

Trend Study 9-16-05

Study site name: Mosby Mountain .

Vegetation type: Mountain Big Sagebrush .

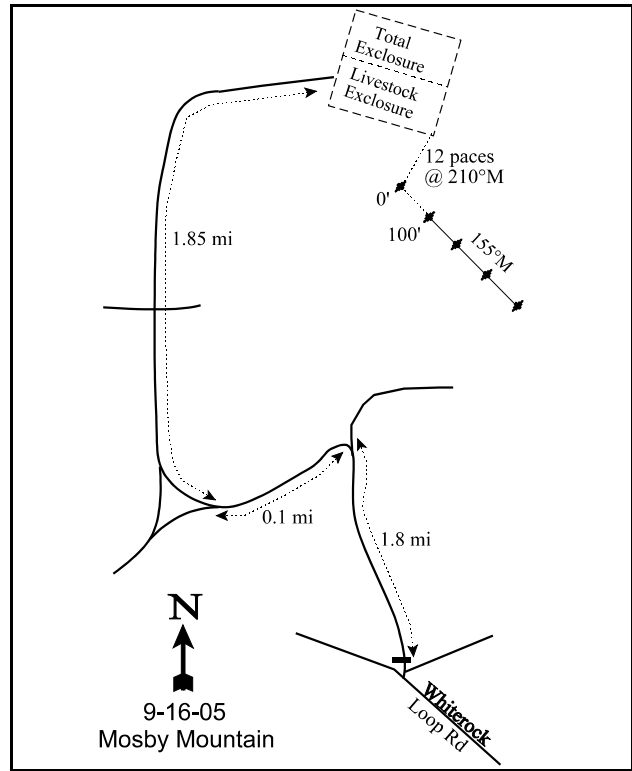
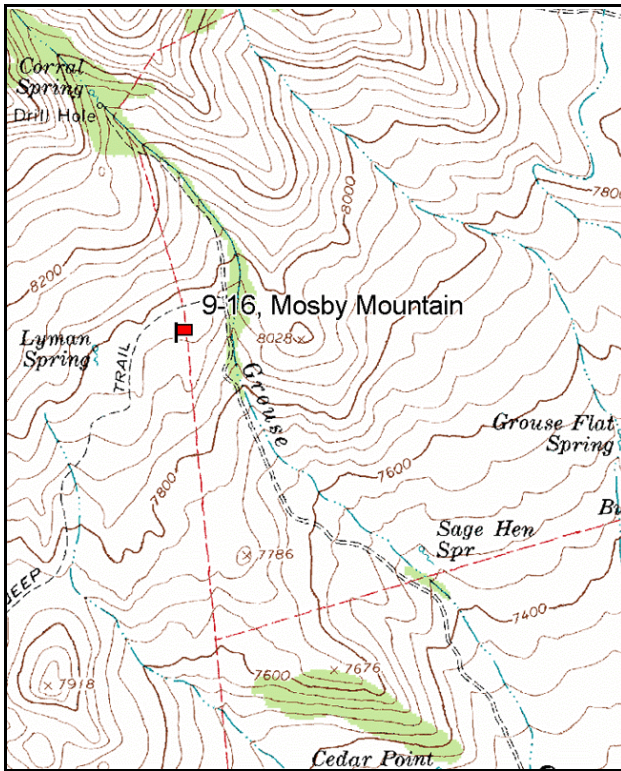
Compass bearing: frequency baseline 155 degrees magnetic.

Frequency belt placement: line 1 (11 & 96ft), line 2 (30ft), line 3 (50ft), line 4 (72ft).

LOCATION DESCRIPTION

From the town of Whiterocks, go east on White Rocks Rd (11500 N) approximately 1.75 miles to a "T" in the road. Turn left (north) on White Rocks Loop Rd (5500 E) and go 3.5 miles to an intersection where 2 roads fork off to the right. Turn right then take the left fork. Head north for approximately 1.9 miles to a two-track on the left (west) side of the road. Turn left and drive 0.1 miles to a fork. Take the right fork and drive 1.85 miles to the Mosby Mountain Enclosure. The 0-foot baseline stake is located 12 paces from the southwest corner of the big game enclosure bearing 210°M.

This site may also be accessed from the east by traveling north through Tridell on 8000 E. Go though the reservation then west to Mosby Mountain.



Map Name: Lake Mountain

Diagrammatic Sketch

Township 3S, Range 18E, Section 14

GPS: NAD 27, UTM 12T 4490403 N, 595963 E

DISCUSSION

Mosby Mountain - Trend Study No. 9-16

The Mosby Mountain study samples a sagebrush-grass type with scattered serviceberry and bitterbrush at an elevation of about 7,900 feet. Slope varies from 8-10% with a southerly aspect. The relatively high elevation may limit or prohibit big game use during severe winters. The study site is in close proximity to the Mosby Mountain big game enclosure and pellet group transect. Soon after the reading of this study in August 1988, the area was burned by a wildfire. During the 1995 reading, it was noted that belts 1 and 5 from the original baseline were not burned while belts 2, 3, and 4 were burned. As a result, most of the shrubs on the burned belts were eliminated. Past and present cattle use is heavy with cattle still on the site during the 1995, 2000, and 2005 readings. The area is managed by the U.S. Forest Service as part of the Mosby Mountain cattle allotment. Pellet group data from 2000 estimated 9 deer, 20 elk, and 36 cows days use/acre (22 ddu/ha, 50 edu/ha, and 89 cdu/ha). Pellet group data from 2005 estimated 13 deer, 13 elk, and 46 cows days use/acre (33 ddu/ha, 33 edu/ha, and 115 cdu/ha).

Soil is relatively shallow and rocky with deeper soil further down slope. Effective rooting depth is estimated at just over 9 inches. Soils are loam to sandy clay loam in texture and are fairly high in organic matter at nearly 5%. Soil is slightly acidic with a pH of 6.4. Phosphorus is moderately high at 27.8 ppm, values less than 6 ppm may limit normal plant growth and development (Tiedemann and Lopez 2004). On nearby steeper slopes, noticeable soil movement was reported in 1988. Bare ground has been around 13-16% relative cover in previous readings, but increased to 28% relative cover in 2005. Abundant herbaceous vegetation, litter, and rock cover have kept erosion at minimal levels. The erosion condition class determined soil movement as stable in 2005.

Browse species are scattered partially due to the spotty burn in 1988. The most abundant shrub is mountain big sagebrush. Density estimated 3,599 plants/acre before the fire in 1988. Density decreased to 1,600 in 1995 after the fire. The much larger sample size utilized in 1995 may also account for some of the difference in density estimates. Mountain big sagebrush density slightly increased in 2000 to 1,900 plants/acre, then slightly decreased in 2005 to 1,540 plants/acre. Utilization is light to moderate and vigor is predominately good. Decadency in 2005 was moderately low at 18% and typically had been lower in previous years. Young recruitment has been good and has averaged 16% since 1982. Seedlings were very abundant in 2005. The percentage of sagebrush plants dying increased slightly from 4% in 2000 to 14% in 2005. Years previous to 2000, there had been no dying plants recorded.

Secondary browse species consist of serviceberry and bitterbrush. Density of serviceberry declined after the fire. Serviceberry density was estimated to be 1,265 plants/acre in 1988 and has remained around 400 plants/acre since the fire. Serviceberry has showed moderate to heavy use in all readings, but vigor has been good. Decadence has been low and young recruitment has varied from 20% in 2000 to 5% in 2005. Bitterbrush density before the fire was 599 plants/acre and decreased to 240 plants/acre after the fire. Bitterbrush density has remained at 300 plants/acre since 2000. Utilization is heavy, but plants display good vigor. No decadency or young recruitment was observed in 2000 or 2005. Bitterbrush plants have a prostrate growth form and may not be available during deep snow. Other palatable species include Fendler ceanothus, Wyeth eriogonum, and blue elderberry.

The herbaceous understory is quite diverse and averaged 72% of the total vegetative cover since 1995. Grasses provided 17% cover in 1995, 23% in 2000, and 17% in 2005. All grasses had moderate use in 2005, which made identification difficult on some plants (46 cow days use/acre). The dominant grasses include: thickspike wheatgrass, mutton bluegrass, and needle-and-thread. Nested frequency of thickspike wheatgrass significantly decreased in 2000 and remained similar in 2005. Percent cover for thickspike wheatgrass decreased from 11% in 2000 to 4% in 2005, most likely due to heavy grazing in some areas. Mutton bluegrass

provided between 3-5% cover between 1995 and 2005. Needle-and-thread significantly increased in 2005 and cover nearly doubled from almost 3% cover in 2000 to 5% cover in 2005. Other perennial species include: Kentucky bluegrass, Sandberg bluegrass, squirreltail, and Letterman needlegrass. Cheatgrass was moderately abundant in 1995 and 2005, but was not sampled in 2000, probably due to dry conditions. Forbs are diverse and increased in average cover from 7% in 1995 to 11% in 2000 and 2005. Sum of nested frequency for perennial forbs dipped in 2000, although recovered in 2005 with normal precipitation. The most common perennial forb species include: hooker balsamroot, trailing fleabane, silver lupine, and aster. Annual forbs were abundant in 1995 and 2005, with normal precipitation, but had nearly disappeared in 2000 with drought. Many of the forb species are weedy increasers.

1982 APPARENT TREND ASSESSMENT

Within the immediate area of the study site, soil trend appears stable to declining. On nearby steeper sites, the trend would be more downward. Vegetative condition is below optimum. Browse density, especially of the more preferred species, is substandard. Animal use is almost certainly one of the more causative factors. Many increaser species of all vegetative classes are present and may be expanding. Range trend appears to be slightly downward.

1988 TREND ASSESSMENT

The soil trend appears fairly stable. Percent bare ground increased slightly, while percent litter cover declined. However, basal vegetative cover increased from 7% to 13%. Mountain big sagebrush has increased in density due to a significant increase in the number of seedlings and young plants. Decadence increased from 5% to 28%, but vigor is generally good. The majority of the sagebrush is lightly hedged so this increase in decadency is more a reflection of the age of the stand in conjunction with drought. The more preferred serviceberry and bitterbrush show improved recruitment. Serviceberry displays heavy use on 100% of the mature plants with an increased rate of decadency. Overall trend for browse is stable. Trend for the herbaceous understory is significantly improved. Quadrat frequency of grasses and forbs nearly doubled since 1982. Quadrat frequency of thickspike wheatgrass and mutton grass increased from 52% and 53% respectively to 92% and 95%.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - up (+2)

1995 TREND ASSESSMENT

Trend for soil is slightly up with a good stand of rhizomatous grasses to help prevent erosion. Trend for key browse mountain big sagebrush is down. The fire that burned in 1988 reduced the density of shrubs by almost 50%, but did not eliminate them. The remaining stand of mountain big sagebrush and serviceberry, though smaller, are healthier with less decadence. Use is still heavy yet vigor is good. Trend for the herbaceous understory is slightly down. Sum nested frequency of perennial grasses and perennial forbs has declined since 1988. The Desirable Components Index rated this site as fair to good with a score of 63 due to low browse cover, low decadence, and excellent forb and grass cover.

TREND ASSESSMENT

soil - slightly up (+1)

browse - down (-2)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - Fair to Good (63) Mid-level Potential scale

2000 TREND ASSESSMENT

Trend for soil is stable. Erosion remains minimal as herbaceous vegetation is abundant. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil increased slightly, but not enough to make a change in trend. This ratio indicates high nested frequency values for vegetation and litter and well dispersed protective ground cover over the site. Trend for browse is stable. Mountain big sagebrush has good recruitment at 12%, mostly good vigor, and moderate decadence at 14%. Use is light to moderate. Serviceberry has moderately high recruitment at 20%, no decadence and good vigor. Bitterbrush displays good vigor and no decadence. Use is moderate to heavy on both serviceberry and bitterbrush. However, these species can tolerate higher levels of use and don't appear to be negatively affected at the present time. Trend for the herbaceous understory is slightly down as sum of nested frequency for both perennial grasses and forbs slightly decreased in 2000. The Desirable Components Index rated this site as good with a score of 72 due to moderate browse cover, low decadence, and excellent forb and grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - Good (72) Mid-level Potential scale

2005 TREND ASSESSMENT

Trend for soil is slightly down. Erosion is minimal with the abundant herbaceous understory. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil decreased to 2.5:1, similar to the 1995 reading. Trend for key browse mountain big sagebrush, serviceberry, and bitterbrush is slightly down. Mountain big sagebrush has moderate decadence and low percent dying. The density of sagebrush decreased 19%, all of which was in the mature age class. Young and seedling recruitment is good and utilization is moderate. Serviceberry and bitterbrush densities have not changed since 2000. Use is moderate to heavy and percent decadence is low. Trend for the herbaceous understory is slightly up. Sum of nested frequency for perennial grasses is did not change much, but increased substantially for perennial forbs. Annual grasses and forbs both increased in frequency with improved precipitation. The Desirable Components Index rated this site as good with a score of 69 due to moderate browse cover, low decadence, and excellent forb and grass cover.

TREND ASSESSMENT

soil - slightly down (-1)

browse - slightly down (-1)

herbaceous understory - slightly up (+1)

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

HERBACEOUS TRENDS --
Management unit 09 , Study no: 16

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron dasystachyum	ab ²⁶⁰	b ²⁶⁶	a ²¹¹	a ²²⁴	8.28	11.19	4.03
G	Bromus tectorum (a)	-	c ¹¹⁵	a ⁻	b ⁷⁴	1.28	-	2.12
G	Poa fendleriana	c ²⁷⁷	a ¹⁴⁹	b ²⁰⁰	ab ¹⁷⁷	2.87	4.78	4.42

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	<i>Poa pratensis</i>	a4	c105	b42	ab23	1.05	1.29	.29
G	<i>Poa secunda</i>	b182	a33	a30	a52	.31	.58	1.10
G	<i>Sitanion hystrix</i>	a16	a19	b58	a17	.09	1.87	.11
G	<i>Stipa comata</i>	a21	b63	b70	c107	1.77	2.75	4.87
G	<i>Stipa lettermani</i>	b53	b58	a7	a11	.84	.30	.13
Total for Annual Grasses		0	115	0	74	1.28	0	2.12
Total for Perennial Grasses		813	693	618	611	15.22	22.78	14.98
Total for Grasses		813	808	618	685	16.51	22.78	17.10
F	<i>Agoseris glauca</i>	-	3	-	10	.00	-	.07
F	<i>Allium</i> sp.	a3	b60	a-	b76	.15	-	.18
F	<i>Antennaria rosea</i>	c61	ab31	bc56	a17	.93	3.15	.16
F	<i>Arabis</i> sp.	c60	b12	a-	b16	.03	-	.05
F	<i>Artemisia ludoviciana</i>	-	-	-	1	-	.00	.00
F	<i>Astragalus purshii</i>	b28	ab7	a-	b10	.06	-	.13
F	<i>Aster</i> sp.	68	65	75	85	.95	1.70	2.24
F	<i>Astragalus</i> sp.	19	2	3	1	.00	.01	.00
F	<i>Balsamorhiza hookeri</i>	c157	b104	a60	ab83	1.15	2.28	2.70
F	<i>Camelina microcarpa</i> (a)	a-	a7	a-	b23	.02	-	.05
F	<i>Calochortus nuttallii</i>	3	-	-	-	-	-	-
F	<i>Cirsium</i> sp.	-	-	-	1	-	-	.00
F	<i>Collomia linearis</i> (a)	-	b75	a-	c163	.24	-	.47
F	<i>Comandra pallida</i>	a-	a-	ab3	b12	-	.15	.05
F	<i>Collinsia parviflora</i> (a)	-	b60	a9	c113	.27	.02	.67
F	<i>Crepis acuminata</i>	a-	b18	a-	a-	.07	-	-
F	<i>Cryptantha</i> sp.	-	1	-	1	.00	-	.00
F	<i>Descurainia pinnata</i> (a)	b23	b27	a2	ab17	.10	.00	.44
F	<i>Draba</i> sp. (a)	-	a-	a-	b8	-	-	.05
F	<i>Eriogonum alatum</i>	b122	a3	a11	a-	.01	.24	-
F	<i>Erigeron divergens</i>	-	-	-	3	-	-	.07
F	<i>Erigeron flagellaris</i>	a19	a30	b92	b71	.09	2.88	1.43
F	<i>Eriogonum racemosum</i>	-	-	-	6	-	-	.02
F	<i>Eriogonum umbellatum</i>	ab6	ab1	a-	b10	.03	-	.02
F	<i>Heterotheca villosa</i>	a-	b13	b12	ab8	.20	.16	.49
F	<i>Lappula occidentalis</i> (a)	-	1	-	9	.00	-	.02
F	<i>Lactuca serriola</i>	-	5	-	-	.01	-	-
F	<i>Lepidium densiflorum</i> (a)	-	b92	a-	a4	.25	-	.01

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
F	Lithospermum ruderales	8	15	7	4	.41	.08	.18
F	Lomatium sp.	a-	a ³	a ³	b ²⁵	.00	.00	.13
F	Lupinus argenteus	ab ¹⁷	a ³	b ²³	b ²⁸	.06	.35	2.38
F	Microsteris gracilis (a)	-	a ⁴	a-	b ⁶⁶	.01	-	.37
F	Orobancha sp.	-	-	-	2	-	-	.00
F	Penstemon sp.	15	8	9	13	.01	.10	.15
F	Phlox longifolia	b ²⁴	ab ¹⁶	a ²	ab ¹³	.03	.00	.03
F	Polygonum douglasii (a)	-	c ¹⁷⁷	a ⁴	b ¹³⁵	1.08	.00	.34
F	Potentilla gracilis	-	1	2	2	.00	.15	.03
F	Sedum lanceolatum	5	1	-	-	.00	-	-
F	Senecio multilobatus	-	-	1	-	-	.00	-
F	Sphaeralcea coccinea	ab ¹³	b ¹⁹	a ³	ab ⁷	.11	.06	.04
F	Taraxacum officinale	a-	c ²⁸	ab ⁶	bc ¹⁹	.16	.06	.22
F	Thermopsis montana	-	-	-	3	-	-	.06
F	Tragopogon dubius	ab ¹⁰	ab ⁶	a ⁵	b ¹⁸	.04	.04	.16
F	Zigadenus paniculatus	-	-	-	9	-	-	.05
Total for Annual Forbs		23	443	15	538	1.98	0.02	2.45
Total for Perennial Forbs		638	455	373	554	4.59	11.47	11.12
Total for Forbs		661	898	388	1092	6.57	11.50	13.57

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

BROWSE TRENDS --

Management unit 09 , Study no: 16

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Amelanchier utahensis	22	19	19	1.81	2.75	2.69
B	Artemisia tridentata vaseyana	41	43	43	3.40	4.54	5.44
B	Ceanothus fendleri	7	7	7	1.92	2.12	3.45
B	Chrysothamnus nauseosus graveolens	0	1	0	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	4	3	3	.18	.03	.00
B	Eriogonum heracleoides	12	6	11	.56	.30	1.05
B	Gutierrezia sarothrae	3	7	9	-	.15	.56
B	Opuntia sp.	6	5	4	-	.03	-
B	Purshia tridentata	10	12	12	.03	1.00	.93
B	Symphoricarpos oreophilus	6	6	5	.06	.15	.15
Total for Browse		111	109	113	7.98	11.09	14.30

CANOPY COVER, LINE INTERCEPT --

Management unit 09 , Study no: 16

Species	Percent Cover
	'05
Amelanchier utahensis	5.58
Artemisia tridentata vaseyana	7.38
Ceanothus fendleri	4.71
Chrysothamnus viscidiflorus lanceolatus	.03
Eriogonum heracleoides	.46
Purshia tridentata	2.58
Symphoricarpos oreophilus	.03

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 09 , Study no: 16

Species	Average leader growth (in)
	'05
Amelanchier utahensis	3.6
Artemisia tridentata vaseyana	2.2
Purshia tridentata	2.8

BASIC COVER --

Management unit 09 , Study no: 16

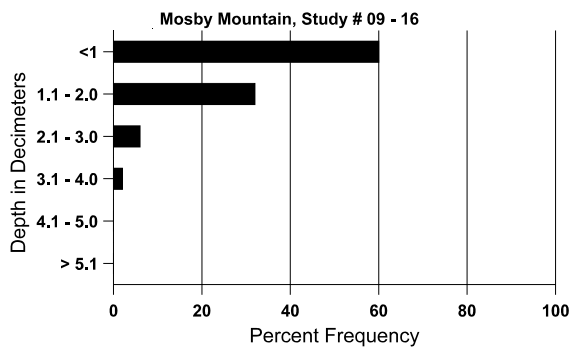
Cover Type	Average Cover %				
	'82	'88	'95	'00	'05
Vegetation	7.00	13.00	39.93	49.49	47.52
Rock	.25	2.50	6.85	7.48	5.47
Pavement	.50	1.00	.23	.60	.35
Litter	72.00	56.50	49.51	50.47	25.79
Cryptogams	.75	5.25	.00	.46	.05
Bare Ground	19.50	21.75	14.68	20.87	30.02

SOIL ANALYSIS DATA --

Herd Unit 09, Study # 16, Study Name: Mosby Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
9.3	59.2 (10.0)	6.4	50.9	28.8	20.3	4.5	27.8	316.8	1.4

Stoniness Index



PELLET GROUP DATA --

Management unit 09 , Study no: 16

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	3	-	17
Moose	-	1	-
Horse	1	-	-
Elk	21	13	17
Deer	16	11	15
Cattle	24	7	21

Days use per acre (ha)	
'00	'05
-	-
-	-
-	-
20 (50)	13 (33)
9 (22)	13 (33)
36 (88)	46 (115)

BROWSE CHARACTERISTICS --
Management unit 09 , Study no: 16

		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)
Amelanchier utahensis												
82	1066	-	266	800	-	-	38	63	0	-	6	23/25
88	1265	133	666	333	266	-	21	32	21	-	5	35/37
95	460	40	20	420	20	80	39	39	4	-	0	23/34
00	400	-	80	320	-	-	50	25	0	-	0	31/43
05	380	-	20	340	20	-	11	84	5	-	0	33/47
Artemisia tridentata vaseyana												
82	2933	-	400	2400	133	-	7	0	5	-	0	16/21
88	3599	133	666	1933	1000	-	19	0	28	-	2	25/29
95	1600	60	120	1360	120	220	61	20	8	-	0	14/21
00	1900	-	220	1420	260	120	28	0	14	4	4	13/23
05	1540	1520	240	1020	280	240	45	6	18	14	14	19/34
Ceanothus fendleri												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	260	-	-	260	-	-	0	0	-	-	0	9/54
00	200	-	-	200	-	-	0	0	-	-	0	11/67
05	420	-	-	420	-	20	0	0	-	-	0	9/51
Chrysothamnus nauseosus graveolens												
82	66	-	-	66	-	-	0	0	-	-	0	19/15
88	66	-	-	66	-	-	0	0	-	-	100	29/9
95	0	-	-	-	-	-	0	0	-	-	0	13/11
00	20	-	-	20	-	-	0	0	-	-	0	15/19
05	0	-	-	-	-	-	0	0	-	-	0	16/15
Chrysothamnus viscidiflorus lanceolatus												
82	399	-	133	266	-	-	0	0	-	-	0	10/14
88	666	-	266	400	-	-	0	0	-	-	60	7/9
95	80	-	-	80	-	-	0	25	-	-	0	8/13
00	60	-	-	60	-	-	0	0	-	-	0	6/10
05	60	-	-	60	-	-	0	0	-	-	0	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)	
Eriogonum heracleoides													
82	0	-	-	-	-	-	0	0	-	-	0	-/-	
88	266	-	66	200	-	-	25	0	-	-	0	4/7	
95	540	-	180	360	-	-	0	0	-	-	0	5/16	
00	220	-	80	140	-	-	0	0	-	-	0	4/11	
05	460	-	20	440	-	-	17	0	-	-	0	10/14	
Gutierrezia sarothrae													
82	0	-	-	-	-	-	0	0	-	-	0	-/-	
88	0	-	-	-	-	-	0	0	-	-	0	-/-	
95	120	-	-	120	-	-	0	0	-	-	0	9/12	
00	320	20	20	300	-	-	0	0	-	-	0	7/8	
05	560	-	-	560	-	-	0	0	-	-	0	8/10	
Opuntia sp.													
82	133	-	-	133	-	-	0	0	0	-	0	1/12	
88	666	66	266	400	-	-	0	0	0	-	20	4/9	
95	140	-	-	140	-	-	0	0	0	-	29	3/14	
00	200	-	40	40	120	-	0	0	60	10	10	2/12	
05	80	-	-	80	-	-	0	0	0	-	0	2/11	
Purshia tridentata													
82	333	-	-	333	-	-	60	40	-	-	0	7/19	
88	599	66	266	333	-	-	33	33	-	-	0	10/19	
95	240	-	60	180	-	-	50	17	-	-	0	10/32	
00	300	-	-	300	-	-	60	27	-	-	0	12/42	
05	300	-	-	300	-	-	0	100	-	-	0	13/45	
Sambucus cerulea													
82	0	-	-	-	-	-	0	0	-	-	0	-/-	
88	0	-	-	-	-	-	0	0	-	-	0	-/-	
95	0	-	-	-	-	-	0	0	-	-	0	-/-	
00	0	-	-	-	-	-	0	0	-	-	0	47/69	
05	0	-	-	-	-	-	0	0	-	-	0	-/-	
Symphoricarpos oreophilus													
82	0	-	-	-	-	-	0	0	0	-	0	-/-	
88	66	-	-	66	-	-	0	0	0	-	0	16/14	
95	200	-	80	120	-	-	10	30	0	-	0	11/19	
00	140	-	-	140	-	-	0	0	0	-	0	15/21	
05	140	20	40	80	20	-	0	14	14	14	14	15/32	