

LOWER SANTAQUIN DRAW - TREND STUDY NO. 17-50-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 6890 ft. (2101 m)

Aspect: East

Slope: 4%

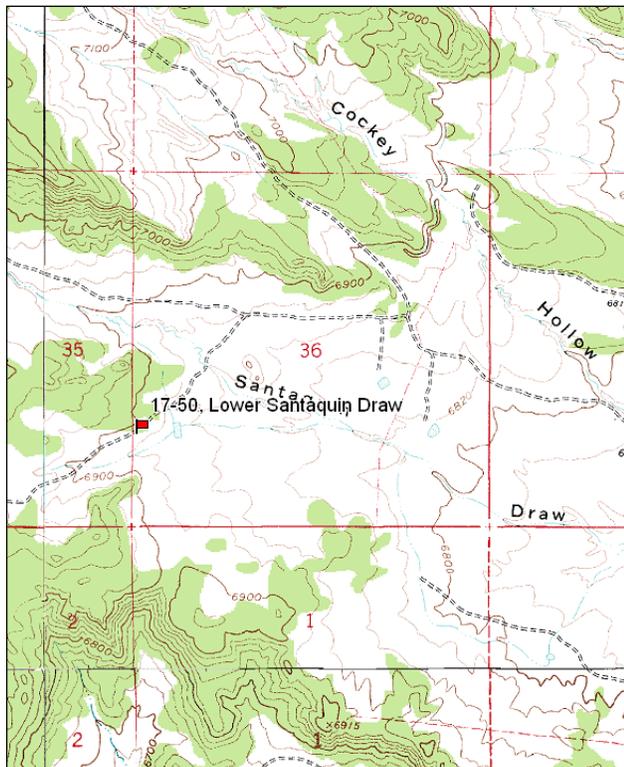
Transect bearing: 180° magnetic

Belt placement: line 1 (11 & 83ft), line 2 (38ft), line 3 (54ft), line 4 (79ft).

Directions:

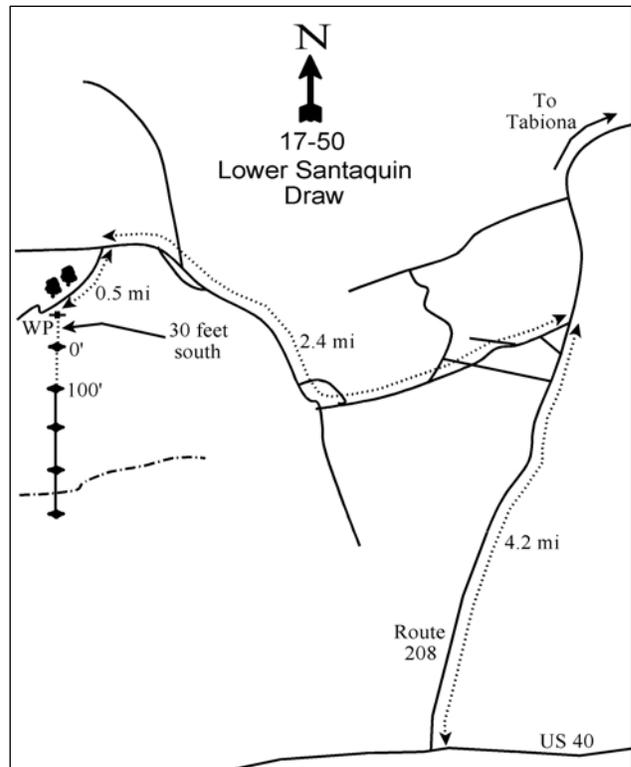
From Highway U.S. 40, take Route 208 towards Tabiona for 4.2 miles and turn west onto a dirt road. Go 2.4 miles on the main road towards Santaquin Draw. Take the road to the left for 0.5 miles to the next intersection to a group of juniper trees and a witness post. From the witness post the 0-foot stake is 30 feet to the south and is marked with browse tag #7021.

Map Name: Tabiona



Township: 2S Range: 8W Section: 35

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 521619 E 4456595 N

LOWER SANTAQUIN DRAW - TREND STUDY NO. 17-50

Site Information

Site Description: The study monitors a big sagebrush (*Artemisia tridentata* spp.) and grass community on deer and elk winter range in Lower Santaquin Draw. Low ridges covered with pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands are within the immediate proximity of the study site, providing important escape and thermal cover. The area is managed by the Utah Division of Wildlife Resources (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA), and has had many antler sheds, winter-killed deer and pellet groups observed during the sample years. Numerous jackrabbit pellets and cattle pats were also observed during study establishment in 1982. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. Pellet group transect data has estimated mostly light use by deer since 2000, with slightly more moderate use in 2005. Estimated use by elk has steadily increased from moderate use in 2000 to heavy use in 2010. Estimated cattle use has been light since 2000.

Browse: The key browse species consists of a moderately dense stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). The site contains sagebrush with characteristics of both mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) and Wyoming big sagebrush, but for ease all sagebrush was categorized as Wyoming big sagebrush. The population of big sagebrush is comprised of mostly mature plants with high amounts of decadence, though vigor is good. Recruitment of young big sagebrush plants has been good over the course of the study. Utilization of big sagebrush has been a mixture of moderate to heavy use. The only other palatable browse species is a small, but stable population of winterfat (*Ceratoides lanata*). Use of winterfat has been moderate to heavy. Less desirable browse species occur in low numbers and consist of narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*), broom snakeweed (*Gutierrezia sarothrae*) and pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are abundant, but are dominated by the introduced species crested wheatgrass (*Agropyron cristatum*). The perennial grass species thickspike wheatgrass (*A. dasystachyum*) and needle-and-thread (*Stipa comata*) are less abundant, but are fairly common. Forbs are fairly diverse, but are not very abundant. Timber poisonvetch (*Astragalus convallarius*), Hood's phlox (*Phlox hoodii*) and scarlet globemallow (*Sphaeralcea coccinea*) provide the majority of the forb cover (Table - Herbaceous Trends).

Soil: The soils are an alluvial deposited loam with slightly alkaline soil reactivity (pH 7.6) (Table - Soil Analysis Data). Bare ground cover is high, but there is good protective ground cover provided by sagebrush and crested wheatgrass (Table - Basic Cover). Sheet erosion is a factor and stream courses in the area tend to be rather deep, steep-sided gullies, effectively lowering the immediate area's water table. There are active gullies around the site and a single 4-foot gully near the end of the baseline. The soil erosion condition was classified as stable in 2010, but was slight in 2005 because of large frequent pedestals surrounding shrubs and perennial grasses, gullies covering less than 2% of the site, some minor soil and litter movement, as well as small rills and flow patterns between perennial species.

Trend Assessments

Browse:

- **1982 to 1988 - stable (0):** Density of the primary browse species, Wyoming big sagebrush, remained similar. Decadence increased from 25% to 44%, but poor vigor decreased from 34% to 3%. Recruitment of young sagebrush plants remained excellent at 27% of the population.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of Wyoming big sagebrush decreased to 8% and poor vigor remained low at 6%. Recruitment of young sagebrush plants decreased, but remained good at 16%.

- **1995 to 2000 - stable (0):** Wyoming big sagebrush density and cover decreased slightly, but the population remained healthy with good recruitment of young plants.
- **2000 to 2005 - down (-2):** The density of Wyoming big sagebrush decreased by 41% from 5,020 plants/acre to 2,960 plants/acre and cover decreased from 9% to 6%. Decadence of sagebrush increased from 22% to 41% and poor vigor increased from 13% to 30%. Recruitment of young sagebrush remained good at 18%, however.
- **2005 to 2010 - slightly down (-1):** There was a 16% decrease in the density of Wyoming big sagebrush to 2,500 plants/acre, though cover remained similar. Decadence of sagebrush decreased, but was still high at 34% and poor vigor increased to 37%.

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 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. Composition changed slightly, however, with a significant decrease in the nested frequency of sedge (*Carex sp.*) and a significant increase in the nested frequency of crested wheatgrass, thickspike wheatgrass and needle-and-thread.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial grasses remained similar, though cover increased from 13% to 17% due to an increase in the cover of crested wheatgrass.
- **2000 to 2005 - stable (0):** The perennial forb sum of nested frequency changed little, but cover increased to 20%, again primarily due to an increase in the cover of crested wheatgrass.
- **2005 to 2010 - stable (0):** The sum of nested frequency and cover of perennial grasses changed little. Needle-and-thread has steadily increased in nested frequency and cover since 2000.

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 - slightly up (+1):** The sum of nested frequency of perennial forbs increased by 12%.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 20% and cover decreased from 4% to 3%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover increased to 4%.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 25% and cover decreased to 2%.

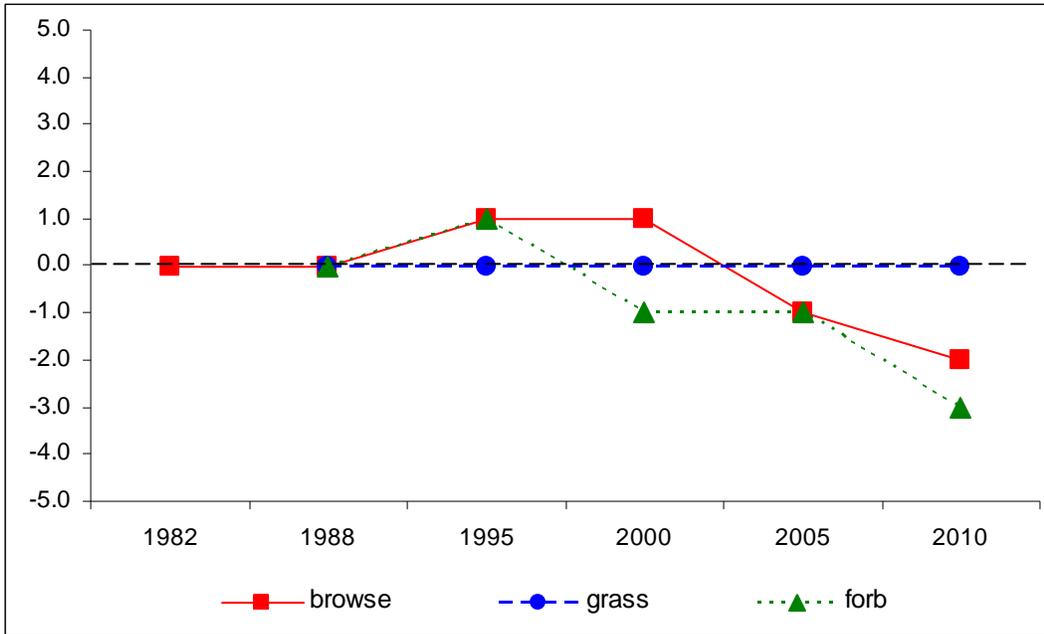
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 17, study no: 50

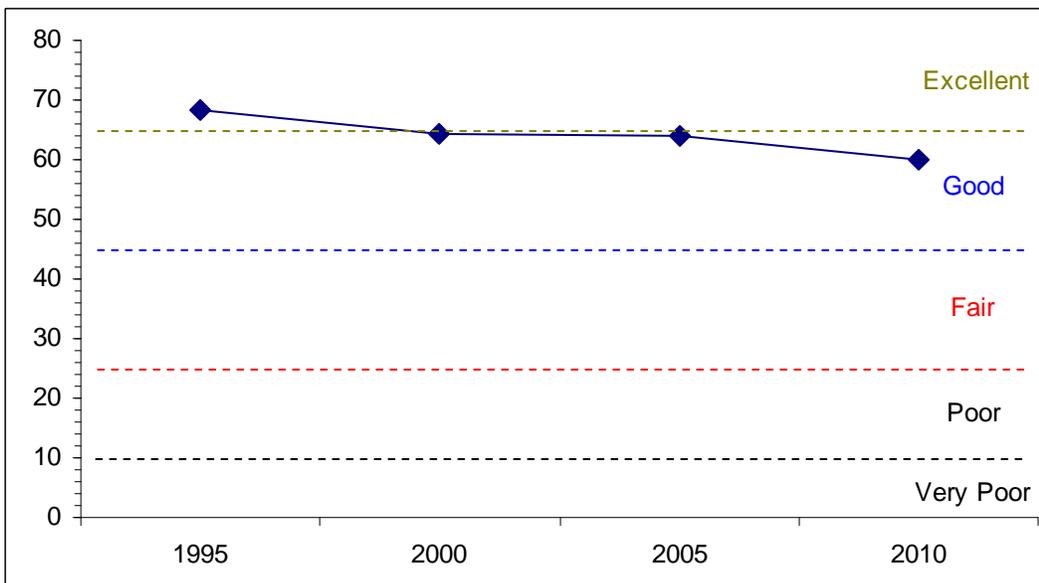
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	13.7	12.7	7.8	25.7	0.0	8.5	0.0	68.3	Excellent
00	13.3	9.0	6.9	30.0	0.0	5.2	0.0	64.4	Good-Excellent
05	9.5	5.4	10.6	30.0	0.0	8.6	0.0	64.1	Good-Excellent
10	9.1	6.1	10.9	30.0	0.0	3.9	0.0	59.9	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17, Study no: 50



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 17, Study no: 50



HERBACEOUS TRENDS--
Management unit 17, Study no: 50

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron cristatum</i>	bc307	d331	cd319	a263	ab283	12.21	16.75	18.44	18.58
G	<i>Agropyron dasystachyum</i>	a-	b13	bc9	bc30	c27	.02	.05	.47	.45
G	<i>Carex sp.</i>	b37	a9	a10	a5	a3	.07	.10	.01	.03
G	<i>Oryzopsis hymenoides</i>	ab15	a9	a2	b32	a6	.22	.04	.30	.04
G	<i>Poa secunda</i>	-	-	-	1	8	-	-	.03	.06
G	<i>Stipa comata</i>	a-	b13	ab7	b21	c51	.30	.06	.81	1.23
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		359	375	347	352	378	12.84	17.01	20.07	20.41
Total for Grasses		359	375	347	352	378	12.84	17.01	20.07	20.41
F	<i>Allium sp.</i>	-	2	-	-	-	.00	-	-	-
F	<i>Astragalus convallarius</i>	a4	b20	ab18	ab25	ab19	.78	.09	.31	.14
F	<i>Astragalus tenellus</i>	a-	b6	a-	ab4	a-	.19	-	.16	-
F	<i>Calochortus nuttallii</i>	-	3	-	4	3	.01	-	.01	.00
F	<i>Chenopodium leptophyllum(a)</i>	-	-	-	2	-	-	-	.00	-
F	<i>Cordylanthus kingii (a)</i>	-	1	-	-	-	.01	-	-	-
F	<i>Descurainia pinnata (a)</i>	-	a1	a-	b16	a-	.00	-	.08	-
F	<i>Draba sp. (a)</i>	-	5	-	-	-	.01	-	-	-
F	<i>Lappula occidentalis (a)</i>	-	a-	a-	b60	a1	-	-	1.76	.00
F	<i>Leucelene ericoides</i>	-	-	8	1	3	-	.04	.01	.00
F	<i>Lygodesmia grandiflora</i>	-	-	-	1	-	-	-	.00	-
F	<i>Machaeranthera canescens</i>	ab2	b10	a-	ab7	a-	.02	-	.07	-
F	<i>Phlox hoodii</i>	b79	b77	b72	a35	a25	2.02	1.77	.66	.51
F	<i>Phlox longifolia</i>	20	25	10	17	11	.06	.02	.21	.03
F	<i>Schoenocrambe linifolia</i>	2	3	-	4	-	.01	-	.01	-
F	<i>Senecio multilobatus</i>	1	-	-	-	-	-	-	-	-
F	<i>Sphaeralcea coccinea</i>	b143	ab121	a109	a106	a83	.98	.65	2.44	.81
F	<i>Tragopogon dubius</i>	-	-	1	-	-	-	.00	-	-
F	<i>Trifolium gymnocarpon</i>	a6	ab20	a11	b27	b29	.17	.02	.38	.43
Total for Annual Forbs		0	7	0	78	1	0.02	0	1.85	0.00
Total for Perennial Forbs		257	287	229	231	173	4.26	2.62	4.28	1.95
Total for Forbs		257	294	229	309	174	4.29	2.62	6.14	1.96

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

BROWSE TRENDS--

Management unit 17, Study no: 50

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	87	80	67	61	10.30	9.44	5.72	6.35
B	Ceratoides lanata	35	34	41	44	.62	1.03	1.88	.91
	Chrysothamnus depressus	0	1	0	0				
B	Chrysothamnus nauseosus graveolens	0	12	0	0	-	.69	-	-
B	Chrysothamnus nauseosus hololeucus	9	1	5	3	.33	.00	-	-
B	Chrysothamnus viscidiflorus stenophyllus	5	5	8	6	.31	.30	.31	.53
B	Gutierrezia sarothrae	3	1	0	2	.06	-	-	.03
B	Leptodactylon pungens	3	0	1	8	.01	-	.03	.18
B	Opuntia sp.	28	34	19	21	.44	.76	.91	.72
B	Pediocactus simpsonii	0	2	1	1	-	.00	-	-
B	Purshia tridentata	0	0	0	0	-	.15	-	-
Total for Browse		170	170	142	146	12.09	12.38	8.87	8.74

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 50

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	4.58	5.51
Ceratoides lanata	1.20	.61
Chrysothamnus nauseosus	-	.08
Chrysothamnus nauseosus graveolens	.15	-
Chrysothamnus nauseosus hololeucus	.10	-
Chrysothamnus viscidiflorus stenophyllus	.36	.15
Opuntia sp.	.08	.25

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 50

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.7	1.4
Ceratoides lanata	3.4	2.9

BASIC COVER--

Management unit 17, Study no: 50

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	6.50	7.00	32.09	31.07	31.29	31.58
Rock	0	0	.15	0	.00	.63
Pavement	0	0	.01	.02	.04	.04
Litter	58.50	53.00	39.47	40.61	25.48	41.29
Cryptogams	0	1.75	1.44	4.18	3.39	1.11
Bare Ground	35.00	38.25	32.60	44.56	49.93	45.15

SOIL ANALYSIS DATA --

Management unit 17, Study no: 50, Study Name: Lower Santaquin Draw

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
10.6	7.6	45.3	36.2	18.6	1.0	2.0	99.2	0.5

PELLET GROUP DATA--

Management unit 17, Study no: 50

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	4	15	12	3	-	-	-
Elk	17	28	45	17	31 (77)	41 (101)	52 (127)
Deer	29	15	31	31	15 (37)	28 (69)	11(28)
Cattle	-	4	2	4	8 (20)	-	6 (14)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 50

		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 wyomingensis</i>										
82	5065	25	50	25	1866	41	28	34	20/23	
88	4998	27	29	44	733	45	13	3	19/23	
95	5420	16	76	8	180	66	17	6	18/30	
00	5020	15	63	22	100	53	24	13	18/26	
05	2960	18	41	41	300	27	22	30	18/27	
10	2500	18	48	34	40	38	39	37	17/27	
<i>Ceratoides lanata</i>										
82	865	0	77	23	-	46	31	8	10/8	
88	1331	45	40	15	66	20	25	10	6/8	
95	1040	8	90	2	60	8	2	4	11/13	
00	1100	4	91	5	-	44	45	4	7/8	
05	1700	31	66	4	1840	35	22	1	9/13	
10	1960	48	52	0	40	23	22	4	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)	
Chrysothamnus depressus										
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	-	-	100	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
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	240	17	67	17	-	8	8	8	19/20	
05	0	0	0	0	-	0	0	0	16/15	
10	0	0	0	0	-	0	0	0	-/-	
Chrysothamnus nauseosus hololeucus										
82	0	0	0	0	-	0	0	0	-/-	
88	0	0	0	0	-	0	0	0	-/-	
95	200	10	80	10	-	0	0	10	20/21	
00	40	100	0	0	-	0	0	0	-/-	
05	120	0	67	33	-	33	17	33	17/18	
10	60	0	67	33	-	33	0	33	18/17	
Chrysothamnus viscidiflorus stenophyllus										
82	133	0	100	0	-	0	0	0	14/9	
88	332	40	40	20	-	0	0	20	24/15	
95	300	0	100	0	-	0	0	0	13/17	
00	280	0	100	0	20	0	0	0	8/18	
05	320	25	75	0	-	0	0	0	9/11	
10	220	36	55	9	-	45	9	9	10/14	
Eriogonum corymbosum										
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	7/14	
10	0	0	0	-	-	0	0	0	-/-	
Gutierrezia sarothrae										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	80	0	100	-	-	0	0	0	5/6	
00	20	0	100	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	6/10	
10	60	33	67	-	-	0	0	0	6/7	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Leptodactylon pungens										
82	1998	30	70	-	-	0	0	0	1/7	
88	0	0	0	-	-	0	0	0	-/-	
95	60	100	0	-	40	0	0	0	2/3	
00	0	0	0	-	60	0	0	0	-/-	
05	20	0	100	-	-	0	0	0	-/-	
10	240	8	92	-	-	8	0	17	2/5	
Opuntia sp.										
82	533	0	100	0	-	0	0	0	3/7	
88	865	23	38	38	66	8	0	69	3/8	
95	940	11	85	4	20	0	0	2	5/11	
00	1180	12	80	8	-	0	0	8	4/9	
05	520	4	88	8	20	0	0	4	4/12	
10	520	4	92	4	-	0	0	4	4/11	
Pediocactus simpsonii										
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	40	50	0	50	-	0	0	50	0/2	
05	20	0	100	0	-	0	0	0	1/2	
10	20	0	100	0	-	0	0	0	2/2	