

SANTAQUINS CABIN - TREND STUDY NO. 17-51-10

Vegetation Type: Chained, Seeded Pinyon-Juniper

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 7210 ft. (2198 m)

Aspect: Southeast

Slope: 5%

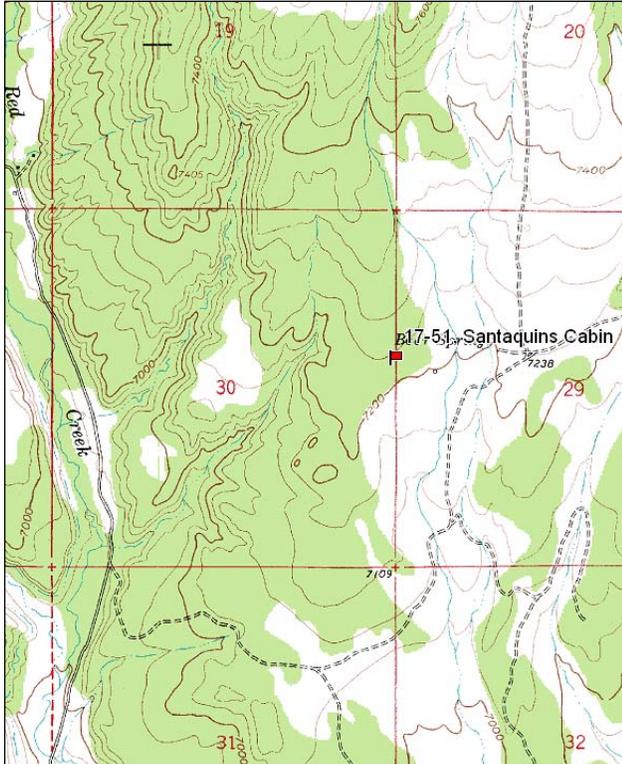
Transect bearing: 159° magnetic

Belt placement: line 1 (19 & 94ft), line 2 (29ft), line 3 (57ft), line 4 (71ft).

Directions:

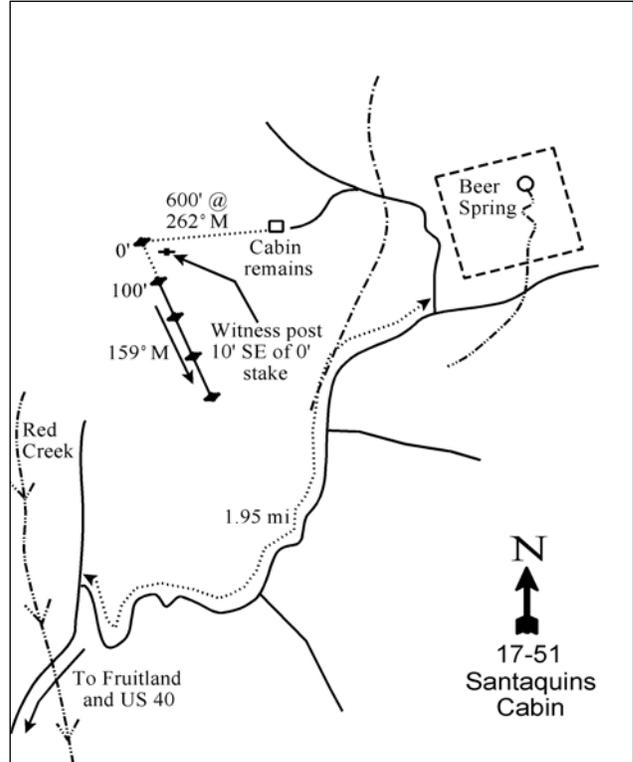
From US 40 in Fruitland, travel north up 45000 S. 1.8 miles to a 3-way fork. Take the middle fork and go 2.5 miles. After crossing Red Creek, turn right onto a dirt road. Go northeast up this road for 1.95 miles, keeping left at two major forks. At Beer Spring, turn left and go along the west side of the fenced spring to a wide, shallow wash. Cross the wash, then bear left onto a faint road. Follow it for about 100 yards to the remains of Santaquins cabin. From the cabin walk west at 262°M for 600 feet, following the old line intercept study, to the 4th stake. From the 4th line-intercept stake, walk 11 paces south to the start of the baseline. The 0-foot baseline stake is marked with red browse tag #7022. There is a witness post southeast of the 0' stake.

Map Name: Tabby Mountain



Township: 2S Range: 8W Section: 30

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 515174 E 4458691 N

SANTAQUINS CABIN - TREND STUDY NO. 17-51

Site Information

Site Description: This study is on winter range located near Santaquins Cabin in an area administered by the Utah Division of Wildlife Resources (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA). The study is in a chained and seeded pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) area west of Beer Spring. The last 200 feet of the baseline transect was treated by a disking treatment in the fall of 1995. Strips and patches were disked and seeded over approximately 270 acres in the area. No seed mix data was available for the treatment. A lop and scatter treatment was done as part of the Coyote Draw Pinyon and Juniper Thinning ([WRI Project #328](#)) in the summer of 2006 that removed many of the pinyon and juniper trees that had become reestablished. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. This area is used heavily by wintering big game, especially deer, though pellet group transect data has estimated decreasing use by deer from very heavy in 2000 to light use in 2010. Estimated elk use has fluctuated from light use in 2000, to heavy use in 2005 and more moderate use in 2010. Estimated use by cattle has been light since 2000 (Table Pellet Group Data).

Browse: The key browse species on the chaining is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) which has provided the majority of the browse cover since 1995 (Table - Browse Trends). There appears to be some sagebrush which exhibit characteristics of basin big sagebrush (*A. tridentata* ssp. *tridentata*) as well as hybrids of Wyoming big sagebrush and basin big sagebrush, but all sagebrush was classified as Wyoming big sagebrush at this location. The sagebrush population is comprised of a mixture of young and mature plants with moderate to heavy use. The population is healthy with low decadence and good vigor. Several other browse species occur, but all are sampled in small numbers (Table - Browse Characteristics). Some pinyon and juniper trees had reestablished on the site following the chaining, but the 2006 treatment removed most of the trees with those remained being mostly young and small (Table - Point-Quarter Tree Data).

Herbaceous Understory: Grasses are diverse and abundant on the site. Crested wheatgrass (*Agropyron cristatum*) is the dominant grass species, but thickspike wheatgrass (*A. dasystachyum*), intermediate wheatgrass (*A. intermedium*), sedge (*Carex* sp.), Russian wildrye (*Elymus junceus*) and Indian ricegrass (*Oryzopsis hymenoides*) are also common. Forbs are diverse but they do not provide very much forage. The only common forb throughout the study has been scarlet globemallow (*Sphaeralcea coccinea*) (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a slightly alkaline soil reaction (pH 7.7). Phosphorus may have limited availability for plant growth and development at 3.3 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover has been moderate to high over the sample years with much of the protective cover provided by chaining litter and vegetation cover (Table - Basic Cover). A number of small, south flowing gullies traverse the area. These have stabilized since the chaining treatment. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly down (-1):** The density of sagebrush decreased by 22% from 5,665 plants/acre to 4,398 plants/acre, though recruitment of young plants remained very high at 48% of the population. Decadence and poor vigor of sagebrush increased slightly.
- **1988 to 1995 - stable (0):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Recruitment of young sagebrush plants decreased, but remained very good at 17% of the population. Poor vigor of sagebrush decreased from 11% to 2%, though decadence remained similar.

- **1995 to 2000 - slightly down (-1):** The density of Wyoming big sagebrush decreased by 24% from 3,040 plants/acre to 2,320 plants/acre, though much of this decrease is likely due to the disking treatment that was done on 2 of the 5 density strips. Cover of sagebrush decreased slightly from 10% to 8%, but remains the dominant browse species.
- **2000 to 2005 - slightly down (-1):** There was little change in the density or cover of Wyoming big sagebrush, but decadence increased from 8% to 21% and poor vigor increased from 4% to 19%.
- **2005 to 2010 - up (+2):** The Wyoming big sagebrush density increased nearly three-fold from 2,160 plants/acre to 5,740 plants/acre, with a slight increase in cover to 9%. Decadence of sagebrush decreased to 4% and poor vigor decreased to 7%. Recruitment of young sagebrush plants increased and comprised half of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial grasses increased by 20%.
- **1995 to 2000 - down (-2):** The perennial grass sum of nested frequency decreased by 23%, though cover increased from 13% to 17% with a large increase in the cover of crested wheatgrass.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.

Forb:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial forbs, but it remained similar.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 21% and cover decreased from 4% to 2%.
- **2000 to 2005 - down (-2):** The perennial forb sum of nested frequency decreased by 25%, though cover remained similar.
- **2005 to 2010 - stable (0):** There was little change in either the sum of nested frequency or cover of perennial forbs.

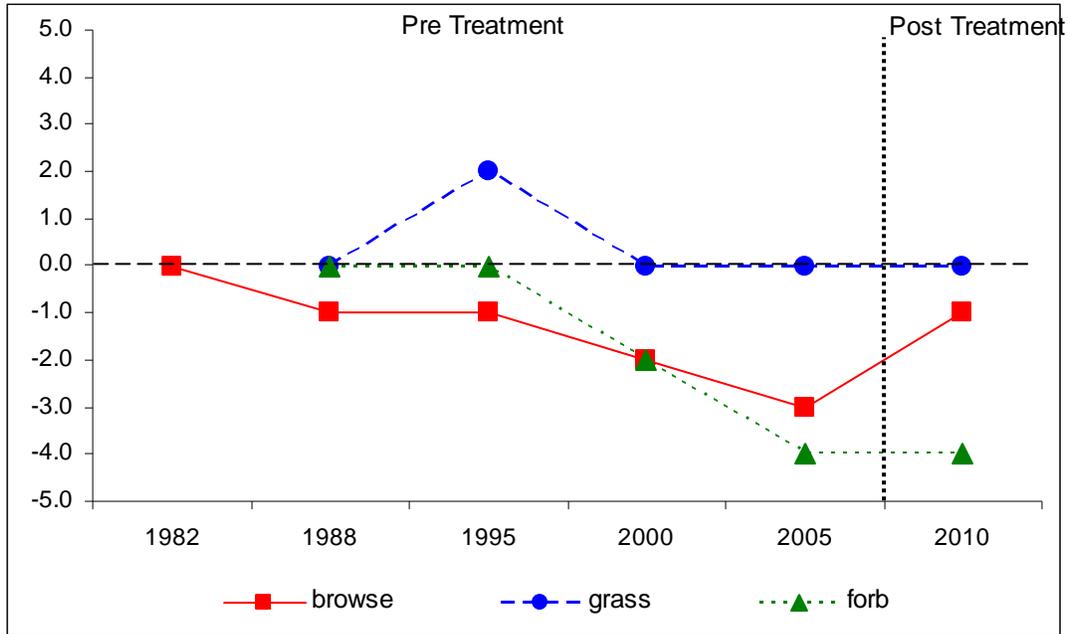
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17, study no: 51

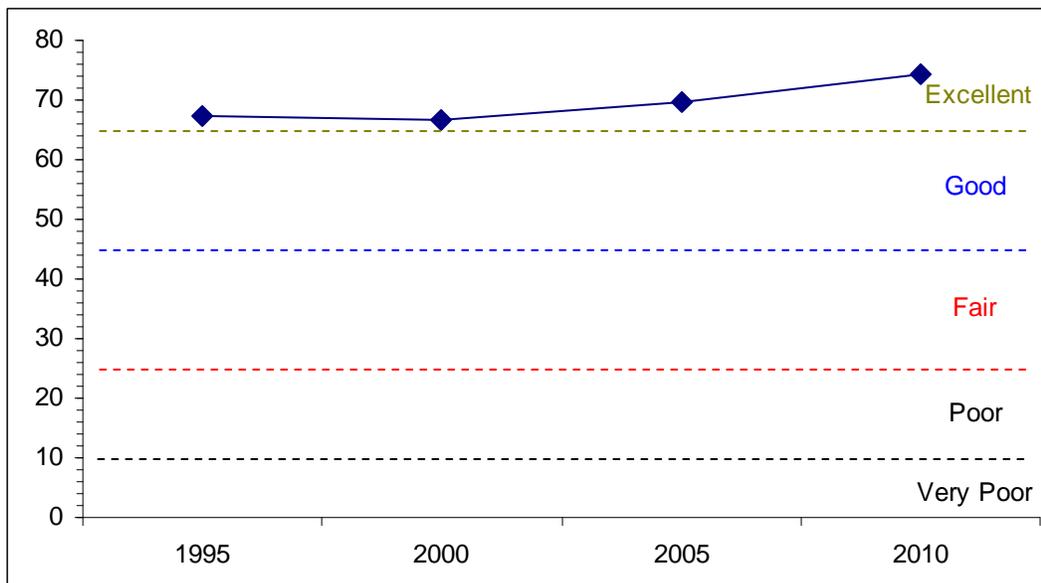
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	12.3	12.9	8.4	25.9	0.0	8.0	0.0	67.5	Excellent
00	10.7	12.7	9.3	30.0	0.0	4.2	0.0	66.8	Good-Excellent
05	11.4	9.1	15.0	30.0	-0.1	4.2	0.0	69.6	Excellent
10	11.6	13.8	15.0	30.0	-0.1	3.8	0.0	74.2	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 51



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 17, Study no: 51



HERBACEOUS TRENDS--
Management unit 17, Study no: 51

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	ab172	ab165	a136	a156	b208	3.85	7.93	8.34	9.64
G	Agropyron dasystachyum	b152	ab113	ab134	a90	a89	3.99	4.32	3.36	4.36
G	Agropyron intermedium	a-	d86	c44	b14	bc36	1.69	.93	.22	.21
G	Bromus inermis	c75	b43	ab24	a3	a13	.78	.83	.04	.28
G	Bromus tectorum (a)	-	a-	a-	ab11	b20	-	-	.08	.09
G	Carex sp.	a-	c60	c57	b25	bc52	1.27	2.12	.40	.54
G	Elymus junceus	a-	a6	a3	b18	ab14	.06	.15	1.43	1.01
G	Festuca ovina	b32	a3	a-	a5	a1	.03	-	.04	.00
G	Oryzopsis hymenoides	ab46	b67	a21	ab52	a29	.86	.38	1.27	.81
G	Poa secunda	a-	a4	a1	b15	a3	.03	.00	.27	.03
G	Sitanion hystrix	ab11	b16	ab10	ab9	a-	.13	.25	.08	.00
G	Stipa comata	a-	bc22	bc23	c30	b14	.22	.43	.65	.42
Total for Annual Grasses		0	0	0	11	20	0	0	0.08	0.08
Total for Perennial Grasses		488	585	453	417	459	12.94	17.36	16.14	17.35
Total for Grasses		488	585	453	428	479	12.94	17.36	16.23	17.44
F	Agoseris glauca	-	-	3	-	-	-	.00	-	-
F	Antennaria rosea	-	-	1	-	-	-	.00	-	-
F	Astragalus convallarius	a-	ab6	ab4	ab9	b12	.06	.04	.07	.10
F	Astragalus tenellus	c91	b23	ab13	a-	ab2	.28	.20	.03	.03
F	Calochortus nuttallii	a-	b8	a-	ab5	ab3	.03	-	.04	.01
F	Castilleja sp.	-	-	-	-	-	-	-	.03	-
F	Chenopodium fremontii (a)	-	b13	a-	c25	a-	.05	-	.22	-
F	Chenopodium leptophyllum(a)	-	3	-	5	7	.00	-	.02	.01
F	Cirsium sp.	1	2	1	3	-	.01	.03	.01	-
F	Cordylanthus kingii (a)	-	c25	a-	ab5	bc15	.28	-	.01	.11
F	Cryptantha sp.	-	-	3	3	-	-	.03	.01	-
F	Cymopterus sp.	-	4	-	2	-	.01	-	.01	-
F	Descurainia pinnata (a)	-	2	-	2	-	.01	-	.00	-
F	Erigeron sp.	3	7	8	1	-	.04	.06	.00	-
F	Hedysarum boreale	-	-	4	-	-	-	.09	-	-
F	Lappula occidentalis (a)	-	b18	a-	b25	ab12	.08	-	.31	.09
F	Machaeranthera canescens	b21	a7	a3	ab10	a3	.06	.04	.07	.00
F	Machaeranthera grindelioides	b8	a-	ab1	a-	a-	.00	.00	-	-
F	Medicago sativa	c58	b28	b25	a7	a4	1.70	.56	.30	.18
F	Penstemon humilis	a-	ab8	b15	a2	ab10	.07	.20	.06	.12
F	Penstemon sp.	-	4	-	-	-	.00	-	-	-
F	Phlox hoodii	ab8	ab14	b19	a-	a6	.61	.43	-	.03
F	Phlox longifolia	-	1	-	-	-	.00	-	-	-
F	Polygonum douglasii (a)	-	b10	a-	ab8	a2	.03	-	.02	.00
F	Schoenocrambe linifolia	3	3	-	-	-	.00	-	-	.00
F	Senecio multilobatus	3	-	-	4	-	-	-	.03	-
F	Sisymbrium altissimum (a)	-	2	-	6	-	.00	-	.04	-
F	Sphaeralcea coccinea	a24	b73	b61	b64	b68	.85	.37	1.20	1.37

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Taraxacum officinale	-	4	-	-	-	.01	-	-	-
F	Tragopogon dubius	1	-	-	-	-	-	-	-	-
F	Trifolium gymnocarpon	a ⁻	b ¹²	a ⁻	ab ¹¹	ab ⁶	.22	-	.19	.04
F	Unknown forb-perennial	4	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	73	0	76	36	0.47	0	0.63	0.22
Total for Perennial Forbs		225	204	161	121	114	4.00	2.08	2.08	1.90
Total for Forbs		225	277	161	197	150	4.48	2.08	2.71	2.13

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

BROWSE TRENDS--

Management unit 17, Study no: 51

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	74	56	47	73	9.66	8.36	8.59	9.15
B	Atriplex canescens	0	1	1	0	-	-	.38	-
B	Chrysothamnus depressus	3	6	1	2	.16	.21	.15	.15
B	Chrysothamnus nauseosus graveolens	0	4	0	7	-	.15	-	.21
B	Chrysothamnus nauseosus hololeucus	35	11	11	10	1.16	.06	.41	.21
B	Chrysothamnus parryi	0	19	22	23	-	1.02	1.28	1.22
B	Chrysothamnus viscidiflorus viscidiflorus	4	2	4	3	-	-	.03	-
B	Eriogonum corymbosum	3	2	3	3	.15	.15	-	.66
B	Gutierrezia sarothrae	13	15	1	4	.24	.24	-	.21
B	Juniperus osteosperma	0	4	4	0	-	.03	.18	-
B	Leptodactylon pungens	4	3	3	3	.15	.15	.00	.00
B	Opuntia sp.	6	8	5	4	.00	.18	.15	.30
B	Pediocactus simpsonii	1	0	1	1	.00	-	.03	.03
B	Pinus edulis	0	3	3	1	-	-	.03	-
Total for Browse		143	134	106	134	11.54	10.57	11.24	12.16

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 51

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	8.36	12.44
Atriplex canescens	.18	-
Chrysothamnus nauseosus graveolens	-	.30
Chrysothamnus nauseosus hololeucus	.43	.08
Chrysothamnus parryi	.95	1.00
Eriogonum corymbosum	.25	.33
Gutierrezia sarothrae	-	.15
Juniperus osteosperma	.31	-
Opuntia sp.	.03	.08
Pinus edulis	.31	.36

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 51

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	3.2	1.2

POINT-QUARTER TREE DATA--

Management unit 17, Study no: 51

Species	Trees per Acre				Average diameter (in)			
	'95	'00	'05	'10	'95	'00	'05	'10
Juniperus osteosperma	47	18	34	22	2.2	2.1	3.7	1.3
Pinus edulis	17	36	27	24	1.4	1.5	2.3	1.0

BASIC COVER--

Management unit 17, Study no: 51

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	8.50	2.25	29.18	35.20	28.07	34.27
Rock	0	.25	.04	.02	0	0
Pavement	0	0	.14	.80	.12	.14
Litter	56.00	55.75	44.87	59.80	33.79	50.95
Cryptogams	0	0	1.22	1.00	1.16	.65
Bare Ground	35.50	41.75	27.60	32.01	49.23	37.23

SOIL ANALYSIS DATA --

Management unit 17, Study no: 51, Study Name: Santaquins Cabin

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		% sand	% silt	% clay				
11.6	7.7	49.6	27.1	23.3	3.0	3.3	134.4	0.8

PELLET GROUP DATA--

Management unit 17, Study no: 51

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	18	24	27	25
Elk	6	2	28	19
Deer	47	55	37	50
Cattle	-	4	1	1

Days use per acre (ha)		
'00	'05	'10
-	-	-
4 (10)	52 (127)	32 (78)
139 (343)	60 (149)	22 (55)
9 (22)	6 (14)	4 (11)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 51

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>Artemisia tridentata wyomingensis</i>									
82	5665	51	49	0	5533	13	4	0	20/20
88	4398	48	42	9	-	55	23	11	22/23
95	3040	17	76	7	20	42	16	2	33/38
00	2320	19	73	8	120	32	4	4	18/24
05	2160	32	46	21	10940	19	30	19	25/30
10	5740	49	47	4	800	16	38	7	23/31
<i>Atriplex canescens</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	0	0	0	32/32
05	20	0	100	-	-	0	100	0	31/34
10	0	0	0	-	-	0	0	0	17/26
<i>Ceratoides lanata</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	18/22
10	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus depressus</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	300	0	100	0	-	0	0	0	6/15
00	260	0	92	8	-	38	15	0	1/5
05	20	0	100	0	-	0	0	0	-/-
10	40	0	100	0	-	0	0	0	4/23

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Chrysothamnus nauseosus graveolens										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	0	0	0	0	-	0	0	0	-/-	
00	80	0	50	50	-	0	0	25	23/23	
05	0	0	0	0	-	0	0	0	17/24	
10	260	8	85	8	-	15	0	8	19/22	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	0	-	0	0	0	-/-	
88	199	100	0	0	-	0	33	33	-/-	
95	2380	9	91	0	-	0	0	0	14/14	
00	260	31	69	0	-	8	0	15	17/18	
05	240	33	50	17	-	8	25	17	18/20	
10	220	0	100	0	-	0	0	0	22/25	
Chrysothamnus parryi										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	1880	2	98	-	-	43	1	0	5/8	
05	1240	11	89	-	220	0	5	0	7/10	
10	1480	4	96	-	-	0	0	0	10/11	
Chrysothamnus viscidiflorus viscidiflorus										
82	66	0	100	0	-	0	0	0	6/10	
88	0	0	0	0	-	0	0	0	-/-	
95	80	25	75	0	-	0	0	0	11/15	
00	40	0	50	50	-	0	0	50	-/-	
05	160	0	100	0	20	0	0	0	10/13	
10	60	0	100	0	-	0	0	0	13/16	
Eriogonum corymbosum										
82	66	0	100	0	-	0	0	0	15/16	
88	66	0	100	0	-	0	0	0	15/13	
95	80	25	75	0	-	0	0	0	16/30	
00	60	0	100	0	-	0	0	0	16/20	
05	60	33	67	0	-	33	33	0	13/18	
10	80	0	75	25	20	0	0	25	14/24	
Gutierrezia sarothrae										
82	0	0	0	-	-	0	0	0	-/-	
88	199	0	100	-	-	0	0	0	6/9	
95	680	6	94	-	-	0	0	0	9/11	
00	860	2	98	-	-	0	0	0	4/6	
05	120	0	100	-	20	0	0	0	7/12	
10	80	0	100	-	-	0	0	0	7/9	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Juniperus osteosperma										
82	0	0	0	-	-	0	0	0	-/-	
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	80	75	25	-	-	0	0	0	-/-	
05	100	60	40	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Leptodactylon pungens										
82	533	0	100	-	-	0	0	0	2/7	
88	0	0	0	-	-	0	0	0	-/-	
95	160	0	100	-	-	0	0	0	6/7	
00	240	0	100	-	-	0	0	0	3/6	
05	100	20	80	-	20	0	0	0	2/8	
10	140	0	100	-	-	0	0	0	4/6	
Opuntia sp.										
82	933	0	100	0	-	0	0	0	3/13	
88	1532	9	91	0	-	0	0	0	3/4	
95	120	0	100	0	-	0	0	0	6/14	
00	220	27	64	9	-	0	0	0	4/12	
05	140	14	86	0	-	0	0	0	4/12	
10	100	20	80	0	-	0	0	0	4/13	
Pediocactus simpsonii										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	20	0	100	-	-	0	0	0	1/2	
00	0	0	0	-	-	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	1/2	
10	20	0	100	-	-	0	0	0	1/3	
Pinus edulis										
82	0	0	0	-	-	0	0	0	-/-	
88	66	100	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	60	100	0	-	-	0	0	0	-/-	
05	60	67	33	-	-	0	0	0	-/-	
10	20	0	100	-	-	0	0	0	-/-	
Tetradymia canescens										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	14/12	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	21/27	