

Trend Study 28-2-98

Study site name: Panguitch .

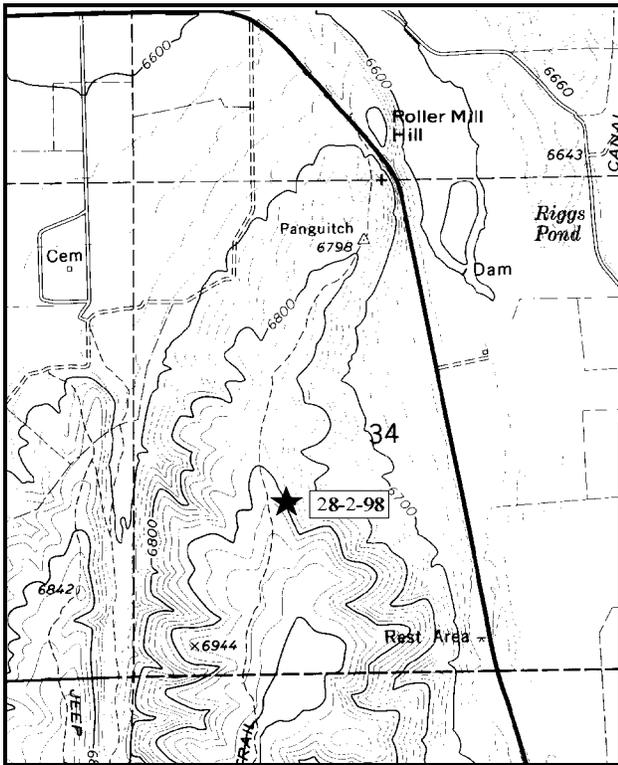
Range type: Pinyon-Juniper .

Compass bearing: frequency baseline 345 degrees.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft).

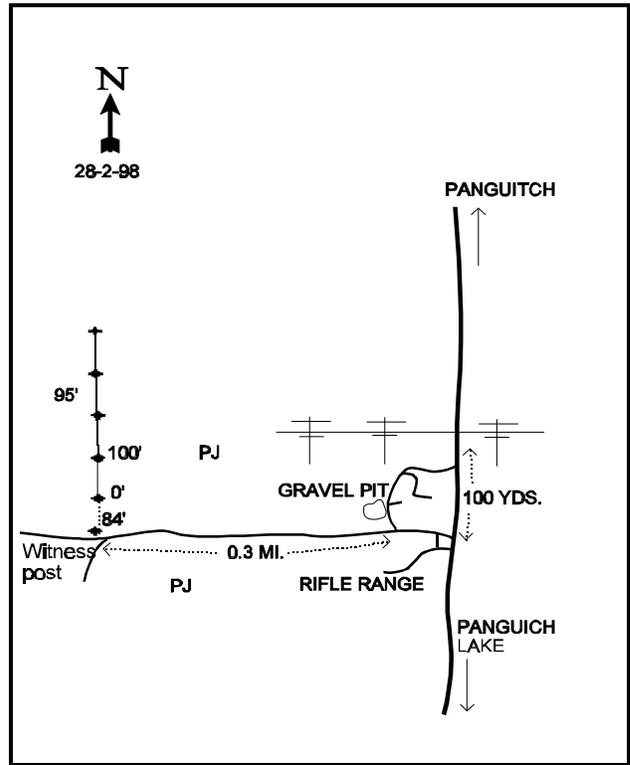
LOCATION DESCRIPTION

From the southern end of Panguitch, head south out of town on the Panguitch Lake road for 1.85 miles. At the top of the hill, you will pass under powerlines and then, in about 100 yards, come to a road turning off to the right leading to the rifle range. Immediately after the cattleguard turn right and follow the fence about 100 feet to a faint road heading west. Follow this trail 0.3 miles, behind the rifle range, to a fork. The transect begins just northeast of this fork. There is a witness post on the north side of the road. The 0-foot stake is 14 paces at 335°M from the witness post. The 0-foot baseline stake is a red 18" tall fencepost tagged #7170. The transect runs north through the pinyon and juniper.



Map Name: Panguitch

Township 35S, Range 5W, Section 34



Diagrammatic Sketch

UTM 4183193.184 N, 372796.398 E

DISCUSSION

Trend Study No. 28-2 (47-2)

The Panguitch transect is located in an extensive pinyon-juniper area south of town. Elevation of the site is 7,100 feet. Slope is nearly level (2%) with a northeast aspect. The site samples a black sagebrush flat which is being overtaken by invading pinyon pine and Utah juniper trees. The study was put in the same location as a line-intercept transect established in 1978. Winter range is limited in this high valley on the east side of the plateau. This area may have once been more important, but now receives light use with an estimated 22 deer days use/acre in 1998. These pinyon-juniper woodlands are utilized more as cover while adjacent sagebrush flats and fields near town are used for foraging.

The soil is moderately deep with rock and pavement scattered across the surface. Soil textural analysis indicates a loam with a neutral pH (6.8). The effective rooting depth (see methods) is estimated at almost 18 inches. Potassium could limit vegetative development at an estimated 16 ppm where 70 ppm are thought to be minimal for normal plant development. Even with the nearly level terrain, there is evidence of past erosion. There is little sign of current erosion, but some of the shrubs are pedestaled from past erosion events. The areas with mature pinyon-juniper as cover have an almost complete covering of pavement.

Black sagebrush is the most abundant shrub with an estimated density of 3,999 plants/acre in 1987, increasing to 6,040 by 1992 and then decreasing to 4,060 plants/acre in 1998. Percent decadency increased from 71% in 1987 to 78% in 1992, no seedlings and few young were encountered in 1992, and vigor declined with 53% of the shrubs encountered displaying poor vigor. Currently, the population appears to be improving slightly with a significant decrease in percent decadence and a decrease in the percentage of plants classified with poor vigor. Many young and seedling plants were encountered in 1998 which could help replace the decadent and dead plants. This will likely only stabilize the population for a short period of time. As the photographs show throughout all years, there is an obvious downward trend of black sagebrush, primarily due to increasing numbers of pinyon and juniper trees which shade out smaller shrubs.

Mountain big sagebrush also occurs on the site but in significantly lower numbers. The population density increased from 199 plants/acre in 1987 to 900 plants/acre in 1992. Currently, the estimated density is 200 plants/acre. Percent decadency has increased and the percentage of plants with poor vigor has decreased. There has not been a seedling mountain big sagebrush encountered in any year. Other shrubs which occur on the site include: Parry rabbitbrush, low rabbitbrush, broom snakeweed, and prickly-pear cactus.

Pinyon, and to a lesser extent juniper, definitely dominate the site. Point-centered quarter data taken in 1992 estimated 444 pinyon pine and 18 Utah juniper trees/acre. In 1998, point-centered quarter data indicates 478 pinyon pine and 36 Utah juniper trees/acre. Average tree diameter is 4.4 inches for pinyon pine and 8 inches for Utah juniper. The trees appear to be increasing in areas formerly occupied by sagebrush. Canopy cover is now estimated at 20%, meaning that the understory production is reduced by 50%. This trend will only get worse through time.

Herbaceous vegetation is infrequent, especially under the larger pinyon trees. Five species of native grass were found including blue grama, Indian ricegrass, bottlebrush squirreltail, muttongrass, and needle-and-thread grass. The rings of blue grama appear to be quite old. Forbs are rare and produce very little forage.

1987 APPARENT TREND ASSESSMENT

Due to past erosion, 23% of the ground is covered by erosion pavement. Soil depth is greatest where herbaceous vegetation and cryptogams are present. Litter cover is nonexistent in the interspaces; but litter buildup is found under the shrubs and trees. Shrubs are being crowded out by increasing numbers of pinyon and juniper trees and herbaceous vegetation is sparse. Chaining would improve the browse and herbaceous trends of this site, but the average diameter of pinyon is less than five inches making treatment difficult.

1992 TREND ASSESSMENT

Soil conditions are still poor on the site and appear to be declining with increasing pinyon and juniper cover. Soil movement in the form of sheet erosion is evident, but due to the lack of slope, no gullies have formed yet. Rock and pavement cover provide some protection for the soil in the bare interspaces. Black sagebrush, the only abundant browse, is declining primarily due to the increase in pinyon and juniper tree cover. Percent decadency increased, vigor has declined, and no seedlings, and few young were encountered. Herbaceous plants have also declined. Treatment of the pinyon and juniper will be required to reverse these trends.

TREND ASSESSMENT

soil - down slightly and poor condition

browse - down

herbaceous understory - down

1998 TREND ASSESSMENT

The soil trend is stable with little erosion apparent at this time. Percent vegetation cover declined slightly, while percent litter cover increased. Percent bare ground remained nearly the same. This site is nearly level which decreases the chance that erosion will occur, except under an intense summer storm event. A majority of the vegetation cover is contributed by shrubs or trees (86%), which is not very effective in slowing erosion and runoff as would herbaceous cover closer to the ground. The browse trend is stable for now with substantial losses since 1992. The key browse, black sagebrush, shows a decline in percent decadency and fewer plants were classified in poor vigor. However, there was a loss of one-third of the population since 1992, and all the losses can be explained by the number of dead plants in the population. Biotic potential is good with an estimated 760 seedling plants/acre. Utilization is currently, mostly light. Although this population looks better at this time than it has in the past, this will not likely last with the increasing density and dominance of pinyon pine and Utah juniper. The herbaceous understory trend is stable, but very poor contributing to barely 3% total cover. Grasses and forbs are rare throughout the area, especially under the trees.

TREND ASSESSMENT

soil - stable

browse - stable, the black sagebrush population looks better but likely only for a short time with pinyon pine and Utah juniper trees increasing in density

herbaceous understory - stable, however grasses and forbs are rare

HERBACEOUS TRENDS --

Herd unit 28 , Study no: 2

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'87	'92	'98	'87	'92	'98	'92	'98
G	Bouteloua gracilis	_b 85	_a 52	_a 46	38	22	21	.72	1.37
G	Oryzopsis hymenoides	_b 34	_a 18	_a 18	16	7	8	.08	.56
G	Poa fendleriana	-	-	8	-	-	4	-	.04
G	Sitanion hystrix	_b 72	_a 41	_{ab} 54	34	19	25	.20	.97
G	Stipa comata	-	4	10	-	2	4	.03	.19
Total Annual Grasses		0	0	0	0	0	0	0	0
Total Perennial Grasses		191	115	136	88	50	62	1.03	3.14

Type	Species	Nestled Frequency			Quadrat Frequency			Average Cover %	
		'87	'92	'98	'87	'92	'98	'92	'98
F	Arabis spp.	a-	ab1	b11	-	1	5	.00	.02
F	Astragalus spp.	a-	b11	b6	-	7	4	.03	.02
F	Chaenactis douglasii	-	-	2	-	-	1	-	.00
F	Cruciferae	3	-	-	2	-	-	-	-
F	Cryptantha spp.	-	-	1	-	-	1	-	.00
F	Erigeron pumilus	5	3	4	3	2	3	.01	.04
F	Ipomopsis aggregata	-	3	8	-	1	3	.03	.04
F	Linum lewisii	-	-	3	-	-	2	-	.01
F	Lupinus spp.	-	3	-	-	1	-	.03	-
F	Phlox longifolia	-	5	7	-	2	3	.01	.04
F	Senecio multilobatus	-	-	2	-	-	1	-	.00
F	Sphaeralcea coccinea	8	1	2	4	1	1	.00	.03
Total Annual Forbs		0	0	0	0	0	0	0	0
Total Perennial Forbs		16	27	46	9	15	24	0.12	0.21

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

BROWSE TRENDS --

Herd unit 28 , Study no: 2

Type	Species	Strip Frequency		Average Cover %	
		'92	'98	'92	'98
B	Artemisia nova	76	75	11.49	8.67
B	Artemisia tridentata vaseyana	22	7	.15	2.63
B	Chrysothamnus viscidiflorus viscidiflorus	2	3	.03	-
B	Echinocereus spp.	-	-	.01	-
B	Gutierrezia sarothrae	3	14	.00	.07
B	Juniperus osteosperma	4	3	.88	1.00
B	Mammillaria spp.	3	0	-	-
B	Opuntia spp.	4	1	-	-
B	Pinus edulis	30	21	14.21	8.41
B	Sclerocactus	0	1	-	.00
Total for Browse		144	125	26.78	20.81

CANOPY COVER --

Herd unit 28 , Study no: 2

Species	Percent Cover '98
Juniperus osteosperma	2
Pinus edulis	18

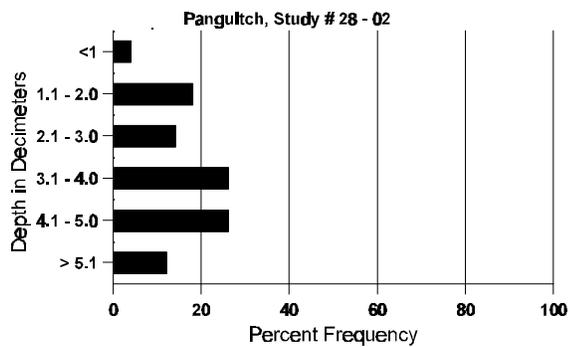
BASIC COVER --
Herd unit 28 , Study no: 2

Cover Type	Nested Frequency		Average Cover %		
	'92	'98	'87	'92	'98
Vegetation	142	171	3.75	27.31	25.87
Rock	199	90	1.00	10.07	1.46
Pavement	122	242	23.25	8.36	23.48
Litter	261	381	31.75	33.18	43.62
Cryptogams	148	123	5.00	3.70	2.28
Bare Ground	256	253	35.25	23.83	23.13

SOIL ANALYSIS DATA --
Herd Unit 28, Study # 02, Study Name: Pangultch

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.6	50.2 (17.4)	6.8	46.2	32.0	21.8	1.7	13.5	16.0	.5

Stoniness Index



PELLET GROUP FREQUENCY --
Herd unit 28 , Study no: 2

Type	Quadrat Frequency	
	'92	'98
Rabbit	-	21
Deer	-	19

BROWSE CHARACTERISTICS --

Herd unit 28 , Study no: 2

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	87	8	-	-	-	-	-	-	-	-	8	-	-	-	266		8	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	98	37	-	-	1	-	-	-	-	-	38	-	-	-	760		38	
Y	87	10	4	-	-	-	-	-	-	14	-	-	-	466		14		
	92	5	-	2	-	-	-	1	-	8	-	-	-	160		8		
	98	17	-	-	2	-	-	-	-	19	-	-	-	380		19		
M	87	4	7	10	-	-	-	-	-	21	-	-	-	700	13	13	21	
	92	18	27	10	-	3	-	1	-	57	-	2	-	1180	-	-	59	
	98	111	14	-	1	-	-	-	-	126	-	-	-	2520	13	21	126	
D	87	35	30	20	-	-	-	-	-	55	-	-	30	2833		85		
	92	45	133	48	2	7	-	-	-	76	-	26	133	4700		235		
	98	39	18	-	1	-	-	-	-	49	-	-	9	1160		58		
X	87	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	92	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	98	-	-	-	-	-	-	-	-	-	-	-	-	2180		109		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		34%			25%			25%			+34%							
'92		56%			20%			53%			-33%							
'98		16%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	3999	Dec:	71%				
											'92	6040		78%				
											'98	4060		29%				
Artemisia tridentata vaseyana																		
Y	87	-	1	3	-	-	-	-	-	4	-	-	-	133		4		
	92	8	4	-	1	-	-	-	-	12	-	1	-	260		13		
	98	2	-	-	-	-	-	-	-	2	-	-	-	40		2		
M	87	-	1	-	-	-	-	-	-	1	-	-	-	33	23	19	1	
	92	12	11	-	-	-	-	-	-	22	-	-	1	460	-	-	23	
	98	4	1	-	-	-	-	-	-	5	-	-	-	100	19	23	5	
D	87	1	-	-	-	-	-	-	-	1	-	-	-	33		1		
	92	5	4	-	-	-	-	-	-	3	-	3	3	180		9		
	98	3	-	-	-	-	-	-	-	3	-	-	-	60		3		
X	87	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	92	-	-	-	-	-	-	-	-	-	-	-	-	0		0		
	98	-	-	-	-	-	-	-	-	-	-	-	-	160		8		
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		33%			50%			00%			+78%							
'92		42%			00%			18%			-78%							
'98		10%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	199	Dec:	17%				
											'92	900		20%				
											'98	200		30%				

A Y G R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
	1	2	3	4	5	6	7	8	9	1	2	3	4					
Chrysothamnus viscidiflorus viscidiflorus																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	92	1	-	-	-	-	-	-	-	-	-	-	-	20			1	
	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	87	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	92	-	-	1	-	-	-	-	-	-	-	-	-	20	-	-	1	
	98	2	-	-	1	-	-	-	-	-	-	-	-	60	8	7	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%			00%							
'92		00%			50%			00%			+33%							
'98		00%			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-			
												'92	40		-			
												'98	60		-			
Gutierrezia sarothrae																		
S	87	9	-	-	-	-	-	-	-	-	9	-	-	-	300		9	
	92	15	-	-	-	-	-	1	-	-	16	-	-	-	320		16	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	87	9	-	-	-	-	-	-	-	-	9	-	-	-	300		9	
	92	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	98	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
M	87	5	-	1	-	-	-	-	-	-	6	-	-	-	200	8	4	6
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	18	-	-	-	-	-	-	-	-	18	-	-	-	360	8	9	18
D	87	1	-	-	-	-	-	-	-	-	-	-	1	33			1	
	92	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	98	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			06%			06%			-85%							
'92		00%			00%			00%			+86%							
'98		00%			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'87	533	Dec:	6%			
												'92	80		0%			
												'98	580		0%			
Juniperus osteosperma																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	92	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	98	1	-	-	2	-	-	-	-	-	3	-	-	-	60		3	
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	33	157	118	1
	92	-	-	-	-	-	-	-	2	-	2	-	-	-	40	-	-	2
	98	-	-	-	-	-	-	-	1	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%			+67%							
'92		00%			00%			00%			-20%							
'98		00%			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'87	33	Dec:	-			
												'92	100		-			
												'98	80		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Mammillaria spp.																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	2	-	-	-	-	-	1	-	-	3	-	-	-	60		3	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	92	-	-	-	-	-	-	1	-	-	1	-	-	-	20	-	1	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%										
'92		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-			
												'92	80		-			
												'98	0		-			
Opuntia spp.																		
M	87	4	-	-	-	-	-	-	-	-	4	-	-	-	133	4	8	4
	92	2	1	-	1	-	-	-	-	-	3	-	1	-	80	-	-	4
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	13	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%			-40%							
'92		25%			00%			25%			-75%							
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	133	Dec:	-			
												'92	80		-			
												'98	20		-			
Pinus edulis																		
S	87	12	1	-	-	-	-	-	-	-	10	1	2	-	433		13	
	92	4	-	-	-	-	-	6	-	-	8	-	-	2	200		10	
	98	2	-	-	4	-	-	-	-	-	6	-	-	-	120		6	
Y	87	13	1	-	-	-	-	-	-	-	13	-	-	1	466		14	
	92	12	2	-	5	-	-	1	-	-	12	-	4	4	400		20	
	98	14	-	-	-	-	-	-	-	-	14	-	-	-	280		14	
M	87	7	-	-	-	-	-	9	-	-	16	-	-	-	533	144	110	16
	92	9	1	-	-	-	-	5	-	-	14	-	-	1	300	-	-	15
	98	9	-	-	-	-	-	-	1	-	10	-	-	-	200	-	-	10
D	87	-	-	-	-	-	-	1	-	-	1	-	-	-	33		1	
	92	4	-	-	-	-	-	-	-	-	2	-	-	2	80		4	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		03%			00%			03%			-24%							
'92		08%			00%			28%			-38%							
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	1032	Dec:	3%			
												'92	780		10%			
												'98	480		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Sclerocactus																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'87	00%			00%			00%										
	'92	00%			00%			00%										
	'98	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-			
												'92	0		-			
												'98	20		-			