

SLACKPILE - TREND STUDY NO. 16B-17-09

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Upland Loam \(Basin Big Sagebrush\), R047XA308UT](#)

Land Ownership: DWR

Elevation: 6,600 ft (2,012 m)

Aspect: North

Slope: 5%-8%

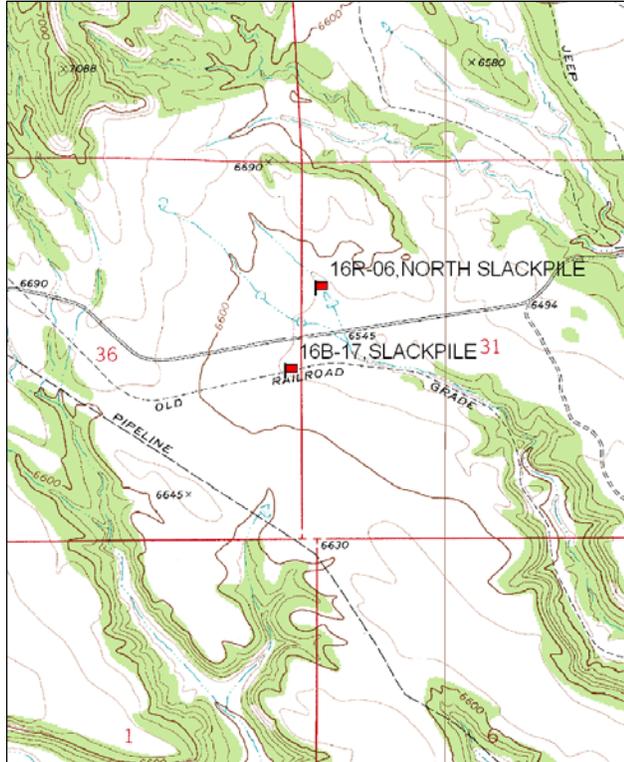
Transect bearing: Line 1 & 2 - 165°M, Line 3 & 4 - 163°M

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

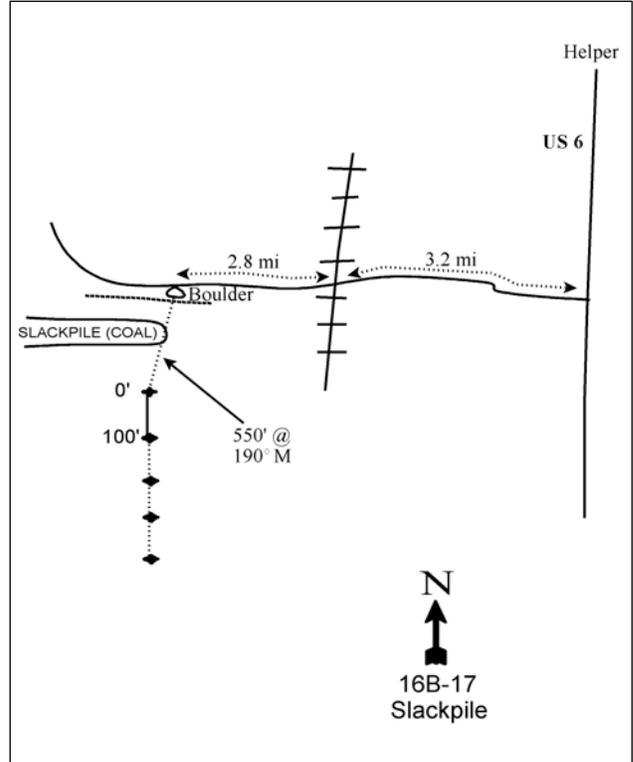
On US 6 south of Helper, turn west onto Consumers Road. Proceed west 3.2 miles to the railroad tracks. Cross the tracks and continue 2.8 miles to a large boulder on the left. The study is located in the sagebrush south of the fence. Walk 550 feet at 190°M from the boulder to the start of the frequency baseline. The first stake is marked with a red browse tag, #9022.

Map Name: Standardville



Township: 13S , Range: 8E, Section: 36

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 502829 E 4388997 N

## SLACKPILE - TREND STUDY NO. 16B-17

### Site Information

Site Description: The study samples a sagebrush/grass site owned by the Utah Division of Wildlife Resources. Similar sagebrush-grass communities cover an extensive part of the Gordon Creek range, an important wintering area for large numbers of deer. The Division allows spring cattle grazing on two pastures, one south of Consumers road and another north of the road. Each pasture is grazed every other year. North Slackpile (16R-6) was established to monitor the north pasture, while this site monitors the south pasture. Pellet group data has indicated that deer use has been consistently heavy on the site. Estimated cattle use was moderate in 1999, but light since 2004 (Table - Pellet Group Data).

Browse: The key browse species is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). There was a large die-off of sagebrush in 2004, likely related to drought conditions in prior years, but good seedling production and recruitment of young sagebrush plants helped to reestablish the population by 2009. The sagebrush population is still maturing since the die-off, and is comprised primarily of young sagebrush plants. The average height/crown of mature sagebrush plants also decreased in 2009, indicating a younger population. Prior to the die-off, decadence of Wyoming big sagebrush was high, but decreased substantially in 2009. Utilization of Wyoming big sagebrush was mostly moderate to heavy from 1987 to 2004, with lighter use in 2009 (Table - Browse Characteristics).

Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) is the most abundant shrub in both cover and density on the site. Density and cover of rabbitbrush also decreased markedly in 2004, but had recovered in 2009. Most of the rabbitbrush is small (Table - Browse Trends, Table - Browse Characteristics). Other browse sampled on the site were black sagebrush (*Artemisia nova*) and broom snakeweed (*Gutierrezia sarothrae*).

Herbaceous Understory: Species diversity and abundance of grasses is normal for a site like this. The native perennial grasses, bluebunch wheatgrass (*Agropyron spicatum*), blue grama (*Bouteloua gracilis*), and Indian ricegrass (*Oryzopsis hymenoides*), are the dominant grasses in cover and frequency on the site. Other important grasses include salina wildrye (*Elymus salina*) and needle-and-thread (*Stipa comata*). Forbs are diverse, but not very abundant on the site. Scarlet globemallow (*Sphaeralcea coccinea*) is the dominant forb on the site, with longleaf phlox (*Phlox longifolia*) and hollyleaf clover (*Trifolium gymnocarpon*) also being common (Table - Herbaceous Trends).

Soil: Soil texture is a loam with a slightly alkaline pH and a moderately deep effective rooting depth. Phosphorus (5.1 ppm) and potassium (44.8 ppm) (Table - Soil Analysis Data) have a low availability for plant development and growth (Tiedemann and Lopez 2004). There is a considerable amount of bare ground on the site ranging from 40%-62% since 1988. Cryptogam cover has fluctuated over the sample years (Table - Basic Cover). The soil erosion condition was classified as slight in 2004 and 2009, primarily due to the pedestaling of plants.

### Trend Assessments

#### Browse:

- **1988 to 1994 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. Decadence and poor vigor of Wyoming big sagebrush increased to 57% and 13%, respectively. Recruitment of young sagebrush plants decreased to only 2% of the population.
- **1994 to 1999 - stable (0):** There was little change in the density of Wyoming big sagebrush, but cover increased from 5% to 8%. Decadence of Wyoming big sagebrush decreased to 36% and recruitment of young sagebrush plants improved slightly, but is still low.

- **1999 to 2004 - down (-2):** There was a large die-off of Wyoming big sagebrush as the density decreased from 2,800 plants/acre to just 600 plants/acre. Decadence of Wyoming big sagebrush increased to 88% and poor vigor increased to 67%. This large decrease in density is attributed to drought conditions in the few years prior to the 2004 sampling.
- **2004 to 2009 - up (+2):** The Wyoming big sagebrush population has rebounded to a density of 8,880 plants/acre. Most of the population is comprised of young plants and the average height/crown of mature Wyoming big sagebrush plants has decreased from previous sample years. Decadence and poor vigor of Wyoming big sagebrush decreased substantially.

Grass:

- **1988 to 1994 - stable (0):** There was a slight decrease of 7% in the sum of nested frequency of perennial grasses. There was a significant increase in the nested frequency of bluebunch wheatgrass.
- **1994 to 1999 - slightly down (-1):** The sum of nested frequency of perennial grasses continued to decline, this time by 8%. Cover of perennial grasses decreased from 15% to 12%.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased by 35% and cover decreased to 4%. There was a significant decrease in the nested frequency of bluebunch wheatgrass.
- **2004 to 2009 - up (+2):** The sum of nested frequency of perennial grasses increased to 1994 levels and cover increased to 9%. There was a significant increase in nested frequency of salina wildrye and needle-and-thread.

Forb:

- **1988 to 1994 - down (-2):** The sum of nested frequency of perennial forbs decreased by 50%. There was a significant decrease in the nested frequency of several important perennial forbs.
- **1994 to 1999 - up (+2):** The sum of nested frequency of perennial forbs increased markedly, but did not reach 1988 levels. Cover of perennial forbs increased from 1% to 2%.
- **1999 to 2004 - up (+2):** The sum of nested frequency of perennial forbs increased by 23% to 1988 levels. Cover of perennial forbs increased to 5%.
- **2004 to 2009 - down (-2):** The sum of nested frequency decreased by 26%, returning to 1999 levels. Cover of perennial forbs decreased to 3%. There was a significant increase in the nested frequency of scarlet globemallow.

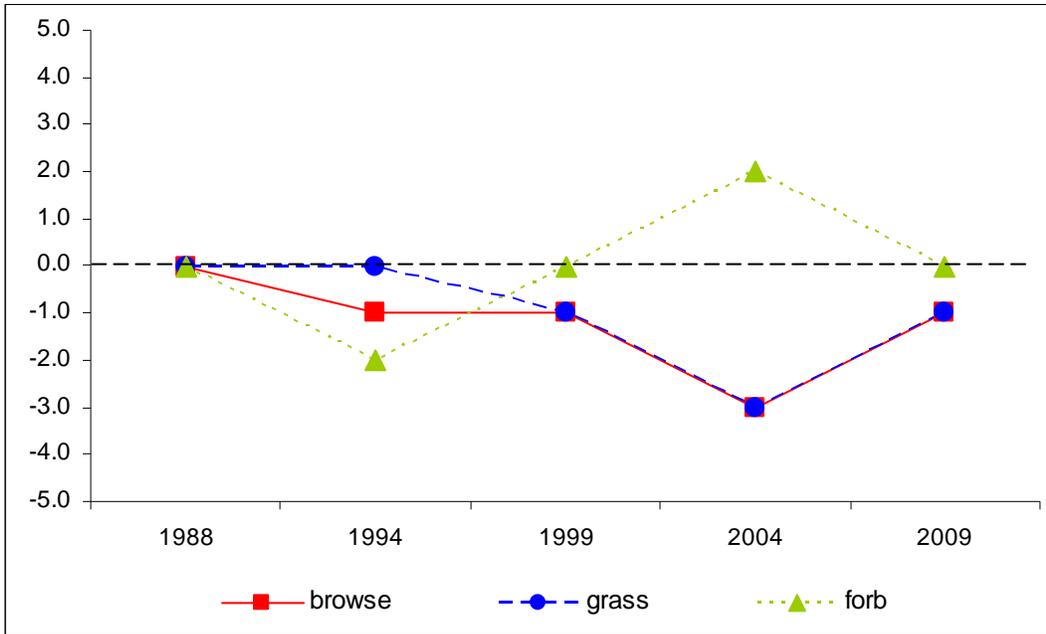
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 16B, study no: 17

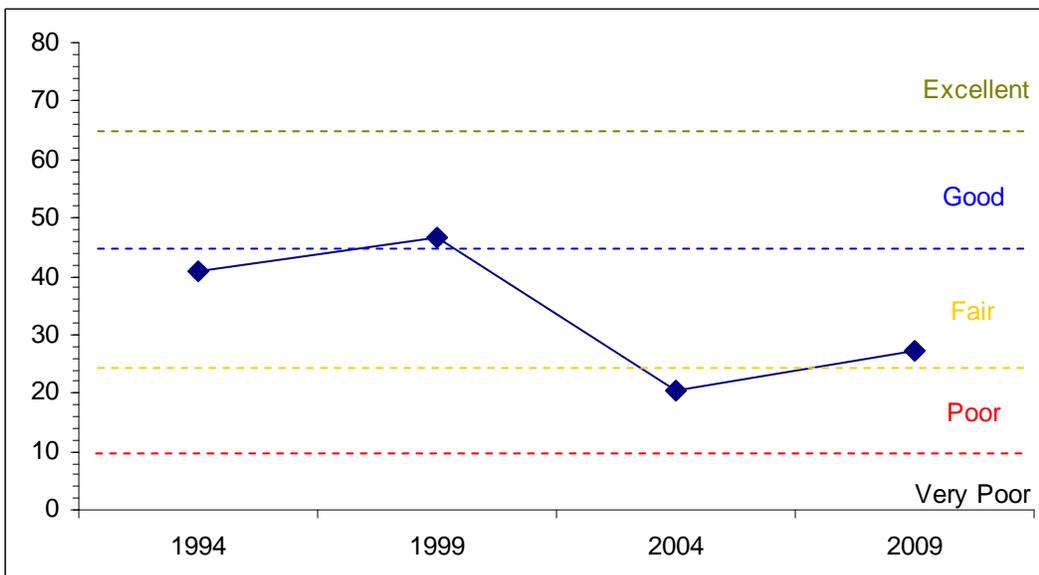
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	7.2	-0.8	2.5	29.4	0.0	2.6	0.0	<b>40.9</b>	Fair
99	9.9	4.7	4.3	23.2	0.0	4.4	0.0	<b>46.5</b>	Fair-Good
04	1.8	0.0	0.0	8.5	0.0	10.0	0.0	<b>20.3</b>	Poor
09	4.2	0.0	0.0	17.9	0.0	5.1	0.0	<b>27.1</b>	Fair

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
Management unit 16B, Study no: 17



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE  
Management unit 16B, Study no: 17



HERBACEOUS TRENDS--

Management unit 16B, Study no: 17

Type	Species	Nested Frequency					Average Cover %			
		'88	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron smithii	a-	a-	a-	a-	b14	-	-	-	.27
G	Agropyron spicatum	a127	b211	b235	a97	a134	10.30	8.85	1.50	2.72
G	Bouteloua gracilis	a-	b37	b30	b30	b34	1.72	1.22	2.04	2.76
G	Bromus tectorum (a)	-	-	-	-	3	-	-	-	.01
G	Elymus salina	a-	ab17	ab20	a3	b27	.51	.87	.00	.73
G	Oryzopsis hymenoides	ab95	ab81	a53	ab81	b107	1.77	.57	.27	1.75
G	Poa fendleriana	-	3	3	3	5	.01	.03	.00	.03
G	Sitanion hystrix	b172	ab26	a7	a-	ab9	.29	.04	-	.06
G	Stipa comata	a15	a6	a3	a14	b61	.06	.03	.40	.59
Total for Annual Grasses		0	0	0	0	3	0	0	0	0.00
Total for Perennial Grasses		409	381	351	228	391	14.68	11.61	4.23	8.96
Total for Grasses		409	381	351	228	394	14.68	11.61	4.23	8.97
F	Alyssum alyssoides (a)	-	-	-	-	3	-	-	-	.00
F	Arabis sp.	6	-	5	-	-	-	.01	-	.00
F	Astragalus convallarius	b44	a5	b35	b48	a5	.01	.08	.65	.04
F	Calochortus nuttallii	a1	a-	ab19	b82	a-	-	.05	.30	-
F	Castilleja linariaefolia	a1	a-	b13	b8	ab8	-	.20	.02	.10
F	Chenopodium leptophyllum(a)	-	a-	a-	b51	a2	-	-	.28	.00
F	Collinsia parviflora (a)	-	-	5	-	-	-	.01	-	-
F	Comandra pallida	-	-	-	-	1	-	-	-	.00
F	Convolvulus arvensis	-	-	-	3	-	-	-	.00	-
F	Delphinium nuttallianum	-	-	-	-	-	-	-	-	.00
F	Descurainia pinnata (a)	-	a-	a-	b13	a-	-	-	.07	-
F	Eriogonum cernuum (a)	-	-	-	3	-	-	-	.01	-
F	Eriogonum umbellatum	a-	a3	b10	a3	a3	.15	.16	.15	.15
F	Gayophytum ramosissimum(a)	-	a-	a-	b46	a7	-	-	.60	.02
F	Helianthella uniflora	-	-	-	-	1	-	-	-	.00
F	Lappula occidentalis (a)	-	-	-	5	2	-	-	.15	.01
F	Machaeranthera grindelioides	ab9	ab10	b19	a2	a1	.07	.07	.18	.03
F	Orthocarpus sp. (a)	b46	a-	a-	a3	a-	-	-	.01	-
F	Penstemon caespitosus	c43	b23	a-	a-	a-	.11	-	-	-
F	Penstemon carnosus	a-	a-	c31	b17	b18	-	.13	.12	.10
F	Phlox austromontana	a3	b29	b32	a2	a2	.36	.70	.00	.00
F	Phlox longifolia	c235	ab106	a88	b131	ab131	.25	.25	.72	.40
F	Physaria sp.	-	-	1	-	-	-	.00	-	-
F	Polygonum douglasii (a)	-	a-	a-	b80	a3	-	-	.43	.01
F	Potentilla sp.	-	-	2	-	-	-	.03	-	-
F	Ranunculus testiculatus (a)	-	a-	a-	a5	b116	-	-	.01	.44
F	Schoenocrambe linifolia	a-	a-	a9	ab9	b19	-	.03	.05	.05
F	Sphaeralcea coccinea	a44	a45	a49	a68	b105	.35	.20	1.94	1.48
F	Thlaspi montanum	-	-	2	-	-	-	.00	-	-
F	Tragopogon dubius	-	-	-	-	1	-	-	-	.00
F	Trifolium gymnocarpon	c59	a-	bc47	c64	b32	-	.24	.86	.14

Type	Species	Nestled Frequency					Average Cover %			
		'88	'94	'99	'04	'09	'94	'99	'04	'09
F	Zigadenus paniculatus	-	-	-	7	3	-	-	.02	.00
	Total for Annual Forbs	46	0	5	206	133	0	0.01	1.57	0.49
	Total for Perennial Forbs	445	221	362	444	330	1.31	2.19	5.04	2.53
	Total for Forbs	491	221	367	650	463	1.31	2.21	6.62	3.03

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 17

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia nova	4	3	2	5	.76	.38	.00	.56
B	Artemisia tridentata wyomingensis	74	73	25	75	5.03	7.57	1.45	2.76
B	Ceratoides lanata	0	0	0	1	-	-	-	.00
B	Chrysothamnus nauseosus	0	0	0	1	-	-	-	.00
B	Chrysothamnus viscidiflorus viscidiflorus	90	95	76	100	6.42	8.37	3.90	12.40
B	Echinocereus sp.	0	3	0	0	-	.00	-	-
B	Gutierrezia sarothrae	42	27	7	51	.17	.30	.03	1.04
B	Opuntia sp.	17	19	15	16	.22	.37	.39	.38
B	Pediocactus simpsonii	0	0	1	0	-	-	.00	-
B	Sclerocactus sp.	0	1	0	0	-	.00	-	-
	Total for Browse	227	221	126	249	12.63	17.00	5.79	17.15

#### CANOPY COVER, LINE INTERCEPT--

Management unit 16B, Study no: 17

Species	Percent Cover	
	'04	'09
Artemisia nova	-	.05
Artemisia tridentata wyomingensis	.76	1.76
Chrysothamnus viscidiflorus viscidiflorus	3.01	17.53
Gutierrezia sarothrae	-	.83
Opuntia sp.	-	.16

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16B, Study no: 17

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata wyomingensis	2.9	1.7

BASIC COVER--

Management unit 16B, Study no: 17

Cover Type	Average Cover %				
	'88	'94	'99	'04	'09
Vegetation	4.50	28.70	30.32	17.02	26.75
Rock	0	.06	.00	.04	0
Pavement	.50	.09	.01	.19	.00
Litter	29.25	25.67	21.25	29.62	26.46
Cryptogams	10.00	2.78	9.93	1.43	.85
Bare Ground	55.75	40.50	42.94	62.46	57.06

SOIL ANALYSIS DATA --

Management unit 16B, Study no: 17, Study Name: Slackpile

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
18	7.5	39.3	34.2	26.6	1.5	5.1	44.8	0.6

PELLET GROUP DATA--

Management unit 16B, Study no: 17

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	8	54	25	51
Elk	4	2	-	5
Deer	48	59	61	55
Cattle	1	6	2	1

Days use per acre (ha)		
'99	'04	'09
-	-	-
-	-	-
65 (160)	52 (139)	49 (121)
23 (57)	7 (18)	9 (23)

BROWSE CHARACTERISTICS--  
Management unit 16B, Study no: 17

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 nova</i>									
88	0	0	0	0	-	0	0	0	-/-
94	160	25	50	25	-	50	0	13	16/34
99	220	0	82	18	-	27	64	0	7/14
04	80	0	0	100	-	0	0	25	9/15
09	100	40	40	20	-	60	0	20	9/15
<i>Artemisia tridentata wyomingensis</i>									
88	2998	27	31	42	199	40	44	4	13/18
94	2800	2	41	57	-	52	7	13	16/23
99	2800	9	55	36	-	31	42	10	18/27
04	660	3	9	88	6440	39	45	67	18/21
09	8880	71	23	6	3840	22	20	4	13/15
<i>Atriplex canescens</i>									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	14/47
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	37/24
09	0	0	0	-	-	0	0	0	26/31
<i>Ceratoides lanata</i>									
88	66	100	0	-	66	100	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	0	100	0	8/6
<i>Chrysothamnus nauseosus</i>									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	0	100	0	7/5
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
88	53798	82	17	0	1999	3	.12	0	6/9
94	12620	3	97	0	-	0	0	.15	5/12
99	19040	18	81	0	560	23	6	.31	4/9
04	4820	13	87	0	133300	2	.82	.41	7/9
09	48040	20	80	1	400	5	5	.16	5/9

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>Echinocereus</i> sp.									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	60	0	100	-	-	0	0	0	2/4
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
88	13398	18	78	3	133	0	0	.99	7/7
94	1400	0	100	0	-	0	0	0	8/5
99	2000	1	99	0	-	0	0	0	4/3
04	280	0	100	0	-	0	0	0	6/6
09	3520	12	83	5	-	0	0	2	5/7
<i>Opuntia</i> sp.									
88	399	67	33	0	66	0	0	33	3/7
94	440	0	100	0	-	0	0	0	4/13
99	540	19	59	22	20	0	4	19	3/13
04	520	12	85	4	40	0	0	4	4/9
09	620	10	87	3	100	0	0	0	3/11
<i>Pediocactus simpsonii</i>									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	2/2
09	0	0	0	-	-	0	0	0	-/-
<i>Pinus edulis</i>									
88	0	0	0	-	66	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Sclerocactus</i> sp.									
88	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-