

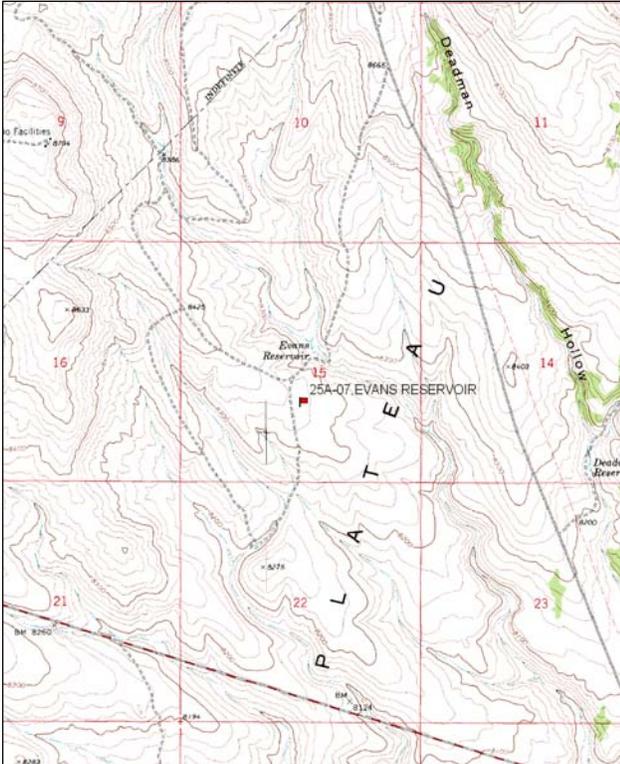
EVANS RESERVOIR - TREND STUDY NO. 25A-7-09

Vegetation Type: Mountain Big Sagebrush
Range Type: Crucial Deer Winter, Substantial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: BLM
Elevation: 8,300 ft (2,530 m)
Aspect: North
Slope: 2%-5%
Transect bearing: 180 degrees magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

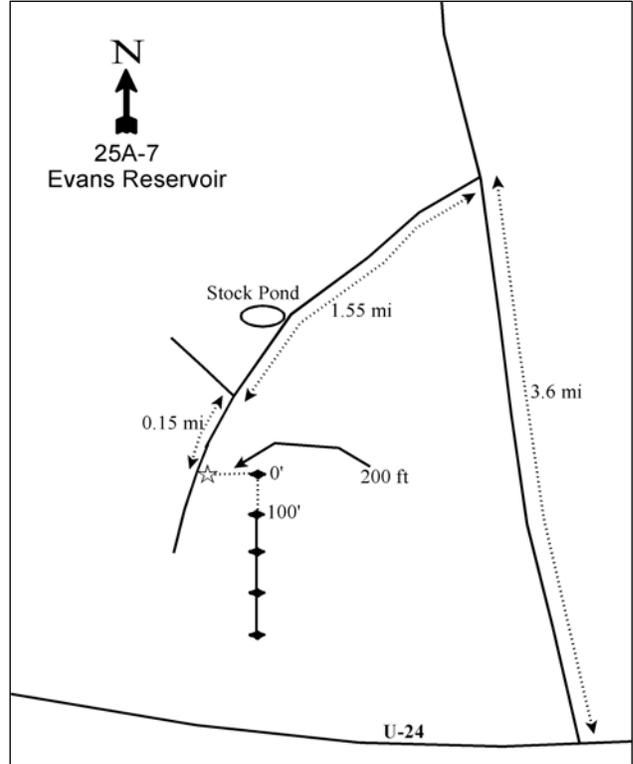
Heading northwest out of Loa on U-24, turn right at mile marker 45. Go 3.5 miles to a green and yellow fence post on the left (20 feet off the road). Continue about 0.1 miles past the fence post and turn left. Go 1.55 miles past a stock pond and up to a fork. Turn left at the fork and go 0.15 miles to a steel rebar witness post on the left side of the road. From the witness post, walk 200 feet east to the 0-foot baseline stake, a rebar with browse tag #7122.

Map Name: Abes Knoll, Utah



Township: 27S, Range: 1E, Section: 15

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 431095 E 4257134 N

EVANS RESERVOIR - TREND STUDY NO. 25A-7

Site Information

Site Description: This study is located on an open rolling ridge on the Awapa Plateau. The area was two-way Dixie harrowed and fourteen species were seeded in the fall of 1999. A small stock pond is located a quarter of a mile north of the transect and sheep graze the area in the spring and fall as part of the Fishlake allotment. Both deer and antelope use the area and sage grouse have been seen. Deer/antelope use was moderate in 1999 and 2004 then was very high in 2009. Elk use was high in 1999 and moderate in 2004 and 2009 (Table - Pellet Group Data).

Browse: Key browse species are mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*Artemisia nova*). Following the two-way harrow treatment in the fall of 1999 there was a substantial decrease in sagebrush cover (Table - Browse Trends) and density, as well as an improvement in decadence rates (Table - Browse Characteristics).

Herbaceous Understory: Perennial native grasses dominate the understory and provide good cover. Bluebunch wheatgrass (*Agropyron spicatum*) and Indian ricegrass (*Oryzopsis hymenoides*) are the predominant species and have provided an average of 67% of grass cover since 1999. The forb community is diverse and perennial species have provided an average of 4% cover since 1999. Desert phlox (*Phlox austromontana*) has consistently been the most common forb since 1999 (Table - Herbaceous Trends).

Soil: The soil was classified as sandy loam with a neutral pH (7.1). Organic matter and phosphorus are low and phosphorus may limit plant growth and development (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Vegetation cover has increased from 11% in 1985 to 34% in 2009 (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1985 to 1991 – slightly down (-1):** Mountain big sagebrush density decreased 24% to 4,732 plants/acre. Decadence improved from 47% to 28% and recruitment of young plants is increased from poor at 3% to good at 10%. Black sagebrush density decreased 29% and decadence decreased from 59% to 48%, which is still considered high. No new recruitment of young black sagebrush was sampled.
- **1991 to 1999 – slightly down (-1):** Differences in density may be related to the larger sample area used in 1999; therefore, trend was determined using other parameters. Mountain big sagebrush decadence increased to 53% and recruitment of young plants remained good at 10%. Black sagebrush decadence remained high at 43% and young plants comprised 6% of the population.
- **1999 to 2004 - down (-2):** This reading followed the two-way dixie harrow completed in the fall of 1999, so the downward trend was expected. Following the treatment mountain big sagebrush density decreased 63% from 4,360 to 1,620 plants/acre and cover decreased from 10% to 3%. However, decadence of mountain big sagebrush decreased to 31%. Recruitment of young mountain sagebrush plants also decreased slightly to 7%. Black sagebrush density decreased 56% from 4,140 to 1,820 plants/acre and cover decreased from 7% to 2%. Black sagebrush decadence also decreased to 14% and recruitment of young plants remained similar at 5%.
- **2004 to 2009 – slightly up (+1):** Mountain big sagebrush density increased 14% to 1,860 plants/acre. Decadence is still moderately high at 31% and recruitment is low at 6%. Black sagebrush density increased 17% to 2,140 plants/acre. Decadence of black sagebrush remained similar at 18%, but recruitment of young plants increased to 13%.

Grass:

- **1985 to 1991 - up (+2):** The sum of nested frequency for perennial grasses increased 47%. Primary species include mutton bluegrass (*Poa fendleriana*), bottlebrush squirreltail (*Sitanion hystrix*) and Pinewoods needlegrass (*Stipa pinetorum*).
- **1991 to 1999 – slightly down (-1):** The sum of nested frequency for perennial grasses decreased 12% and cover is at 13%. Bluebunch wheatgrass and mutton bluegrass combined provided 69% of grass cover.
- **1999 to 2004 - stable (0):** This reading followed the two-way dixie harrow completed in the fall of 1999 and was intended to increase the herbaceous understory. Following the treatment the sum of nested frequency for perennial grasses is similar to the past reading, but perennial grass cover increased to 19%. Bluebunch wheatgrass and mutton bluegrass combined to provide 76% of grass cover.
- **2004 to 2009 - stable (0):** The sum of nested frequency and cover of perennial grasses is similar to the last reading. Bluebunch wheatgrass, mutton bluegrass and pinewoods needlegrass combined to provide 90% of grass cover.

Forb:

- **1985 to 1991 - up (+2):** The sum of nested frequency for perennial forbs increased 21%. Desert phlox is the most frequent species.
- **1991 to 1999 - down (-2):** The sum of nested frequency for perennial forbs decreased 25% and cover is at 5%. Timber poisonvetch (*Astragalus convallarius*) provided 41% of the forb cover.
- **1999 to 2004 - down (-2):** This reading followed the two-way dixie harrow completed in the fall of 1999 that was intended to increase the herbaceous understory. Following the treatment the sum of nested frequency for perennial forbs decreased 22% and perennial forb cover decreased to 3%. Desert phlox is the most common forb species.
- **2004 to 2009 – slightly down (-1):** The sum of nested frequency for perennial forbs decreased 12% and forb cover remained at 3%.

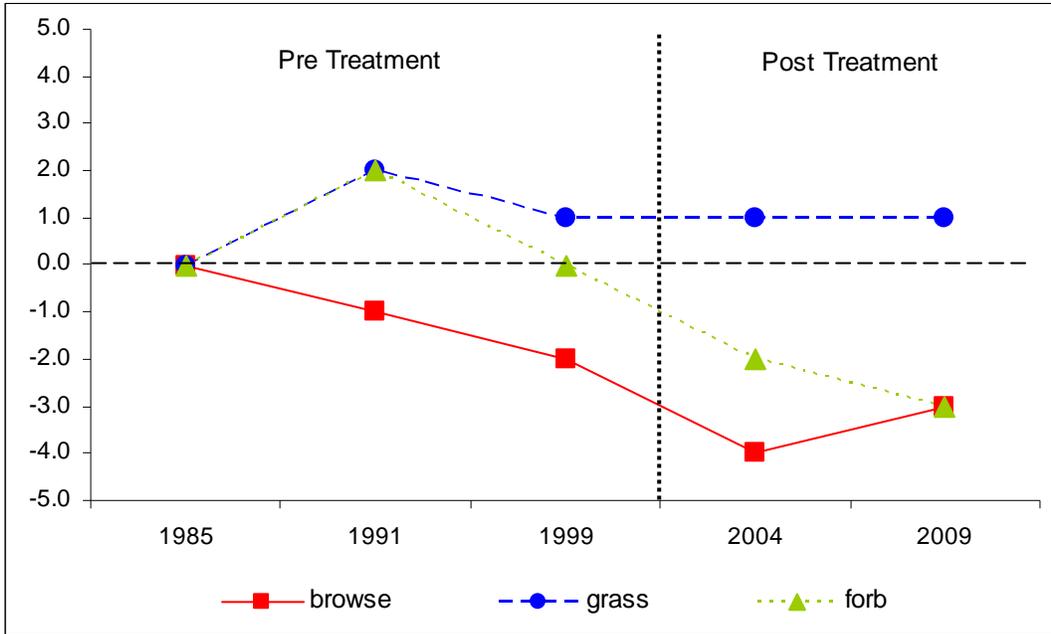
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 25A, study no: 7

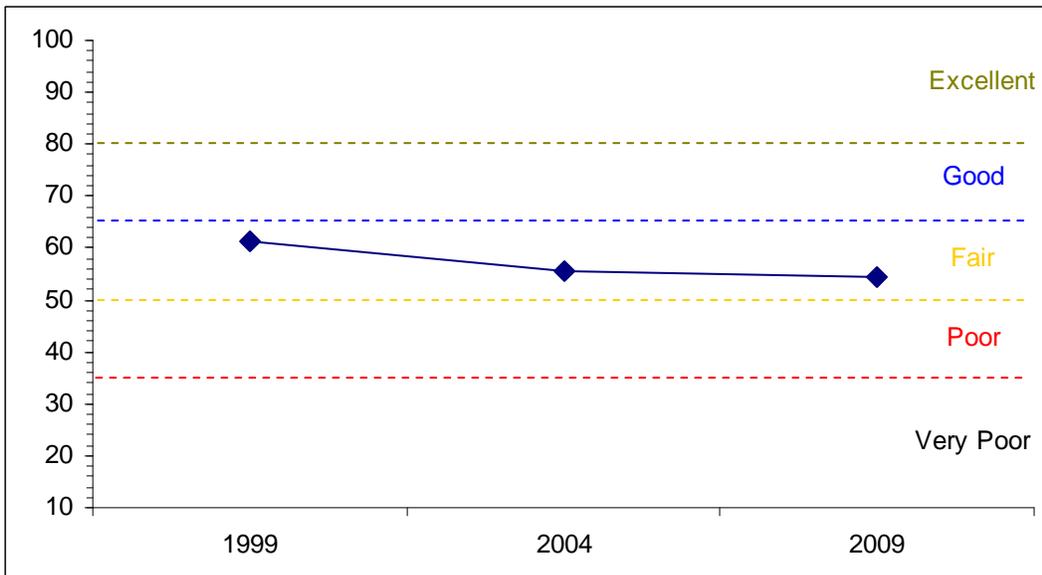
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
99	20.9	0.4	4.2	26.0	0.0	10.0	0.0	61.5	Fair
04	7.6	8.0	3.1	30.0	0.0	6.8	0.0	55.5	Fair
09	7.3	7.4	4.2	30.0	0.0	5.5	0.0	54.4	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 25A Study no: 7



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
 Management unit 25A, Study no: 7



HERBACEOUS TRENDS--

Management unit 25A, Study no: 7

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'99	'04	'09	'99	'04	'09
G	Agropyron cristatum	a-	a-	a-	b19	b14	-	.28	.65
G	Agropyron intermedium	a-	a-	a-	a-	b6	-	.00	.21
G	Agropyron spicatum	a2	b51	c127	c116	c113	4.24	6.28	5.76
G	Agropyron trachycaulum	-	-	-	3	-	-	.03	-
G	Bouteloua gracilis	37	40	50	39	34	.65	.75	1.29
G	Carex sp.	6	4	18	19	25	.56	.29	.20
G	Oryzopsis hymenoides	-	2	7	3	6	.33	.06	.06
G	Poa fendleriana	abc136	bc168	ab139	c178	a120	4.73	8.13	4.46
G	Poa secunda	b44	a16	a10	a4	a2	.09	.04	.03
G	Sitanion hystrix	b62	c119	a25	ab45	ab38	.71	1.11	.95
G	Stipa comata	a-	a-	b5	b7	b7	.21	.24	.22
G	Stipa pinetorum	ab81	d142	bc97	a47	cd115	1.47	1.64	4.13
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		368	542	478	480	480	13.02	18.89	18.00
Total for Grasses		368	542	478	480	480	13.02	18.89	18.00
F	Androsace septentrionalis (a)	-	-	b29	a5	a-	.19	.01	-
F	Arabis demissa	b62	a19	a3	a6	a10	.00	.01	.06
F	Aster sp.	-	1	-	-	-	-	-	-
F	Astragalus convallarius	a6	a14	c71	b39	ab25	2.23	.31	.20
F	Astragalus sp.	1	-	-	-	-	-	-	-
F	Castilleja chromosa	-	5	-	-	-	-	-	-
F	Chaenactis douglasii	-	3	8	-	-	.02	-	-
F	Chenopodium leptophyllum(a)	-	-	-	-	3	-	-	.00
F	Collinsia parviflora (a)	-	-	-	-	3	-	-	.03
F	Comandra pallida	-	-	4	2	2	.06	.03	.03
F	Cryptantha sp.	b58	b68	a17	a19	a5	.25	.16	.04
F	Erigeron pumilus	3	1	5	12	4	.01	.13	.04
F	Eriogonum alatum	-	-	2	-	3	.00	-	.00
F	Eriogonum racemosum	-	-	1	3	2	.01	.06	.03
F	Eriogonum umbellatum	14	11	10	4	4	.21	.09	.04
F	Gayophytum ramosissimum(a)	-	-	-	19	12	-	.06	.03
F	Lactuca serriola	-	3	-	-	-	-	-	-
F	Lappula occidentalis (a)	-	-	-	8	-	-	.02	-
F	Linum lewisii	a1	ab17	ab29	a1	b15	.30	.00	.06
F	Lotus utahensis	b55	a-	ab16	ab16	a4	.36	.80	.04
F	Penstemon comarrhenus	-	-	-	1	2	-	.03	.03
F	Phlox austromontana	a67	b130	ab101	b100	ab102	1.83	1.67	2.07
F	Phlox longifolia	ab9	b19	a-	ab9	a2	-	.03	.00
F	Sanguisorba minor	b6	a-	a-	a-	a-	-	-	-
F	Senecio multilobatus	a3	b61	a6	a-	a6	.05	-	.04
F	Streptanthus cordatus	-	5	-	2	-	-	.03	-
F	Tragopogon dubius	-	-	-	-	2	-	-	.03
F	Trifolium sp.	a-	b13	a5	a2	a3	.01	.01	.00

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'99	'04	'09	'99	'04	'09
F	Unknown forb-perennial	_b 20	a-	a-	a-	a-	-	-	-
F	Zigadenus paniculatus	2	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	29	32	18	0.19	0.09	0.06
Total for Perennial Forbs		307	370	278	216	191	5.38	3.40	2.75
Total for Forbs		307	370	307	248	209	5.57	3.49	2.82

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

BROWSE TRENDS--

Management unit 25A, Study no: 7

Type	Species	Strip Frequency			Average Cover %		
		'99	'04	'09	'99	'04	'09
B	Artemisia nova	65	42	47	6.79	2.40	2.15
B	Artemisia tridentata vaseyana	85	47	55	9.89	3.47	3.54
B	Chrysothamnus viscidiflorus viscidiflorus	30	42	36	.46	1.54	1.73
B	Coryphantha vivipara	1	0	0	.00	-	-
B	Eriogonum corymbosum	1	2	1	.03	.03	.00
B	Eriogonum microthecum	3	13	10	.06	.18	.18
B	Gutierrezia sarothrae	1	24	28	.00	.91	.29
B	Kochia prostrata	0	0	0	-	.02	-
B	Leptodactylon pungens	18	25	21	.09	.23	.48
B	Opuntia sp.	1	0	1	.00	-	.00
B	Tetradymia canescens	0	2	2	-	.00	.00
Total for Browse		205	197	201	17.33	8.82	8.39

CANOPY COVER, LINE INTERCEPT--

Management unit 25A, Study no: 7

Species	Percent Cover	
	'04	'09
Artemisia nova	3.54	3.48
Artemisia tridentata vaseyana	5.09	5.84
Chrysothamnus viscidiflorus viscidiflorus	2.26	.73
Eriogonum microthecum	.16	-
Gutierrezia sarothrae	1.03	1.20
Leptodactylon pungens	.25	.16

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 25A, Study no: 7

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata vaseyana	2.0	1.1

BASIC COVER--

Management unit 25A, Study no: 7

Cover Type	Average Cover %				
	'85	'91	'99	'04	'09
Vegetation	11.00	8.75	35.34	32.10	33.76
Rock	0	4.00	1.35	2.43	.39
Pavement	54.75	33.00	25.01	31.26	14.33
Litter	26.25	30.25	25.26	31.07	35.95
Cryptogams	.50	1.00	.08	.03	0
Bare Ground	7.50	23.00	10.93	16.96	20.91

SOIL ANALYSIS DATA --

Management unit 25A, Study no: 7, Study Name: Evans Reservoir

Effective rooting depth (in)	pH	sandy loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.3	7.1	59.3	21.4	19.3	1.7	8.8	217.6	1.2

PELLET GROUP DATA--

Management unit 25A, Study no: 7

Type	Quadrat Frequency			Days use per acre (ha)		
	'99	'04	'09	'99	'04	'09
Rabbit	45	53	58	-	-	-
Grouse	2	2	-	26 pellets/acre	-	17 pellets/acre
Elk	38	14	53	51 (126)	25 (63)	25 (61)
Deer	5	18	9	16 (40)	15 (36)	80 (198)
Antelope	1	3	-	-	5 (12)	-

BROWSE CHARACTERISTICS--

Management unit 25A, Study no: 7

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Artemisia nova									
85	3731	4	37	59	199	36	54	11	10/9
91	2665	0	52	48	-	75	0	23	8/16
99	4140	6	51	43	80	44	1	24	11/19
04	1820	5	80	14	2180	0	0	4	8/16
09	2140	13	69	18	60	18	12	15	9/15
Artemisia tridentata vaseyana									
85	6265	3	50	47	533	68	11	9	15/21
91	4732	10	62	28	266	49	34	17	18/26
99	4360	10	37	53	-	62	10	15	17/29
04	1620	7	62	31	1480	12	6	11	14/23
09	1860	6	62	31	20	11	20	18	14/22

		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>Chrysothamnus viscidiflorus viscidiflorus</i>										
85	1066	0	69	31	133	0	0	6	5/4	
91	332	40	40	20	-	20	20	20	5/6	
99	1220	8	87	5	-	0	0	0	8/10	
04	1540	1	97	1	160	0	0	0	9/15	
09	1200	0	95	5	-	0	0	8	7/12	
<i>Coryphantha vivipara</i>										
85	0	0	0	-	-	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	2/4	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
<i>Eriogonum corymbosum</i>										
85	0	0	0	-	-	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	40	50	50	-	-	0	0	0	7/6	
04	60	0	100	-	-	33	0	0	9/12	
09	20	0	100	-	-	0	0	0	8/12	
<i>Eriogonum microthecum</i>										
85	399	0	100	-	-	0	0	0	7/5	
91	466	29	71	-	-	57	29	0	5/7	
99	80	0	100	-	-	25	0	0	4/4	
04	440	5	95	-	-	0	5	0	7/11	
09	200	0	100	-	-	0	0	0	6/9	
<i>Gutierrezia sarothrae</i>										
85	0	0	0	0	-	0	0	0	-/-	
91	0	0	0	0	-	0	0	0	-/-	
99	20	0	100	0	-	0	0	0	3/7	
04	920	0	100	0	100	0	0	0	9/13	
09	1100	5	75	20	-	13	0	15	6/9	
<i>Kochia prostrata</i>										
85	0	0	0	-	-	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	360	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	12/5	
<i>Leptodactylon pungens</i>										
85	0	0	0	0	-	0	0	0	-/-	
91	0	0	0	0	-	0	0	0	-/-	
99	600	7	93	0	-	0	0	0	6/7	
04	820	7	88	5	-	0	0	5	6/10	
09	780	0	100	0	-	0	0	3	5/9	

		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>Opuntia</i> sp.										
85	0	0	0	-	-	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	5/13	
04	0	0	0	-	-	0	0	0	6/9	
09	20	0	100	-	-	0	0	0	4/11	
<i>Symphoricarpos oreophilus</i>										
85	0	0	0	-	-	0	0	0	-/-	
91	66	100	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	11/27	
09	0	0	0	-	-	0	0	0	6/19	
<i>Tetradymia canescens</i>										
85	0	0	0	-	-	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	80	75	25	-	-	0	0	0	4/5	
09	40	0	100	-	-	0	0	0	4/4	