

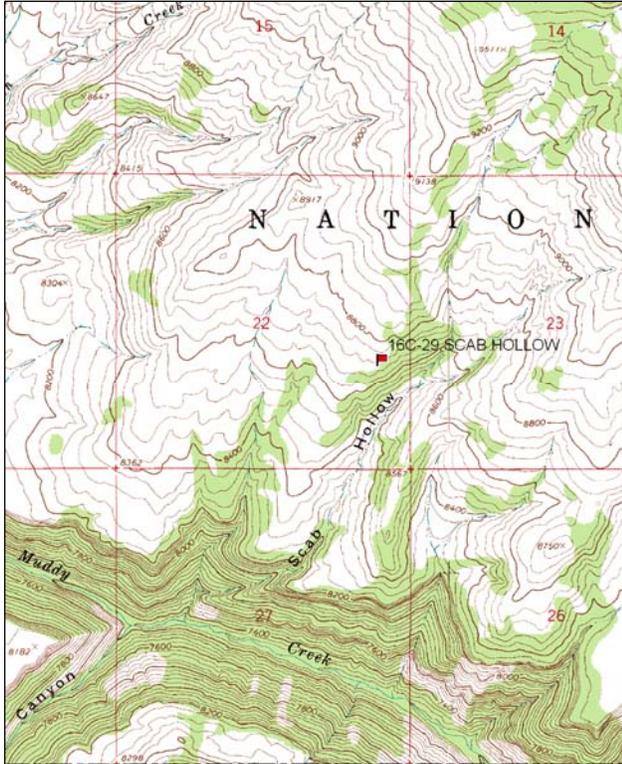
SCAB HOLLOW - TREND STUDY NO. 16C-29-09

Vegetation Type: Curleaf Mountain Mahogany
Range Type: Crucial Deer Winter, Substantial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8,700 ft (2,652 m)
Aspect: Southeast
Slope: 23%-25%
Transect bearing: 183 degrees magnetic.
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

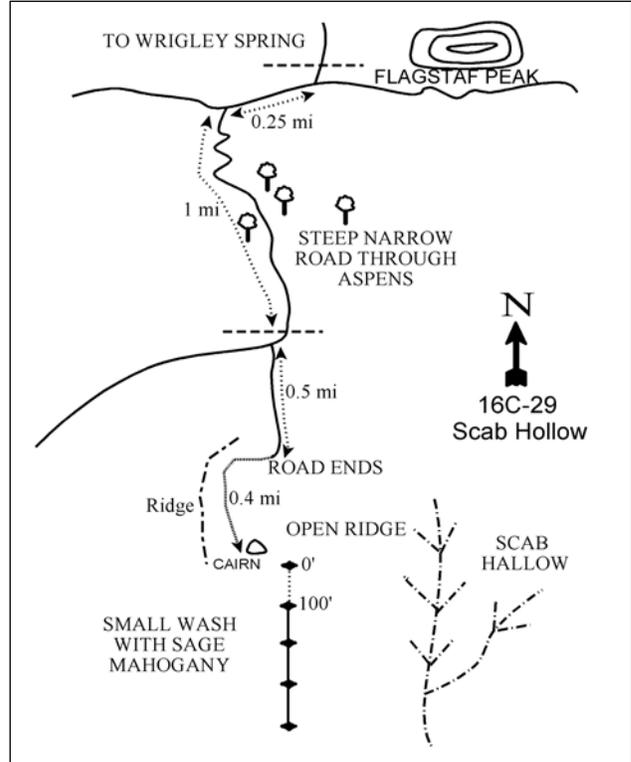
From the Forest Service boundary up Ferron Canyon, travel 7.8 miles to Wrigley Reservoir. From Wrigley Springs Reservoir on F.S. Road #43, continue on the main road SW to Wrigley Spring. Proceed south 0.9 miles to a T-intersection. Turn right toward Twelve Mile Flat. Go 0.25 miles and turn left onto a dirt road (F.S. Road #274). Go 1.0 miles down through the aspens on the steep narrow road to a fence. Just past the fence, bear left at a faint fork. Continue 0.5 miles to the end of the road. It is possible to continue driving down the ridge. Turn right down the small hill then go down the ridge bearing left through the clearings for .4 miles to the SE edge of the small, open ridge above Scab Hollow. There is a rock cairn along the edge to mark the study site. From the cairn, it is 15 feet SE to the 0-foot baseline stake, identified by a red browse tag #9027 on the short fencepost. The study runs down across the slope.

Map Name: Flagstaff Peak



Township: 20S, Range: 5E, Section: 22

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 470708 E 4322590 N

SCAB HOLLOW - TREND STUDY NO. 16C-29

Site Information

Site Description: The study is located in the upper end of Scab Hollow, a small drainage on the north side of Muddy Creek. The area is managed by the Forest Service as part of the Ferron allotment. The study samples a curlleaf mountain mahogany (*Cercocarpus ledifolius*) and grass slope, and the area is considered important elk winter range. Little elk sign was observed in 1994, but pellet group data has indicated increasingly heavy use by elk since 1999. Estimated deer and cattle use has been minimal since 1999 (Table - Pellet Group Data).

Browse: The slope is dominated by a mature stand of curlleaf mountain mahogany which provides the majority of the browse cover on the site (Table - Browse Trends). Some of the mature plants are large trees which are highlined and mostly unavailable to browsing. The mountain mahogany population is healthy with low decadence and good vigor, and good recruitment of young plants over the study period. Mountain mahogany plants have displayed moderate utilization in most sample years, but showed heavy use in 2004. There are pockets of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*Artemisia nova*) on the ridge which have shown mostly light use, but with a few years of heavy use. Other browse species which occur infrequently include stickleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), Fremont's buckwheat (*Eriogonum corymbosum*), broom snakeweed (*Gutierrezia sarothrae*), snowberry (*Symphoricarpos oreophilus*), and gray horsebrush (*Tetradymia canescens*). A few scattered pinyon pine (*Pinus edulis*) and Rocky Mountain juniper (*Juniperus scopulorum*) trees occur on the site (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant and provides the majority of the vegetation cover on the site, but are not very diverse. The dominant species in cover on the site is Salina wildrye (*Elymus salina*) which provides most of the grass and herbaceous cover. There is also some bluebunch wheatgrass (*Agropyron spicatum*) and Indian ricegrass (*Oryzopsis hymenoides*) present in small numbers. A variety of forbs are present on the site, but all species combined provide little cover or usable forage. Only the somewhat weedy species bastard toadflax (*Comandra pallida*) is fairly common.

Soil: The soil is derived from a limestone parent material with a clay texture and a slightly alkaline pH. Phosphorus has a limited availability for plant growth and development at only 2.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Open areas have high amounts of rock and pavement cover. Bare ground cover is moderately low due to the cover provided by rock, pavement, and the herbaceous vegetation on the site (Table - Basic Cover). There is evidence of soil and litter movement, pedestaling and terracing on the steeper slopes, and the soil erosion condition was classified as slight in 2004 and 2009.

Trend Assessments

Browse:

- **1988 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 primary browse species, curlleaf mountain mahogany, though decadence did decrease from 20% to 0%.
- **1994 to 1999 - slightly up (+1):** The density of curlleaf mountain mahogany increased from 580 plants/acre to 660 plants/acre, and cover increased from 3% to 6%. The Point-Quarter method estimated mountain mahogany density at 93 trees/acre and the line-intercept method estimated cover to be 14%. Decadence of mahogany is low, vigor is good, and half the population is comprised of young plants.
- **1999 to 2004 - stable (0):** The Point-Quarter density of curlleaf mountain mahogany decreased to 68 trees/acre, though canopy cover increased to 15%. There was a slight increase in the decadence and poor vigor of the mahogany population, but both are still considered good.

- **2004 to 2009 - stable (0):** The Point-Quarter density of curleaf mountain mahogany remained similar, though canopy cover increased slightly to 16%. There was a decrease in the strip density of mountain mahogany primarily due to a decrease in the recruitment of young mahogany plants from 45% of the population to 13%.

Grass:

- **1988 to 1994 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1994 to 1999 - stable (0):** Perennial grass sum of nested frequency changed little, but cover decreased from 21% to 18%.
- **1999 to 2004 - stable (0):** The sum of nested frequency and cover of perennial grasses changed little.
- **2004 to 2009 - stable (0):** The sum of nested frequency of perennial grasses changed little, though cover increased from 17% to 24%.

Forb:

- **1988 to 1994 - slightly down (-1):** Perennial forb sum of nested frequency decreased by 66% mostly due to a significant decrease in bastard toadflax.
- **1994 to 1999 - slightly up (+1):** The sum of nested frequency of perennial forbs more than doubled and cover increased from less than 1% to over 5%. However, most of the increase was due to a significant increase in the less desirable species, bastard toadflax.
- **1999 to 2004 - slightly down (-1):** Perennial forb sum of nested frequency decreased to 1994 levels and cover decreased to less than 1%.
- **2004 to 2009 - stable (0):** There was a decrease in the sum of nested frequency of perennial forbs, but forbs are so rare on the site that it made little difference to the community. Total forb cover was less than 1%.

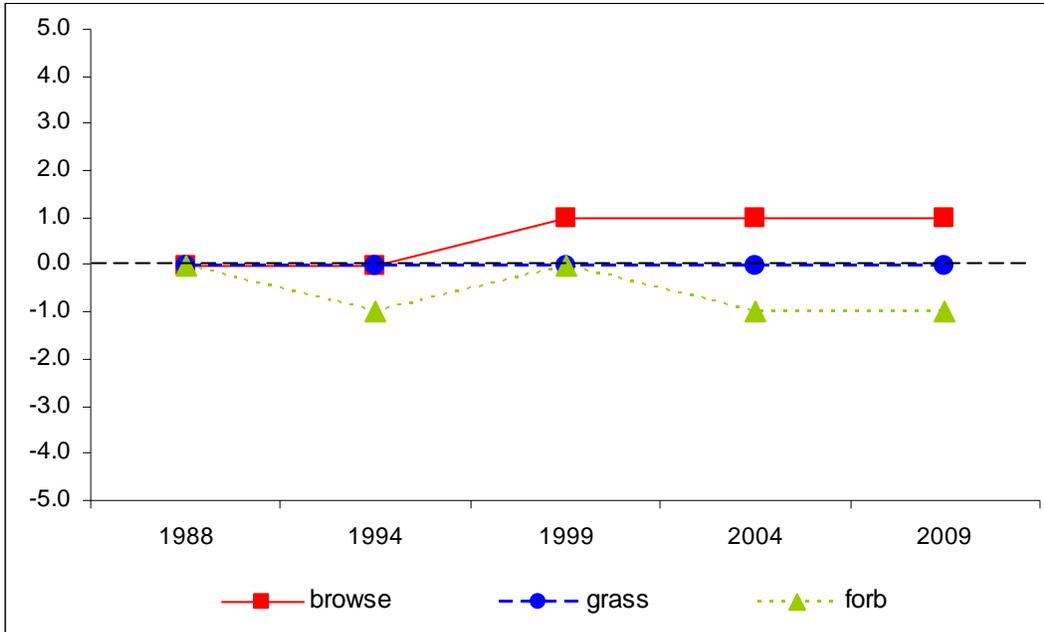
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 16C, study no: 29

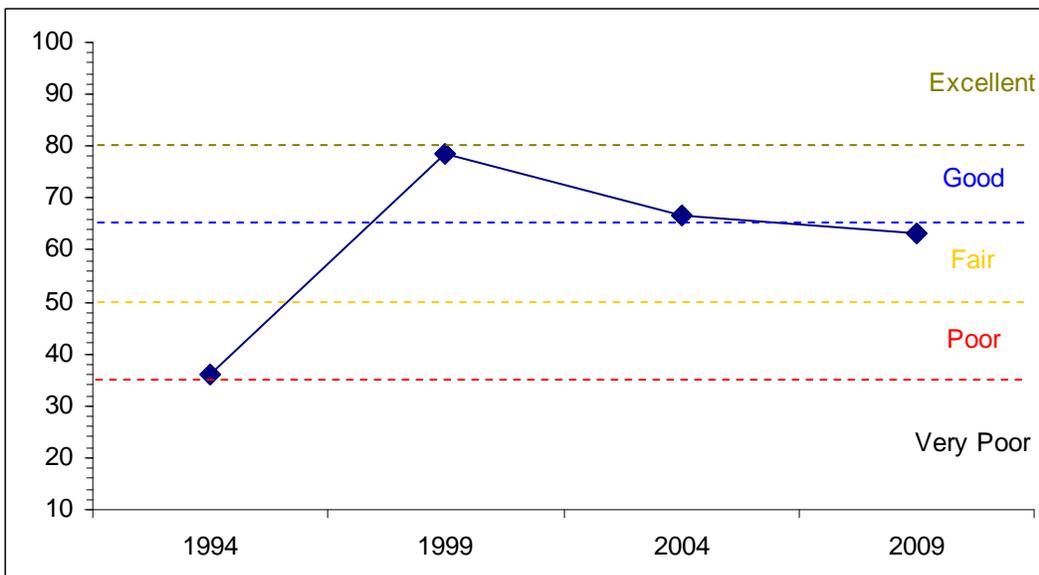
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	5.0	0.0	0.0	30.0	0.0	1.2	0.0	36.2	Very Poor-Poor
99	8.6	14.9	15.0	30.0	0.0	10.0	0.0	78.4	Good-Excellent
04	8.2	11.8	15.0	30.0	0.0	1.7	0.0	66.8	Fair-Good
09	10.4	14.7	6.7	30.0	0.0	1.6	0.0	63.3	Fair-Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 16C Study no: 29



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
 Management unit 16C, Study no: 29



HERBACEOUS TRENDS--

Management unit 16C, Study no: 29

Type	Species	Nested Frequency					Average Cover %			
		'88	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron spicatum	a-	a-	a ²	ab ²⁴	b ⁴⁸	-	.02	.76	2.25
G	Agropyron trachycaulum	b ¹⁸	a ⁵	ab ²¹	a-	a-	.18	.65	-	-
G	Carex sp.	4	-	2	-	-	-	.03	-	-
G	Elymus salina	286	276	268	262	252	20.00	17.11	15.33	20.35
G	Oryzopsis hymenoides	27	33	19	15	24	.84	.37	1.11	1.06
G	Poa sp.	3	-	-	-	-	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		338	314	312	301	324	21.03	18.19	17.20	23.65
Total for Grasses		338	314	312	301	324	21.03	18.19	17.20	23.65
F	Astragalus convallarius	3	-	-	3	-	-	-	.00	-
F	Calochortus nuttallii	1	-	3	-	-	-	.00	-	-
F	Castilleja linariaefolia	3	-	2	-	-	-	.03	-	-
F	Chaenactis douglasii	a ³	a-	b ²⁰	a-	a-	-	.25	-	-
F	Chenopodium fremontii (a)	-	a-	a-	b ¹¹	a ⁴	-	-	.02	.00
F	Chenopodium leptophyllum(a)	-	a-	a-	b ¹¹	a ¹	-	-	.03	.00
F	Comandra pallida	bc ⁶¹	a ²⁵	c ⁸²	ab ⁴⁸	ab ³⁷	.06	3.60	.46	.36
F	Cymopterus sp.	-	-	1	-	-	-	.00	-	-
F	Descurainia pinnata (a)	-	-	-	-	2	-	-	-	.00
F	Erigeron eatonii	-	-	2	-	-	-	.00	-	-
F	Erigeron pumilus	-	-	3	3	-	-	.03	.00	-
F	Erigeron sp.	2	-	-	-	-	-	-	-	-
F	Eriogonum alatum	-	1	7	4	1	.00	.06	.01	.00
F	Hymenopappus filifolius	8	5	-	-	-	.01	-	-	-
F	Hymenoxys richardsonii	12	2	3	8	3	.03	.18	.30	.06
F	Lappula occidentalis (a)	-	a ²	a-	b ¹⁷	a-	.00	-	.72	-
F	Lesquerella sp.	b ²⁸	a ⁴	ab ⁸	a-	a-	.01	.10	-	-
F	Linum lewisii	-	4	3	-	2	.03	.04	-	.10
F	Lithospermum ruderae	3	-	-	-	-	-	-	-	-
F	Machaeranthera canescens	9	-	3	3	8	-	.00	.00	.06
F	Machaeranthera grindelioides	b ⁵¹	ab ²¹	ab ²⁰	a ⁴	a-	.32	.67	.07	-
F	Madia glomerata (a)	-	-	-	-	-	-	-	.03	-
F	Penstemon caespitosus	6	1	8	2	7	.00	.04	.00	.18
F	Petradoria pumila	8	4	9	-	-	.06	.33	-	-
F	Phlox hoodii	b ¹⁴	ab ⁶	ab ⁴	a-	a-	.03	.06	-	-
F	Senecio multilobatus	1	-	-	-	-	-	-	-	-
F	Tragopogon dubius	-	-	2	3	-	-	.03	.00	-
Total for Annual Forbs		0	2	0	39	7	0.00	0	0.81	0.01
Total for Perennial Forbs		213	73	180	78	58	0.58	5.47	0.87	0.78
Total for Forbs		213	75	180	117	65	0.59	5.47	1.68	0.79

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

BROWSE TRENDS--

Management unit 16C, Study no: 29

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	0	0	1	0	-	-	.00	-
B	Artemisia nova	4	3	7	6	.30	.18	.44	.38
B	Artemisia tridentata vaseyana	2	2	0	1	.00	.00	-	.15
B	Ceratoides lanata	0	0	0	1	-	-	-	.00
B	Cercocarpus ledifolius	19	22	20	12	3.09	5.56	5.12	6.47
B	Chrysothamnus viscidiflorus viscidiflorus	1	2	4	11	.00	.06	.03	.36
B	Eriogonum corymbosum	18	9	13	5	.52	.48	.24	.23
B	Gutierrezia sarothrae	13	20	28	11	.05	.44	1.06	.09
B	Juniperus scopulorum	0	1	1	1	2.25	2.00	2.23	3.19
B	Mahonia repens	10	11	13	11	.04	.06	.18	.03
B	Pediocactus simpsonii	0	0	1	0	-	-	.00	-
B	Pinus flexilis	0	1	0	0	.98	.00	-	-
B	Symphoricarpos oreophilus	2	1	4	4	.00	.00	.00	.00
B	Tetradymia canescens	2	2	2	7	.15	.03	.15	.06
Total for Browse		71	74	94	70	7.40	8.84	9.48	10.98

CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 29

Species	Percent Cover		
	'99	'04	'09
Artemisia nova	-	.58	.21
Artemisia tridentata vaseyana	-	-	.26
Cercocarpus ledifolius	13.60	15.25	16.13
Chrysothamnus viscidiflorus viscidiflorus	-	-	.10
Eriogonum corymbosum	-	.03	.08
Gutierrezia sarothrae	-	1.85	.05
Juniperus scopulorum	2.79	3.20	3.20
Mahonia repens	-	-	.05

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16C, Study no: 29

Species	Average leader growth (in)	
	'04	'09
Cercocarpus ledifolius	3.6	1.2

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 29

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Cercocarpus ledifolius	93	68	61	9.7	7.8	7.2

BASIC COVER--

Management unit 16C, Study no: 29

Cover Type	Average Cover %				
	'88	'94	'99	'04	'09
Vegetation	5.50	29.47	30.78	29.20	33.79
Rock	6.50	19.67	16.20	14.73	13.47
Pavement	13.25	9.30	20.36	15.73	12.32
Litter	51.00	22.71	28.31	22.69	25.11
Cryptogams	0	.00	.04	.24	.15
Bare Ground	23.75	30.78	21.73	30.37	30.82

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 29, Study Name: Scab Hollow

Effective rooting depth (in)	pH	clay			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.7	7.6	34	24.2	41.8	2.9	2.3	89.6	0.6

PELLET GROUP DATA--

Management unit 16C, Study no: 29

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	27	15	10	10	-	-	-
Elk	11	29	34	41	61 (151)	88 (218)	137 (337)
Deer	7	6	5	1	10 (25)	-	7 (18)
Cattle	1	-	-	1	2 (5)	1 (2)	2 (5)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 29

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Amelanchier utahensis									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	100	0	-	-	0	0	0	21/22
09	0	0	0	-	60	0	0	0	-/-
Artemisia nova									
88	0	0	0	0	-	0	0	0	-/-
94	280	43	21	36	-	43	0	7	10/22
99	140	0	86	14	-	57	43	0	8/19
04	320	19	63	19	-	0	0	13	8/21
09	300	27	53	20	-	0	0	7	9/25

		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>Artemisia tridentata vaseyana</i>										
88	66	0	100	0	-	0	0	0	12/15	
94	40	0	100	0	-	50	0	0	6/10	
99	40	0	50	50	-	0	50	0	15/17	
04	0	0	0	0	-	0	0	0	25/22	
09	20	0	100	0	-	0	0	0	9/15	
<i>Ceratoides lanata</i>										
88	0	0	0	0	-	0	0	0	-/-	
94	0	0	0	0	-	0	0	0	-/-	
99	0	0	0	0	-	0	0	0	-/-	
04	0	0	0	0	-	0	0	0	-/-	
09	20	0	0	100	-	0	0	100	5/7	
<i>Cercocarpus ledifolius</i>										
88	165	40	40	20	33	20	0	0	119/116	
94	580	52	48	0	20	17	0	0	77/67	
99	660	52	48	0	80	24	12	0	84/78	
04	620	45	45	10	20	35	52	3	66/61	
09	300	13	87	0	-	33	0	0	50/47	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
88	0	0	0	0	-	0	0	0	-/-	
94	20	0	100	0	-	100	0	0	7/11	
99	40	0	50	50	-	100	0	0	7/9	
04	160	13	88	0	-	0	0	0	10/15	
09	420	5	95	0	-	0	0	5	12/22	
<i>Eriogonum corymbosum</i>										
88	66	50	0	50	-	0	0	0	-/-	
94	920	39	57	4	-	17	9	4	10/13	
99	420	0	90	10	20	29	0	0	7/9	
04	380	21	63	16	-	5	16	0	5/9	
09	100	20	80	0	-	0	0	0	6/11	
<i>Gutierrezia sarothrae</i>										
88	1499	9	91	0	-	0	0	0	8/10	
94	380	42	53	5	-	0	0	5	11/11	
99	1720	12	87	1	-	0	0	0	6/8	
04	2300	6	94	0	-	0	0	0	7/8	
09	360	0	89	11	-	0	0	6	7/8	
<i>Juniperus scopulorum</i>										
88	33	100	0	-	-	0	0	0	-/-	
94	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Mahonia repens									
88	899	96	0	4	-	0	0	0	-/-
94	580	66	34	0	80	0	0	0	3/4
99	900	58	42	0	20	0	0	0	2/4
04	880	2	98	0	-	0	0	0	3/4
09	580	7	93	0	-	0	0	0	3/4
Pediocactus simpsonii									
88	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	-/-
09	0	0	0	-	-	0	0	0	-/-
Pinus edulis									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
Symphoricarpos oreophilus									
88	66	100	0	0	-	0	0	0	-/-
94	120	67	33	0	-	0	33	0	7/13
99	40	50	50	0	40	0	0	0	7/11
04	160	13	75	13	-	0	0	0	6/11
09	160	38	63	0	-	0	0	0	6/7
Tetradymia canescens									
88	66	50	50	0	33	0	0	0	8/11
94	80	0	100	0	-	25	0	0	7/13
99	40	0	50	50	-	50	0	0	7/18
04	40	0	100	0	-	50	0	0	9/21
09	200	30	40	30	-	0	0	10	7/9