

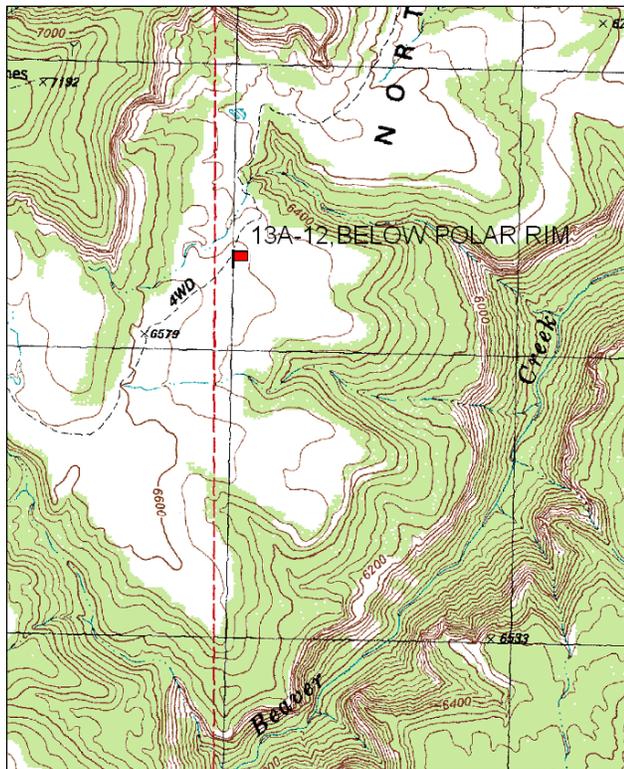
BELOW POLAR RIM - TREND STUDY NO. 13A-12-09

Vegetation Type: Chained, Seeded P-J
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Not Available
Land Ownership: BLM
Elevation: 6,500 ft (1,981 m)
Aspect: Southeast
Slope: 5%
Transect bearing: 165 degrees magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft)

Directions:

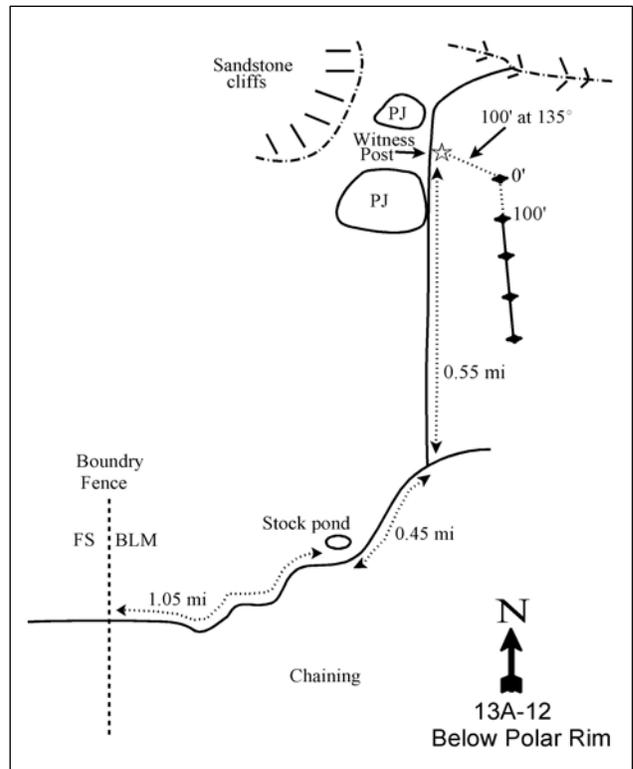
From the intersection of La Sal Mountain Loop and Gateway roads, travel east towards Gateway, Colorado for 7.7 miles to the North Beaver Mesa turnoff. Turn left and go 4.2 miles to the Polar Mesa/Fisher Valley road. Continue straight through this fork, over a cattleguard and 0.85 miles to a stockpond and study 13A-12-87. Continue 0.45 miles to a fork by another stockpond. Turn right, go 0.35 miles to an intersection. Turn left and proceed 0.6 miles to a boundary fence. Continue on the road 1.05 miles, winding through the large chaining, to a stock pond. Cross the pond and continue 0.45 miles to a fork. Keep left on the main road and continue 0.55 miles to a fence post on the right side of the road. The 0-foot baseline stake, tagged #7857, is 100 feet away at 85°M.

Map Name: Dolores Point North



Township: 25S, Range: 25E, Section: 1

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 664940 E 4280500 N

BELOW POLAR RIM - TREND STUDY NO. 13A-12

Site Information

Site Description: The study is on a 1,540 acre treatment on lower Beaver Mesa that was two-way-chained and seeded in 1969. This BLM land is part of the Taylor allotment and is grazed by cattle from winter to spring. Pellet group data shows estimated elk use to have declined from high use in 1999 to light to moderate use in 2009. Estimated deer use has been light to moderate since 1999. Estimated cattle use on the site has also decreased from high use in 1999 to more light to moderate use in 2009 (Table - Pellet Group Data).

Browse: The key browse species on this chaining is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) providing an average cover of 12% since 1994. Cover of big sagebrush has increased in that same time span (Table - Browse Trends). The density of big sagebrush was very high early in the study, but it appears the population went through a period of self thinning. Decadence and vigor of sagebrush have been good over the duration of the study. Recruitment of young sagebrush plants has fluctuated over sample years, but has been mostly good. Utilization of sagebrush is mostly moderate with some heavy use (Table - Browse Characterization).

There are a few scattered pinyon pine (*Pinus edulis*) trees on the site at low densities. Though point-quarter estimates do not show a decrease in density of pinyon between 2004 and 2009, there was a decrease in the average basal diameter of pinyon (Table - Point-Quarter Tree Data). The photo transect shows a die-off of some of the large pinyon trees on the site over these sample years. There are also a few scattered fourwing saltbush (*Atriplex canescens*) and green ephedra (*Ephedra verididis*) plants on the site.

Herbaceous Understory: The dominant grass on the site is the native warm season grass blue grama (*Bouteloua gracilis*). Sandberg bluegrass (*Poa secunda*) and the seeded species, crested wheatgrass (*Agropyron cristatum*), are the next most common grasses, and these three species provide the majority of grass cover on the site. Other fairly common grasses include needle-and-thread (*Stipa comata*) and cheatgrass (*Bromus tectorum*). Cover and frequency of perennial grasses has fluctuated over the sample years (Table - Herbaceous Trends).

Forbs were fairly diverse and abundant at the outset of the study, however, frequency and cover of forbs has declined drastically over the sample years. The most common forb is scarlet globemallow (*Sphlaeralcea coccinea*) (Table - Herbaceous Trends).

Soil: The soil is a sandy clay loam with a neutral reaction (pH 6.7) and an effective rooting depth is 15 inches. Percent organic matter is quite low (1.6 %) and amount of phosphorous in the soil has marginal availability to plant growth and development at 6.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover has stayed fairly consistent at an average of 41% since the outset of the study. The herbaceous species and litter provide some protective cover from erosion (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **198 to 1994 - stable (0):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. Sagebrush decadence and vigor remained good in the population. Recruitment of young sagebrush plants decreased.
- **1994 to 1999 - slightly down (-1):** There may have been some identification problems between young and mature form classes on this site, with large fluctuations in density of both classes. The sagebrush population also appears to be maturing and going through a period of self thinning. Density of sagebrush decreased by 21% to 10,900 plants/acre, but cover increased from 10% to 12%. The

average height/crown of sagebrush also increased. Recruitment of young sagebrush plants increased markedly, and comprised 40% of the population.

- **1999 to 2004 - stable (0):** Though there was a large decrease in the total density of sagebrush plants, the density of mature sagebrush plants remained similar. Cover of sagebrush increased slightly to 13% with vigor and decadence remaining good in the population. Recruitment of young sagebrush plants was less than 1% of the population.
- **2004 to 2009 - slightly up (+1):** Density of sagebrush increased 16% to 7,640 plants/acre, and cover remained similar. Sagebrush decadence and vigor have remained good in the population, and recruitment of young sagebrush plants increased to 7% of the population.

Grass:

- **1987 to 1994 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. There was a significant decrease in the nested frequency of bottlebrush squirreltail (*Sitanion hystrix*).
- **1994 to 1999 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 19%, though cover increased slightly. There was a significant decrease in the nested frequency of needle-and-thread grass.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial grasses decreased by 23% and cover decreased from 17% to 10%. There was a significant decrease in the nested frequency of crested wheatgrass and needle-and-thread grass. Annual grass species frequency and cover have also decreased on the site.
- **2004 to 2009 - up (+2):** The sum of nested frequency and cover of perennial grasses increased to 1999 levels. Most of the increase came from the significant increase in nested frequency of Sandberg bluegrass.

Forb:

- **1987 to 1994 - stable (0):** There was little change in the sum of nested frequency of perennial forbs.
- **1994 to 1999 - down (-2):** The sum of nested frequency of perennial forbs decreased by 37%, though cover increased slightly.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial forbs decreased by 47%, and cover decreased to 1%. There was a significant decrease in the nested frequency of scarlet globemallow.
- **2004 to 2009 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 11% and cover decreased to less than 1%.

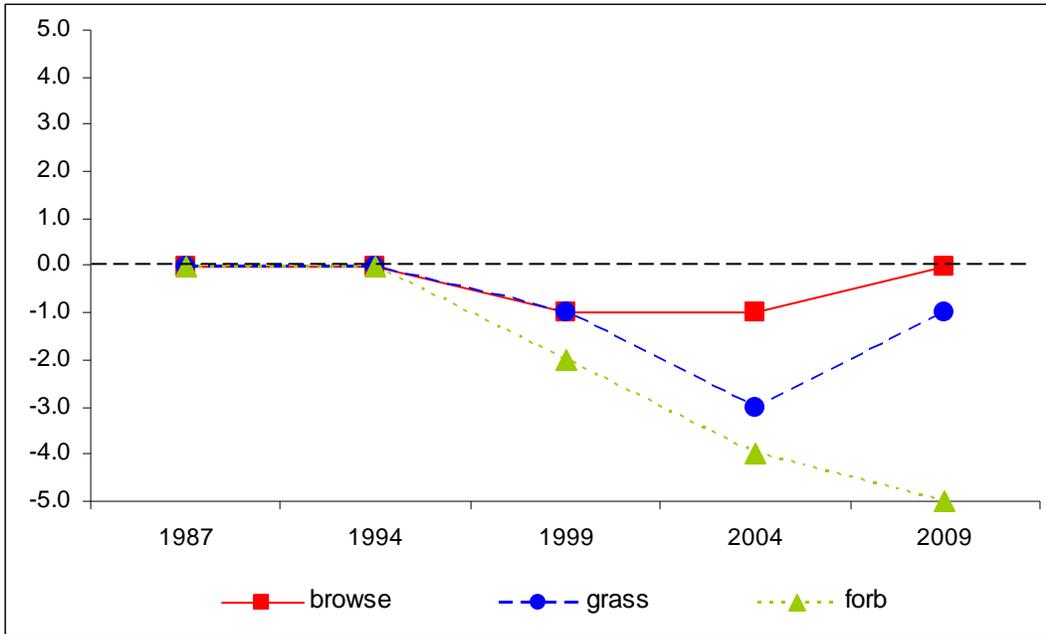
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 13A, study no: 12

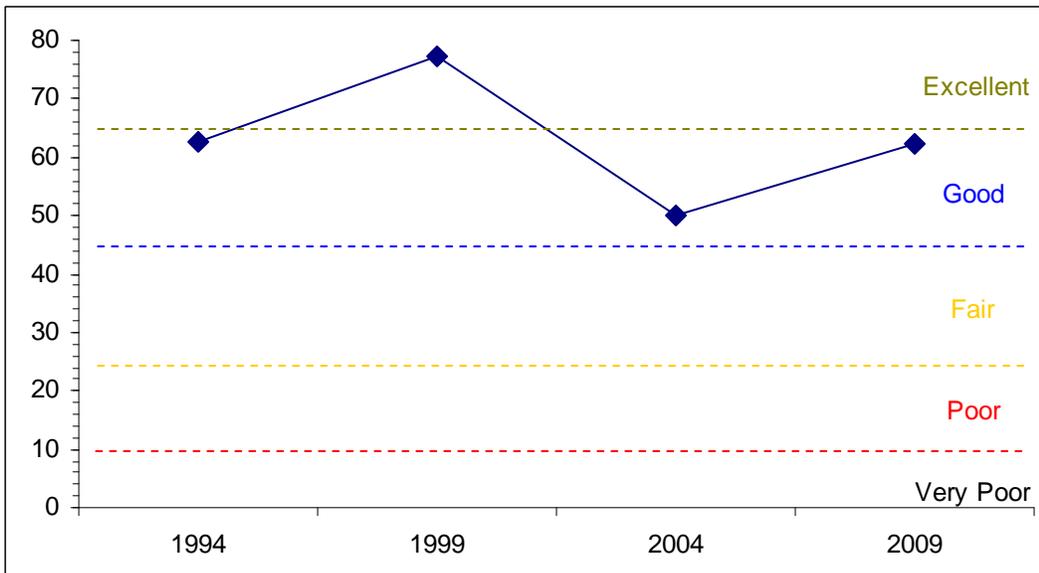
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	13.8	14.2	0.9	29.7	-0.6	4.7	0.0	62.7	Good
99	15.1	12.3	15.0	30.0	-1.4	6.1	0.0	77.2	Excellent
04	16.7	11.4	0.0	19.6	-0.1	2.5	0.0	50.1	Good
09	16.9	11.4	3.5	30.0	-0.4	0.9	0.0	62.4	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 13A, Study no: 12



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE
Management unit 13A, Study no: 12



HERBACEOUS TRENDS--

Management unit 13A, Study no: 12

T y P e	Species	Nested Frequency					Average Cover %			
		'87	'94	'99	'04	'09	'94	'99	'04	'09
G	Agropyron cristatum	b ₁₃₉	b ₁₄₅	b ₁₂₆	a ₅₆	a ₇₇	3.17	3.07	.69	2.50
G	Bouteloua gracilis	212	177	201	202	222	6.89	9.97	6.67	8.28
G	Bromus tectorum (a)	-	53	40	22	26	.32	.50	.08	.33
G	Hilaria jamesii	c ₂₂	bc ₂₂	abc ₁₃	a ⁻	ab ₂	.09	.13	.00	.00
G	Poa secunda	a ₁₀₄	a ₁₁₂	a ₉₂	a ₁₂₅	b ₂₁₃	.97	2.25	1.71	4.98
G	Sitanion hystrix	b ₃₅	a ₁₇	a ₁₅	a ⁻	a ₃	.08	.13	-	.03
G	Sporobolus cryptandrus	-	6	4	4	5	.18	.18	.04	.06
G	Stipa comata	c ₁₈₃	c ₂₀₁	b ₁₀₁	a ₃₈	a ₃₉	3.44	1.04	.67	.53
G	Vulpia octoflora (a)	-	c ₁₆₈	b ₈₀	a ₈	a ₃	.44	1.30	.02	.15
Total for Annual Grasses		0	221	120	30	29	0.75	1.80	0.10	0.47
Total for Perennial Grasses		695	680	552	425	561	14.84	16.78	9.80	16.40
Total for Grasses		695	901	672	455	590	15.60	18.59	9.90	16.88
F	Astragalus cicer	abc ₃₉	c ₅₂	bc ₄₃	ab ₁₈	a ₁₄	.24	.21	.18	.02
F	Astragalus convallarius	-	5	2	3	7	.01	.03	.00	.02
F	Calochortus nuttallii	b ₄₆	a ₄	a ⁻	a ₃	a ⁻	.01	-	.01	-
F	Castilleja sp.	a ⁻	b ₂₅	a ⁻	a ⁻	a ⁻	.10	-	-	-
F	Draba reptans (a)	-	b ₁₃₉	a ⁻	a ₁	a ⁻	.30	-	.00	-
F	Erigeron pumilus	c ₆₇	b ₃₈	bc ₅₈	a ⁻	a ₃	.22	.92	-	.01
F	Gilia sp. (a)	-	c ₈₅	a ⁻	b ₁₈	a ⁻	.20	-	.03	-
F	Lappula occidentalis (a)	-	-	-	4	-	-	-	.01	-
F	Lomatium sp.	3	-	-	-	-	-	-	-	-
F	Medicago sativa	6	4	2	-	-	.18	.21	-	-
F	Microsteris gracilis (a)	-	b ₄₉	a ₄	a ₁₇	a ⁻	.10	.00	.04	-
F	Oenothera albicaulis (a)	5	-	-	-	-	-	-	-	-
F	Phlox longifolia	b ₇₆	b ₇₁	a ₂₂	a ₁₇	a ₂₇	.18	.09	.07	.11
F	Plantago patagonica (a)	-	bc ₉₆	b ₇₃	c ₁₂₀	a ⁻	.20	.53	.40	-
F	Potentilla gracilis	a ⁻	b ₃₈	a ⁻	a ⁻	a ⁻	.26	-	-	-
F	Sphaeralcea coccinea	b ₁₃₅	b ₁₃₁	b ₁₁₀	a ₇₅	a ₆₁	1.12	1.60	.92	.30
F	Tragopogon dubius	b ₁₀	a ₉	a ⁻	b ₁₀	a ⁻	.01	-	.05	-
Total for Annual Forbs		5	369	77	160	0	0.81	0.53	0.49	0
Total for Perennial Forbs		382	377	237	126	112	2.37	3.07	1.24	0.46
Total for Forbs		387	746	314	286	112	3.18	3.61	1.73	0.46

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

BROWSE TRENDS--

Management unit 13A, Study no: 12

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia tridentata wyomingensis	92	88	84	89	9.97	12.05	13.34	13.38
B	Atriplex canescens	1	2	1	1	1.00	.03	.00	.15
B	Eriogonum microthecum	7	4	7	3	.07	.03	.03	.00
B	Gutierrezia sarothrae	5	4	9	1	.15	.00	.36	.00
B	Opuntia sp.	20	20	21	22	.29	.05	.25	.37
B	Pediocactus simpsonii	0	0	8	2	-	-	.05	.01
B	Pinus edulis	0	4	6	3	1.27	5.05	3.89	3.22
B	Sclerocactus whipplei	0	8	0	3	-	.03	-	.00
Total for Browse		125	130	136	124	12.77	17.25	17.93	17.13

CANOPY COVER, LINE INTERCEPT--

Management unit 13A, Study no: 12

Species	Percent Cover		
	'99	'04	'09
Artemisia tridentata wyomingensis	-	18.63	21.23
Eriogonum microthecum	-	.28	.11
Gutierrezia sarothrae	-	.35	-
Opuntia sp.	-	.30	.21
Pediocactus simpsonii	-	-	.03
Pinus edulis	3.40	5.50	5.01
Sclerocactus whipplei	-	-	.03

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 13A, Study no: 12

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata wyomingensis	1.1	0.7

POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 12

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	20	<20	<20	1.0	-	-
Pinus edulis	71	47	47	3.3	4.4	2.3

BASIC COVER--

Management unit 13A, Study no: 12

Cover Type	Average Cover %				
	'87	'94	'99	'04	'09
Vegetation	12.25	34.09	36.44	29.85	35.18
Rock	0	.00	0	0	0
Pavement	0	0	.01	.00	0
Litter	42.25	30.93	31.25	34.56	32.34
Cryptogams	5.00	1.81	4.96	4.73	4.15
Bare Ground	40.50	38.21	38.89	44.86	42.11

SOIL ANALYSIS DATA --

Management unit 13A, Study no: 12, Study Name: Below Polar Rim

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.1	6.7	58.9	19.8	21.3	1.6	6.5	60.8	0.3

PELLET GROUP DATA--

Management unit 13A, Study no: 12

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'04	'09	'99	'04	'09
Rabbit	30	22	30	25	-	-	-
Horse	-	2	-	-	-	1 (2)	-
Elk	39	37	18	28	94 (232)	33 (83)	17 (43)
Deer	8	18	8	5	13 (32)	19 (46)	9 (23)
Cattle	-	6	7	5	52 (128)	31 (75)	17 (43)

BROWSE CHARACTERISTICS--

Management unit 13A, Study no: 12

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 tridentata wyomingensis									
87	7732	71	25	4	533	21	7	.86	20/31
94	13800	2	95	3	-	2	0	10	15/21
99	10900	40	51	9	380	47	14	.91	18/31
04	6580	0	88	12	160	58	10	4	18/27
09	7640	7	81	12	40	67	16	3	17/28
Atriplex canescens									
87	0	0	0	-	-	0	0	0	-/-
94	40	0	100	-	20	100	0	0	20/24
99	80	0	100	-	-	0	0	0	21/13
04	20	0	100	-	-	0	100	0	17/14
09	20	0	100	-	-	100	0	0	11/16

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>Eriogonum microthecum</i>									
87	0	0	0	0	-	0	0	0	-/-
94	360	0	100	0	-	0	0	0	4/10
99	120	50	50	0	-	0	0	0	11/8
04	200	0	100	0	-	10	70	0	8/7
09	220	0	91	9	-	0	0	0	7/6
<i>Gutierrezia sarothrae</i>									
87	0	0	0	0	-	0	0	0	-/-
94	100	0	80	20	-	0	0	0	8/9
99	140	43	57	0	-	0	0	0	8/12
04	340	6	94	0	-	0	0	0	8/10
09	40	0	0	100	-	0	0	100	6/9
<i>Opuntia sp.</i>									
87	1265	32	58	11	199	0	0	21	3/13
94	620	0	97	3	20	10	0	0	3/9
99	560	32	57	11	20	0	0	11	4/9
04	600	10	87	3	-	0	0	3	5/12
09	960	4	92	4	-	0	0	8	4/12
<i>Pediocactus simpsonii</i>									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	200	10	90	-	-	0	0	0	1/3
09	40	0	100	-	40	0	0	0	1/2
<i>Pinus edulis</i>									
87	0	0	0	-	133	0	0	0	-/-
94	0	0	0	-	-	0	0	0	-/-
99	100	20	80	-	-	0	0	0	-/-
04	120	33	67	-	-	0	0	17	-/-
09	60	0	100	-	20	0	0	0	-/-
<i>Sclerocactus whipplei</i>									
87	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	1/4
99	200	70	30	-	40	0	0	0	1/2
04	0	0	0	-	-	0	0	0	-/-
09	60	0	100	-	-	0	0	0	2/2