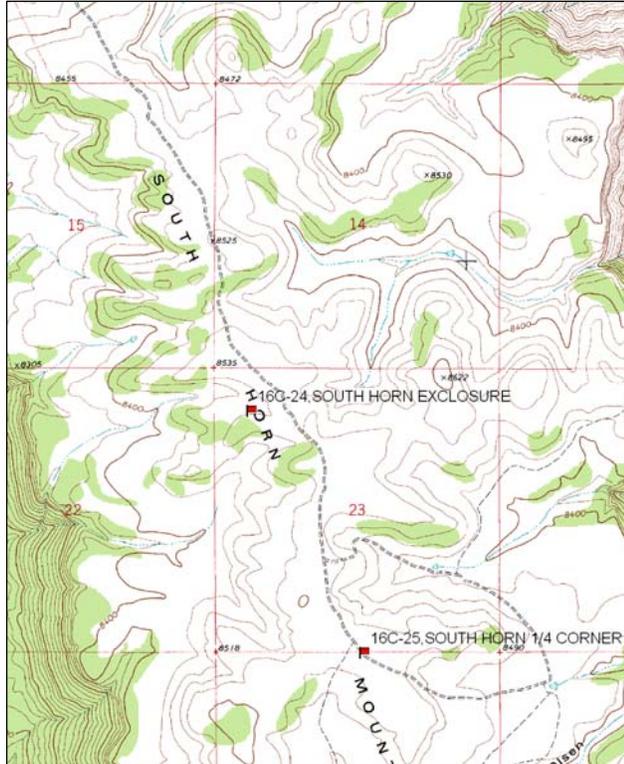


SOUTH HORN ENCLOSURE - TREND STUDY NO. 16C-24-09

Vegetation Type: Mixed Mountain Brush
Range Type: Crucial Deer Winter, Substantial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8,500 ft (2,591 m)
Aspect: Northwest
Slope: 5%
Transect bearing: 206 degrees magnetic.
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

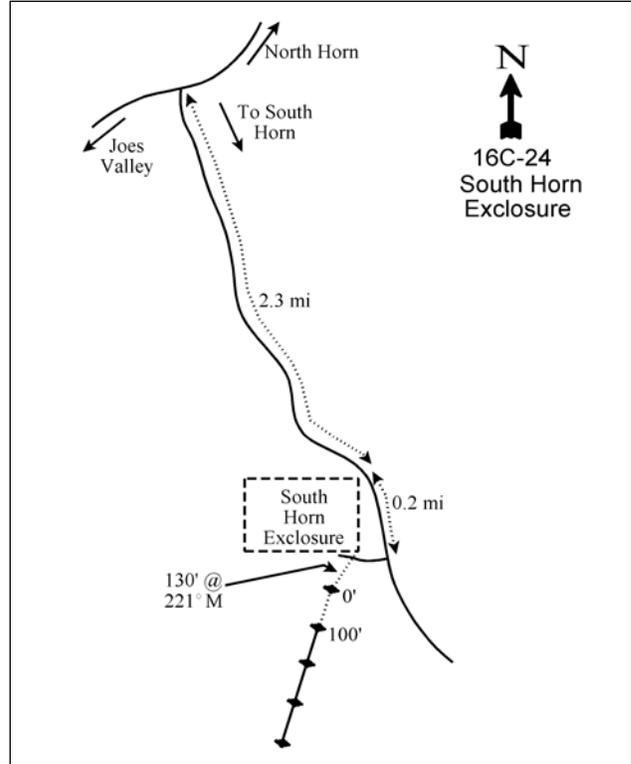
Directions:
From the intersection of the North Horn and South Horn roads, turn right (south) onto the South Horn road (#21). Proceed 2.3 miles to the NE corner of an enclosure. Continue 0.2 miles past the enclosure to a faint road. Turn right onto this faint road and go 0.15 miles to the SE corner of the enclosure. The 0-foot baseline stake is approximately 130 feet southwest (221°M) of the SE corner.

Map Name: The Cap



Township: 19S, Range: 6E, Section: 23

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 480700 E 4334410 N

SOUTH HORN ENCLOSURE - TREND STUDY NO. 16C-24

Site Information

Site Description: The study samples a mixed mountain brush community with scattered old pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). The study is located on the south side of the South Horn Mountain Enclosure and is representative of north slopes in the area which support a higher density of true mountain mahogany. The area is managed as part of the Horn Mountain allotment. Pellet group data has indicated moderate use by deer and elk and light use by cattle since 1999 (Table - Pellet Group Data).

Browse: The site supports a variety of browse species. The key species include true and curlleaf mountain mahogany (*Cercocarpus montanus* and *C. ledifolius*), serviceberry (*Amelanchier utahensis*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Mountain big sagebrush provides the majority of browse cover on the site (Table - Browse Trends), but is not as heavily utilized as the other three species. Mountain mahogany is represented by a small population of mostly mature plants which average a little over four feet in height, making some plants partly unavailable. There are also some large tree-like curlleaf mountain mahogany plants, but both mountain mahogany species are heavily utilized on the available portions of the plants. Serviceberry plants are typically large, averaging about 7 feet in height, but available parts of the plants are highly utilized. Snowberry (*Symphoricarpos oreophilus*) is common on the site, but is not heavily utilized (Table - Browse Characteristics).

Large and very old pinyon and juniper trees are scattered throughout the site. The density of pinyon and juniper trees is fairly low and appears to be stable with little change in density or average diameter since 1999 (Table - Point-Quarter Tree Data). There does appear to be some infilling of pinyon and juniper occurring as canopy cover has steadily increased for both species since 1999 (Table - Canopy Cover).

Herbaceous Understory: Grasses are diverse, but not very abundant. No one species provides a large majority of the grass cover, but the most common species include Salina wildrye (*Elymus salina*), mutton bluegrass (*Poa fendleriana*), and Indian ricegrass (*Oryzopsis hymenoides*). There are numerous other native perennial species sampled on the site, but none provide much cover. Forbs are very diverse, but no one species is very abundant and forbs provide little forage on the site (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam with a neutral pH. Phosphorus and potassium have limited availability for plant growth and development at just 4.2 ppm and 32 ppm, respectively (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is fairly low on the site due to a high amount of litter cover (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1988 to 1994 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1994; therefore, other parameters were used to determine trend. Decadence has increased and recruitment of young plants decreased for most of the preferred browse on the site.
- **1994 to 1999 - up (+2):** Density of serviceberry, mountain big sagebrush, and true mountain mahogany all increased substantially. The cover of mountain big sagebrush more than doubled from 5% to 11%. Decadence decreased in serviceberry and mountain big sagebrush, but increased in true mountain mahogany.
- **1999 to 2004 - slightly down (-1):** There was a 34% decrease in the density of mountain big sagebrush and cover decreased to 7%. Decadence of sagebrush increased from 6% to 27% and poor vigor increased from 5% to 19%. However, the density of serviceberry and true mountain mahogany each increased slightly, and decadence and poor vigor decreased.

- **2004 to 2009 - stable (0):** Density of mountain big sagebrush increased by 14% and cover increased to 9%, but decadence increased to 34%. The density of true mountain mahogany decreased by 18% and cover decreased from 4% to 3%.

Grass:

- **1988 to 1994 - slightly down (-1):** Perennial grass sum of nested frequency decreased by 12% with a significant decrease in the nested frequency of intermediate wheatgrass (*Agropyron intermedium*).
- **1994 to 1999 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial grasses, but cover increased slightly. Western wheatgrass (*Agropyron smithii*) increased significantly in nested frequency and Salina wheatgrass decreased significantly.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased 55% and cover decreased from 5% to 2%. There was a significant decrease in the nested frequency of western wheatgrass.
- **2004 to 2009 - up (+2):** Perennial grass sum of nested frequency increased 34% and cover increased to 5%. There was a large increase in the cover of Salina wildrye.

Forb:

- **1988 to 1994 - down (-2):** There was a 52% decrease in the sum of nested frequency of perennial forbs with a significant decrease in many of the palatable forbs.
- **1994 to 1999 - up (+2):** The sum of nested frequency of perennial forbs increased 28% and cover increased from 2% to 3%.
- **1999 to 2004 - down (-2):** Perennial forb sum of nested frequency decreased by 25% and cover decreased to 2%. Annual forb sum of nested frequency increased four-fold and cover increased from less than 1% to near 3%.
- **2004 to 2009 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 13% and cover decreased slightly. There was also a substantial decrease in the sum of nested frequency and cover of annual forbs.

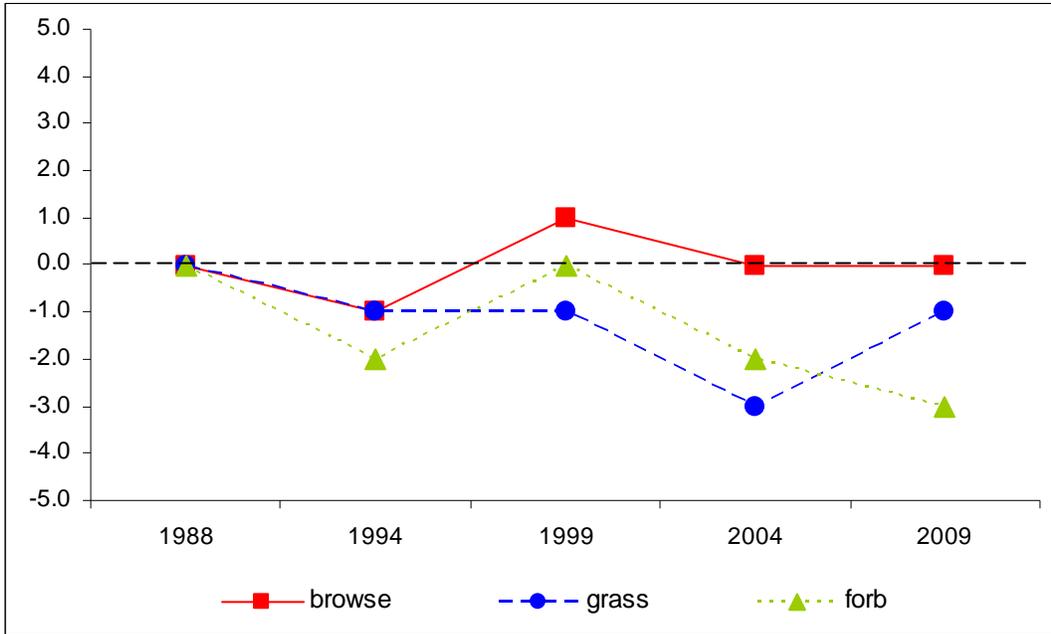
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 16C, study no: 24

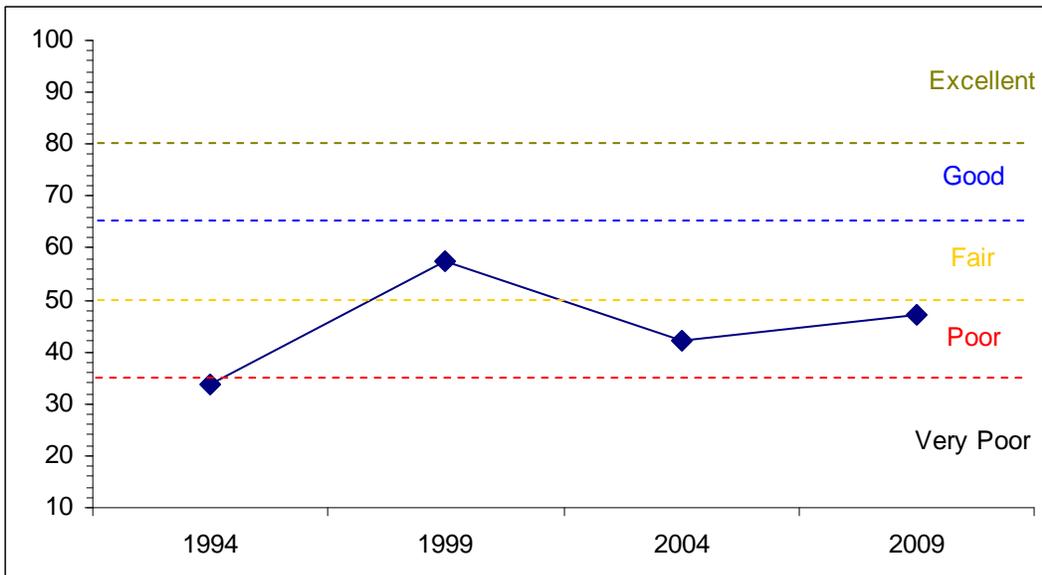
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	16.3	6.0	0.4	7.0	0.0	4.2	0.0	33.9	Very Poor-Poor
99	24.1	11.5	5.7	10.0	0.0	6.3	0.0	57.6	Fair
04	18.5	10.2	6.0	3.6	0.0	4.0	0.0	42.3	Poor
09	20.2	7.8	7.1	9.1	0.0	2.7	0.0	47.0	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 16C Study no: 24



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
 Management unit 16C, Study no: 24



HERBACEOUS TRENDS--
Management unit 16C, Study no: 24

Type	Species	Nested Frequency					Average Cover %			
		'88	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron intermedium	b144	a7	a3	a-	a-	.01	.00	-	-
G	Agropyron smithii	a-	a2	c84	ab17	b33	.03	.50	.11	.15
G	Bromus tectorum (a)	-	-	-	-	1	-	-	-	.00
G	Carex sp.	c46	ab14	bc23	a2	a5	.11	.82	.04	.10
G	Elymus salina	a-	c70	b43	b20	b35	.71	1.59	.32	1.99
G	Festuca ovina	a-	b33	a3	a2	a-	.36	.03	.03	-
G	Koeleria cristata	a-	b37	a6	a3	a-	.33	.06	.04	-
G	Oryzopsis hymenoides	a-	b17	b21	b16	b27	.57	.79	.13	.68
G	Poa fendleriana	a-	b38	b58	b38	b35	.29	.81	.81	1.20
G	Poa secunda	b60	a30	a13	a8	a11	.52	.22	.18	.05
G	Sitanion hystrix	-	6	-	6	3	.01	-	.01	.00
G	Stipa comata	b56	a26	a5	a7	a15	.50	.04	.10	.36
G	Stipa lettermani	b11	a-	b9	ab3	a-	-	.12	.03	-
Total for Annual Grasses		0	0	0	0	1	0	0	0	0.00
Total for Perennial Grasses		317	280	268	122	164	3.48	5.02	1.82	4.55
Total for Grasses		317	280	268	122	165	3.48	5.02	1.82	4.55
F	Androsace septentrionalis (a)	-	a-	b49	a-	a-	-	.18	.00	-
F	Arabis sp.	b61	b64	ab57	ab46	a24	.29	.35	.24	.08
F	Chenopodium album (a)	-	a-	a-	b35	b17	-	-	.10	.05
F	Chenopodium fremontii (a)	-	5	-	-	3	.01	-	-	.00
F	Chenopodium leptophyllum(a)	-	-	-	-	5	-	-	-	.02
F	Collinsia parviflora (a)	-	a15	a10	c129	b63	.05	.02	1.50	.22
F	Comandra pallida	29	24	20	31	36	.52	.60	.20	.42
F	Crepis acuminata	b57	a6	a16	a1	a1	.04	.10	.03	.03
F	Cryptantha sp.	c38	ab11	ab16	bc33	a2	.16	.27	.18	.06
F	Delphinium nuttallianum	b13	a-	a-	a-	a-	-	-	-	-
F	Erigeron eatonii	c75	b48	ab42	ab22	a18	.37	.24	.13	.09
F	Erigeron pumilus	a-	a-	a-	a2	b12	-	-	.00	.05
F	Erigeron sp.	-	5	-	-	-	.01	-	-	-
F	Eriogonum alatum	b23	ab20	ab15	a4	ab15	.34	.31	.18	.10
F	Eriogonum cernuum (a)	-	5	2	-	-	.01	.03	-	-
F	Eriogonum racemosum	-	-	-	-	5	-	-	-	.01
F	Eriogonum umbellatum	b13	a1	a1	a2	a2	.00	.03	.03	.06
F	Gayophytum ramosissimum(a)	-	9	-	4	16	.06	-	.01	.10
F	Heterotheca villosa	-	-	5	6	5	-	.21	.09	.16
F	Lappula occidentalis (a)	-	a-	a5	b29	a3	-	.01	.70	.00
F	Lupinus sp.	4	-	-	-	-	-	-	-	-
F	Machaeranthera canescens	b18	a2	a-	a-	ab3	.03	.03	-	.01
F	Oenothera sp.	-	-	-	8	-	-	-	.33	-
F	Penstemon humilis	b25	a2	a5	a-	a1	.01	.03	-	.03
F	Penstemon sp.	-	-	-	7	7	-	-	.02	.04
F	Penstemon watsonii	-	-	5	-	-	-	.12	-	-
F	Phlox austromontana	b49	a9	a11	a15	a9	.21	.21	.34	.06

T y P e	Species	Nestled Frequency					Average Cover %			
		'88	'94	'99	'04	'09	'94	'99	'04	'09
F	<i>Polygonum douglasii</i> (a)	-	_b 85	_a 21	_c 148	_a 42	.14	.04	.38	.12
F	<i>Potentilla</i> sp.	-	3	-	1	-	.00	-	.00	-
F	<i>Schoenocrambe linifolia</i>	_a -	_b 13	_c 46	_{bc} 21	_c 38	.05	.40	.08	.12
F	<i>Senecio multilobatus</i>	_{bc} 24	_a 4	_c 31	_{ab} 10	_a 4	.01	.19	.10	.01
F	<i>Sphaeralcea coccinea</i>	-	4	9	-	-	.00	.02	-	-
F	<i>Townsendia</i> sp.	_b 24	_a 2	_a -	_a -	_a -	.03	-	-	-
Total for Annual Forbs		0	119	87	345	149	0.28	0.29	2.70	0.53
Total for Perennial Forbs		453	218	279	209	182	2.11	3.14	1.99	1.35
Total for Forbs		453	337	366	554	331	2.40	3.43	4.69	1.88

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

BROWSE TRENDS--

Management unit 16C, Study no: 24

T y P e	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	<i>Amelanchier utahensis</i>	2	6	5	5	2.32	1.83	2.03	2.26
B	<i>Artemisia tridentata vaseyana</i>	54	59	53	58	5.16	11.05	7.18	9.05
B	<i>Cercocarpus ledifolius</i>	3	4	4	2	.00	.48	.18	.56
B	<i>Cercocarpus montanus</i>	10	15	15	13	4.22	4.55	4.12	3.13
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	18	16	26	35	.28	.24	.71	.86
B	<i>Gutierrezia sarothrae</i>	7	5	6	0	.04	.21	.04	-
B	<i>Juniperus osteosperma</i>	0	0	0	0	.15	-	-	1.00
B	<i>Leptodactylon pungens</i>	11	11	10	9	.10	.54	.13	.12
B	<i>Mahonia repens</i>	0	0	1	0	-	-	.06	.03
B	<i>Opuntia</i> sp.	7	12	15	16	.07	.29	.26	.24
B	<i>Pinus edulis</i>	0	1	1	2	1.46	2.76	.84	.75
B	<i>Purshia tridentata</i>	2	2	1	2	.00	.00	.00	.00
B	<i>Symphoricarpos oreophilus</i>	13	16	14	13	.58	1.76	1.29	.42
B	<i>Tetradymia canescens</i>	1	0	2	0	.00	-	.00	-
Total for Browse		128	147	153	155	14.41	23.74	16.87	18.47

CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 24

Species	Percent Cover		
	'99	'04	'09
Amelanchier utahensis	1.79	3.00	4.61
Artemisia tridentata vaseyana	-	8.76	9.85
Cercocarpus ledifolius	2.40	2.28	2.13
Cercocarpus montanus	2.00	7.73	5.00
Chrysothamnus viscidiflorus viscidiflorus	-	2.76	1.89
Gutierrezia sarothrae	-	.06	-
Juniperus osteosperma	2.79	3.00	4.05
Leptodactylon pungens	-	.33	.20
Opuntia sp.	-	.33	.11
Pinus edulis	15.39	17.20	20.26
Purshia tridentata	-	.33	.25
Symphoricarpos oreophilus	-	1.68	.50

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16C, Study no: 24

Species	Average leader growth (in)	
	'04	'09
Amelanchier utahensis	3.2	1.8
Artemisia tridentata vaseyana	1.8	1.5
Cercocarpus montanus	5.6	2.4

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 24

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	13	<18	29	20.7	-	16.6
Pinus edulis	30	34	32	15.4	13.9	13.5

BASIC COVER--

Management unit 16C, Study no: 24

Cover Type	Average Cover %				
	'88	'94	'99	'04	'09
Vegetation	2.50	20.51	31.71	22.03	25.01
Rock	.75	.44	.89	.67	.74
Pavement	.75	.05	.66	.72	.56
Litter	75.00	61.38	62.79	62.39	62.25
Cryptogams	1.00	.54	.46	2.36	1.70
Bare Ground	20.00	22.79	17.32	25.20	22.79

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 24, Study Name: South Horn Exclosure

Effective rooting depth (in)	pH	sandy loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.3	6.8	76.7	11.4	11.8	0.8	4.2	32	0.5

PELLET GROUP DATA--

Management unit 16C, Study no: 24

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	52	55	22	58
Elk	30	13	16	9
Deer	23	26	14	16
Cattle	1	-	-	1

Days use per acre (ha)		
'99	'04	'09
-	-	-
33 (82)	29 (73)	17 (41)
32 (79)	23 (56)	36 (88)
3 (7)	5 (13)	8 (20)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 24

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>									
88	332	60	40	0	199	40	0	0	42/31
94	40	0	50	50	-	0	0	0	82/103
99	120	17	67	17	480	50	17	17	93/90
04	200	50	40	10	-	0	50	10	55/54
09	220	18	82	0	80	9	45	0	88/103
<i>Artemisia nova</i>									
88	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	13/38
09	0	0	0	-	-	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>									
88	1864	11	68	21	533	14	4	4	16/22
94	1820	2	59	38	20	3	0	10	28/35
99	2540	14	80	6	160	33	0	5	21/31
04	1680	7	65	27	20	29	7	19	18/27
09	1920	19	47	34	140	28	11	19	18/31
<i>Cercocarpus ledifolius</i>									
88	0	0	0	0	-	0	0	0	-/-
94	80	75	0	25	-	50	25	0	76/53
99	100	40	60	0	-	20	20	0	15/20
04	100	60	20	20	-	0	80	0	41/41
09	40	0	50	50	-	0	100	0	40/41
<i>Cercocarpus montanus</i>									
88	1798	44	56	0	1333	48	7	0	51/58
94	220	0	91	9	-	45	0	0	55/60
99	320	0	75	25	40	50	50	6	50/54
04	340	0	100	0	-	0	71	0	52/57
09	280	0	93	7	-	7	71	7	51/59

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>Chrysothamnus viscidiflorus viscidiflorus</i>									
88	1598	46	42	12	66	8	0	4	8/11
94	640	0	94	6	-	6	3	16	20/28
99	580	14	86	0	-	0	0	0	11/14
04	1020	2	94	4	-	4	4	4	11/16
09	1740	2	93	5	-	0	0	8	10/13
<i>Cowania mexicana stansburiana</i>									
88	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	24/43
09	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
88	1731	42	46	11	399	4	0	15	3/4
94	400	30	55	15	60	0	0	0	5/5
99	380	0	100	0	-	0	0	0	7/9
04	660	12	88	0	-	0	0	0	6/8
09	0	0	0	0	-	0	0	0	-/-
<i>Leptodactylon pungens</i>									
88	0	0	0	-	-	0	0	0	-/-
94	620	13	87	-	-	0	0	0	5/8
99	640	0	100	-	-	0	0	0	4/5
04	520	0	100	-	-	0	0	0	6/8
09	760	0	100	-	-	0	0	0	5/6
<i>Mahonia repens</i>									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	3/5
99	0	0	0	-	-	0	0	0	-/-
04	160	100	0	-	-	0	0	0	2/6
09	0	0	0	-	-	0	0	0	3/4
<i>Opuntia sp.</i>									
88	7531	24	68	8	133	0	0	39	2/4
94	180	22	78	0	-	0	0	0	2/5
99	480	17	83	0	40	0	0	0	2/5
04	780	3	97	0	-	0	0	0	3/9
09	820	17	80	2	-	0	0	7	3/13
<i>Pinus edulis</i>									
88	0	0	0	-	66	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	40	0	0	0	-/-
04	20	0	100	-	20	0	0	0	-/-
09	40	0	100	-	20	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)	
Purshia tridentata										
88	0	0	0	-	-	0	0	0	-/-	
94	80	0	100	-	-	75	0	0	9/16	
99	80	25	75	-	-	0	100	0	17/25	
04	60	0	100	-	-	0	0	0	13/22	
09	80	75	25	-	-	100	0	0	20/48	
Sambucus racemosa										
88	0	0	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	21/49	
99	0	0	0	-	-	0	0	0	33/52	
04	0	0	0	-	-	0	0	0	41/66	
09	0	0	0	-	-	0	0	0	22/54	
Sclerocactus whipplei										
88	66	0	100	-	-	0	0	0	1/3	
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	-/-	
Symphoricarpos oreophilus										
88	1665	84	16	0	266	12	8	0	15/9	
94	500	4	96	0	-	12	0	0	9/19	
99	860	70	30	0	60	0	0	0	14/22	
04	760	32	68	0	-	11	0	0	10/25	
09	980	6	86	8	-	0	8	8	12/24	
Tetradymia canescens										
88	0	0	0	-	-	0	0	0	-/-	
94	20	0	100	-	-	0	0	0	10/11	
99	0	0	0	-	-	0	0	0	7/24	
04	40	0	100	-	-	0	0	0	8/15	
09	0	0	0	-	-	0	0	0	6/7	