

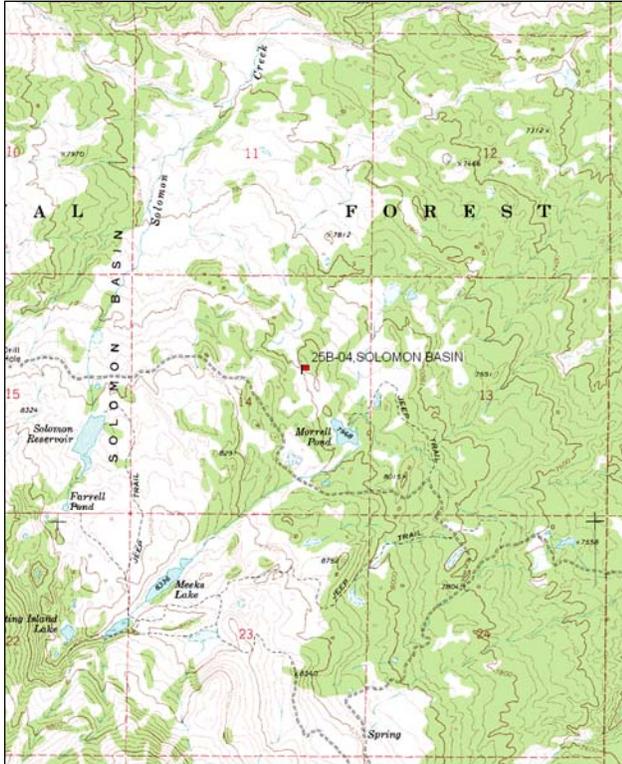
SOLOMON BASIN - TREND STUDY NO. 25B-4-09

Vegetation Type: Black/Mountain Big Sagebrush
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: USFS
Elevation: 8,000 ft (2,438 m)
Aspect: East
Slope: 5%, but varies from 0%-20%
Transect bearing: 320 degrees magnetic
Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft)

Directions:

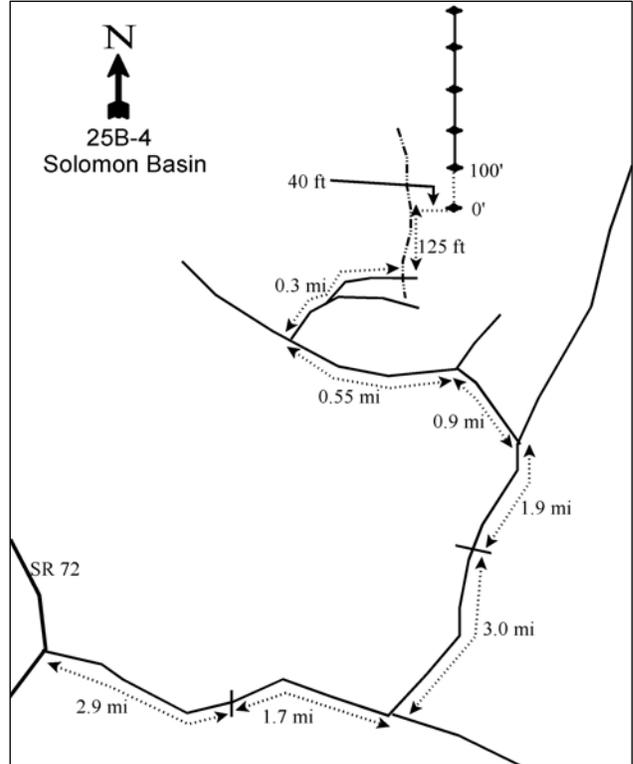
Travel north from Fremont on SR 72 for 7.3 miles to the Elkhorn-Torrey Road. Turn right and go 2.9 miles to a cattleguard. From the cattleguard go 1.7 miles to an intersection by Heart Lake. Turn left toward Meeks Lake and go 3.0 miles to a cattleguard. Go another 1.9 miles on the main road to an intersection. Stay left and go 0.9 miles toward Solomon Basin. Stay left again, bypassing the Morrell Pond Road and continue 0.55 miles, passing a doughnut-shaped pond. Take a sharp right turn here and go 0.2 miles to another fork. Bear left (the right fork takes you to Morrells Pond) and drive less than 0.1 miles to a ditch. Park here (very faint) and walk down the ditch for approximately 125 feet. The 0-foot stake is approximately 40 feet east of the ditch and marked with browse tag #26.

Map Name: Geyser Peak, Utah



Township: 26S, Range: 4E, Section: 14

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 461652 E 4266999 N

SOLOMON BASIN - TREND STUDY NO. 25B-4

Site Information

Site Description: This study was reestablished in 1994 after a new road was run through the original transect. The new site is located between two low parallel ridges in a narrow, shallow ravine. The site is part of a pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodland with nearby aspen (*Populus tremuloides*) stands and sagebrush flats. A pond is also nearby, perhaps concentrating grazing in the area. Pellet group data estimates that from 1999 to 2009 elk and cow use was low. Estimated deer use was moderate in 1999 and 2004 and high in 2009 (Tables – Pellet Group Data). This area is recognized as a key wintering area for deer and has a rest rotation grazing system.

Browse: The key browse species are mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*Artemisia nova*) under an overstory of mature pinyon pine and Utah juniper. Combined sagebrush cover has ranged from 42% to 52% cover from 1994 to 2009 (Table - Browse Trends). Crispleaf buckwheat (*Eriogonum corymbosum*), serviceberry (*Amelanchier utahensis*) and winterfat (*Ceratoides lanata*) are other preferred species found on site. Point centered quarter density estimated an average of 90 pinyon trees/acre from 1999 to 2009 and fewer than 26 juniper trees/acre in the same period (Table - Point-Quarter Data).

Herbaceous Understory: Grass cover has decreased since 1999 while the sum of nested frequency has decreased since the initial reading in 1994. In 2009, the grass component was predominantly composed of Mutton bluegrass (*Poa fendleriana*) and blue grama (*Bouteloa gracilis*). In past years, Salina wildrye (*Elymus salina*) and Kentucky bluegrass (*Poa pratensis*) dominated the understory. The forb understory has decreased since 1994. No one species was dominant, but the forb species are diverse (Table - Herbaceous Trends).

Soil: The rocky soil was classified as a clay loam with a neutral pH (7.3). Soil phosphorus is low at 4.6 ppm and may have low availability for plant growth and development (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare soil average 31% of cover over all sample years (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and slight in 2009 due to pedestalling and gully formation and the attendant movement of soil, rock, and litter.

Trend Assessments

Browse:

- **1994 to 1999 - stable (0):** The black sagebrush component improved slightly while the mountain big sagebrush component is down slightly. Black sagebrush density increased 13% to 4,680 plants/acre while decadence improved to 15% and recruitment of young is good at 19%. Mountain big sagebrush density remained similar while decadence increased slightly to 13% and recruitment of young decreased from 36% to 7%. Crispleaf buckwheat, Utah serviceberry, and winterfat density remained similar to the past reading.
- **1999 to 2004 – down (-2):** Black sagebrush density is similar to the past reading as are decadence and recruitment rates. Mountain big sagebrush density decreased 26% to 1,000 plants/acre while decadence is low and recruitment fair at 14%. Crispleaf buckwheat, Utah serviceberry, and winterfat density decreased 38% in the same period.
- **2004 to 2009 – slightly down (-1):** Black sagebrush density increased 41% to 6,920 plants/acre while decadence is low at 14% and recruitment of young is good at 20%. Mountain big sagebrush density decreased 44% to 560 plants/acre and decadence increased to 29%, however, recruitment is good at 18%. Crispleaf buckwheat, Utah serviceberry, and winterfat density decreased 22% in the same period.

Grass:

- **1994 to 1999 – slightly down (-1):** The sum of nested frequency for perennial grasses decreased 19% while cover increased from 9% to 12%. Salina wildrye and Kentucky bluegrass accounted for 85% of grass cover.
- **1999 to 2004 - down (-2):** The sum of nested frequency for perennial grasses decreased 20% while cover decreased to 6%. Salina wildrye and Kentucky bluegrass provided 83% of grass cover.
- **2004 to 2009 – slightly down (-1):** The sum of nested frequency for perennial grasses decreased 9% and cover was 5%. The dominant species were mutton bluegrass and blue grama, accounting for 21% of grass cover. Only mutton bluegrass provided more than 1% cover.

Forb:

- **1994 to 1999 – slightly down (-1):** The sum of nested frequency for perennial forbs decreased 16% while cover increased from 2% to 4%, due predominantly to dandelion (*Taraxacum officinale*).
- **1999 to 2004 - down (-2):** The sum of nested frequency for perennial forbs decreased 25% while cover decreased to 2%. No one species provided 1% cover or more.
- **2004 to 2009 – slightly down (-1):** The sum of nested frequency was similar to the past reading, but cover decreased to below 1% and only 13 species were sampled.

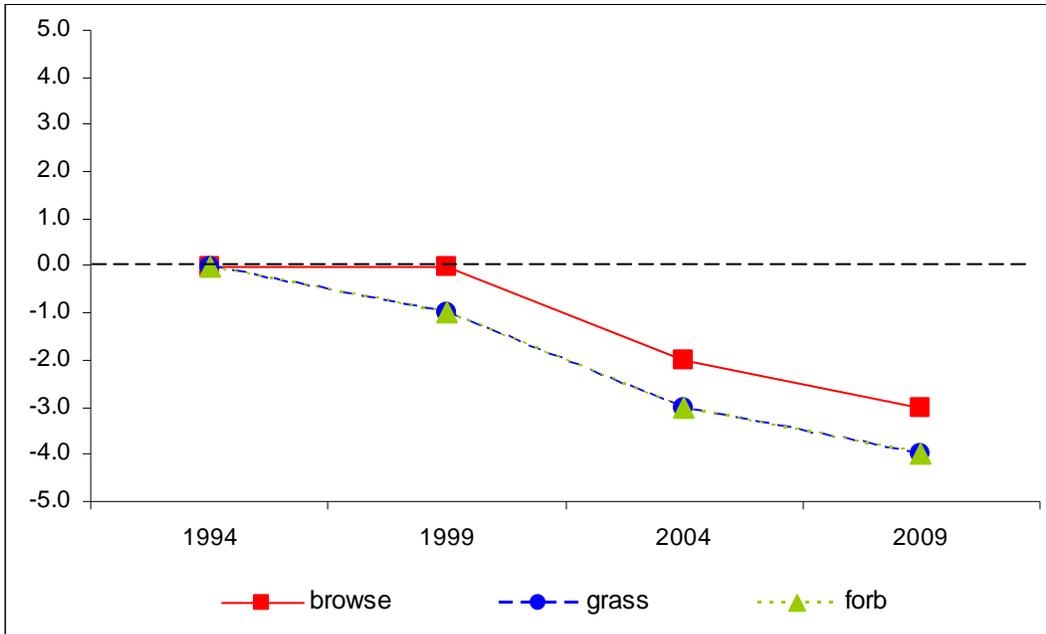
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 25B, study no: 4

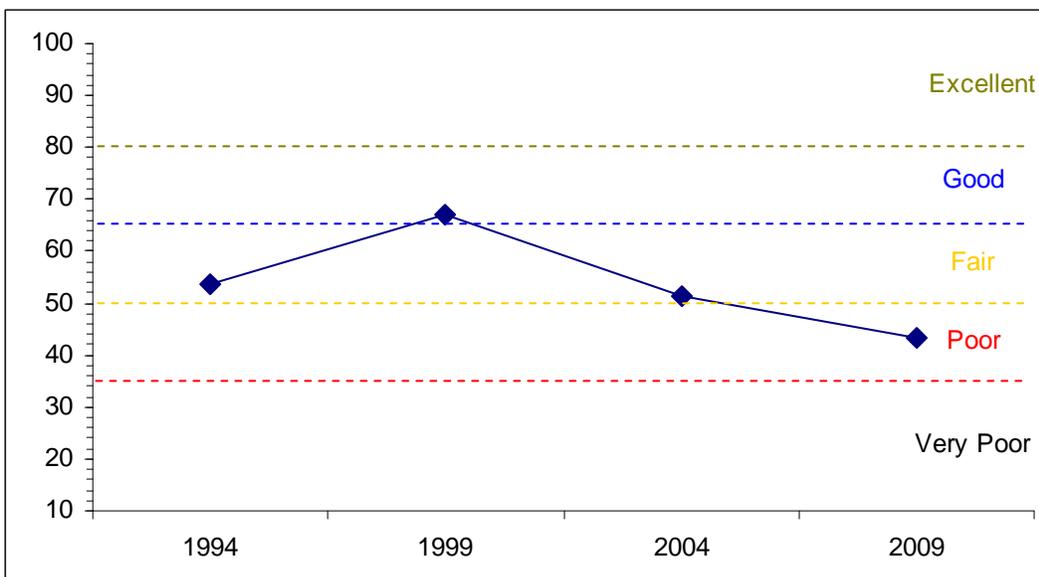
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	11.5	11.0	8.8	18.3	0.0	4.0	0.0	53.6	Fair
99	17.4	10.8	6.5	23.5	0.0	8.8	0.0	67.0	Good
04	17.0	11.8	7.2	11.5	0.0	3.8	0.0	51.3	Poor-Fair
09	12.8	9.5	9.7	9.9	0.0	1.5	0.0	43.5	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 25B Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
Management unit 25B, Study no: 4



HERBACEOUS TRENDS--
Management unit 25B, Study no: 4

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron smithii	-	1	11	4	-	.00	.36	.03
G	Agropyron spicatum	-	4	-	-	-	.03	-	-
G	Bouteloua gracilis	b56	ab35	a23	ab41	.78	1.45	.53	.89
G	Carex sp.	23	16	18	18	.16	.12	.31	.36
G	Elymus salina	c201	bc168	b135	a74	5.25	4.33	3.33	.66
G	Festuca ovina	10	3	-	-	.18	.03	-	-
G	Oryzopsis hymenoides	b16	a3	b21	ab3	.09	.15	.07	.07
G	Poa fendleriana	a-	a6	a4	b34	-	.06	.18	1.40
G	Poa pratensis	b65	b76	a25	a14	2.55	5.40	.60	.42
G	Poa secunda	7	-	3	8	.01	-	.03	.39
G	Sitanion hystrix	11	12	18	2	.05	.12	.11	.00
G	Stipa columbiana	4	-	-	-	.03	-	-	-
G	Stipa comata	a6	a-	a2	b39	.03	-	.18	.71
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		399	324	260	237	9.16	11.73	5.73	4.97
Total for Grasses		399	324	260	237	9.16	11.73	5.73	4.97
F	Achillea millefolium	-	-	4	-	-	-	.09	-
F	Androsace septentrionalis (a)	-	2	-	-	-	.00	-	-
F	Antennaria rosea	5	5	5	5	.15	.38	.15	.03
F	Arabis demissa	-	5	-	3	-	.01	-	.00
F	Artemisia ludoviciana	3	4	3	-	.03	.15	.00	-
F	Aster sp.	a5	ab18	b39	ab27	.01	.36	.76	.25
F	Astragalus convallarius	6	6	1	1	.01	.04	.03	.00
F	Astragalus miser	-	1	2	3	-	.00	.00	.00
F	Astragalus sp.	11	1	3	-	.02	.00	.01	-
F	Castilleja linariaefolia	a7	a3	a8	b33	.02	.03	.10	.26
F	Cirsium sp.	9	9	9	8	.07	.22	.18	.02
F	Cryptantha sp.	11	3	3	3	.05	.04	.03	.02
F	Cymopterus sp.	-	-	4	-	-	-	.03	-
F	Erigeron pumilus	b18	ab4	a-	a-	.03	.01	-	-
F	Eriogonum racemosum	-	-	-	1	-	.00	-	.00
F	Hymenoxys richardsonii	b57	b38	a8	a5	.62	.69	.05	.05
F	Lesquerella sp.	3	-	-	-	.00	-	-	-
F	Machaeranthera canescens	b36	a11	a10	a12	.38	.49	.26	.05
F	Microsteris gracilis (a)	3	-	-	-	.00	-	.00	-
F	Penstemon comarrhenus	-	-	1	-	-	-	.00	-
F	Penstemon sp.	a2	ab4	ab8	b19	.00	.04	.03	.04
F	Phlox longifolia	11	9	9	5	.02	.01	.05	.01
F	Schoenocrambe linifolia	7	-	-	-	.04	-	-	-
F	Senecio multilobatus	-	3	2	-	-	.00	.00	-
F	Sphaeralcea coccinea	4	2	9	-	.01	.03	.06	-
F	Taraxacum officinale	ab18	b52	a3	a-	.49	1.85	.03	-
F	Tragopogon dubius	-	-	4	-	-	-	.00	-

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
F	Unknown forb-perennial	-	1	-	-	-	.00	-	-
	Total for Annual Forbs	3	2	0	0	0.00	0.00	0.00	0
	Total for Perennial Forbs	213	179	135	125	2.00	4.40	1.92	0.76
	Total for Forbs	216	181	135	125	2.00	4.41	1.92	0.76

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

BROWSE TRENDS--

Management unit 25B, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Amelanchier utahensis	9	5	8	5	.63	.03	.00	.03
B	Artemisia frigida	1	1	0	0	.00	.00	-	-
B	Artemisia nova	39	57	55	68	4.28	6.84	7.03	7.18
B	Artemisia tridentata vaseyana	24	32	32	18	3.94	6.73	6.41	3.04
B	Atriplex canescens	0	0	0	1	-	-	-	.00
B	Ceratoides lanata	9	10	7	15	.21	.33	.19	.02
B	Cercocarpus montanus	0	0	0	1	-	-	-	.00
B	Chrysothamnus nauseosus	17	18	14	16	2.23	3.11	2.32	.87
B	Chrysothamnus viscidiflorus viscidiflorus	50	42	47	31	2.21	1.47	4.39	.67
B	Coryphantha vivipara arizonica	0	1	0	0	-	.00	-	-
B	Eriogonum corymbosum	22	21	23	38	.88	1.17	1.48	1.85
B	Gutierrezia sarothrae	53	49	39	29	1.27	1.00	1.52	.21
B	Juniperus osteosperma	0	1	1	1	.15	.15	.03	.38
B	Opuntia sp.	2	2	1	1	.01	.00	.00	.00
B	Pediocactus simpsonii	0	2	1	1	-	.03	.00	.01
B	Pinus edulis	0	13	12	10	3.49	4.09	6.13	7.96
B	Symphoricarpos oreophilus	5	8	9	3	.16	.48	.74	.15
B	Tetradymia canescens	14	17	15	13	.10	.24	.93	.09
B	Yucca harrimaniae	0	2	3	0	-	.18	.00	-
	Total for Browse	245	281	267	251	19.60	25.92	31.19	22.50

CANOPY COVER, LINE INTERCEPT--

Management unit 25B, Study no: 4

Species	Percent Cover		
	'99	'04	'09
Amelanchier utahensis	1.60	.93	-
Artemisia nova	-	9.69	8.96
Artemisia tridentata vaseyana	-	8.16	4.81
Ceratoides lanata	-	.50	.20
Chrysothamnus nauseosus	-	4.66	2.46
Chrysothamnus viscidiflorus viscidiflorus	-	5.30	.55
Eriogonum corymbosum	-	1.98	.91
Gutierrezia sarothrae	-	.58	.11
Opuntia sp.	-	-	.01
Pinus edulis	8.39	9.25	11.66
Symphoricarpos oreophilus	-	1.76	.05
Tetradymia canescens	-	1.06	.05
Yucca harrimaniae	-	.50	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 25B, Study no: 4

Species	Average leader growth (in)	
	'04	'09
Amelanchier utahensis	5.2	2.1
Artemisia tridentata vaseyana	1.4	1.2

POINT-QUARTER TREE DATA--

Management unit 25B, Study no: 4

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	27	24	26	2.9	3.2	2.8
Pinus edulis	82	97	90	2.1	1.9	2.0

BASIC COVER--

Management unit 25B, Study no: 4

Cover Type	Average Cover %			
	'94	'99	'04	'09
Vegetation	27.32	38.12	37.22	28.33
Rock	5.05	2.79	4.19	2.97
Pavement	4.77	10.95	16.01	13.52
Litter	29.63	31.77	30.99	30.96
Cryptogams	.30	.43	.68	.68
Bare Ground	31.40	29.84	28.35	33.97

SOIL ANALYSIS DATA --

Management unit 25B, Study no: 4, Study Name: Solomon Basin

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
18.7	7.3	44.2	20.2	35.6	2	4.6	208	0.5

PELLET GROUP DATA--

Management unit 25B, Study no: 4

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	5	12	6	19
Elk	-	1	-	6
Deer	11	6	11	8
Cattle	1	9	3	6
Moose	-	-	-	-

Days use per acre (ha)		
'99	'04	'09
-	-	-
1 (2)	9 (23)	8 (20)
19 (47)	28 (69)	45 (111)
42 (104)	11 (27)	14 (34)
-	1 (2)	-

BROWSE CHARACTERISTICS--

Management unit 25B, Study no: 4

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>									
94	280	7	93	0	-	7	7	0	33/42
99	120	17	33	50	40	33	0	33	50/57
04	200	30	60	10	-	20	60	10	57/55
09	100	40	20	40	-	0	60	40	59/64
<i>Artemisia frigida</i>									
94	40	0	100	-	-	0	0	0	1/2
99	20	0	100	-	-	0	0	0	2/6
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Artemisia nova</i>									
94	4140	3	75	22	40	5	.48	6	10/16
99	4680	19	66	15	180	22	3	.42	8/17
04	4880	15	74	11	440	0	0	8	9/19
09	6920	20	65	14	300	17	.86	4	8/18
<i>Artemisia tridentata vaseyana</i>									
94	1500	36	57	7	-	1	0	4	19/28
99	1360	7	79	13	-	18	3	3	23/36
04	1000	14	76	10	4580	18	2	4	24/40
09	560	18	54	29	120	36	18	21	16/27
<i>Atriplex canescens</i>									
94	0	0	0	-	-	0	0	0	28/23
99	0	0	0	-	-	0	0	0	37/32
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	6/11
<i>Ceratoides lanata</i>									
94	380	0	100	0	-	58	26	0	6/6
99	460	13	78	9	40	22	74	0	4/7
04	380	0	89	11	-	5	89	5	7/8
09	960	13	88	0	-	50	13	0	4/4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Cercocarpus montanus									
94	0	0	0	-	-	0	0	0	15/24
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	0	100	0	-/-
Chrysothamnus depressus									
94	0	0	0	-	-	0	0	0	6/12
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
Chrysothamnus nauseosus									
94	640	6	91	3	20	0	3	0	27/29
99	820	15	71	15	-	0	0	7	34/39
04	460	4	78	17	-	0	0	13	32/34
09	640	13	84	3	-	19	9	0	33/35
Chrysothamnus viscidiflorus viscidiflorus									
94	2720	7	81	12	-	3	2	5	9/16
99	2020	16	66	18	20	0	0	6	12/16
04	3940	9	86	5	40	3	0	6	12/16
09	1360	10	60	29	-	4	0	26	5/9
Coryphantha vivipara arizonica									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	0	100	0	1/4
04	0	0	0	-	-	0	0	0	2/3
09	0	0	0	-	-	0	0	0	-/-
Eriogonum corymbosum									
94	2660	13	87	0	40	40	24	0	4/8
99	2100	22	66	12	-	20	11	2	9/16
04	2120	15	84	1	-	14	37	0	9/16
09	3960	8	91	1	-	40	8	0	5/11
Gutierrezia sarothrae									
94	4280	11	87	2	40	0	0	0	6/5
99	4020	10	90	0	100	0	.49	0	7/7
04	2280	9	91	0	-	0	0	0	8/8
09	1100	2	98	0	-	0	0	5	5/5
Juniperus osteosperma									
94	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	-	0	0	0	-/-
04	20	100	0	-	-	0	0	0	-/-
09	20	100	0	-	-	100	0	100	-/-

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>Opuntia</i> sp.									
94	40	0	100	-	-	0	0	0	1/2
99	40	0	100	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	4/15
09	20	0	100	-	-	0	0	0	-/-
<i>Pediocactus simpsonii</i>									
94	0	0	0	-	-	0	0	0	2/3
99	40	0	100	-	-	0	0	0	2/3
04	20	0	100	-	-	0	0	0	1/2
09	20	0	100	-	-	0	0	0	1/4
<i>Pinus edulis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	280	93	7	-	140	0	0	0	-/-
04	280	57	43	-	80	0	0	0	-/-
09	260	23	77	-	100	0	0	0	-/-
<i>Ribes</i> sp.									
94	0	0	0	-	-	0	0	0	26/35
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
94	120	0	100	0	-	0	17	0	15/23
99	280	21	71	7	40	7	0	7	16/28
04	300	40	53	7	-	0	0	7	16/25
09	180	11	89	0	-	0	78	0	5/14
<i>Tetradymia canescens</i>									
94	520	12	85	4	-	0	0	8	10/17
99	580	21	59	21	40	14	3	7	10/15
04	660	39	55	6	-	6	0	0	11/18
09	480	8	79	13	60	8	8	8	5/7
<i>Yucca harrimaniae</i>									
94	0	0	0	-	-	0	0	0	-/-
99	180	0	100	-	-	0	0	0	13/16
04	240	17	83	-	-	0	0	0	7/12
09	0	0	0	-	-	0	0	0	-/-