

TWO MILE CHAINING - TREND STUDY NO. 13A-1-09

Vegetation Type: Chained, Seeded P-J

Range Type: Crucial Deer Spring/Fall, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Stony Loam \(Mountain Big Sagebrush\), R048AY448UT](#)

Land Ownership: US Forest Service

Elevation: 7,530 ft (2,295 m)

Aspect: Southeast

Slope: 4%

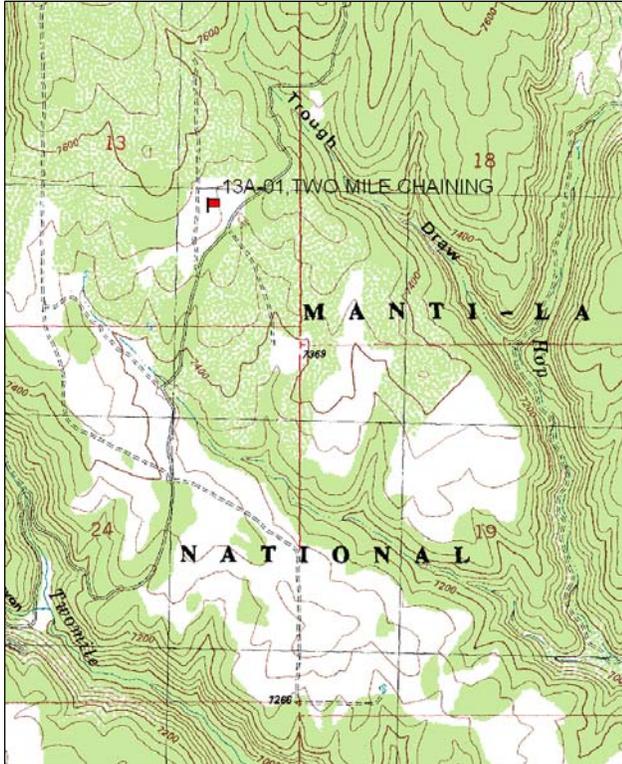
Transect bearing: 165 degrees magnetic.

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

Directions:

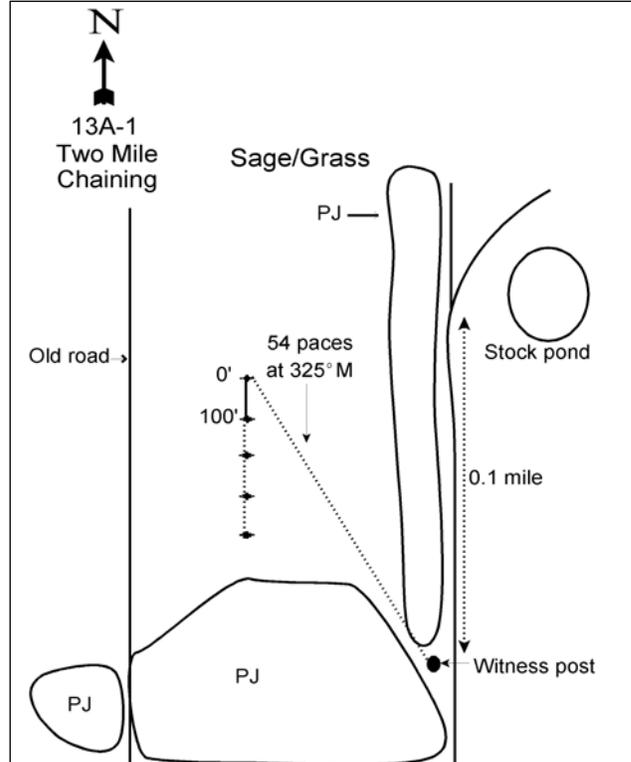
Travel east on SR 46 through the town of La Sal to mile marker 16. Continue 0.1 miles, then turn left off the highway. Proceed 1.2 miles to a fork. Turn right and proceed toward Buckeye Reservoir for 0.8 miles to another fork. Stay left and continue 2.95 miles to a witness post (fencepost) on the left side of the road. The transect is located in the chaining opposite a fork further up the road and can be reached from the witness post by walking 54 paces northwest (325°M). The 0-foot baseline stake is a 1-foot tall fencepost, tagged #7813.

Map Name: Ray Mesa



Township: 28S, Range: 25E, Section: 13

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 665079 E 4248100 N

TWO MILE CHAINING - TREND STUDY NO. 13A-1

Site Information

Site Description: The study is located in the Two Mile Chaining on the south end of the La Sal Mountains. Nine hundred acres were chained and seeded in 1978. This site is located on the South Paradox allotment which receives summer/fall cattle use. The Hang Dog fire on Ray Mesa burned 6,000 acres about 300 yards from the edge of this site in 2002. Pellet group data indicates a decline in elk use and an increase in deer use since 1999 (Table - Pellet Group Data).

Browse: Mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) is the dominant browse species on the site with a good component of Utah serviceberry (*Amelanchier utahensis*). Both species are mostly mature populations, but maintain good recruitment of young plants (Table - Browse Characteristics). Pinyon pine (*Pinus edulis*) has begun to reestablish on this site. Estimated density of pinyon has remained similar, but the average basal diameter of pinyon has been increasing over time (Table - Point-Quarter Tree Data).

Herbaceous Understory: Species diversity is relatively high and plants are vigorous. Seeded grasses, crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*A. intermedium*) and smooth brome (*Bromus inermis*), are well established and productive. However, the introduced species, bulbous bluegrass (*Poa bulbosa*), is the dominant grass species on the site (Table - Herbaceous Trends).

Forbs were diverse and abundant at the outset of the study in 1987, but both variables have decreased on the site over time. Silvery lupine (*Lupinus argenteus*) was the dominant forb at the outset of the study, but has not been sampled on the site since 2004. Scarlet globemallow (*Sphaeralcea coccinea*) was the dominant forb species in 2009 (Table - Herbaceous Trends).

Soil: The soil is a loam with a slightly acidic pH (6.5). Phosphorus is marginally available for plant growth and development at 8 ppm (Tiedemann and Lopez 2004). Organic matter is well below average for the unit, with the sites in this herd unit averaging 3.5% organic matter (Table - Soil Analysis Data). The erosion condition was classified as slight due to soil movement and pedestaling in 2004 and 2009.

Trend Assessments

Browse:

- **1987 to 1994 - slightly down (-1):** Differences in density of browse species may be related to the larger sample area used in 1994; therefore, trend for browse was determined using other parameters. Decadence of the primary browse species, mountain big sagebrush, increased from 12% to 42%, and plants displaying poor vigor increased from 2% to 10% in the same period.
- **1994 to 1999 - slightly down (-1):** Density of mountain big sagebrush has decreased by 15%, and cover of sagebrush decreased from 61% of the browse cover to 39%. However, decadence of sagebrush decreased to 24%.
- **1999 to 2004 - stable (0):** Density of the key browse species, mountain big sagebrush and serviceberry, decreased slightly, but mature mountain big sagebrush has increased with a decrease in the recruitment of young sagebrush.
- **2004 to 2009 - stable (0):** Density of mountain big sagebrush changed little, while density of serviceberry increased slightly. Sagebrush plants displaying poor vigor increased from 9% to 22%. Recruitment of young serviceberry plants increased to 44% of the population.

Grass:

- **1987 to 1994 - slightly down (-1):** Sum of nested frequency of perennial grasses decreased by 13%, prairie junegrass (*Koeleria cristata*) and needle-and-thread grass (*Stipa comata*) decreased significantly in nested frequency.

- **1994 to 1999 - stable (0):** There was a slight increase in the sum of nested frequency of perennial grasses. Most of this increase was from the significant increase in nested frequency of mutton bluegrass (*Poa fendleriana*).
- **1999 to 2004 - stable (0):** Sum of nested frequency of perennial grasses decreased by 22%, but this is primarily due to the significant decrease in the nested frequency of the introduced grass, bulbous bluegrass.
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, and no significant change in nested frequency of any species.

Forb:

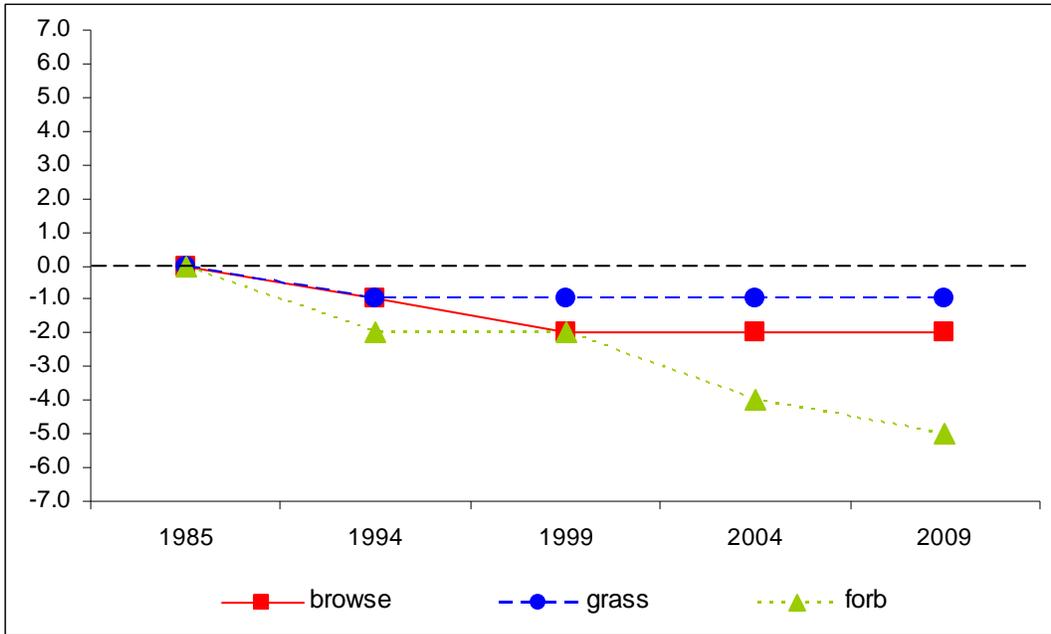
- **1987 to 1994 - down (-2):** Sum of nested frequency of perennial forbs decreased by 64%. Most of the native perennial species decreased significantly in nested frequency including silvery lupine, mat penstemon (*Penstemon caespitosus*), and desert Indian paintbrush (*Castilleja chromosa*).
- **1994 to 1999 - stable (0):** The sum of nested frequency of perennial forbs decreased slightly with a significant increase in the nested frequency of silvery lupine.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial forbs decreased by 35% and the formerly dominant forb, silvery lupine, was not sampled on the site.
- **2004 to 2009 - slightly down (-1):** There was a 20% decrease in the sum of nested frequency of perennial forbs with a significant decrease in the nested frequency of timber poisonvetch (*Astragalus convallarius*).

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 13A, study no: 1

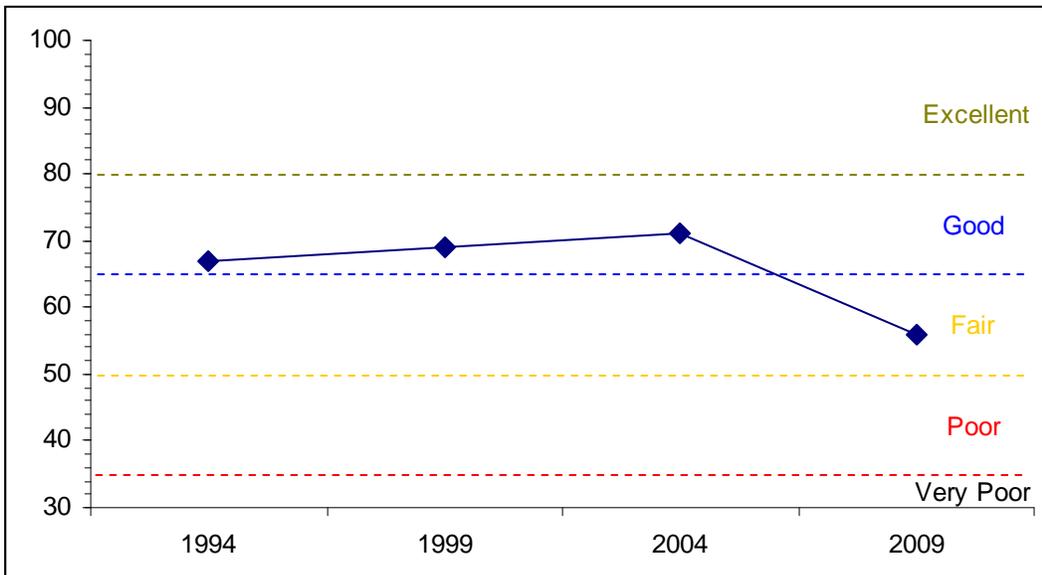
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	25.3	4.6	3.8	23.0	0.0	10.0	0.0	66.7	Fair-Good
99	19.6	9.8	7.5	27.8	0.0	4.3	0.0	69.0	Good
04	26.5	9.5	6.7	22.7	0.0	5.3	0.0	70.7	Good
09	20.0	10.1	9.2	14.6	0.0	2.3	0.0	56.2	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 13A Study no: 1



DESIRABLE COMPONENTS INDEX TREND: MID-LEVEL POTENTIAL
 Management unit 13A, Study no: 1



HERBACEOUS TRENDS--
Management unit 13A, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	b135	ab106	ab100	ab112	a81	2.46	2.50	4.81	2.00
G	Agropyron intermedium	-	-	3	2	3	-	.03	.00	.03
G	Bouteloua gracilis	15	19	17	13	17	1.07	.14	.53	.30
G	Bromus inermis	75	67	63	68	92	.63	2.40	1.00	1.35
G	Bromus tectorum (a)	-	-	3	-	-	-	.00	-	-
G	Carex sp.	-	-	-	-	-	.00	-	-	-
G	Hilaria jamesii	-	-	-	2	-	-	-	.03	-
G	Koeleria cristata	b61	a3	a19	a3	a-	.03	.18	.01	-
G	Oryzopsis hymenoides	-	3	3	3	8	.00	.00	.03	.07
G	Poa bulbosa	b220	b256	b250	a129	a136	7.14	8.01	2.43	2.86
G	Poa fendleriana	a-	b16	d53	cd55	bc24	.06	.38	1.24	.33
G	Sitanion hystrix	6	1	-	-	-	.00	-	-	-
G	Stipa comata	b48	a14	bc24	bc30	a21	.11	.23	1.24	.36
Total for Annual Grasses		0	0	3	0	0	0	0.00	0	0
Total for Perennial Grasses		560	485	532	417	382	11.52	13.89	11.35	7.32
Total for Grasses		560	485	535	417	382	11.52	13.90	11.35	7.32
F	Agoseris glauca	-	-	-	-	-	-	-	.00	-
F	Astragalus convallarius	b40	bc17	ab25	b37	a9	.10	.42	.99	.10
F	Calochortus nuttallii	8	-	-	1	-	-	-	.00	-
F	Castilleja chromosa	b38	a4	a-	a-	a-	.01	-	-	-
F	Castilleja linariaefolia	-	2	1	-	-	.01	.03	-	-
F	Comandra pallida	-	-	-	3	-	-	-	.01	-
F	Cordylanthus sp. (a)	-	-	-	5	5	-	-	.16	.01
F	Crepis acuminata	b14	a6	a-	a-	a-	.03	-	-	-
F	Erigeron flagellaris	-	-	3	-	1	-	.15	-	.00
F	Erigeron pumilus	b111	a21	a43	a20	a12	.07	.51	.53	.08
F	Eriogonum racemosum	b63	a30	a34	a25	a28	.14	.30	.35	.21
F	Hymenoxys acaulis	3	-	3	1	-	-	.00	.03	-
F	Lomatium triternatum	b31	a-	a-	a-	a-	-	-	-	-
F	Lupinus argenteus	d162	c57	b20	a-	a-	3.64	.14	-	-
F	Machaeranthera canescens	1	-	2	-	-	-	.01	-	-
F	Penstemon caespitosus	85	2	6	6	5	.01	.03	.07	.02
F	Petradoria pumila	-	-	5	-	-	-	.06	-	-
F	Phlox longifolia	c67	bc53	ab31	a7	a17	.14	.06	.05	.10
F	Polygonum douglasii (a)	-	-	-	-	6	-	-	-	.01
F	Senecio multilobatus	-	1	1	-	-	.00	.00	-	-
F	Sphaeralcea coccinea	58	55	52	49	48	1.24	.38	.60	.59
F	Tragopogon dubius	6	-	-	-	-	-	-	-	-
F	Trifolium gymnocarpon	-	3	3	2	-	.00	.00	.00	-
F	Unknown forb-perennial	6	-	-	-	-	-	-	-	-
F	Zigadenus paniculatus	-	-	3	-	1	-	.00	.00	.03
Total for Annual Forbs		0	0	0	5	11	0	0	0.15	0.01
Total for Perennial Forbs		693	251	232	151	121	5.43	2.15	2.66	1.15

Type	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
	Total for Forbs	693	251	232	156	132	5.43	2.15	2.82	1.17

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

BROWSE TRENDS--

Management unit 13A, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	18	18	16	20	2.25	3.74	6.50	5.30
B	Artemisia tridentata vaseyana	86	82	85	85	16.28	9.40	10.65	9.94
B	Chrysothamnus depressus	12	26	23	23	.66	.72	1.46	.87
B	Chrysothamnus viscidiflorus viscidiflorus	86	81	72	72	3.62	4.96	5.00	6.14
B	Coryphantha vivipara arizonica	0	2	5	5	-	.00	.00	.00
B	Eriogonum microthecum	10	16	10	9	.01	.53	.12	.12
B	Gutierrezia sarothrae	0	4	8	4	.01	.04	.15	.03
B	Juniperus osteosperma	0	0	0	0	-	-	-	.15
B	Opuntia sp.	36	35	41	45	.32	.56	1.12	1.33
B	Pinus edulis	0	16	14	10	2.92	3.53	7.21	8.53
B	Purshia tridentata	0	1	1	1	-	.00	.00	.00
B	Quercus gambelii	0	3	3	2	.76	.63	1.48	.76
B	Symphoricarpos oreophilus	3	2	4	2	.00	.00	.00	.00
	Total for Browse	251	286	282	278	26.86	24.13	33.72	33.20

CANOPY COVER, LINE INTERCEPT--

Management unit 13A, Study no: 1

Species	Percent Cover		
	'99	'04	'09
Amelanchier utahensis	.80	7.25	9.48
Artemisia tridentata vaseyana	-	13.21	13.93
Chrysothamnus depressus	-	1.04	.58
Chrysothamnus viscidiflorus viscidiflorus	-	4.73	7.25
Eriogonum microthecum	-	.11	.06
Gutierrezia sarothrae	-	-	.06
Opuntia sp.	-	.65	.71
Pinus edulis	3.59	11.86	13.43
Quercus gambelii	-	1.23	1.43
Symphoricarpos oreophilus	-	-	.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 13A, Study no: 1

Species	Average leader growth (in)	
	'04	'09
Amelanchier utahensis	1.8	1.7
Artemisia tridentata vaseyana	1.3	1.3

POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 1

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Pinus edulis	201	175	213	2.1	2.8	3.2

BASIC COVER--

Management unit 13A, Study no: 1

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	15.25	33.38	39.61	42.08	42.20
Rock	0	.02	.00	.00	.00
Pavement	0	.03	.04	.05	.03
Litter	61.00	46.05	40.37	45.25	50.69
Cryptogams	3.50	1.50	8.07	2.74	2.00
Bare Ground	20.25	32.20	29.56	34.09	22.93

SOIL ANALYSIS DATA --

Management unit 13A, Study no: 1, Study Name: Two Mile Chaining

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11	6.5	48.2	30.6	21.3	2	8	105.6	0.4

PELLET GROUP DATA--

Management unit 13A, Study no: 1

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	44	6	6	34	-	-	-
Elk	28	26	11	3	70 (173)	27 (68)	4 (10)
Deer	14	28	15	9	32 (79)	16 (40)	25 (63)
Cattle	-	2	-	1	6 (14)	4 (11)	4 (9)

BROWSE CHARACTERISTICS--
Management unit 13A, Study no: 1

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	66	100	0	0	66	0	0	0	-/-
94	480	38	58	4	-	21	4	0	41/42
99	440	23	68	9	60	36	32	9	51/53
04	400	30	65	5	60	5	70	0	42/46
09	680	44	53	3	-	26	12	3	51/53
<i>Artemisia tridentata vaseyana</i>									
87	3198	8	79	12	-	42	8	2	13/17
94	4800	4	54	42	940	13	2	10	18/32
99	4080	13	63	24	360	41	3	3	21/31
04	3800	5	73	22	-	33	10	9	15/24
09	3820	6	68	26	60	34	17	22	17/25
<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	101/113
09	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus depressus</i>									
87	0	0	0	0	-	0	0	0	-/-
94	560	0	100	0	80	0	0	0	16/22
99	1580	6	94	0	40	33	0	0	4/9
04	1500	1	97	1	20	17	49	1	5/9
09	1720	9	90	1	-	7	0	0	5/10
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
87	6199	25	75	0	66	14	1	1	5/8
94	7300	3	96	0	2500	0	0	1	9/20
99	8500	6	93	1	-	2	0	.23	5/10
04	5680	2	96	2	20	4	0	1	6/11
09	5840	4	92	3	40	3	0	2	5/12
<i>Coleogyne ramosissima</i>									
87	66	0	100	-	-	0	0	0	11/4
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	-/-

		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>Coryphantha vivipara arizonica</i>										
87	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	60	0	100	-	-	0	0	0	3/5	
04	100	20	80	-	-	0	0	0	2/4	
09	100	0	100	-	-	0	0	0	3/5	
<i>Eriogonum microthecum</i>										
87	0	0	0	-	-	0	0	0	-/-	
94	280	0	100	-	20	0	0	0	8/8	
99	400	5	95	-	20	15	0	0	5/7	
04	340	0	100	-	-	6	0	0	7/7	
09	400	0	100	-	-	5	0	0	10/10	
<i>Gutierrezia sarothrae</i>										
87	66	0	100	-	-	0	0	0	8/6	
94	0	0	0	-	-	0	0	0	7/9	
99	160	13	88	-	-	0	0	0	11/8	
04	180	0	100	-	-	0	0	0	8/10	
09	140	0	100	-	-	0	0	0	8/9	
<i>Opuntia sp.</i>										
87	199	0	100	0	-	0	0	67	3/6	
94	1480	16	69	15	40	3	0	7	2/7	
99	1320	30	65	5	20	0	0	0	3/9	
04	1800	1	90	9	40	0	0	9	4/8	
09	1880	5	91	3	-	0	0	4	3/8	
<i>Pinus edulis</i>										
87	133	100	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	340	53	47	-	80	0	0	0	-/-	
04	380	32	68	-	40	0	0	0	-/-	
09	280	14	86	-	20	0	0	7	-/-	
<i>Purshia tridentata</i>										
87	0	0	0	-	66	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	12/28	
99	20	0	100	-	-	0	0	0	12/40	
04	20	0	100	-	-	100	0	0	10/23	
09	20	0	100	-	-	0	100	0	15/33	
<i>Quercus gambelii</i>										
87	0	0	0	0	-	0	0	0	-/-	
94	0	0	0	0	-	0	0	0	-/-	
99	220	18	82	0	20	0	0	0	43/18	
04	140	14	14	71	-	0	0	0	43/19	
09	120	17	83	0	-	17	0	0	7/8	

		Age class distribution				Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Symphoricarpos oreophilus										
87	0	0	0	-	66	0	0	0	-/-	
94	80	0	100	-	-	25	0	0	8/19	
99	40	50	50	-	-	0	0	0	22/36	
04	80	0	100	-	-	0	0	0	10/12	
09	80	50	50	-	-	0	25	0	14/28	