

SIDEHILL SPRING - TREND STUDY NO. 15-13-09

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Year-Long, Crucial Bison Year-Long

NRCS Ecological Site Description: Not Available

Land Ownership: BLM

Elevation: 7,700 ft (2,347 m)

Aspect: southeast

Slope: 5%

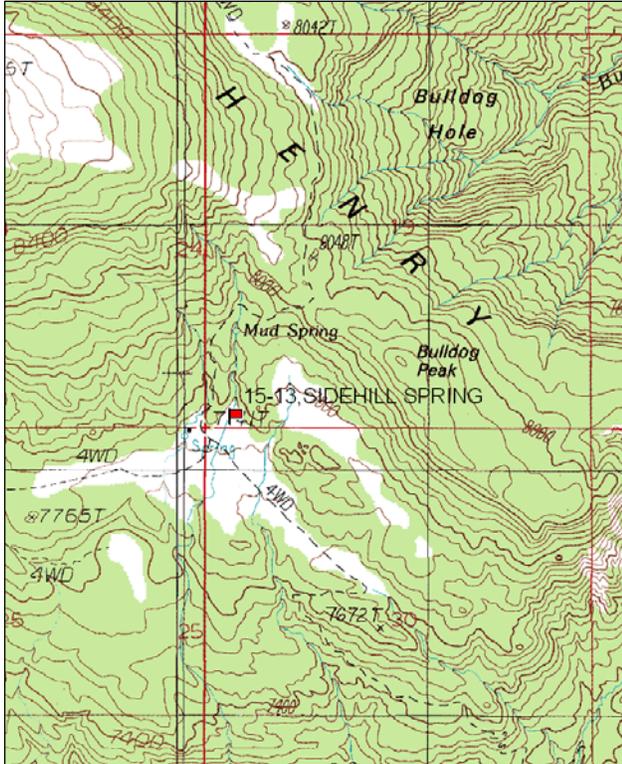
Transect bearing: 170 degrees magnetic.

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

Directions:

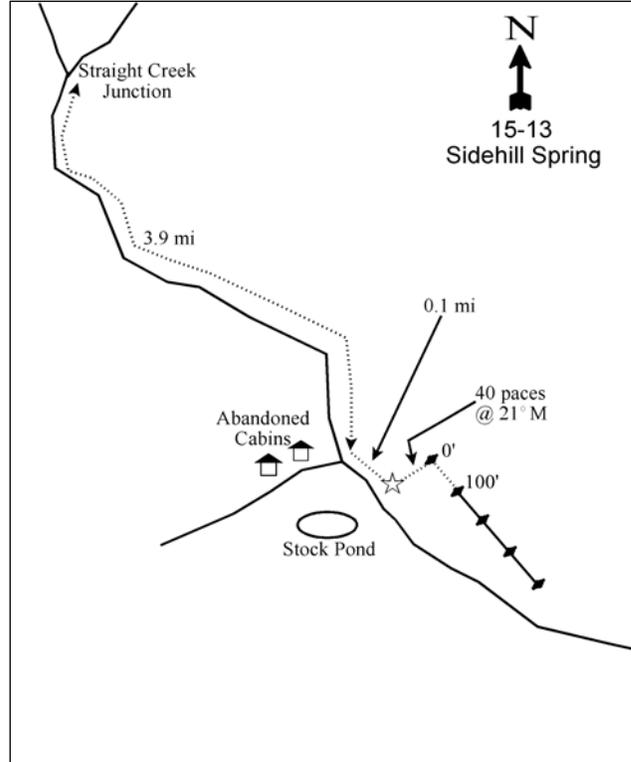
From Straight Creek Junction (T33S, R10E, Sec. 12), proceed south on the main road for 0.3 miles to Straight Creek. Continue 3.6 miles to a minor fork by a spring, stock pond and some abandoned cabins. Bear left on the main road, cross a small wash and less than 0.1 miles into the sage flat where a witness post for the transect is found on the left side of the road. The study area is northeast of the witness post. The 0-foot stake has browse tag #271 attached, and is 40 paces away at a bearing of 21°M from the witness post.

Map Name: Cass Creek Peak



Township: 33S, Range: 11E, Section: 19

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 522131 E 4196390 N

## SIDEHILL SPRING - TREND STUDY NO. 15-13

### Site Information

Site Description: The Sidehill Spring study is located one-half mile west of Bulldog Peak and halfway between Mt. Pennell and Mt. Hillars. This area was a sagebrush flat surrounded by a pinyon-juniper/oak woodland with young trees scattered throughout the flat, but it burned in 2003 in the Bulldog fire. The site was seeded and chained by the BLM to rehabilitate the area after the fire (Table - Seed Mix). The area is within the Pennell Allotment, and water is available for livestock and wildlife in a nearby spring, creek, and stock pond. There is evidence of past mining activity; a cabin, pump house, and old mining equipment are located near the spring. Pellet group data for bison and cattle were combined due to the difficulty in differentiating between these species. Bison/cattle use was moderate before the fire in 1999, with no sign sampled in 2004 after the fire, but increasing to heavy use in 2009. Deer use was estimated to be moderate before the fire, but has been minimal since the fire (Table - Pellet Group Data).

Browse: A dense stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) dominated the site prior to the 2003 Bulldog wildfire. Sagebrush density had been increasing in each sampling until 1999. Cover of sagebrush was relatively stable at nearly 19% in 1994 and 1999. The fire removed most of the browse on the site in 2004 and sagebrush was not reseeded, but sagebrush has reestablished on the site with a large increase in density and cover in 2009 (Table - Browse Trends, Table - Browse Characteristics). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) had begun to invade the site in moderate numbers, but were almost entirely removed by the fire (Table - Point-Quarter Tree Data). There was only one small juniper tree sampled by the point-quarter method in 2009.

Herbaceous Understory: Grasses are dominated by the introduced species crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*A. intermedium*) which were seeded after the fire. Native species are rare on the site. Cheatgrass (*Bromus tectorum*) is still common on the site, but has decreased in cover and frequency since the fire. Forbs are fairly diverse, but not very abundant on the site. Prior to the fire, silky lupine (*Lupinus sericeus*) and segolily (*Calochortus nuttallii*) were the dominant forb species. After the fire and reseeded, western yarrow (*Achillea millefolium*) and thorn skeletonplant (*Lygodesmia spinosa*) are now the dominant perennial forb species on the site (Table - Herbaceous Trends).

Soil: The soil is a fairly deep loam soil with an estimated effective rooting depth of over 15 inches and slightly alkaline pH (7.4). Bare ground cover has been fairly high since the fire in 2003 (Table - Basic Cover). There was very little rock or pavement on or near the soil surface, about 5-8%. Black sagebrush was present in small scattered patches on the site before the burn indicating that at least some rocky and/or shallow hardpan exists within the soil profile. Some active gullies were noted in 1999. The soil erosion condition classification was rated as slight in 2004, following the fire, due to litter movement, flow patterns, gullies, and rills. The erosion condition classification was rated as stable in 2009.

#### SEED MIX -- BLM BULLDOG FIRE (NON-WSA)

Management unit 15, study no. 13

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##### Seed Type

Crested Wheatgrass, Hycres

Pubescent Wheatgrass, Luna

Russian Wild Rye, Bozoisky

Tall Wheatgrass, Alkar

Indian Ricegrass, Rimrock

Alfalfa, Ladak

Lewis Flax, Appar

Fourwing Saltbush

## Trend Assessments

### Browse:

- **1987 to 1994 - stable (0):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. Mountain big sagebrush decadence has increased to 29%, but vigor improved in the population. Recruitment of young sagebrush plants has remained good.
- **1994 to 1999 - stable (0):** Mountain big sagebrush density, cover, and recruitment are similar to the last reading, and decadence has decreased noticeably.
- **1999 to 2004 - down (-2):** This area burned in 2003 and was then seeded and chained. All of the mountain big sagebrush sampled on the site were young plants.
- **2004 to 2009 - up (+2):** The mountain big sagebrush population has rebounded well from the fire as density has increased four-fold to 2,240 plants/acre, and cover increased to over 6%. Recruitment of young sagebrush plants remained good.

### Grass:

- **1987 to 1994 - stable (0):** The sum of nested frequency of perennial grasses stayed similar to 1987 levels. There was a significant decrease in the nested frequency of Indian ricegrass (*Oryzopsis hymenoides*).
- **1994 to 1999 - down (-2):** The sum of nested frequency of perennial grasses decreased 33%, while the nested frequency of cheatgrass had a significant increase. Cheatgrass cover increased dramatically from 1% to 17%.
- **1999 to 2004 - up (+2):** After the fire, the sum of nested frequency for perennial grasses increased 19% and cover increased from 2% to 9%. Many of the grass species seeded after the fire have become established and are now the dominant grass species on the site. Cheatgrass decreased from 17% cover to 2% and with a significant decrease in nested frequency.
- **2004 to 2009 - up (+2):** The sum of nested frequency for perennial grasses increased 37% and cover increased from to 13%. Cheatgrass nested frequency and cover remained at levels similar to 2004.

### Forb:

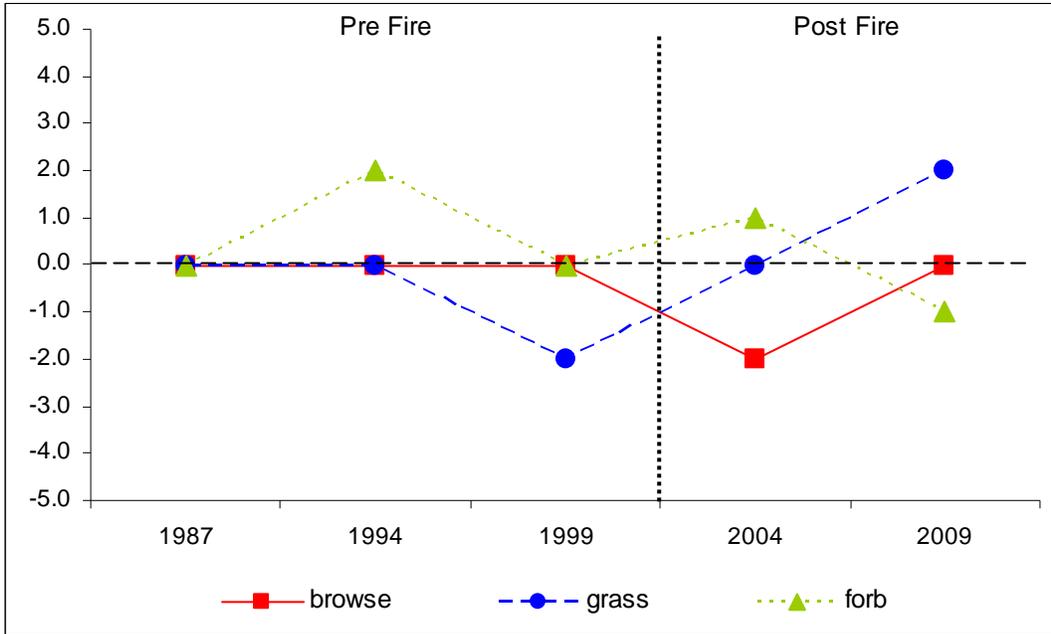
- **1987 to 1994 - up (+2):** The sum of nested frequency for perennial forbs increased 133%, mostly due to a significant increase in nested frequency of silky lupine and sego lily.
- **1994 to 1999 - down (-2):** The sum of nested frequency for perennial forbs decreased 43%, and cover decreased slightly. There was a significant decrease in the nested frequency of silky lupine.
- **1999 to 2004 - slightly up (+1):** After the fire, the sum of nested frequency for perennial forbs increased 21% and cover increased from 4% to 5%. Annual forbs increased from 0% cover to 6%. Much of the perennial forb cover is provided by species seeded after the fire including yarrow and alfalfa (*Medicago sativa*).
- **2004 to 2009 - down (-2):** Sum of nested frequency for perennial forbs is down 39%, and cover decreased to 4%. Annual forb frequency and cover also decreased. The seeded species, yarrow, is now the dominant forb on the site.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE -  
Management unit 15, study no: 13

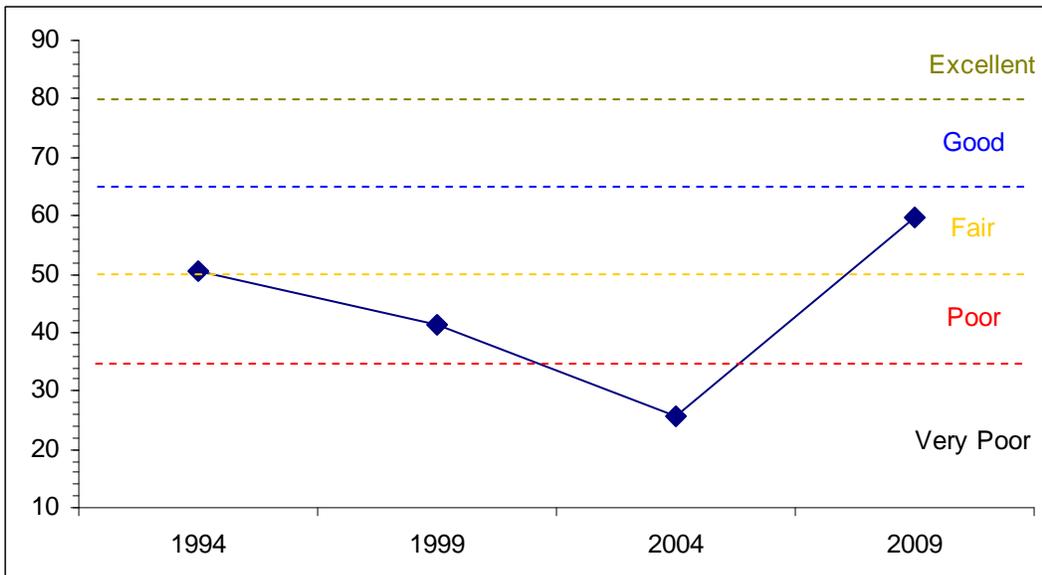
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	24.2	6.3	7.5	3.1	-0.6	10	0	<b>50.5</b>	Poor-Fair
99	24	11.5	6.9	4.3	-12.6	7.3	0	<b>41.3</b>	Poor
04	0.4	0	0	17.3	-1.6	9.6	0	<b>25.6</b>	Very poor
09	7.8	15	5.5	25.3	-1.6	7.5	0	<b>59.5</b>	Fair

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
Management unit 15 Study no: 13



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL  
Management unit 15, Study no: 13



HERBACEOUS TRENDS--  
Management unit 15, Study no: 13

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	a-	a-	a-	b75	c196	-	-	1.84	7.42
G	Agropyron intermedium	a-	a-	a-	b89	c146	-	-	2.33	3.64
G	Agropyron sp.	9	-	-	-	-	-	-	-	-
G	Agropyron spicatum	a-	a-	a-	a3	b17	-	.01	.00	.55
G	Agropyron trachycaulum	a-	a-	a-	c69	b16	-	-	1.83	.11
G	Bouteloua gracilis	-	4	3	3	7	.00	.00	.15	.21
G	Bromus carinatus	a-	a-	a-	c41	b11	-	-	.98	.06
G	Bromus tectorum (a)	-	b163	c326	a55	a54	.80	16.80	2.17	2.14
G	Dactylis glomerata	-	-	-	5	-	-	-	.18	-
G	Elymus junceus	a-	a-	a-	b18	c39	-	-	.45	.49
G	Hilaria jamesii	2	-	-	-	-	-	-	-	-
G	Oryzopsis hymenoides	b33	a13	ab16	a10	a6	.13	.17	.07	.09
G	Poa interior	-	4	2	-	-	.03	.00	-	-
G	Poa secunda	-	-	-	-	4	-	-	-	.00
G	Sitanion hystrix	c138	c138	b88	a13	a6	1.36	1.94	.75	.04
G	Stipa lettermani	-	6	1	-	-	.01	.03	-	-
Total for Annual Grasses		0	163	326	55	54	0.80	16.80	2.17	2.14
Total for Perennial Grasses		182	165	110	326	448	1.55	2.16	8.63	12.64
Total for Grasses		182	328	436	381	502	2.35	18.97	10.81	14.78
F	Achillea millefolium	a-	a-	a-	b22	b36	-	-	.77	1.92
F	Agastache sp.	-	-	-	-	-	-	-	-	.15
F	Astragalus sp.	-	-	-	3	1	-	.00	.01	.00
F	Calochortus nuttallii	a7	b54	b41	ab11	a-	.14	.29	.03	-
F	Castilleja linariaefolia	-	-	3	-	3	-	.41	-	.00
F	Chenopodium album (a)	-	-	-	2	-	-	-	.18	-
F	Chenopodium leptophyllum(a)	-	a-	a-	b17	a3	-	-	1.94	.00
F	Gayophytum ramosissimum(a)	-	ab9	a-	b17	a-	.02	-	.47	-
F	Ipomopsis aggregata	b11	a-	a-	a-	a-	-	-	-	-
F	Lappula occidentalis (a)	-	4	-	4	8	.01	-	.18	.04
F	Linum lewisii	a5	a3	a-	b17	a-	.00	-	.28	-
F	Lomatium sp.	-	3	6	-	3	.03	.06	-	.03
F	Lupinus sericeus	b58	c160	b71	a14	a7	4.92	2.67	.78	.57
F	Lygodesmia spinosa	a-	a-	a-	a8	b28	-	-	1.21	.61
F	Medicago sativa	-	-	-	8	3	-	-	.51	.03
F	Nicotiana attenuata (a)	-	a-	a-	b10	a-	-	-	.49	-
F	Penstemon comarrhenus	5	2	4	2	4	.00	.02	.15	.38
F	Penstemon sp.	-	-	-	-	-	-	-	.00	-
F	Phlox longifolia	ab12	a-	a5	b72	a-	-	.01	.83	-
F	Polygonum douglasii (a)	-	a-	a-	b33	a7	-	-	1.62	.01
F	Ranunculus testiculatus (a)	-	-	-	6	6	-	-	.01	.15
F	Solanum triflorum (a)	-	-	-	2	-	-	-	.89	-
F	Sphaeralcea coccinea	-	-	1	2	12	-	.15	.21	.05
F	Zigadenus paniculatus	-	6	-	-	-	.01	.01	-	-

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
	Total for Annual Forbs	0	13	0	91	24	0.02	0	5.80	0.21
	Total for Perennial Forbs	98	228	131	159	97	5.11	3.63	4.80	3.77
	Total for Forbs	98	241	131	250	121	5.14	3.63	10.60	3.99

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

#### BROWSE TRENDS--

Management unit 15, Study no: 13

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	2	2	0	1	.03	.00	-	.00
B	Artemisia nova	0	2	0	1	-	.41	-	.00
B	Artemisia tridentata vaseyana	93	89	15	49	19.32	18.78	.30	6.26
B	Atriplex canescens	0	0	2	1	-	-	.00	.00
B	Chrysothamnus viscidiflorus viscidiflorus	77	66	10	14	6.09	7.08	.26	.22
B	Juniperus osteosperma	0	5	0	0	4.61	7.52	-	-
B	Opuntia sp.	5	5	0	0	.00	.00	-	-
B	Pinus edulis	0	3	0	0	1.61	2.62	-	-
B	Quercus gambelii	0	0	1	1	-	-	.00	.00
B	Rosa woodsii	0	0	1	0	-	-	.00	-
B	Symphoricarpos oreophilus	10	7	1	2	.33	.18	.00	.18
	Total for Browse	187	179	30	69	32.02	36.63	0.57	6.67

#### CANOPY COVER, LINE INTERCEPT--

Management unit 15, Study no: 13

Species	Percent Cover		
	'99	'04	'09
Artemisia nova	-	-	.03
Artemisia tridentata vaseyana	-	.11	5.76
Atriplex canescens	-	.18	-
Chrysothamnus viscidiflorus viscidiflorus	-	.08	.06
Juniperus osteosperma	3.79	-	-
Pinus edulis	3.40	-	-
Quercus gambelii	-	-	.53
Symphoricarpos oreophilus	-	.16	.01

#### KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 15, Study no: 13

Species	Average leader growth (in) '09
Amelanchier utahensis	2.0
Artemisia tridentata vaseyana	1.7

POINT-QUARTER TREE DATA--  
Management unit 15, Study no: 13

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	29	<18	19	4.5	-	2.8
Pinus edulis	17	<18	<18	4.5	-	-

BASIC COVER--  
Management unit 15, Study no: 13

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	7.25	40.99	53.78	20.81	27.87
Rock	.25	2.09	1.99	4.44	2.66
Pavement	2.00	.50	.99	3.35	6.24
Litter	62.75	32.65	39.14	10.51	19.11
Cryptogams	0	.18	.38	0	0
Bare Ground	27.75	25.28	24.26	68.29	55.54

SOIL ANALYSIS DATA --  
Management unit 15, Study no: 13, Study Name: Sidehill Spring

Effective rooting depth (in)	pH	loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.4	7.3	37.6	37.8	24.6	2.1	13.6	252.8	0.6

PELLET GROUP DATA--  
Management unit 15, Study no: 13

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	19	24	19	29	-	-	-
Elk	1	-	1	-	-	-	-
Deer	12	5	3	3	18 (44)	1 (3)	1 (3)
Bison/Cattle	-	2	-	42	25 (630)	-	88 (217)

BROWSE CHARACTERISTICS--  
Management unit 15, Study no: 13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
87	0	0	0	-	-	0	0	0	-/-
94	60	0	100	-	-	33	0	0	17/143
99	40	0	100	-	-	0	0	0	48/44
04	0	0	0	-	-	0	0	0	25/48
09	20	0	100	-	-	0	0	0	26/37
<i>Artemisia nova</i>									
87	1532	48	52	-	1733	9	0	17	9/8
94	0	0	0	-	-	0	0	0	-/-
99	60	0	100	-	-	0	0	0	19/31
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	100	0	0	11/22
<i>Artemisia tridentata vaseyana</i>									
87	4798	47	50	3	466	26	0	17	20/19
94	5600	15	56	29	3020	2	.71	9	51/54
99	5920	14	74	12	240	2	0	6	24/36
04	520	100	0	0	1560	0	0	0	14/26
09	2240	11	89	0	-	12	0	.89	16/21
<i>Atriplex canescens</i>									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	60	100	0	-	60	0	0	0	14/8
09	20	100	0	-	-	0	100	0	2/1
<i>Cercocarpus montanus</i>									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	12/9
09	0	0	0	-	-	0	0	0	5/15
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
87	11332	34	66	0	199	0	0	4	4/8
94	8340	9	90	1	3960	.47	.23	0	31/22
99	11000	13	87	1	200	0	0	.18	5/10
04	340	0	100	0	-	0	0	0	7/9
09	440	36	64	0	20	5	14	0	6/10

		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>Gutierrezia sarothrae</i>										
87	865	8	92	-	-	0	0	0	9/5	
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
<i>Juniperus osteosperma</i>										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	100	0	100	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
87	132	50	50	-	133	0	0	0	4/7	
94	200	40	60	-	-	0	0	0	5/16	
99	100	0	100	-	-	0	0	0	4/7	
04	0	0	0	-	-	0	0	0	7/7	
09	0	0	0	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	60	33	67	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
<i>Quercus gambelii</i>										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	0	100	-	-	0	0	0	25/19	
09	20	0	100	-	-	0	0	0	83/53	
<i>Rosa woodsii</i>										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	10/13	
09	0	0	0	-	-	0	0	0	21/23	
<i>Symphoricarpos oreophilus</i>										
87	0	0	0	0	-	0	0	0	-/-	
94	260	15	69	15	20	15	0	0	9/46	
99	280	57	43	0	-	0	0	0	17/24	
04	40	0	100	0	-	0	0	100	15/36	
09	80	0	100	0	20	100	0	0	8/15	