

BRUSHY BASIN - TREND STUDY NO. 14-2-09

Vegetation Type: Chained, Seeded P-J

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

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 7,400 ft (2,256 m)

Aspect: Southeast

Slope: 12%

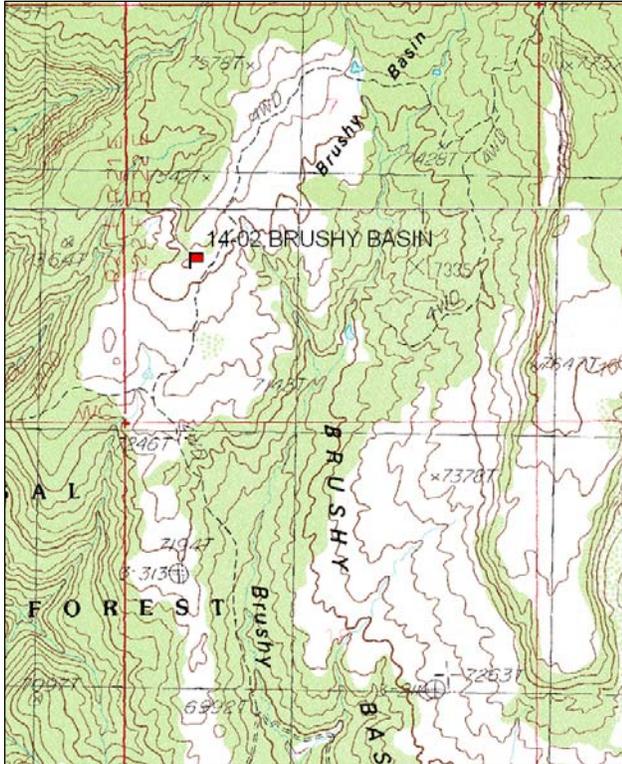
Transect bearing: 180 degrees magnetic.

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

Directions:

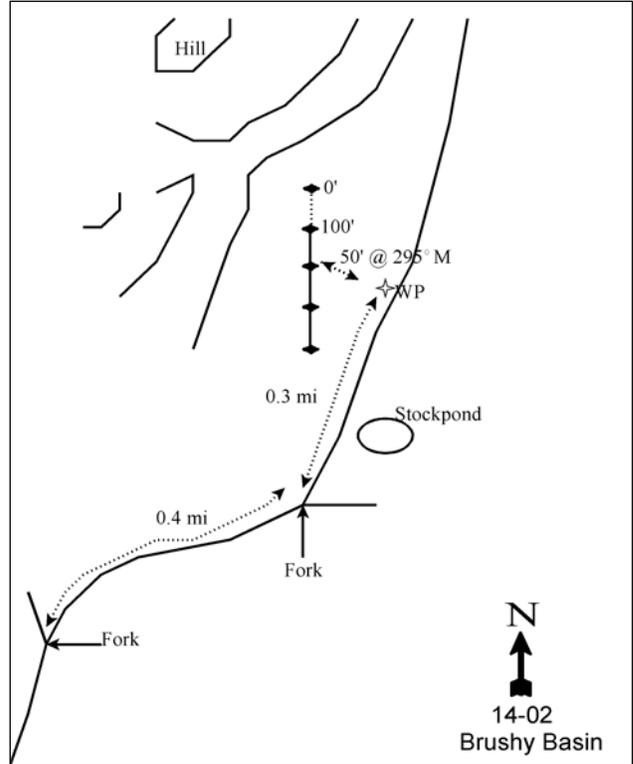
From Blanding, go northwest on the mountain road (toward the Causeway, Elk Ridge) to a junction 0.6 miles beyond the Forest Service boundary. Turn left. After 0.05 miles, go straight through an intersection and continue 0.6 miles to a fork. Turn left. Go 0.75 miles to another fork, turn right. Turn right again after 0.7 miles. Proceed 0.4 miles and stay left at the fork. After 0.3 miles you reach the edge of a chaining. Continue 0.1 miles to a fork. Turn right. Go 0.1 miles, pass a stockpond and continue 0.2 miles to a witness post (green fence post) 10 feet off the west side of the road. From the witness post, walk 50 feet at 295°M to the 200 stake. The 0 foot baseline stake is found 200 feet to the north, and has browse tag #7869 attached.

Map Name: Manco Jim Butte



Township: 35S, Range: 22E, Section: 7

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 627520 E 4178828 N

BRUSHY BASIN - TREND STUDY NO. 14-2

Site Information

Site Description: The study is located in the foothills south of the Abajo Mountains about 10 miles northwest of Blanding. The area is managed by the U.S. Forest Service and is part of a 1,400 acre chaining and seeding project done in 1971. Water is available in a stock pond about 0.2 miles down the road. The Brushy Basin unit is one of three units on a rest-rotation grazing system on the Camp Jackson Allotment. The area is a transition zone of Ponderosa pine (*Pinus ponderosa*), Gambel oak (*Quercus gambelii*), serviceberry (*Amelanchier utahensis*), sagebrush (*Artemisia spp.*), pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Pellet group data has indicated somewhat fluctuating deer use, but deer use has been mostly light to moderate since 1994. Estimated elk use has been moderate since 1994. Estimated cattle use was moderate in 1999, but has been light since 2004.

Browse: There is a good mixture of Utah serviceberry (*Amelanchier utahensis*), antelope bitterbrush (*Purshia tridentata*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) on the site with mountain big sagebrush being the dominant species in cover (Table - Browse Cover). The mountain big sagebrush population is mostly mature, but decadence has been low and recruitment of young sagebrush plants good over the length of the study. The number of sagebrush plants displaying poor vigor has been low in most years, but increased markedly in 2009. Utilization of sagebrush on the site has fluctuated from light to heavy use over the sample years. The Utah serviceberry population is comprised of mostly large, mature plants, but recruitment of young serviceberry plants has increased since 2004. Utilization of serviceberry has been mostly light to moderate over the sample years. Antelope bitterbrush is scattered over the site and is also mostly mature, but decadence is mostly low. Utilization of bitterbrush has been quite heavy over the sample years which has led it to have a prostrate growth form (Table - Browse Characteristics). Other preferred browse that occur on the site in low density and cover are true mountain mahogany (*Cercocarpus montanus*), dwarf rabbitbrush (*Chrysothamnus depressus*), and Gambel oak (*Quercus gambelii*). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are present in the chaining, but do not appear to be increasing greatly in size or density (Table - Point-Quarter Tree Data).

Herbaceous Understory: Herbaceous species are important on deer spring-fall transition range and elk winter range. In 1986, there was a vigorous and diverse stand of native and seeded grasses. Since then, the grass understory has declined somewhat, mostly due to a decrease in the nested frequency of intermediate wheatgrass (*Agropyron intermedium*) and mutton bluegrass (*Poa fendleriana*). These two species and crested wheatgrass (*Agropyron cristatum*) provide the majority of grass cover on the site. Perennial forbs are quite diverse, but do not provide an abundant source of forage. The most common forb is mat penstemon (*Penstemon caespitosus*) (Table - Herbaceous Trends).

Soil: This site has variable soils, generally deep loam surface soils with clay loam subsoil with a neutral pH and a deep effective rooting depth (Table - Soil Analysis Data). Litter cover is abundant, with most of the litter as persistent debris left from the chaining. Bare ground cover has been low to moderate over the sample years (Table - Basic Cover). In 1999, there was evidence of sheet erosion and roads and trails in the area showed active soil movement from high intensity summer storm events. The soil erosion condition was classified as stable in 2004, but was slight in 2009 due to flow patterns, and surface litter, surface rock and soil movement.

Trend Assessments

Browse:

- **1986 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. There was little change in the populations of any of the preferred browse species.

- **1994 to 1999 - up (+2):** The density of the primary browse species, mountain big sagebrush, increased by 25% from 2,320 plants/acre to 2,920 plants/acre, and cover increased from 5% to 7%. Recruitment of young sagebrush plants increased from 6% to 45% of the population. Density of bitterbrush decreased slightly, but recruitment of young bitterbrush plants increased from 3% to 17% of the population.
- **1999 to 2004 - stable (0):** There was little change in the cover or density of mountain big sagebrush. Decadence and vigor of sagebrush, and the recruitment of young sagebrush plants remained good. There was a slight increase in the density of serviceberry and a large increase in the density of bitterbrush, but bitterbrush is still not common.
- **2004 to 2009 - up (+2):** There was a 31% increase in the density of mountain big sagebrush to 3,920 plants/acre and cover increased to 9%. Decadence of sagebrush increased slightly, but remained good. However, the number of sagebrush plants displaying poor vigor increased from 3% to 30%. Recruitment of young sagebrush plants decreased, but still comprised 11% of the population. Recruitment of young serviceberry plants has increased slightly.

Grass:

- **1986 to 1994 - down (-2):** The sum of nested frequency of perennial grasses decreased by 48% with a significant decrease in nested frequency of crested wheatgrass, smooth brome (*Bromus inermis*), and a *Carex sp.*
- **1994 to 1999 - slightly down (-1):** There was a 16% decrease in the sum of nested frequency of perennial grasses and cover decreased from 12% to 7%. There was a significant decrease in the nested frequency of intermediate wheatgrass.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased by 52% and cover decreased to 4%. There was a significant decrease in the nested frequency of crested wheatgrass, intermediate wheatgrass, and mutton bluegrass.
- **2004 to 2009 - slightly up (+1):** There was a 22% increase in the sum of nested frequency of perennial grasses, though levels are still lower than in 1999. Cover of perennial grasses increased to 6%.

Forb:

- **1986 to 1994 - up (+2):** There was over a three-fold increase in the sum of nested frequency of perennial forbs. There was a significant increase in the sum of nested frequency of many important perennial forbs including yellow sweet clover (*Melilotus officinalis*).
- **1994 to 1999 - stable (0):** There was no change in the sum of nested frequency of perennial forbs, but cover decreased slightly.
- **1999 to 2004 - down (-2):** There was a 41% decrease in the sum of nested frequency of perennial forbs and cover decreased from 4% to 3%.
- **2004 to 2009 - up (+2):** The sum of nested frequency of perennial forbs increased by 31% and cover increased to 4%.

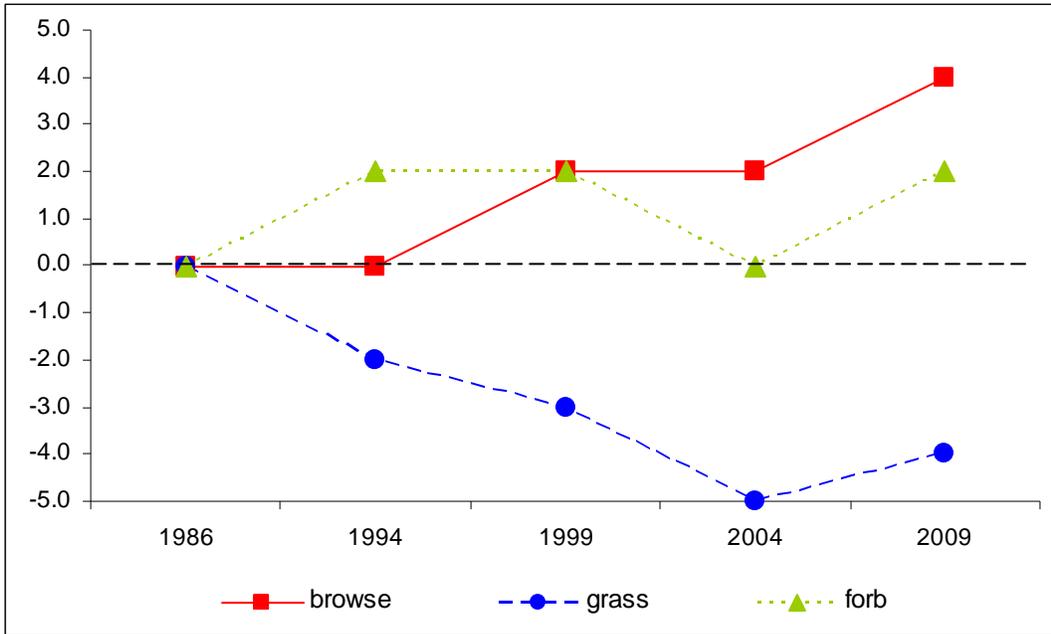
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 14, study no: 2

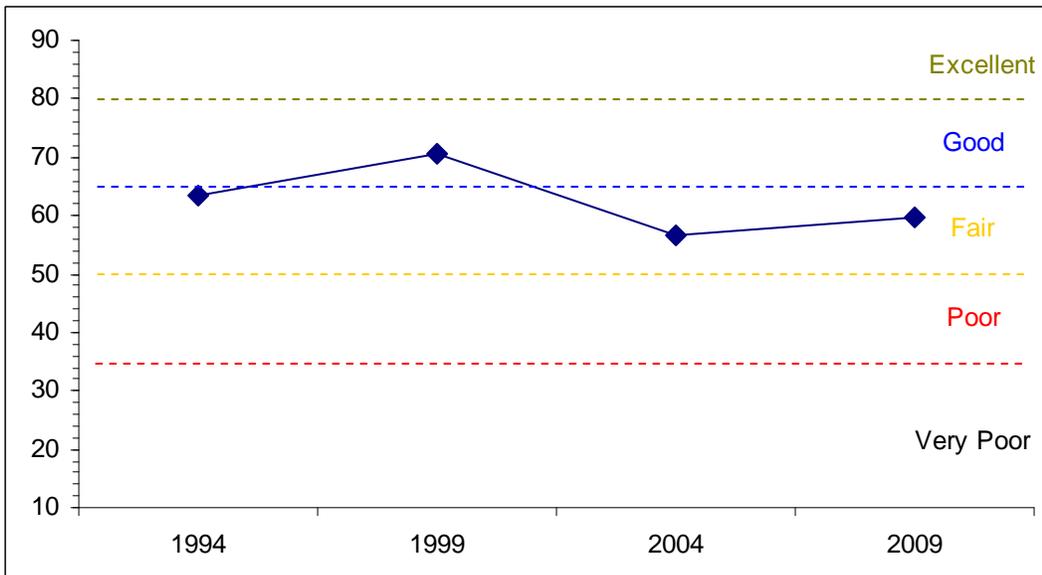
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	16.6	13.3	1.7	23.1	0.0	8.7	0.0	63.5	Fair-Good
99	20.0	14.1	14.6	14.3	0.0	7.7	0.0	70.7	Good
04	17.9	13.4	12.9	7.1	0.0	5.5	0.0	56.8	Fair
09	19.9	12.2	8.8	11.0	0.0	7.8	0.0	59.6	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 14, Study no: 2



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
Management unit 14, Study no: 2



HERBACEOUS TRENDS--

Management unit 14, Study no: 2

Type	Species	Nested Frequency					Average Cover %			
		'86	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	c198	ab76	b112	a66	ab93	1.57	2.71	1.67	2.87
G	Agropyron intermedium	bc410	c218	b152	a79	a68	7.75	3.11	1.27	1.14
G	Bromus inermis	b26	a-	a-	a-	a2	-	-	.00	.03
G	Bromus japonicus (a)	-	1	6	-	-	.00	.03	-	-
G	Bromus tectorum (a)	-	-	2	-	-	-	.00	-	-
G	Carex sp.	c80	b43	ab22	a1	a-	.76	.41	.03	-
G	Koeleria cristata	-	3	1	-	-	.03	.00	-	-
G	Oryzopsis hymenoides	-	1	3	7	1	.01	.03	.02	.00
G	Poa fendleriana	c120	bc90	c87	a31	ab49	1.19	.85	.54	1.25
G	Sitanion hystrix	b38	ab27	a6	a-	a11	.24	.02	-	.19
G	Stipa sp.	2	-	-	-	-	-	-	-	-
Total for Annual Grasses		0	1	8	0	0	0.00	0.03	0	0
Total for Perennial Grasses		874	458	383	184	224	11.55	7.15	3.54	5.50
Total for Grasses		874	459	391	184	224	11.56	7.19	3.54	5.50
F	Achillea millefolium	-	-	-	-	1	-	-	-	.00
F	Allium sp.	-	2	3	-	-	.00	.00	-	.00
F	Arabis sp.	-	1	7	-	-	.00	.04	-	-
F	Astragalus miser	5	4	4	12	12	.21	.21	.38	.25
F	Cirsium sp.	3	6	10	-	-	.01	.12	-	-
F	Crepis acuminata	-	2	8	-	4	.00	.04	-	.03
F	Cymopterus sp.	a-	c43	c41	ab10	b17	.33	.50	.04	.09
F	Eriogonum elatum	-	3	-	-	2	.03	-	-	.03
F	Eriogonum racemosum	4	4	10	4	5	.04	.07	.01	.04
F	Helianthella uniflora	a-	a6	b13	a-	a-	.09	.42	-	-
F	Hymenoxys acaulis	-	8	6	3	4	.21	.09	.03	.03
F	Lactuca serriola	-	9	-	-	-	.02	-	-	-
F	Lappula occidentalis (a)	-	3	-	-	-	.00	-	-	-
F	Lesquerella fendleri	16	25	19	7	13	.05	.05	.02	.06
F	Lupinus sp.	-	1	7	3	2	.15	.19	.15	.18
F	Machaeranthera canescens	-	-	-	1	-	-	-	.00	-
F	Machaeranthera grindelioides	8	-	5	6	3	-	.06	.06	.18
F	Medicago sativa	-	-	3	2	-	.15	.03	.00	-
F	Melilotus officinalis	a-	b16	a5	a3	a2	1.01	.04	.00	.01
F	Pedicularis centranthera	-	7	-	-	8	.31	-	.00	.34
F	Penstemon caespitosus	a-	bc47	a-	b37	c53	1.43	.06	1.48	1.73
F	Penstemon comarrhenus	-	-	-	7	3	-	-	.04	.15
F	Penstemon pachyphyllus	ab8	a3	a6	a2	b21	.03	.06	.03	.67
F	Penstemon thompsoniae	a-	a-	b53	a-	a-	-	1.82	-	-
F	Phlox longifolia	-	6	-	-	3	.01	-	.00	.03
F	Polygonum douglasii (a)	-	a6	b22	a7	a-	.01	.05	.01	-
F	Tragopogon dubius	3	8	1	-	-	.05	.00	-	-
F	Trifolium gymnocarpon	-	3	3	2	4	.15	.00	.03	.01
F	Unknown forb-perennial	b9	a-	a-	b21	a-	-	-	.44	-

Type	Species	Nested Frequency					Average Cover %			
		'86	'94	'99	'04	'09	'94	'99	'04	'09
	Total for Annual Forbs	0	9	22	7	0	0.01	0.05	0.01	0
	Total for Perennial Forbs	56	204	204	120	157	4.33	3.84	2.77	3.88
	Total for Forbs	56	213	226	127	157	4.35	3.89	2.78	3.88

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

BROWSE TRENDS--

Management unit 14, Study no: 2

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	7	5	6	11	3.05	3.33	2.91	1.88
B	Artemisia tridentata vaseyana	36	50	48	58	5.21	6.88	6.96	9.39
B	Atriplex confertifolia	0	0	0	0	-	-	-	1.00
B	Cercocarpus montanus	1	2	2	3	.00	.00	.00	.15
B	Chrysothamnus depressus	6	13	7	8	.15	.45	.33	.68
B	Chrysothamnus nauseosus hololeucus	1	0	1	1	.00	-	.00	.00
B	Gutierrezia sarothrae	15	13	17	21	.49	.21	.30	.93
B	Juniperus osteosperma	0	2	2	4	.81	1.16	.93	.06
B	Opuntia sp.	3	4	3	2	.15	.38	.15	.00
B	Pinus edulis	0	1	1	2	.94	3.52	3.79	5.16
B	Purshia tridentata	23	18	23	24	2.91	3.42	2.41	2.17
B	Quercus gambelii	0	3	4	6	1.00	.76	.78	1.00
B	Yucca sp.	1	1	0	1	.63	.00	-	.00
	Total for Browse	93	112	114	141	15.37	20.13	18.60	22.45

CANOPY COVER, LINE INTERCEPT--

Management unit 14, Study no: 2

Species	Percent Cover		
	'99	'04	'09
Amelanchier utahensis	4.00	6.93	5.19
Artemisia tridentata vaseyana	-	11.01	13.73
Cercocarpus montanus	-	.63	.70
Gutierrezia sarothrae	-	.31	.20
Juniperus osteosperma	1.00	2.21	1.63
Pinus edulis	2.20	9.51	7.28
Purshia tridentata	-	2.08	2.79
Quercus gambelii	-	1.58	1.21

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 14, Study no: 2

Species	Average leader growth (in)	
	'04	'09
Amelanchier utahensis	2.2	1.2
Artemisia tridentata vaseyana	1.9	2.8
Cercocarpus montanus	3.0	2.4
Purshia tridentata	3.1	2.3

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 2

Species	Trees per Acre				Average diameter (in)			
	'94	'99	'04	'09	'94	'99	'04	'09
Juniperus osteosperma	48	37	50	50	-	4.5	4.4	3.1
Pinus edulis	87	95	97	86	-	4.0	3.8	3.7

BASIC COVER--

Management unit 14, Study no: 2

Cover Type	Average Cover %				
	'86	'94	'99	'04	'09
Vegetation	4.75	31.59	30.04	24.81	30.70
Rock	4.50	4.86	6.09	7.54	5.94
Pavement	.75	.30	1.18	1.18	1.79
Litter	73.50	43.61	53.56	49.31	52.70
Cryptogams	.25	.04	.06	.00	.52
Bare Ground	16.25	20.18	27.41	32.04	27.32

SOIL ANALYSIS DATA --

Management unit 14, Study no: 2, Study Name: Brushy Basin

Effective rooting depth (in)	pH	sandy clay			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.6	6.6	46.9	10.6	42.6	2.9	6.8	102.4	0.6

PELLET GROUP DATA--

Management unit 14, Study no: 2

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	6	30	1	4	-	-	-
Elk	3	6	6	8	15 (37)	19 (8)	19 (46)
Deer	5	17	2	4	14 (35)	23 (58)	3 (7)
Cattle	-	4	-	2	33 (82)	10 (25)	7 (16)

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 2

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>									
86	0	0	0	-	-	0	0	0	-/-
94	140	0	100	-	40	0	0	0	81/91
99	100	0	100	-	40	60	0	0	74/75
04	200	20	80	-	20	30	0	0	80/71
09	240	58	42	-	20	8	8	0	91/82
<i>Artemisia tridentata vaseyana</i>									
86	3332	78	22	0	199	17	1	13	14/22
94	2320	6	86	8	3120	0	.86	9	25/29
99	2920	45	49	6	3780	10	1	0	23/38
04	2980	29	65	6	1420	41	9	3	18/30
09	3920	11	76	13	360	15	35	30	16/23
<i>Cercocarpus montanus</i>									
86	0	0	0	-	-	0	0	0	-/-
94	20	0	100	-	-	0	0	0	47/45
99	40	0	100	-	-	0	100	0	43/43
04	40	0	100	-	-	50	50	0	41/46
09	60	33	67	-	-	0	0	0	49/47
<i>Chrysothamnus depressus</i>									
86	6965	2	98	0	-	0	0	0	2/11
94	120	17	83	0	80	0	0	0	6/15
99	800	80	15	5	340	8	0	5	6/15
04	160	0	100	0	-	25	50	0	6/15
09	220	0	100	0	80	0	0	0	5/12
<i>Chrysothamnus nauseosus hololeucus</i>									
86	0	0	0	0	-	0	0	0	-/-
94	20	100	0	0	-	0	0	0	9/3
99	0	0	0	0	-	0	0	0	-/-
04	20	0	100	0	-	0	100	0	9/9
09	20	0	0	100	-	0	0	0	8/7
<i>Echinocereus engelmannii</i>									
86	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	4/8
04	0	0	0	-	-	0	0	0	4/9
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>Gutierrezia sarothrae</i>										
86	7932	11	88	2	-	0	0	0	6/6	
94	540	15	85	0	20	0	0	0	8/9	
99	580	14	79	7	20	0	0	7	7/10	
04	600	3	97	0	-	0	0	0	9/10	
09	720	3	92	6	20	0	0	0	8/10	
<i>Juniperus osteosperma</i>										
86	66	0	0	100	-	0	0	0	-/-	
94	0	0	0	0	-	0	0	0	-/-	
99	40	100	0	0	-	0	0	0	-/-	
04	40	50	50	0	-	0	0	0	-/-	
09	80	50	50	0	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
86	0	0	0	0	-	0	0	0	-/-	
94	80	0	75	25	-	0	0	25	4/9	
99	80	0	75	25	-	0	0	25	4/13	
04	120	0	83	17	-	0	0	17	4/12	
09	80	0	100	0	-	0	0	0	2/5	
<i>Pinus edulis</i>										
86	99	100	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	20	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	40	50	50	-	-	0	0	0	-/-	
<i>Purshia tridentata</i>										
86	33	0	100	0	166	0	100	0	15/35	
94	640	3	88	9	-	3	0	0	12/34	
99	460	17	83	0	80	30	48	0	13/38	
04	800	8	80	13	-	13	65	13	9/26	
09	880	0	91	9	-	23	34	7	10/26	
<i>Quercus gambelii</i>										
86	299	100	0	-	-	89	11	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	160	38	63	-	20	0	0	0	50/35	
04	260	85	15	-	20	0	0	0	47/30	
09	320	50	50	-	-	0	0	0	12/14	
<i>Sclerocactus sp.</i>										
86	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	4/4	
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)	
Symphoricarpos oreophilus										
86	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	-/-	
09	0	0	0	-	-	0	0	0	63/56	
Yucca sp.										
86	0	0	0	0	-	0	0	0	-/-	
94	40	0	100	0	-	0	0	100	14/29	
99	20	0	0	100	-	0	0	100	-/-	
04	0	0	0	0	-	0	0	0	5/10	
09	60	0	100	0	-	0	0	0	6/11	