

SOUTH PLAIN - TREND STUDY NO. 14-23-09

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Yearlong

NRCS Ecological Site Description: [Upland Loam \(Basin Big Sagebrush\), R035XY306UT](#)

Land Ownership: BLM

Elevation: 6,300 ft (1,920 m)

Aspect: North

Slope: 5%

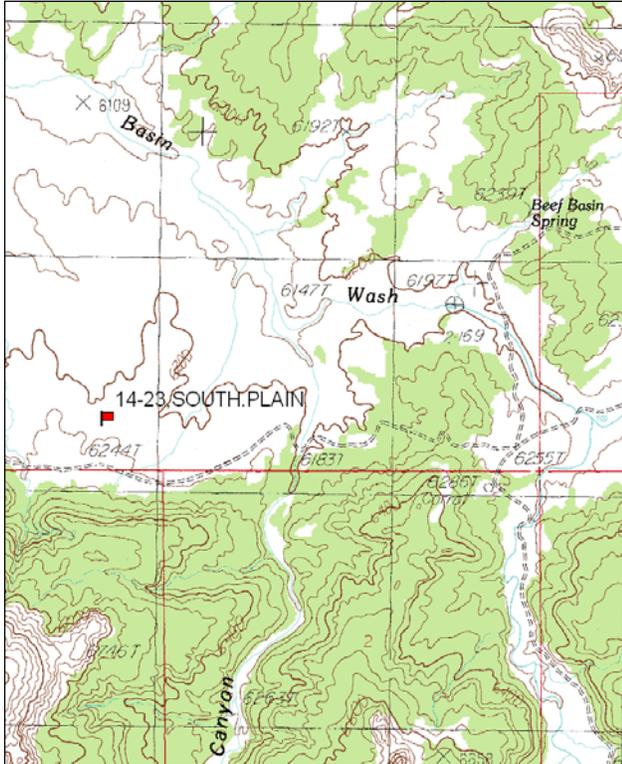
Transect bearing: 165 degrees magnetic

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

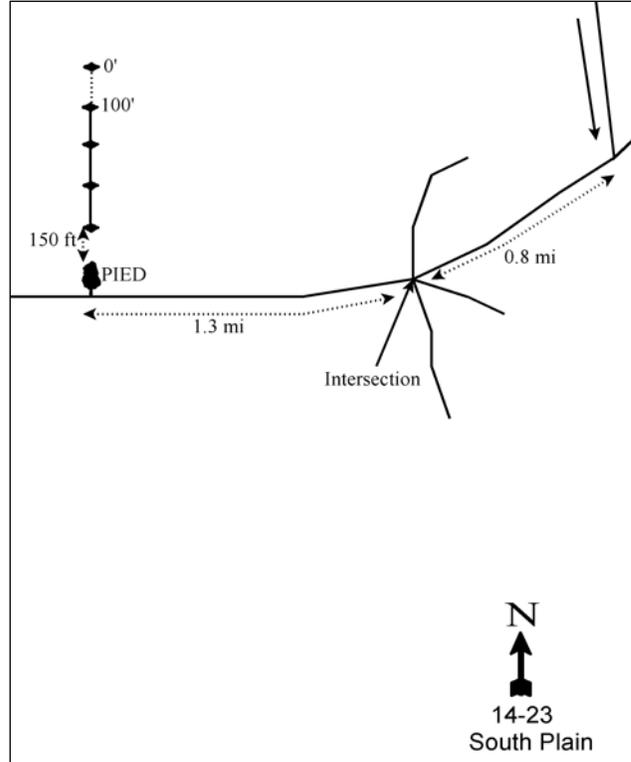
Directions:

At the junction of the Elk Ridge-Salt Creek Mesa-Beef Basin Roads, go north down into the Beef Basin area. Follow the main road for 9.1 miles, passing the FS/BLM boundary down to an intersection where there is a BLM register box. Stay left on County Road #104 and proceed 1.45 miles to the turnoff to an enclosure. Stay left for 0.45 miles to a fork. Stay right again and go 0.4 miles to a fork. Go right at the intersection with the Beef Basin Canyon Road and go 0.8 miles to a 5-way intersection. Take west fork straight through the intersection (left fork goes to Indian ruins) and continue 1.3 miles to a large pinyon pine on the right. Stop here. The 400-stake of the transect starts 150 feet north of the pinyon.

Map Name: Warren Canyon



Diagrammatic Sketch:



Township: 32S, Range: 18E, Section: 34

GPS: NAD 83, UTM 12S 594698 E 4200481 N

Site Information

Site Description: The study is located in the southern part of Beef Basin, in an area known as South Plain. The whole flat is surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) covered hills and slickrock. There is very little vegetation cover over two feet in height out in the flat. Besides heavy winter-spring use by deer, Beef Basin also receives heavy grazing pressure from cattle. There are plans for additional water developments to help distribute livestock use to the north part of the basin. Deer pellet groups were numerous in 1986 with no elk sign observed. A DWR pellet group transect in the area shows years of continuous high use by deer (Jense et al. 1987, Jense et al. 1992, Hodson 2000). Pellet group data taken along the study site baseline estimated heavy use by deer in 1999, but decreased to more moderate use since 2004. Estimated cattle use was light in 1999 and 2004, but increased to heavy use in 2009. Elk use was sampled for the first time at light use in 2009 (Table - Pellet Group Data).

Browse: A moderately dense stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominated the area at the outset of the study in 1986. However, the stand was overly mature, heavily hedged and in poor vigor, and has decreased in cover (Table - Browse Trends) and density since 1992. Decadence and poor vigor have remained high in the population in all sample years. Recruitment of young sagebrush plants decreased markedly between 1992 and 1999, and has remained low. Utilization of sagebrush has been very heavy in all sample years (Table - Browse Characteristics). The livestock enclosure in Beef Basin is a dramatic example of overuse and subsequent decline of sagebrush compared to a protected stand in the total enclosure.

Other preferred browse species on the study site are winterfat (*Ceratoides lanata*) and fourwing saltbush (*Atriplex canescens*). Winterfat is selected by both cattle and deer, and both winterfat and fourwing saltbush show signs of heavy hedging but still maintain good vigor and low decadence (Table - Browse Characteristics). Narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*) is also common. There are also a few scattered pinyon pine and juniper throughout the site and into the flat.

Herbaceous Understory: Grasses are an important part of the community, providing more than twice as much ground cover as the shrubs. The most abundant perennial include blue gramma (*Bouteloua gracilis*), needle-and-thread (*Stipa comata*), and sand dropseed (*Sporobolus cryptandrus*). The annual species cheatgrass (*Bromus tectorum*) is abundant on the site, though nested frequency and cover of cheatgrass have fluctuated with precipitation patterns. Cheatgrass provided 88% of the grass cover in 1999, but both cover and nested frequency have decreased steadily since then. Perennial forbs are relatively scarce and provide little forage on the site (Table - Herbaceous Trends).

Soil: The soil is a light red sandy loam with a slightly alkaline pH and deep effective rooting depth. Phosphorus has limited availability for plant growth and development at 5.3 (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Litter and soil are building under plants, however, the average bare ground cover increased in 2004 and is fairly high (Table - Basic Cover). The soil erosion condition was classified as moderate in 2009 due to pedestaling of plants, gullies, flow patterns, and surface litter and soil movement.

Trend Assessments

Browse:

- **1986 to 1992 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1992; therefore, trend was determined using other parameters. Decadence of sagebrush increased from 47% to 81% and poor vigor increased from 36% to 61%.
- **1992 to 1999 - down (-2):** The density of the primary browse species, Wyoming big sagebrush, decreased by 67% from 3,520 plants/acre to 1,160 plants/acre, and cover decreased from 5% to 2%. Decadence and poor vigor remained very high, and recruitment of young sagebrush decreased.

- **1999 to 2004 - down (-2):** The density of sagebrush decreased 48% to 600 plants/acre and cover decreased to 1%. Decadence of sagebrush decreased slightly, but decadence and poor vigor remained high. There was no new recruitment of young sagebrush plants.
- **2004 to 2009 - stable (0):** There was a slight decrease in the density of sagebrush, though cover remained similar. Decadence of sagebrush decreased from 77% to 67%, but poor vigor increased from 60% to 67%. There was no recruitment of young sagebrush plants.

Grass:

- **1986 to 1992 - up (+2):** The sum of nested frequency of perennial grasses increased 28% with a significant increase in the nested frequency of blue grama and bottlebrush squirreltail (*Sitanion hystrix*).
- **1992 to 1999 - down (-2):** There was a 54% decrease in the sum of nested frequency of perennial grasses and cover decreased from 26% to 4%. There was a significant increase in the nested frequency of cheatgrass and cover increased from 2% to 26%. Bottlebrush squirreltail, sand dropseed, and blue grama all had a significant decrease in nested frequency.
- **1999 to 2004 - up (+2):** The sum of nested frequency of perennial grasses increased 44% and cover increased to 11%. Cheatgrass decreased significantly in nested frequency and cover decreased to 10%. There was a significant increase in the nested frequency of blue grama.
- **2004 to 2009 - up (+2):** There was a 29% increase in the sum of nested frequency of perennial grasses and cover increased to 19%. Cheatgrass decreased significantly in nested frequency and cover continued to decrease to 1%. There was a significant increase in the nested frequency of needle-and-thread.

Forb:

- **1986 to 1992 - slightly down (-1):** There was a slight decrease in the sum of nested frequency of perennial forbs due to a significant decrease in the nested frequency of low fleabane (*Erigeron pumilus*). Forbs are extremely rare on the site.
- **1992 to 1999 - stable (0):** There was little change in the sum of nested frequency or cover of perennial forbs.
- **1999 to 2004 - stable (0):** There was little change in the sum of nested frequency or cover of perennial forbs. There was a significant decrease in the nested frequency of woolly milkvetch (*Astragalus mollissimus*).
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency or cover of perennial forbs. There was a significant increase in the nested frequency of woolly milkvetch.

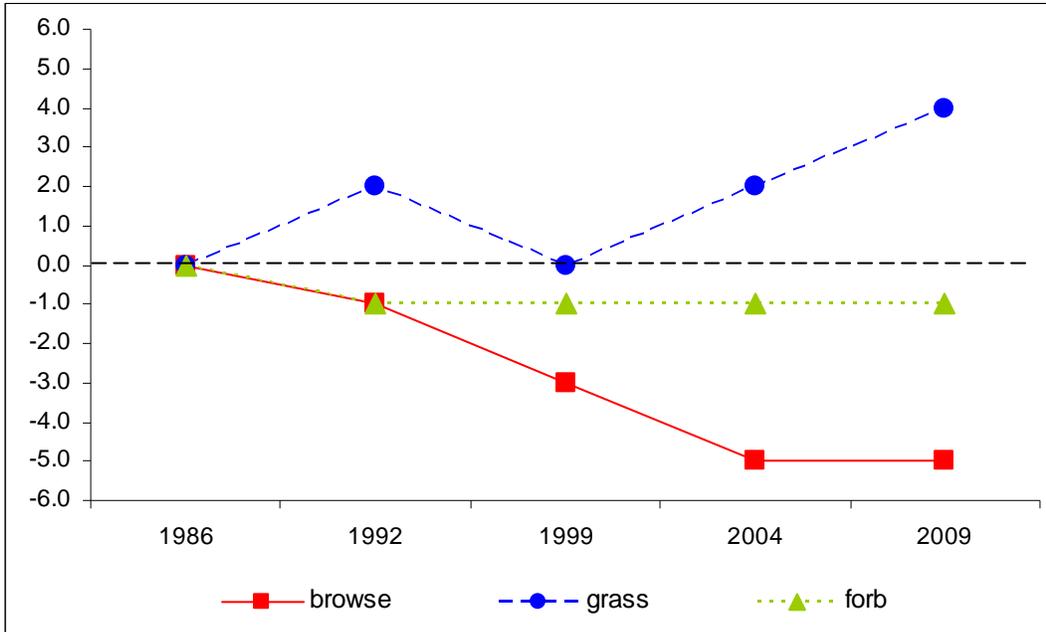
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 14, study no: 23

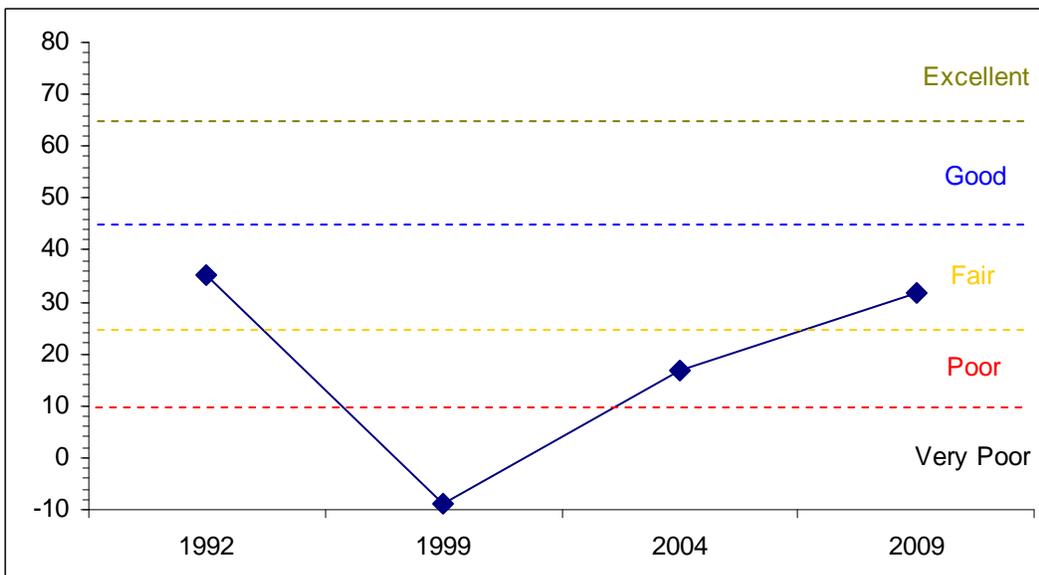
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
92	6.2	0.0	0.0	30.0	-1.5	0.5	0.0	35.2	Fair
99	3.4	0.0	0.0	7.2	-19.9	0.4	0.0	-8.9	Very Poor
04	1.8	0.0	0.0	21.6	-7.2	0.4	0.0	16.7	Poor
09	2.0	0.0	0.0	30.0	-0.9	0.7	0.0	31.7	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 14, Study no: 23



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE
Management unit 14, Study no: 23



HERBACEOUS TRENDS--

Management unit 14, Study no: 23

T y P e	Species	Nested Frequency					Average Cover %			
		'86	'92	'99	'04	'09	'92	'99	'04	'09
G	<i>Bouteloua gracilis</i>	_b 141	_c 192	_a 58	_b 100	_b 132	18.76	1.20	5.47	7.96
G	<i>Bromus tectorum</i> (a)	-	_a 27	_d 336	_c 268	_b 146	1.95	26.46	9.62	1.24
G	<i>Oryzopsis hymenoides</i>	-	7	2	12	11	.21	.03	.16	.34
G	<i>Sitanion hystrix</i>	_b 42	_c 96	_b 48	_{ab} 36	_a 11	1.10	.46	.41	.16
G	<i>Sporobolus cryptandrus</i>	_c 95	_c 92	_a 20	_{ab} 42	_{bc} 66	4.32	.32	2.07	2.98
G	<i>Stipa comata</i>	_{ab} 67	_a 54	_{ab} 74	_b 100	_c 153	1.50	1.57	2.70	7.08
G	<i>Vulpia octoflora</i> (a)	-	_b 21	_a 5	_a 1	_a -	.10	.01	.00	-
Total for Annual Grasses		0	48	341	269	146	2.06	26.47	9.63	1.24
Total for Perennial Grasses		345	441	202	290	373	25.90	3.60	10.82	18.54
Total for Grasses		345	489	543	559	519	27.97	30.07	20.45	19.78
F	<i>Antennaria rosea</i>	-	-	-	1	-	-	-	.00	-
F	<i>Astragalus mollissimus</i>	_b 9	_b 18	_b 12	_a -	_b 10	.06	.06	-	.03
F	<i>Calochortus nuttallii</i>	-	1	-	-	-	.00	-	-	-
F	<i>Chenopodium leptophyllum</i> (a)	-	11	-	1	1	.03	-	.00	.00
F	<i>Collinsia parviflora</i> (a)	-	-	-	10	-	-	-	.02	-
F	<i>Descurainia pinnata</i> (a)	-	-	1	5	-	-	.00	.02	-
F	<i>Erigeron pumilus</i>	_b 35	_a 7	_a 2	_a 2	_a 3	.06	.06	.03	.00
F	<i>Eriogonum cernuum</i> (a)	-	4	-	-	-	.01	-	-	-
F	<i>Gayophytum ramosissimum</i> (a)	-	-	5	-	-	-	.01	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	-	4	-	-	-	.04	-
F	<i>Machaeranthera canescens</i>	12	8	7	1	-	.07	.09	.00	-
F	<i>Phlox austromontana</i>	-	3	-	3	6	.03	-	.15	.30
F	<i>Phlox longifolia</i>	-	-	2	5	-	-	.00	.01	-
F	<i>Plantago patagonica</i> (a)	-	_{ab} 18	_{bc} 28	_c 35	_a 1	.03	.16	.45	.00
F	<i>Sphaeralcea coccinea</i>	2	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	33	34	55	2	0.07	0.18	0.53	0.00
Total for Perennial Forbs		58	37	23	12	19	0.24	0.21	0.20	0.34
Total for Forbs		58	70	57	67	21	0.31	0.40	0.74	0.35

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

BROWSE TRENDS--

Management unit 14, Study no: 23

Type	Species	Strip Frequency				Average Cover %			
		'92	'99	'04	'09	'92	'99	'04	'09
B	Artemisia tridentata wyomingensis	60	38	22	21	4.69	2.00	.99	.91
B	Atriplex canescens	3	2	3	4	.00	.15	.15	.33
B	Ceratoides lanata	10	7	5	5	.30	.53	.33	.33
B	Chrysothamnus viscidiflorus stenophyllus	47	51	42	45	3.82	4.67	4.76	6.00
B	Gutierrezia sarothrae	0	1	0	0	-	.00	-	-
B	Juniperus osteosperma	0	1	0	0	-	.03	-	-
B	Opuntia sp.	6	4	6	6	.15	.15	.06	.04
B	Pinus edulis	0	2	1	1	.85	.63	.85	.38
B	Sclerocactus whipplei	5	8	6	5	.04	.12	.12	.06
Total for Browse		131	114	85	87	9.87	8.31	7.27	8.06

CANOPY COVER, LINE INTERCEPT--

Management unit 14, Study no: 23

Species	Percent Cover	
	'04	'09
Artemisia tridentata wyomingensis	.68	.50
Atriplex canescens	.90	.88
Ceratoides lanata	.66	.40
Chrysothamnus viscidiflorus stenophyllus	5.31	7.53
Opuntia sp.	.06	-
Pinus edulis	1.04	1.93
Sclerocactus whipplei	.05	.13

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 14, Study no: 23

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata wyomingensis	1.4	1.3
Atriplex canescens	2.2	1.9
Ceratoides lanata	3.4	1.6

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 23

Species	Trees per Acre		
	'99	'04	'09
Juniperus osteosperma	10	<18	23
Pinus edulis	11	<18	29

Average diameter (in)	Average diameter (in)		
	'99	'04	'09
Juniperus osteosperma	6.8	-	2.0
Pinus edulis	7.7	-	4.7

BASIC COVER--

Management unit 14, Study no: 23

Cover Type	Average Cover %				
	'86	'92	'99	'04	'09
Vegetation	9.50	39.09	37.93	32.02	29.15
Rock	0	1.76	.06	.00	0
Pavement	0	0	.65	.33	.75
Litter	52.75	30.99	34.20	24.15	41.15
Cryptogams	0	.68	.33	.38	.11
Bare Ground	37.75	33.59	33.42	52.01	51.55

SOIL ANALYSIS DATA --

Management unit 14, Study no: 23, Study Name: South Plain

Effective rooting depth (in)	pH	sandy loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
19.8	7.6	60	23.4	16.6	0.8	5.3	67.2	0.4

PELLET GROUP DATA--

Management unit 14, Study no: 23

Type	Quadrat Frequency				Days use per acre (ha)		
	'92	'99	'04	'09	'99	'04	'09
Rabbit	25	28	9	21	-	-	-
Elk	-	-	2	-	-	1 (2)	3 (8)
Deer	47	47	32	17	76 (188)	40 (99)	32 (79)
Cattle	1	6	17	11	13 (32)	17 (43)	52 (129)

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 23

		Age class distribution						Utilization		
Y	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Artemisia tridentata wyomingensis										
86	2998	0	53	47	-	0	96	36	19/23	
92	3520	18	2	81	20	19	77	61	-/-	
99	1160	2	7	91	140	22	66	52	18/23	
04	600	7	17	77	-	0	93	60	17/24	
09	540	0	33	67	-	15	52	67	12/19	
Atriplex canescens										
86	0	0	0	0	-	0	0	0	-/-	
92	60	0	100	0	-	67	0	0	-/-	
99	40	0	100	0	-	0	0	0	39/58	
04	60	0	100	0	20	67	33	0	41/59	
09	100	0	80	20	-	20	40	0	34/46	

		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>Ceratoides lanata</i>										
86	932	0	36	64	-	36	64	0	11/8	
92	640	66	6	28	20	25	53	13	-/-	
99	400	0	95	5	-	0	100	5	16/12	
04	440	18	82	0	20	18	64	0	11/11	
09	540	19	74	7	20	11	22	7	9/14	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
86	2331	23	17	60	199	17	6	23	12/14	
92	2320	31	52	17	-	9	0	22	-/-	
99	1920	4	77	19	-	13	2	3	18/28	
04	1500	0	80	20	-	0	0	16	16/27	
09	1600	1	78	21	-	0	0	15	15/28	
<i>Gutierrezia sarothrae</i>										
86	0	0	0	-	-	0	0	0	-/-	
92	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	100	0	0	9/10	
04	0	0	0	-	-	0	0	0	7/7	
09	0	0	0	-	-	0	0	0	7/9	
<i>Juniperus osteosperma</i>										
86	0	0	0	-	-	0	0	0	-/-	
92	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
86	0	0	0	0	-	0	0	0	-/-	
92	200	100	0	0	60	0	0	30	-/-	
99	80	25	75	0	20	0	0	0	6/13	
04	220	0	91	9	-	0	0	9	4/12	
09	260	23	69	8	-	0	0	8	4/13	
<i>Pinus edulis</i>										
86	0	0	0	-	66	0	0	0	-/-	
92	0	0	0	-	-	0	0	0	-/-	
99	40	0	100	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	
<i>Sclerocactus whipplei</i>										
86	0	0	0	-	-	0	0	0	-/-	
92	100	60	40	-	20	0	0	0	-/-	
99	160	0	100	-	-	0	0	0	4/6	
04	120	0	100	-	-	0	0	0	5/6	
09	100	0	100	-	-	0	0	0	5/6	