16</sup>	.04	.00	.26

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Zigadenus paniculatus</i>	-	-	-	2	3	-	.04	.01
Total for Annual Forbs		0	0	134	256	406	0.50	1.59	1.36
Total for Perennial Forbs		253	280	430	229	145	12.63	2.88	4.21
Total for Forbs		253	280	564	485	551	13.13	4.47	5.57

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

#### BROWSE TRENDS --

Management unit 05 , Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Artemisia tridentata vaseyana</i>	64	53	41	14.37	18.14	13.68
B	<i>Chrysothamnus nauseosus albicaulis</i>	1	1	0	-	-	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	12	13	13	.33	.18	.18
B	<i>Leptodactylon pungens</i>	0	0	0	-	-	.03
B	<i>Mahonia repens</i>	22	21	24	.83	.45	.60
B	<i>Opuntia sp.</i>	6	5	2	.03	-	.03
B	<i>Purshia tridentata</i>	4	5	4	2.40	1.94	1.06
Total for Browse		109	98	84	17.98	20.71	15.60

#### CANOPY COVER, LINE INTERCEPT --

Management unit 05 , Study no: 3

Species	Percent Cover
	'06
<i>Artemisia tridentata vaseyana</i>	20.38
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.73
<i>Mahonia repens</i>	.80
<i>Opuntia sp.</i>	.03
<i>Purshia tridentata</i>	1.01

KEY BROWSE ANNUAL LEADER GROWTH --  
 Management unit 05 , Study no: 3

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata vaseyana	1.3	2.2
Purshia tridentata	1.9	1.5

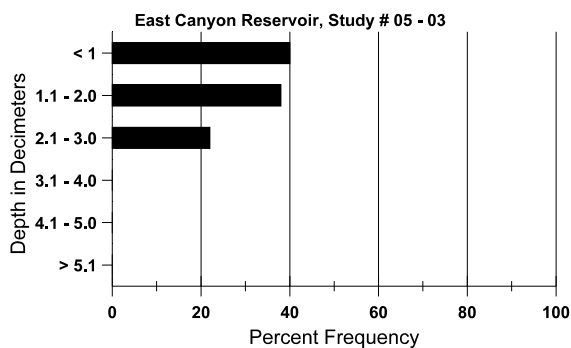
BASIC COVER --  
 Management unit 05 , Study no: 3

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	3.50	6.00	50.76	60.62	61.56
Rock	5.25	6.75	5.53	3.97	3.74
Pavement	.50	2.00	1.27	1.48	.67
Litter	79.50	71.00	61.27	49.72	45.27
Cryptogams	.50	0	.13	.95	.73
Bare Ground	10.75	14.25	4.19	8.60	3.04

SOIL ANALYSIS DATA --  
 Herd Unit 05, Study no: 03, East Canyon Reservoir

Effective rooting depth (in)	Temp °F (depth)	PH	Loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
10.8	69.2 (11.4)	6.3	48.7	28.0	23.3	2.4	20.6	163.2	0.4

### Stoniness Index



PELLET GROUP DATA --  
 Management unit 05 , Study no: 3

Type	Quadrat Frequency		
	'96	'01	'06
Sheep	-	4	-
Rabbit	-	-	10
Grouse	-	1	-
Elk	5	-	4
Deer	32	26	38
Cow	-	-	-

Days use per acre (ha)	
'01	'06
15 (38)	-
-	-
2 (17) groups/acre	-
-	38 (93)
79 (195)	36 (89)
1 (2)	1 (2)

BROWSE CHARACTERISTICS --  
 Management unit 05 , Study no: 3

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Amelanchier alnifolia</i>												
84	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
96	<b>0</b>	-	-	-	-	-	0	0	-	-	0	37/60
01	<b>0</b>	-	-	-	-	-	0	0	-	-	0	51/55
06	<b>0</b>	-	-	-	-	-	0	0	-	-	0	32/44
<i>Artemisia tridentata vaseyana</i>												
84	<b>1998</b>	-	66	566	1366	-	42	58	68	2	3	25/24
90	<b>1732</b>	400	66	533	1133	-	44	25	65	9	15	29/38
96	<b>1900</b>	20	280	1220	400	660	32	2	21	4	8	30/45
01	<b>1580</b>	-	100	1120	360	460	23	3	23	6	6	32/47
06	<b>1040</b>	-	20	440	580	640	31	0	56	38	46	32/52
<i>Chrysothamnus nauseosus albicaulis</i>												
84	<b>33</b>	-	-	-	33	-	0	100	100	-	0	-/-
90	<b>33</b>	-	-	33	-	-	100	0	0	-	0	26/28
96	<b>20</b>	-	-	20	-	-	0	0	0	-	0	-/-
01	<b>20</b>	-	-	20	-	-	0	0	0	-	0	-/-
06	<b>0</b>	-	-	-	-	-	0	0	0	-	0	31/46

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<b>Chrysothamnus viscidiflorus viscidiflorus</b>												
84	<b>33</b>	-	-	-	33	-	0	0	100	-	100	-/-
90	<b>33</b>	-	-	33	-	-	100	0	0	-	100	14/15
96	<b>320</b>	-	20	300	-	-	0	0	0	-	6	15/27
01	<b>320</b>	-	-	300	20	-	0	0	6	-	0	12/17
06	<b>340</b>	-	-	340	-	-	0	0	0	-	0	13/22
<b>Mahonia repens</b>												
84	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
96	<b>2960</b>	40	640	2320	-	-	0	0	-	-	0	5/6
01	<b>4460</b>	-	620	3840	-	20	0	0	-	-	0	3/4
06	<b>4480</b>	100	720	3760	-	-	0	0	-	-	0	3/4
<b>Opuntia sp.</b>												
84	<b>66</b>	-	-	66	-	-	0	0	0	-	0	10/13
90	<b>66</b>	-	-	-	66	-	0	0	100	-	0	-/-
96	<b>380</b>	-	120	260	-	40	0	0	0	-	5	5/15
01	<b>180</b>	-	20	160	-	-	0	0	0	-	0	5/14
06	<b>80</b>	-	-	80	-	-	0	0	0	-	0	6/14
<b>Purshia tridentata</b>												
84	<b>199</b>	-	-	66	133	-	17	83	67	-	0	20/9
90	<b>266</b>	-	100	100	66	-	25	75	25	-	0	35/47
96	<b>120</b>	-	-	120	-	-	0	100	0	-	0	35/80
01	<b>100</b>	-	-	80	20	20	20	80	20	-	0	33/61
06	<b>80</b>	20	-	60	20	20	0	100	25	25	25	32/61
<b>Rosa woodsii</b>												
84	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
96	<b>0</b>	-	-	-	-	-	0	0	-	-	0	24/17
01	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
06	<b>0</b>	-	-	-	-	-	0	0	-	-	0	12/7