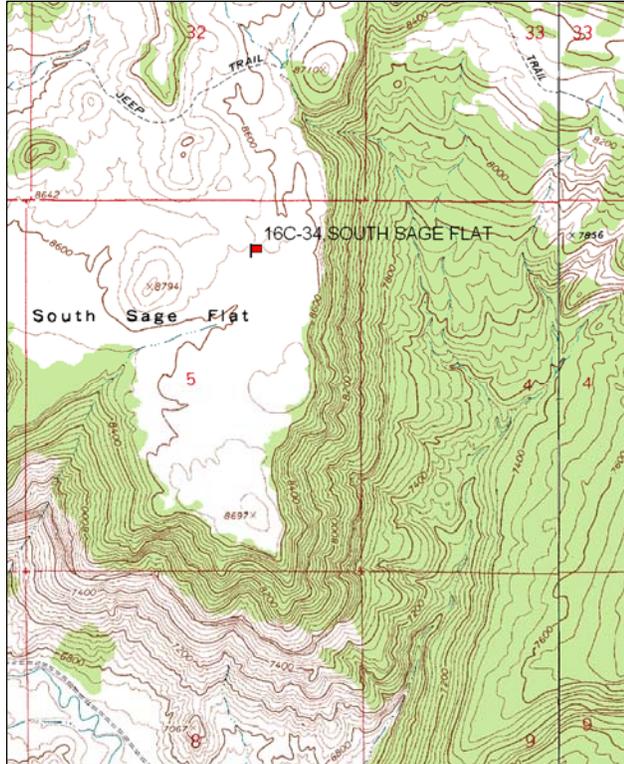


SOUTH SAGE FLAT - TREND STUDY NO. 16C-34-09

Vegetation Type: Black Sagebrush-Grass
Range Type: Crucial Deer Winter, Substantial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8,650 ft (1,932 m)
Aspect: East
Slope: 1%
Transect bearing: 203 degrees magnetic
Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft)

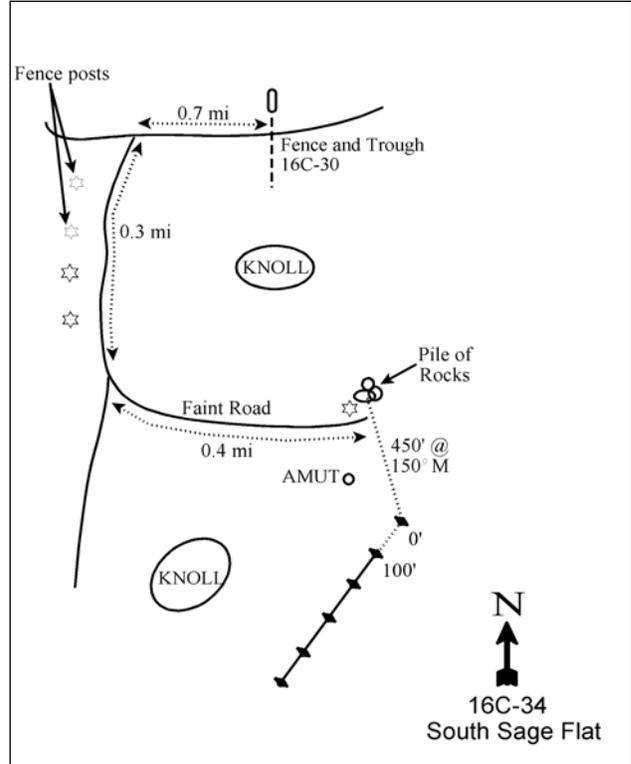
Directions:
From the fence and trough at site # 16C-30 (Upper Hole Trail), proceed west 0.7 miles. Turn left and travel along a road with fenceposts marking a water line for 0.3 miles. Turn left on a faint road and travel 0.4 miles to a fencepost and a pile of rocks on the left. From the rock pile, walk 450 ft at 150° magnetic to the 0 ft baseline stake.

Map Name: Flagstaff Peak



Township: 21S, Range: 6E, Section: 5

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 476821 E 4319646 N

SOUTH SAGE FLAT - TREND STUDY NO. 16C-34

Site Information

Site Description: The study is located on South Sage Flat in a black sagebrush (*Artemisia nova*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community south-west of Little Nelson Mountain. The area is managed by the Forest Service as part of the Ferron grazing allotment. There is a water trough about one-quarter of a mile to the north of the site. Pellet group data has indicated heavy use by elk and light use by deer and cattle since 1999 (Table - Pellet Group Data).

Browse: The key browse species on the site consist of a dense population of relatively small statured black sagebrush with a mixture of mountain big sagebrush. There was a large die-off of both species of sagebrush between the 1999 and 2004 sample years attributed to drought conditions in the years prior to 2004. The black sagebrush population is mostly healthy with moderate decadence, good vigor, and good recruitment of young plants over the sample years. Utilization of black sagebrush has been mostly light with some moderate use over the sample years. The mountain big sagebrush population was healthy prior to 2004, but has been mostly decadent with a large number of plants displaying poor vigor since 2004. There has been no new recruitment of young mountain big sagebrush plants sampled since 2004. Mountain big sagebrush displayed light to moderate use prior to 2004, but has had heavy use since. The only other abundant shrub on the site consists of a dense stand of low growing stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). Palatability of this shrub is poor and most individuals are not utilized (Table - Browse Characteristics). Several other species of shrubs occur on the site, although none were very abundant.

Herbaceous Understory: Grasses on the site are fairly abundant and diverse. The dominant grass is crested wheatgrass (*Agropyron cristatum*) which was seeded in the past and comprises most of the grass cover. Other common grasses include letterman needlegrass (*Stipa lettermani*) and western wheatgrass (*Agropyron smithii*). Most other grass species are rare. Forbs are diverse and fairly abundant, but no one species provided more than 1% cover in 2009. The most common species include redroot eriogonum (*Eriogonum racemosum*) and pingue hymenoxys (*Hymenoxys richardsonii*).

Soil: The soil texture is a sandy clay loam with a neutral pH (Table - Soil Analysis Data). Pavement sized rock is common on the surface with a few larger rocks scattered on the surface. Many of the rocks have a calcium carbonate coating. There is quite a bit of bare ground cover on the site (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1994 to 1999 - stable (0):** There was little change in either of the sagebrush species populations.
- **1999 to 2004 - down (-2):** Black sagebrush density decreased by 54% from 14,120 plants/acre to 6,440 plants/acre, and mountain big sagebrush density decreased by 86% from 1,680 plants/acre to 240 plants/acre. Cover of black sagebrush decreased from 12% to 6% and the cover of mountain big sagebrush decreased from 4% to less than 1%. Decadence of mountain big sagebrush increased from 8% to 50% and poor vigor increased from 1% to 50% of the population. Recruitment of both sagebrush species decreased with no new recruitment of young mountain big sagebrush plants.
- **2004 to 2009 - slightly up (+1):** The density of black sagebrush increased by 33% to 8,620 plants/acre, but cover decreased slightly. Much of the increase in density was due to a large increase in the recruitment of young black sagebrush plants. The mountain big sagebrush population changed little in density and high decadence with no new recruitment of young plants, though poor vigor decreased to 25%.

Grass:

- **1994 to 1999 - stable (0):** Perennial grass sum of nested frequency changed little, though cover increased from 7% to 10%.
- **1999 to 2004 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 13%, but cover increased to 16%. Letterman needlegrass decreased significantly in nested frequency.
- **2004 to 2009 - slightly up (+1):** There was a 15% increase in the sum of nested frequency of perennial grasses, but cover decreased to 11%. There was a significant increase in the nested frequency of Letterman needlegrass and western wheatgrass.

Forb:

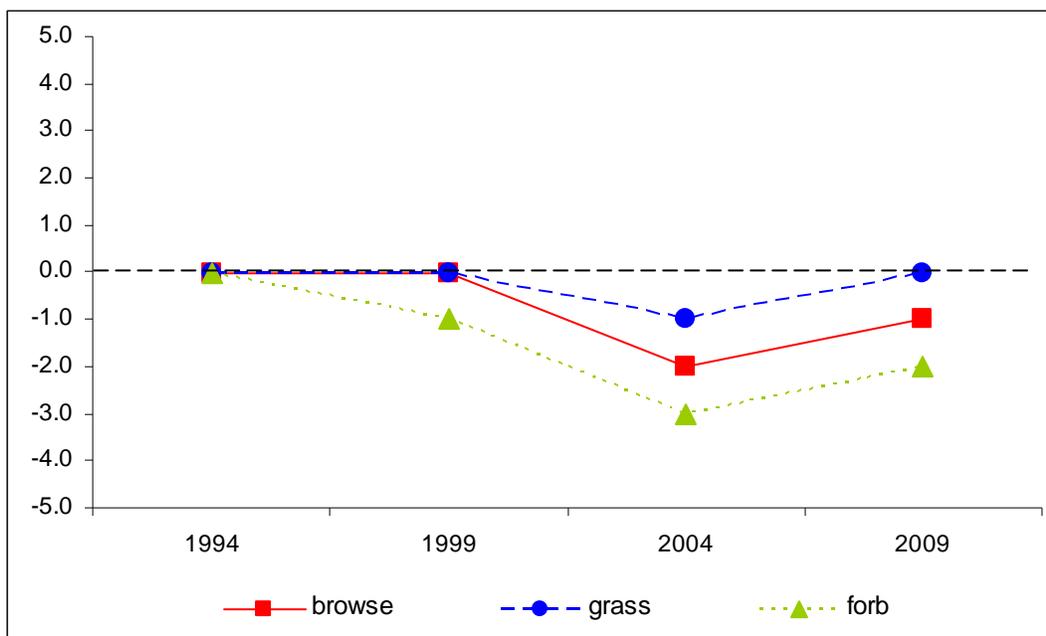
- **1994 to 1999 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 13%, but cover increased slightly.
- **1999 to 2004 - down (-2):** Perennial forb sum of nested frequency decreased by 36% and cover decreased from 4% to 2%.
- **2004 to 2009 - slightly up (+1):** There was a 12% increase in the sum of nested frequency of perennial forbs, but there was little change in cover.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 16C, study no: 34

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	16.2	11.0	5.1	16.0	0.0	6.4	0.0	54.7	Fair
99	20.1	9.9	9.8	20.7	0.0	8.2	0.0	68.8	Good
04	8.0	7.7	2.8	30.0	0.0	4.2	0.0	52.7	Fair
09	7.6	7.9	7.3	21.7	0.0	4.1	0.0	48.5	Poor-Fair

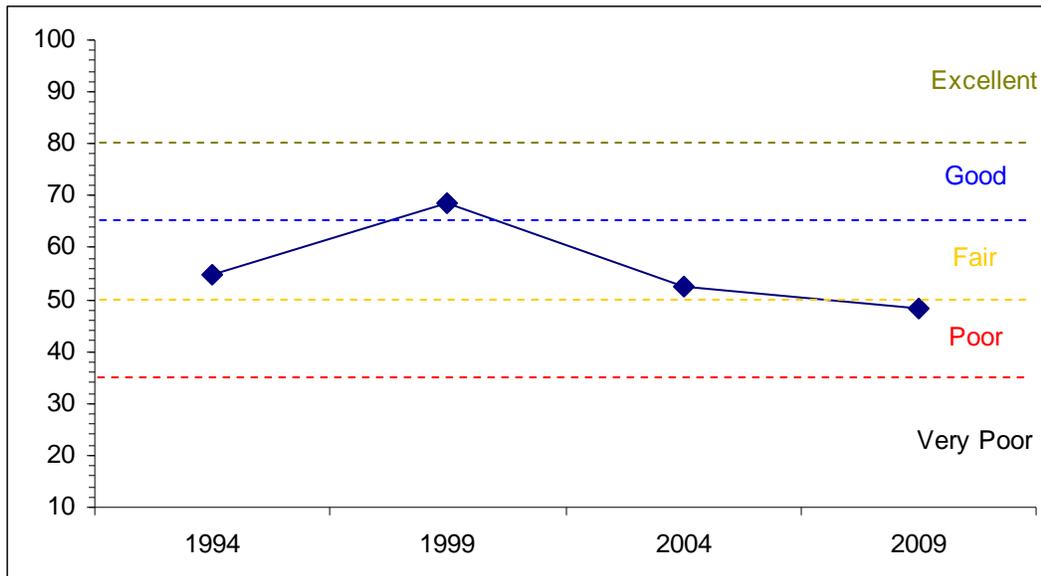
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 16C Study no: 34



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL

Management unit 16C, Study no:34



HERBACEOUS TRENDS--

Management unit 16C, Study no: 34

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	233	254	234	246	4.23	6.86	13.96	7.88
G	Agropyron dasystachyum	a ⁻	a ⁻	b ²²	a ⁻	-	-	.40	-
G	Agropyron smithii	a ¹	a ⁶	a ²⁰	b ⁷²	.00	.15	.19	.77
G	Bromus inermis	8	3	-	-	.01	.06	-	-
G	Elymus salina	ab ¹⁵	b ⁴¹	a ⁶	a ³	.11	.21	.06	.15
G	Festuca ovina	-	-	-	3	-	-	-	.03
G	Oryzopsis hymenoides	-	-	1	2	-	-	.03	.00
G	Poa fendleriana	64	40	63	55	1.03	.50	.75	.58
G	Sitanion hystrix	2	2	9	-	.03	.06	.10	-
G	Stipa lettermani	c ¹³³	c ¹²⁰	a ⁵¹	b ⁸⁴	1.95	2.49	.45	1.42
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		456	466	406	465	7.38	10.36	15.96	10.84
Total for Grasses		456	466	406	465	7.38	10.36	15.96	10.84
F	Agoseris glauca	-	-	-	4	-	-	-	.00
F	Androsace septentrionalis (a)	a ⁻	b ²⁸	a ⁻	a ⁻	-	.14	-	-
F	Arabis sp.	3	3	2	-	.00	.01	.01	-
F	Aster sp.	a ⁻	b ¹⁴	a ⁻	a ⁻	-	.05	-	-
F	Astragalus convallarius	6	-	1	4	.03	-	.03	.01
F	Astragalus miser	3	3	2	5	.15	.03	.00	.06
F	Calochortus nuttallii	-	-	7	11	-	-	.02	.02
F	Castilleja linariaefolia	3	2	-	-	.01	.01	-	-
F	Chaenactis douglasii	-	4	-	3	-	.00	-	.00
F	Chenopodium leptophyllum(a)	a ⁻	a ⁻	c ⁵⁰	b ¹⁸	-	-	.23	.09
F	Cryptantha sp.	2	-	-	-	.00	-	-	-

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
F	<i>Erigeron eatonii</i>	c128	b49	a3	a25	1.05	.36	.03	.19
F	<i>Erigeron flagellaris</i>	-	-	3	-	-	-	.03	-
F	<i>Erigeron pumilus</i>	b15	a2	a4	ab12	.04	.03	.01	.05
F	<i>Eriogonum alatum</i>	3	-	-	4	.03	-	-	.01
F	<i>Eriogonum racemosum</i>	a25	b65	b52	ab41	.16	.56	.43	.41
F	<i>Gayophytum ramosissimum(a)</i>	-	-	2	-	-	-	.01	-
F	<i>Hymenoxys acaulis</i>	b16	ab4	a3	a4	.10	.01	.00	.00
F	<i>Hymenoxys richardsonii</i>	51	55	32	55	.78	1.23	.67	.95
F	<i>Ipomopsis aggregata</i>	-	2	-	-	-	.03	-	-
F	<i>Linum lewisii</i>	2	1	-	-	.03	.03	.03	-
F	<i>Lupinus argenteus</i>	b10	ab3	a-	a-	.07	.09	-	-
F	<i>Machaeranthera canescens</i>	3	3	6	10	.01	.01	.02	.04
F	<i>Machaeranthera grindelioides</i>	12	10	6	11	.08	.10	.09	.06
F	<i>Penstemon caespitosus</i>	b59	b55	a-	a4	.35	1.17	-	.01
F	<i>Penstemon sp.</i>	5	-	3	-	.01	-	.03	-
F	<i>Petradoria pumila</i>	5	2	2	1	.03	.03	.03	.03
F	<i>Phlox longifolia</i>	-	-	2	4	-	-	.00	.01
F	<i>Polygonum douglasii (a)</i>	-	-	7	-	-	-	.01	-
F	<i>Potentilla gracilis</i>	ab3	b9	a-	ab8	.03	.07	.00	.02
F	<i>Senecio multilobatus</i>	a4	ab22	b29	a4	.00	.07	.20	.01
F	<i>Sphaeralcea coccinea</i>	a3	ab7	ab9	b14	.01	.07	.21	.08
F	<i>Trifolium sp.</i>	ab36	ab43	b62	a31	.16	.09	.21	.06
Total for Annual Forbs		0	28	59	18	0	0.14	0.26	0.08
Total for Perennial Forbs		397	358	228	255	3.20	4.08	2.09	2.04
Total for Forbs		397	386	287	273	3.20	4.23	2.35	2.13

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

BROWSE TRENDS--

Management unit 16C, Study no: 34

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia frigida	0	0	0	1	-	-	-	.00
B	Artemisia nova	98	100	91	95	9.90	11.98	6.00	5.17
B	Artemisia tridentata vaseyana	29	37	7	7	3.06	3.95	.38	.59
B	Chrysothamnus depressus	0	4	3	13	-	.15	.03	.28
B	Chrysothamnus viscidiflorus viscidiflorus	92	93	87	95	3.55	7.03	8.10	6.79
B	Eriogonum corymbosum	13	13	12	12	.36	.34	.33	.23
B	Gutierrezia sarothrae	14	14	24	11	.03	.09	.48	.12
B	Leptodactylon pungens	1	2	1	0	.00	.00	.00	-
B	Opuntia sp.	1	1	1	2	.00	.00	.00	.00
B	Pediocactus simpsonii	0	0	1	1	-	-	.00	.00
B	Symphoricarpos oreophilus	1	1	1	1	.00	.00	.00	.00
B	Tetradymia canescens	0	0	0	2	-	-	-	.00
Total for Browse		249	265	228	240	16.92	23.55	15.34	13.21

CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 34

Species	Percent Cover	
	'04	'09
Artemisia nova	6.56	6.58
Artemisia tridentata vaseyana	.21	.30
Chrysothamnus depressus	-	.50
Chrysothamnus viscidiflorus viscidiflorus	10.56	8.41
Eriogonum corymbosum	.81	1.06
Gutierrezia sarothrae	.33	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16C, Study no: 34

Species	Average leader growth (in)	
	'04	'09
Artemisia nova	1.2	0.9

BASIC COVER--

Management unit 16C, Study no: 34

Cover Type	Average Cover %			
	'94	'99	'04	'09
Vegetation	29.04	33.97	34.65	30.32
Rock	4.80	1.56	1.79	1.70
Pavement	1.41	8.42	8.31	5.03
Litter	20.91	27.77	28.44	34.18
Cryptogams	0	.04	.03	.09
Bare Ground	40.17	38.25	38.18	40.62

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 34, Study Name: South Sage Flat

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.2	6.9	62	15.4	22.6	1.9	10.5	115.2	0.6

PELLET GROUP DATA--

Management unit 16C, Study no: 34

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	10	15	3	6	-	-	-
Elk	48	59	42	61	85 (210)	58 (144)	127 (312)
Deer	12	8	3	1	1 (2)	9 (22)	-
Cattle	4	8	4	3	31 (77)	14 (34)	20 (48)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 34

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									
94	0	0	0	-	-	0	0	0	11/11
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	24/36
Artemisia frigida									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	40	0	100	-	-	0	0	0	-/-
Artemisia nova									
94	13900	10	74	16	200	17	5	2	6/16
99	14120	19	61	20	700	16	4	5	6/15
04	6440	6	71	23	9020	0	0	16	6/11
09	8620	17	62	21	6280	24	3	15	6/11
Artemisia tridentata vaseyana									
94	1600	11	84	5	-	30	0	3	14/30
99	1680	21	70	8	140	13	20	1	14/27
04	240	0	50	50	-	50	42	50	13/23
09	240	0	42	58	20	25	33	25	9/13
Chrysothamnus depressus									
94	0	0	0	0	-	0	0	0	-/-
99	100	40	60	0	-	0	0	0	2/5
04	60	0	100	0	-	0	0	0	-/-
09	800	0	98	3	40	0	0	3	3/8

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	9560	5	94	1	20	.20	0	0	4/8
99	12480	11	88	1	220	1	0	0	3/8
04	10420	5	95	0	18740	0	0	0	5/10
09	14040	12	88	0	3360	6	.99	0	4/9
<i>Eriogonum corymbosum</i>									
94	320	0	88	13	-	6	0	6	9/19
99	340	12	88	0	-	24	6	0	12/21
04	280	0	86	14	40	7	7	7	9/20
09	360	0	89	11	20	0	0	0	9/24
<i>Eriogonum microthecum</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	9/17
09	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	640	6	88	6	-	0	0	6	5/7
99	540	19	81	0	-	0	0	0	5/6
04	1500	0	100	0	60	0	0	0	7/7
09	600	3	93	3	-	0	10	10	5/9
<i>Leptodactylon pungens</i>									
94	20	0	100	0	-	0	0	0	-/-
99	60	0	67	33	-	0	0	33	2/6
04	20	0	100	0	-	0	0	0	5/6
09	0	0	0	0	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	40	0	100	0	-	0	0	0	2/5
99	40	0	50	50	-	0	0	0	-/-
04	20	0	100	0	-	0	0	0	3/9
09	60	0	33	67	-	0	0	67	-/-
<i>Pediocactus simpsonii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	3/3
<i>Symphoricarpos oreophilus</i>									
94	20	0	100	-	-	0	0	0	14/38
99	20	0	100	-	-	0	0	0	13/27
04	40	0	100	-	-	0	0	0	9/22
09	20	0	100	-	-	0	0	0	7/16

		Age class distribution						Utilization	
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Tetradymia canescens									
94	0	0	0	0	-	0	0	0	4/8
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	4/9
09	40	0	50	50	-	50	0	0	5/8