

Trend Study 9-19-05

Study site name: Mosby Mountain South.

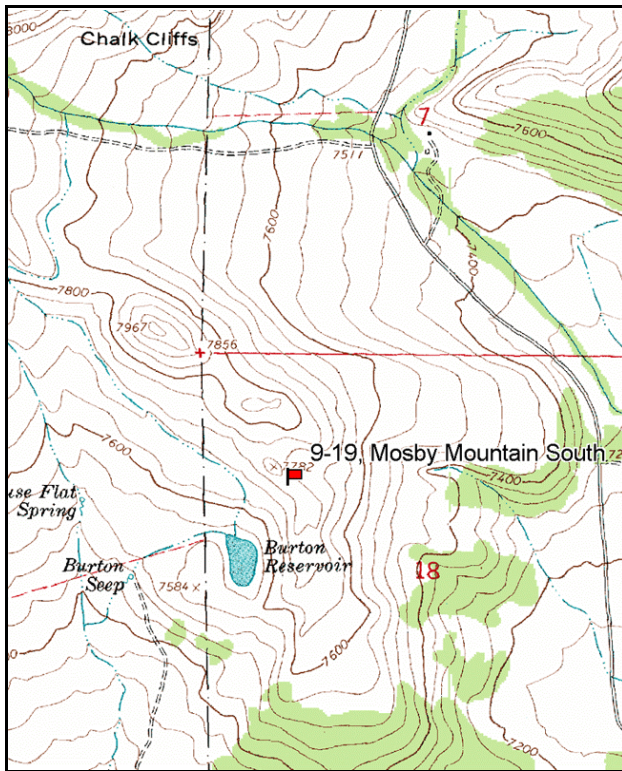
Vegetation type: Mountain Brush.

Compass bearing: frequency baseline 167 degrees magnetic.

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

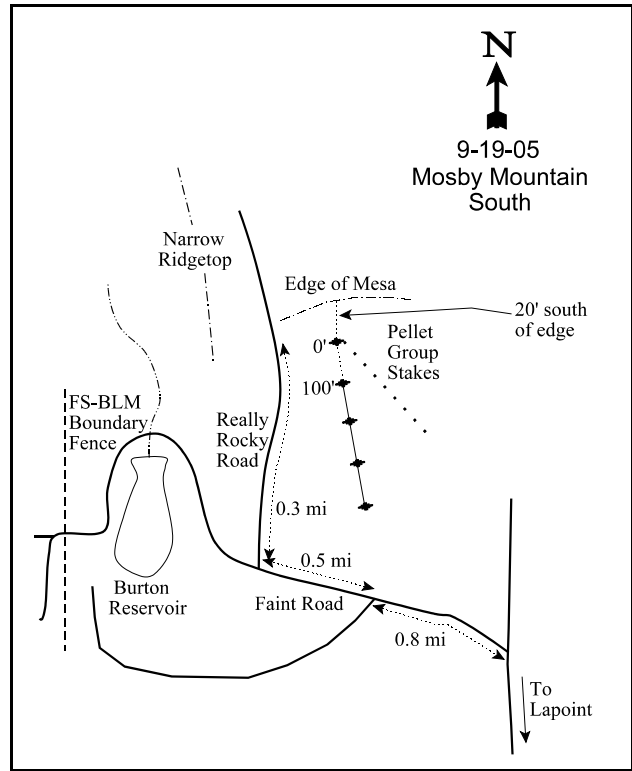
LOCATION DESCRIPTION

Just east of Lapoint, turn north onto Paradise Park Rd from highway 121. Go 6.9 miles to a fork, keep left toward Mosby Mountain. Proceed 4.8 miles and turn left onto a dirt road heading west. Go 0.15 miles to a 3-way intersection, bear left on the main road. Continue 0.45 miles to a fork, stay left. Go 0.2 miles to another fork, stay to the right. Go 0.5 miles to an intersection on the ridge above Burton Reservoir. Drive 0.25 miles north on a very rocky road to the study site. A tall, bent, and twisted fencepost is the 0-foot baseline stake. It is marked by browse tag #7870. The frequency baseline stakes are short green fenceposts.



Map Name: Lake Mountain

Township 3S Range 19E, Section 18



Diagrammatic Sketch

GPS: NAD 27, UTM 12T 4490149 N, 598273 E

## DISCUSSION

### Mosby Mountain South - Trend Study No. 9-19

The Mosby Mountain South study was established in 1988 on BLM land and is located on a narrow ridge top which drops off sharply to Burton Reservoir on the west. To the east is a sagebrush and pinyon-juniper valley. The slope is gentle (2-3%) with a southeast aspect at an elevation of 7,600 feet. A large fire burned the entire area after the initial reading in 1988 and the majority of the sagebrush was eradicated. Springs are common in the area and most have been developed for cattle. According to Forest Service personnel, the area between this study and study #9-14 (Red Pine Canyon) is an important wintering area for several hundred elk. A pellet group transect from 2000 estimated 15 elk, 7 deer, and 9 cow days use/acre (36 edu/ha, 17ddu/ha, and 22cdu/ha). Sage grouse abundance was indicated by 35 pellet groups/acre (86 pellet groups/ha) and evidence of sage grouse was observed during transect establishment. Pellet group data from 2005 estimated 4 elk, 22 deer, and 22 cow days use/acre (10 edu/ha, 55 ddu/ha, and 54 cdu/ha). Sage grouse abundance was estimated with 52 pellet groups/acre (129 pellets/ha). The BLM manages this land as the Mosby allotment and cattle were on the site in 2000, however it was noted that most of the cattle were distributed close to the reservoir about ½ mile away.

The soil is very rocky and has a sandy loam texture. The soil reaction is neutral (pH of 6.6). Phosphorus was measured at 19.6, values less than 6 ppm may limit normal plant growth and development (Tiedemann and Lopez 2004). Rocks of all sizes are distributed throughout the soil profile and continuously over the surface. They are cobble type rocks from alluvial deposits from the Uinta mountains. Effective rooting depth is estimated at about 7 inches due to the rocky profile. However, the presence of deep rooted shrubs suggest that roots are able to penetrate down through the rock to deeper levels. Rock cover was moderately high in 1988 at 17%, but increased after the fire to 26% in 1995 and has changed very little since then. There was a considerable amount of litter cover (67%) in addition to the extensive shrub cover in 1988, providing good soil protection. Litter cover declined after the fire to 46% in 1995 and has continued to decrease from 37% in 2000 to 21% in 2005. The erosion condition class determined soil movement as stable in 2005.

Mountain big sagebrush is the dominant shrub and estimated 7,533 plants/acre in 1988. After the fire in 1988, the population has stabilized around 1,320 plants/acre for the last 10 years. Percent decadency was high in 1988 and 1995 (34% and 30%), but decreased to 5% in 2000 and then up to 14% by 2005. Seedling production and young recruitment have fluctuated from year to year. Utilization has decreased in recent years. In 1995, utilization was considered moderate, but has been estimated at only light to moderate use since. Vigor has been good during all sample years and average annual leader growth was estimated at 3 inches in 2000 and 2 inches in 2005. Black sagebrush was abundant in 1988 prior to the fire with an estimated 2,866 plants/acre. Following the fire, density was estimated at 240 plants/acre in 1995, 120 in 2000, and 180 in 2005. Utilization is much like mountain big sagebrush, in that moderate to heavy use was recorded in 1995 and 2000, but decreased in 2005 to light to moderate use.

Bitterbrush and serviceberry are scattered throughout the area in relatively lower densities. Bitterbrush is slightly more abundant than serviceberry and has continued to increase since the fire. In 1995, density was estimated at 320 plants/acre. By 2005, density had increased to 420 plants/acre. Utilization has been heavy with good vigor during all sampling years. Serviceberry density has averaged 200 plants/acre since the fire and also has received moderate to heavy use in all sampling years.

In 1995, a substantial amount of cheatgrass was reported in the understory. Cheatgrass had the highest nested frequency of any species in 1995 and accounted for 21% of the grass cover. Drought conditions in 2000 reduced cheatgrass to almost 0% and was only sampled in 2 quadrats. Above normal precipitation in 2005 returned cheatgrass to 1995 levels. Perennial grasses consist of a mix of native and seeded species which include: several wheatgrass's (crested, thickspike, intermediate, and bluebunch); needle-and-thread;

squirreltail; Kentucky and mutton bluegrass; and a sedge species. Crested wheatgrass and needle-and-thread are the dominant species. Bluebunch wheatgrass and squirreltail, both native, increased significantly in nested frequency. Perennial grasses increased to an all-time high in sum of nested frequency in 2005 after a drop in 2000. Utilization was moderate to heavy on most species in 2000 and 2005. Perennial forbs are moderately diverse, but only hairy goldaster and silver lupine are common. These two species provided between 86-95% of the total forb cover since 1995. Annual forbs are small and infrequent, especially in 2000 when conditions were very dry.

### 1995 TREND ASSESSMENT

The soil trend is stable. Litter cover declined due to the fire but there is still adequate soil protection. Currently, percent bare ground is only 4%. The browse trend is down with reduced densities of all species encountered in 1988. The key species, mountain big sagebrush, declined in density and has a moderately high rate of decadency (34%). This species is not tolerant of fire, as some of the other species are. Recruitment is also poor with no seedlings encountered and estimated only 140 young plants/acre. Vigor was good on most other browse, with the density expected to eventually increase in time. Trend for the preferred bitterbrush was slightly up due to a relatively abundant mature population, low decadency, reduced heavy use, and more tolerance of the fire. Trend for the herbaceous understory is up with increased sum of nested frequency for both grasses and forbs. The Desirable Components Index rated this site as fair with a score of 56 due to moderate browse cover, low decadence, and excellent perennial grass and forb cover.

#### TREND ASSESSMENT

soil - stable (0)

browse - down (-2)

herbaceous understory - up (+2)

winter range condition (DC Index) - Fair (56) Mid-level Potential scale

### 2000 TREND ASSESSMENT

Trend for soil is considered stable. Percent relative bare soil increased slightly from 3% to 8%, while litter cover decreased from 46% to 37% in 2000. Rock cover remains moderately high at 26%. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil decreased. Trend for browse is stable. All of the preferred browse species show stable to slightly increasing populations in 2000. Recruitment is low for all species except bitterbrush, but all species show low and improving decadency rates and good vigor. Trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses as a group decreased in 2000, but the dominant species, crested wheatgrass and needle-and-thread, remained at fairly stable frequencies. Also, cheatgrass was nearly non-existent in 2000 due to drought. Sum of nested frequency of perennial forbs slightly increased with drought in 2000 which offset some of the losses of the grasses but not enough to keep from a change in trend slightly downward. The Desirable Components Index rated this site as good with a score of 69 due to increased browse cover, low decadence, and excellent perennial grass and forb cover.

#### TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - Good (69) Mid-level Potential scale

## 2005 TREND ASSESSMENT

Trend for soil is stable. Percent bare ground has remained similar to previous levels. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil has remained similar to 2000. Litter continues to decrease, but with higher vegetative cover this year, it should be higher. Trend for key browse mountain big sagebrush is stable. Density has changed very little, although percent decadency increased from 5% to 14%. It still remains within reasonable limits. Utilization remains light to moderate and seedlings were fairly abundant. Serviceberry and bitterbrush both have stable densities and utilization is moderate to heavy with good vigor. Trend for herbaceous understory is up. Perennial grasses sum of nested frequency increased by 44% and perennial forbs remained steady, but only contribute to about 34% of the total herbaceous cover. Cheatgrass returned to similar nested frequency values as before the drought. The Desirable Components Index rated this site as good with a score of 73 due to moderate browse cover, low decadence, and excellent perennial grass and forb cover.

### TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - up (+2)

winter range condition (DC Index) - Good (73) Mid-level Potential scale

### HERBACEOUS TRENDS --

Management unit 09 , Study no: 19

T y p e	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron cristatum	a <sup>-</sup>	b <sup>144</sup>	b <sup>159</sup>	b <sup>175</sup>	3.26	5.83	6.80
G	Agropyron dasystachyum	a <sup>-</sup>	b <sup>74</sup>	a <sup>4</sup>	b <sup>48</sup>	1.99	.04	.56
G	Agropyron intermedium	a <sup>-</sup>	b <sup>32</sup>	a <sup>2</sup>	a <sup>13</sup>	.32	.00	.31
G	Agropyron spicatum	c <sup>93</sup>	ab <sup>31</sup>	a <sup>16</sup>	b <sup>56</sup>	.61	.36	2.08
G	Bouteloua gracilis	b <sup>27</sup>	a <sup>3</sup>	a <sup>-</sup>	a <sup>-</sup>	.03	-	-
G	Bromus japonicus (a)	-	-	-	2	-	-	.00
G	Bromus tectorum (a)	-	c <sup>298</sup>	a <sup>5</sup>	b <sup>239</sup>	3.60	.03	3.37
G	Carex sp.	7	9	11	7	.02	.10	.06
G	Festuca ovina	-	-	-	3	-	-	.03
G	Koeleria cristata	-	-	-	7	-	-	.36
G	Oryzopsis hymenoides	-	-	-	-	-	-	.00
G	Poa fendleriana	a <sup>-</sup>	ab <sup>4</sup>	b <sup>22</sup>	c <sup>43</sup>	.03	.30	1.29
G	Poa pratensis	ab <sup>25</sup>	b <sup>40</sup>	a <sup>5</sup>	a <sup>5</sup>	.88	.18	.06
G	Poa secunda	b <sup>66</sup>	a <sup>2</sup>	a <sup>18</sup>	a <sup>5</sup>	.00	.30	.04
G	Sitanion hystrix	c <sup>155</sup>	a <sup>40</sup>	a <sup>18</sup>	b <sup>98</sup>	.31	.51	2.39
G	Sporobolus cryptandrus	-	2	7	-	.00	.04	-
G	Stipa comata	a <sup>31</sup>	b <sup>181</sup>	b <sup>205</sup>	b <sup>211</sup>	5.77	11.26	8.69
Total for Annual Grasses		0	298	5	241	3.60	0.03	3.38
Total for Perennial Grasses		404	562	467	671	13.25	18.95	22.70

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
	Total for Grasses	404	860	472	912	16.86	18.99	26.08
F	Agoseris glauca	-	-	-	6	-	-	.03
F	Allium sp.	a-	a5	a-	b19	.01	-	.07
F	Arabis sp.	ab7	a3	a2	b13	.00	.03	.08
F	Artemisia ludoviciana	-	-	3	-	-	.15	-
F	Astragalus purshii	8	-	-	-	-	-	-
F	Aster sp.	a-	ab4	b10	a-	.01	.10	-
F	Balsamorhiza hookeri	-	3	-	1	.04	-	.15
F	Castilleja linariaefolia	-	-	-	2	-	-	.03
F	Chenopodium leptophyllum(a)	-	b14	a-	a-	.02	-	-
F	Collomia linearis (a)	-	c29	a-	b9	.07	-	.02
F	Comandra pallida	3	-	1	4	-	.03	.03
F	Collinsia parviflora (a)	-	a8	a2	b30	.01	.00	.13
F	Cryptantha sp.	-	1	-	-	.00	-	-
F	Cymopterus sp.	-	-	-	3	-	-	.03
F	Descurainia pinnata (a)	-	8	-	-	.01	-	-
F	Draba sp. (a)	-	1	-	6	.03	-	.01
F	Erigeron divergens	-	-	-	7	-	-	.12
F	Erigeron eatonii	-	-	-	1	-	-	.00
F	Erigeron flagellaris	-	1	2	2	.03	.03	.03
F	Eriogonum racemosum	b25	ab6	a3	ab9	.16	.06	.10
F	Heterotheca villosa	a18	b142	c171	bc143	4.69	6.92	7.59
F	Hymenoxys acaulis	2	1	-	-	.00	-	-
F	Lappula occidentalis (a)	-	3	-	1	.01	-	.00
F	Lepidium densiflorum (a)	-	b44	a2	a7	.15	.03	.02
F	Lithospermum sp.	-	-	4	-	-	.01	-
F	Lomatium sp.	-	-	-	6	-	-	.09
F	Lupinus argenteus	a13	b41	c72	b37	1.75	2.72	3.26
F	Machaeranthera grindelioides	-	-	-	1	-	-	.03
F	Oenothera pallida	1	-	-	-	-	-	-
F	Penstemon sp.	5	5	-	4	.04	-	.06
F	Petradoria pumila	8	3	-	4	.15	-	.06
F	Phlox longifolia	9	-	-	-	-	-	-
F	Polygonum douglasii (a)	-	c29	a-	b10	.07	-	.02
F	Sedum lanceolatum	1	-	-	-	-	-	-
F	Senecio multilobatus	1	4	8	3	.01	.06	.06

T y p e	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
F	<i>Sphaeralcea coccinea</i>	5	11	2	11	.09	.01	.08
F	<i>Taraxacum officinale</i>	-	3	-	3	.01	-	.03
F	<i>Tragopogon dubius</i>	<sub>a</sub> -	<sub>b</sub> 10	<sub>a</sub> -	<sub>a</sub> 1	.06	-	.01
Total for Annual Forbs		0	136	4	63	0.39	0.03	0.22
Total for Perennial Forbs		106	243	278	280	7.09	10.14	12.00
Total for Forbs		106	379	282	343	7.49	10.18	12.23

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

#### BROWSE TRENDS --

Management unit 09 , Study no: 19

T y p e	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	<i>Amelanchier utahensis</i>	10	11	8	1.94	2.63	3.87
B	<i>Artemisia nova</i>	7	4	5	.18	.03	.53
B	<i>Artemisia tridentata vaseyana</i>	33	34	43	2.27	3.00	6.06
B	<i>Ceanothus fendleri</i>	0	0	1	-	-	-
B	<i>Chrysothamnus nauseosus graveolens</i>	0	0	0	-	.03	-
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	3	0	2	.15	-	-
B	<i>Eriogonum heracleoides</i>	3	6	4	.66	.41	.38
B	<i>Gutierrezia sarothrae</i>	12	23	32	.31	.63	.76
B	<i>Opuntia sp.</i>	19	24	38	.41	.41	.49
B	<i>Pediocactus simpsonii</i>	6	3	1	.45	.03	.03
B	<i>Purshia tridentata</i>	14	19	18	1.16	2.05	1.81
Total for Browse		107	124	152	7.55	9.25	13.94

CANOPY COVER, LINE INTERCEPT --  
Management unit 09 , Study no: 19

Species	Percent Cover
	'05
Amelanchier utahensis	4.46
Artemisia nova	.26
Artemisia tridentata vaseyana	7.01
Eriogonum heracleoides	.13
Gutierrezia sarothrae	1.31
Opuntia sp.	.43
Purshia tridentata	2.41

KEY BROWSE ANNUAL LEADER GROWTH --  
Management unit 09 , Study no: 19

Species	Average leader growth (in)
	'05
Amelanchier utahensis	3.5
Artemisia tridentata vaseyana	1.9
Purshia tridentata	2.7

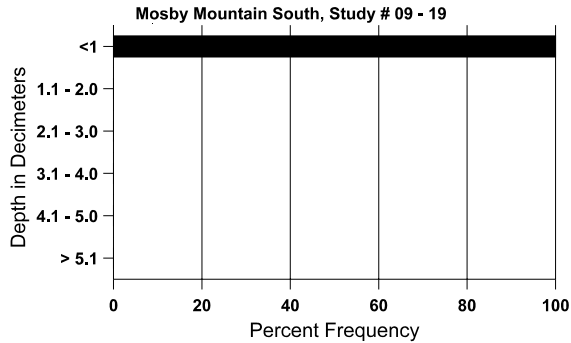
BASIC COVER --  
Management unit 09 , Study no: 19

Cover Type	Average Cover %			
	'88	'95	'00	'05
Vegetation	7.50	40.06	42.06	50.70
Rock	16.50	26.87	26.17	30.12
Pavement	1.00	2.96	5.90	3.72
Litter	67.00	46.25	37.31	20.71
Cryptogams	0	.12	.15	.01
Bare Ground	8.00	3.95	10.04	7.76

SOIL ANALYSIS DATA --  
Herd Unit 09, Study # 19, Study Name: Mosby Mountain South

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
6.8	67.4 (8.7)	6.6	72.0	13.4	14.6	8.0	19.6	208.0	0.6

# Stoniness Index



## PELLET GROUP DATA --

Management unit 09 , Study no: 19

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	3	13	42
Grouse	-	1	4
Elk	30	12	10
Deer	19	6	16
Cattle	1	7	10

Days use per acre (ha)	
'00	'05
-	-
35/acre	53/acre
15 (37)	4 (10)
7 (17)	22 (55)
9 (22)	22 (54)

## BROWSE CHARACTERISTICS --

Management unit 09 , Study no: 19

		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>Amelanchier utahensis</b>												
82	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
88	<b>600</b>	-	600	-	-	-	22	67	-	-	44	-/-
95	<b>220</b>	-	-	220	-	40	64	18	-	-	9	25/34
00	<b>220</b>	-	-	220	-	20	45	18	-	-	0	27/47
05	<b>180</b>	-	20	160	-	-	44	44	-	-	0	31/57
<b>Artemisia nova</b>												
82	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
88	<b>2866</b>	200	1000	266	1600	-	47	5	56	.69	5	12/20
95	<b>240</b>	-	40	160	40	-	67	33	17	-	0	7/18
00	<b>120</b>	-	-	120	-	-	17	33	0	-	0	18/28
05	<b>180</b>	-	-	160	20	-	11	0	11	11	11	11/21

		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)
<i>Artemisia tridentata vaseyana</i>												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
88	7533	200	2400	2600	2533	-	47	4	34	.26	2	14/21
95	1380	-	140	820	420	900	72	3	30	1	1	10/16
00	1280	60	-	1220	60	60	36	5	5	2	2	14/23
05	1320	440	140	1000	180	60	29	3	14	6	6	18/32
<i>Ceanothus fendleri</i>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	9/31
00	0	-	-	-	-	-	0	0	-	-	0	10/41
05	20	-	-	20	-	-	0	0	-	-	0	6/10
<i>Chrysothamnus nauseosus graveolens</i>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	24/24
00	0	-	-	-	-	-	0	0	-	-	0	27/41
05	0	-	-	-	-	-	0	0	-	-	0	26/36
<i>Chrysothamnus viscidiflorus lanceolatus</i>												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	60	-	-	60	-	-	0	0	0	-	0	12/17
00	0	-	-	-	-	-	0	0	0	-	0	7/17
05	40	-	-	20	20	-	0	0	50	-	0	10/13
<i>Eriogonum heracleoides</i>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	140	-	-	140	-	-	0	0	-	-	0	5/22
00	180	-	-	180	-	-	11	0	-	-	0	3/17
05	100	-	-	100	-	-	0	0	-	-	0	3/22
<i>Gutierrezia sarothrae</i>												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
88	1999	-	-	1933	66	-	0	0	3	-	0	6/6
95	440	40	20	420	-	-	0	0	0	-	0	7/9
00	1980	-	-	1980	-	-	0	0	0	-	0	6/8
05	1860	-	20	1780	60	20	1	0	3	1	1	8/9

		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>Opuntia sp.</b>												
82	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
88	<b>1732</b>	600	1666	66	-	-	0	0	0	-	8	2/10
95	<b>580</b>	-	140	440	-	-	0	0	0	-	0	3/10
00	<b>800</b>	-	60	720	20	-	0	0	3	-	0	2/10
05	<b>1220</b>	-	360	780	80	-	0	0	7	3	3	2/9
<b>Pediocactus simpsonii</b>												
82	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
88	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
95	<b>120</b>	-	40	80	-	-	0	0	-	-	0	2/3
00	<b>60</b>	-	-	60	-	-	0	0	-	-	0	1/3
05	<b>20</b>	-	-	20	-	-	0	0	-	-	0	2/2
<b>Purshia tridentata</b>												
82	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
88	<b>466</b>	-	133	333	-	-	0	86	-	-	0	12/43
95	<b>320</b>	20	20	300	-	-	44	44	-	-	0	7/26
00	<b>380</b>	-	80	300	-	-	11	84	-	-	0	7/33
05	<b>420</b>	-	-	420	-	-	5	95	-	-	0	9/39