

Trend Study 25C-16-98

Study site name: Whites Flat .

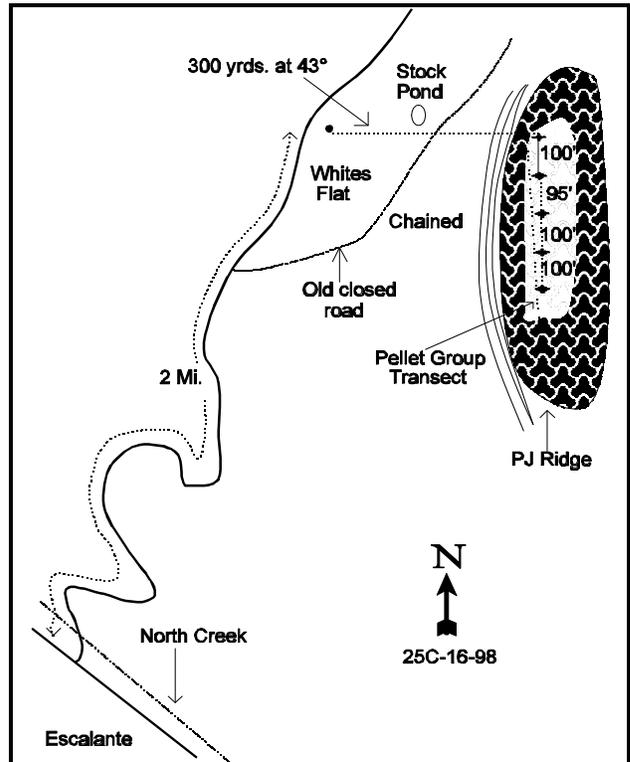
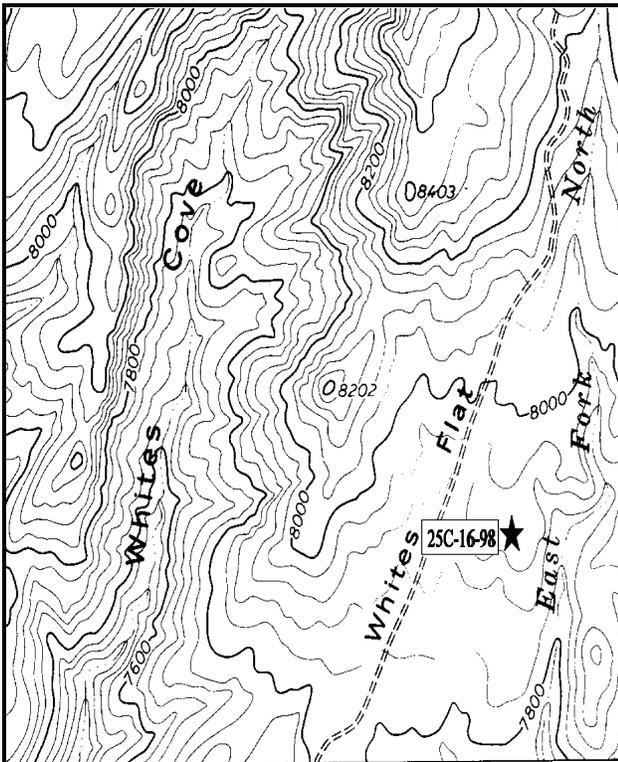
Range type: Bitterbrush .

Compass bearing: frequency baseline 159 degrees.

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

LOCATION DESCRIPTION

Turn off SR 12 west of Escalante onto the North Creek Road. Follow this road 7.2 miles to North Creek Reservoir. Continue past the reservoir 2 miles to a fork. Turn right onto the Whites Flat Road. Proceed 2 miles to a witness post on the right side of the road by a pullout. The transect is located on the P-J ridge across Whites Flat at a bearing of approximately 93 degrees. Walk across the chained flat (about 1/8 mile) and onto the ridge. Look for the small yellow painted rebar marking the adjacent pellet group transect. The range trend study is marked by 2-foot tall fence posts. There is no browse tag to mark the first stake.



Map Name: Barker Reservoir

Diagrammatic Sketch

Township 34S, Range 1E, Section Unsurveyed

UTM 4192670.092 N, 433638.067 E

DISCUSSION

Trend Study No. 25C-16 (44-16)

This transect samples a well-used, high elevation deer winter range in the North Creek Basin below the rim of the Aquarius Plateau. The ridge where the transect is located is covered with pinyon-juniper, ponderosa pine, Wyoming big sagebrush, and bitterbrush. White's Flat to the west, has been chained and seeded and provides ample grass forage. Pellet group data from 1998 estimate 31 deer, 2 elk and 4 cow days use/acre. Rabbit sign was also abundant. Deer sign appeared uniformly aged from a couple of months ago. Cow sign was old and likely from last year. A deer carcass was found near the site and apparently died 3 to 4 months ago. Elk pellet groups also appeared to be a couple of months old.

Elevation at the site is 8,000 feet on a small ridge which is not much higher than the surrounding country. It is level on top and very rocky with a slight southern aspect. Soil is moderately shallow with an effective rooting depth (see methods) of 12 inches. Texture is a sandy clay loam with a moderately acid pH (6.2). Phosphorus may be limiting to plant development at 8.2 ppm, when 10 ppm is considered to be the minimum. Parent material is a basalt. Rocks are common on the surface and in the profile. Soil erosion is minimal.

Wyoming big sagebrush is the dominant key browse species along with a smaller, but important population of antelope bitterbrush. This prostrate form of bitterbrush is lightly to moderately hedged, very vigorous and productive. Density in 1987 was estimated to be 599 plants/acre, 78% of those being young plants. Biotic potential was 22% (proportion of seedlings to the population). The population increased to 799 plants/acre in 1991. The larger sample size used in 1994 estimated the population at 2,040 mature and decadent plants/acre. No seedlings or young were encountered. The larger sample size gives much better population estimates for aggregated or clumped populations. During the 1998 reading, density was estimated at 1,380 plants/acre. Due to the lack of large numbers of dead or decadent plants found in 1994, it appears that density estimates from that year may be inflated. This could have been caused by the difficulty estimating individual bitterbrush plants which have a prostrate, spreading growth form on this site. Vigor remains good, utilization light to moderate and percent decadence low. Reproduction from seed is poor but some reproduction from layering may be occurring.

Wyoming big sagebrush is abundant and provided 48% of the browse cover in 1994, down to 33% by 1998. Canopy cover of sagebrush averaged 19% in 1994 and 13% in 1998. It has a good density (considering the high conifer overstory cover) of 5,066 plants/acre in 1987, which remained quite consistent at 5,040 plants/acre by 1994. Density declined 28% to 3,640 plants/acre by 1998. The number of mature plants increased slightly but density of decadent plants declined from 2,720 to 800 plants/acre. Biotic and reproductive potentials are poor and have declined since 1987. These cycles are not unusual for shrub species which are moderately long lived. The majority of mature plants show only light to moderate hedging, with heavier use on some individuals which appear to have characteristics more like that of mountain big sagebrush.

The increaser, broom snakeweed, was common in 1987 with an estimated density of 1,199 plants/acre. That number dropped by 50%, to a population estimate of only 600 plants/acre in 1991 and 260 by 1994. Currently ('98), there are only 160 plants/acre estimated. This has been the typical pattern for broom snakeweed with the prolonged drought. Pinyon, and to a lesser extent juniper and ponderosa pine, provide quite a bit of cover on the site, but do not appear to be limiting the productivity of the more desirable shrubs. Overhead canopy cover was estimated at 3% for juniper and 15% for pinyon. Point quarter data estimated 283 pinyon and 52 juniper trees/acre in 1994. Average basal diameter of pinyon was approximately 4 inches while that of juniper was 4.4 inches. Data from 1998 estimate 267 pinyon, 62 juniper and 10 Ponderosa pine trees/acre. Average basal diameter is estimated at 5.3 inches for pinyon, 4.1 inches for juniper and 11.2 inches for Ponderosa pine. There are many young conifers, so it's numbers will likely increase in the future.

The herbaceous understory is sparse producing only 9% cover in 1994 and 8.6% in 1998. The most abundant grasses include: blue grama which provides 50% of the grass cover and bottlebrush squirreltail which makes up an additional 41%. Although grass frequency is fairly high because of the abundance blue grama, overall grass forage is limited on the site. Diversity of forbs is good, but no species are especially prevalent. Many of the forbs present in 1987 were not present in 1991 or 1994. Currently ('98), the only abundant species is silvery lupine which provides half of the forb cover.

1991 TREND ASSESSMENT

Even though vegetative basal cover declined to 4%, and bare ground rose to 7% due to the effect of the drought, this site would still be considered stable. The key browse species, Wyoming big sagebrush and antelope bitterbrush display different trends. Sagebrush appears to be declining with moderate to heavy use, poor vigor on 34% of the population, percent decadence increasing from 25% to 56%, and reduced reproduction. In addition, 59% (1,733 plants/acre) of the decadent sagebrush were classified as dying. Bitterbrush appears to have an upward trend with mostly moderate use, good vigor, low decadence and good reproduction. Density of mature plants has remained the same compared to 1987 data but the density of young plants has increased. Another positive trend indicator is that broom snakeweed's density decreased by 50%. With all of this in mind, trend for browse is considered stable. Trend for the herbaceous understory is considered down slightly due to a decline in the sum of nested frequency of both grasses and forbs. Of the 6 grasses sampled in 1987, 5 show a decline in nested frequency. Nested frequency of forbs declined substantially from 202 to only 55.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - slightly downward

1994 TREND ASSESSMENT

Trend for soil is down slightly due to an increase in percent bare ground and a drop in litter cover, most likely the result of the continuing drought. Although winter precipitation has been above normal in 1993 and 1994, spring and early summer precipitation was about half of normal at Boulder and Escalante in 1994. Erosion is not a problem on this site due to the gentle terrain and rocky surface. The browse trend is stable for Wyoming big sagebrush. Plants are less heavily hedged and in better vigor than those sampled in 1991. The percent decadence is still high at 54%, but only 27% (740 plants/acre) of these were classified as dying compared to the 1,733 estimated in 1991. However, no seedlings were encountered and young plants are not in sufficient numbers to maintain the current population. Trend for antelope bitterbrush has improved slightly. Shrubs are less heavily hedged, in better vigor, show a declining decadency rate, and have increased in number. Some of the difference in density may be due to the larger sample used in 1994. The lack of seedlings will likely improve with the return of normal precipitation patterns. Overall browse trend is up slightly. The herbaceous understory is sparse on this site and dominated by blue grama which is considered an increaser under grazing pressure. Nested frequencies of forbs are low, yet improved since 1991. Sum of nested frequencies of perennial grasses and forbs combined have remained similar to 1991 indicating a stable trend with a composition that is still poor. Continued increases in shrub and tree density will eventually cause more declines in the herbaceous understory.

TREND ASSESSMENT

soil - down slightly

browse - up slightly for bitterbrush, down slightly for sagebrush, stable overall

herbaceous understory - stable, but with a poor composition

1998 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare ground and a small increase in vegetation and litter cover. Density of both key browse species, bitterbrush and Wyoming big sagebrush, have declined since 1994 but both populations currently appear stable. Sagebrush density declined from 5,040 plants/acre to 3,640. Density of mature plants actually increased by 620 plants/acre. It appears that the decline came primarily from the decadent age class. As a result, percent decadence fell from 54% to 22%. Utilization is mostly light and vigor improved. Bitterbrush decreased 32% since 1994. Due to the lack of decadent or dead plants sampled during 1994 and 1998, the change in density appears to be caused by a problem in counting density in 1994 of the low growing, spreading bitterbrush. Utilization is heavier but vigor is good and percent decadence is very low at only 1%. Reproduction is still poor but improved from 1994. Trend for browse is stable to slightly down with a smaller but healthier population of sagebrush. Trend for the herbaceous understory is considered stable. Composition has changed slightly. Nested frequency of blue grama declined significantly while frequency of bottlebrush squirreltail increased significantly. Forbs are still limited.

TREND ASSESSMENT

soil - up slightly

browse - stable to slightly down

herbaceous understory - stable, but poor

HERBACEOUS TRENDS --

Herd unit 25C, Study no: 16

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'87	'91	'94	'98	'87	'91	'94	'98	04	08
G	Agropyron cristatum	-	-	-	2	-	-	-	1	.00	.01
G	Agropyron spicatum	-	-	-	5	-	-	-	3	-	.04
G	Bouteloua gracilis	_{ab} 133	_{ab} 124	_b 158	_a 115	53	48	56	45	3.65	3.10
G	Bromus tectorum (a)	-	-	-	9	-	-	-	3	-	.01
G	Carex spp.	_b 32	_b 24	_b 19	_a 2	15	14	10	1	.29	.03
G	Oryzopsis hymenoides	9	19	14	4	5	8	5	2	.08	.04
G	Poa fendleriana	35	20	26	33	16	9	11	12	1.06	.40
G	Sitanion hystrix	_c 112	_{ab} 60	_a 39	_{bc} 93	47	33	20	41	.22	2.53
G	Stipa comata	_b 37	_{ab} 15	_a 5	_a 6	15	9	2	4	.18	.02
Total Annual Grasses		0	0	0	9	0	0	0	3	0	0.01
Total Perennial Grasses		358	262	261	260	151	121	104	109	5.52	6.19
F	Alyssum alyssoides (a)	-	-	-	15	-	-	-	7	-	.06
F	Antennaria parvifolia	-	4	3	-	-	1	1	-	.15	-
F	Arabis spp.	-	3	-	8	-	2	-	3	-	.04
F	Artemesia carruthii	_b 17	_{ab} 5	_a 1	_a 2	7	3	1	1	.00	.03
F	Astragalus spp.	1	-	4	5	1	-	2	2	.01	.03
F	Castilleja chromosa	_c 26	_a -	_a -	_b 13	15	-	-	7	-	.20
F	Camelina microcarpa (a)	-	-	-	5	-	-	-	2	-	.01
F	Chaenactis douglasii	_b 25	_a 8	_a 14	_a 3	12	5	4	2	1.27	.01
F	Cruciferae	13	-	-	-	7	-	-	-	-	-

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'87	'91	'94	'98	'87	'91	'94	'98	Ø4	Ø8
F	Cryptantha spp.	4	2	-	-	1	2	-	-	-	-
F	Eriogonum alatum	1	-	1	3	1	-	1	2	.00	.01
F	Erigeron flagellaris	a ⁻	a ⁻	a ⁻	b ¹¹	-	-	-	4	-	.09
F	Erigeron pumilus	b ³⁵	a ²	a ⁸	a ¹⁷	17	2	5	8	.16	.14
F	Eriogonum racemosum	b ²³	ab ²²	a ⁴	ab ¹⁴	11	8	2	6	.38	.18
F	Hymenoxys acaulis	a ⁻	a ⁻	b ¹⁰	a ⁻	-	-	4	-	.07	-
F	Hymenoxys richardsonii	-	-	1	-	-	-	1	-	.00	-
F	Lepidium spp. (a)	-	-	-	8	-	-	-	4	-	.02
F	Lotus utahensis	7	-	4	5	3	-	1	2	.15	.03
F	Lupinus argenteus	b ³⁰	a ⁻	b ¹⁸	b ²³	16	-	8	13	1.25	1.20
F	Penstemon spp.	6	-	-	-	2	-	-	-	-	-
F	Petradoria pumila	a ⁻	a ¹	a ⁻	b ¹²	-	1	-	6	-	.22
F	Phlox longifolia	5	5	-	3	2	3	-	1	-	.00
F	Sphaeralcea coccinea	5	1	7	7	3	1	5	5	.02	.10
F	Unknown forb-perennial	4	2	-	-	3	1	-	-	-	-
Total Annual Forbs		0	0	0	28	0	0	0	13	0	0.09
Total Perennial Forbs		202	55	75	126	101	29	35	62	3.50	2.31

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

BROWSE TRENDS --

Herd unit 25C, Study no: 16

Type	Species	Strip Frequency		Average Cover %	
		Ø4	Ø8	Ø4	Ø8
B	Artemisia tridentata wyomingensis	86	81	18.80	13.05
B	Chrysothamnus depressus	0	2	-	.03
B	Chrysothamnus viscidiflorus	4	3	.16	-
B	Echinocereus spp.	2	0	-	-
B	Gutierrezia sarothrae	9	4	.18	.15
B	Juniperus osteosperma	0	3	1.76	2.40
B	Opuntia spp.	7	8	.04	.84
B	Pinus edulis	0	10	9.98	11.21
B	Pinus ponderosa	0	0	-	-
B	Purshia tridentata	48	46	7.91	11.19
B	Sclerocactus	0	3	-	.00
B	Symphoricarpos oreophilus	0	0	-	-
B	Tetradymia canescens	10	8	-	.21
Total for Browse		166	168	38.86	39.09

CANOPY COVER --

Herd unit 25C, Study no: 16

Species	Percent Cover 08
Juniperus osteosperma	3
Pinus edulis	15

BASIC COVER --

Herd unit 25C, Study no: 16

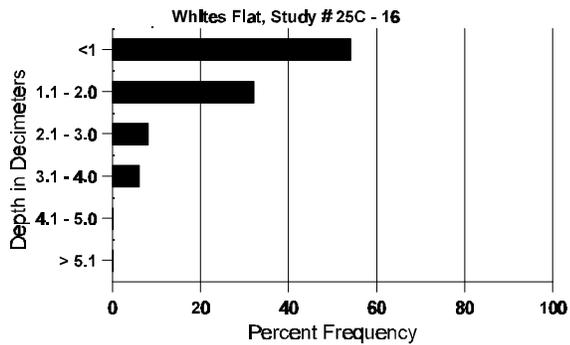
Cover Type	Nested Frequency		Average Cover %			
	04	08	'87	'91	'94	'98
Vegetation	263	263	7.25	3.75	41.23	43.01
Rock	247	249	20.00	23.25	20.37	20.27
Pavement	132	152	6.25	6.00	2.44	7.03
Litter	380	380	61.00	59.50	47.75	49.46
Cryptogams	47	34	.50	1.00	.61	.68
Bare Ground	221	192	5.00	6.50	14.48	12.28

SOIL ANALYSIS DATA --

Herd Unit 25C, Study # 16, Study Name: Whites Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.1	58.4 (12.9)	6.2	57.4	20.0	22.6	3.0	8.2	115.2	.8

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25C, Study no: 16

Type	Quadrat Frequency	
	04	08
Rabbit	8	22
Elk	1	-
Deer	24	19

BROWSE CHARACTERISTICS --

Herd unit 25C, Study no: 16

A G R E	Y	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				
<i>Artemisia tridentata wyomingensis</i>																		
S	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	87	6	9	3	-	-	-	-	-	-	18	-	-	-	1200			18
	91	5	-	-	2	-	-	-	-	-	7	-	-	-	466			7
	94	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
	98	2	3	-	2	-	-	-	-	-	7	-	-	-	140			7
M	87	17	11	11	-	-	-	-	-	-	39	-	-	-	2600	23	20	39
	91	11	12	4	-	1	-	-	-	-	24	4	-	-	1866	14	19	28
	94	69	33	-	2	-	-	-	-	-	104	-	-	-	2080	18	26	104
	98	112	17	-	5	1	-	-	-	-	134	-	1	-	2700	19	26	135
D	87	9	6	4	-	-	-	-	-	-	18	-	-	1	1266			19
	91	10	19	5	1	7	-	2	-	-	17	-	1	26	2933			44
	94	70	64	-	2	-	-	-	-	-	98	1	-	37	2720			136
	98	33	6	-	1	-	-	-	-	-	31	-	-	9	800			40
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	1000			50
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1020			51
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		34%			24%			01%			+ 4%							
'91		49%			11%			34%			- 4%							
'94		38%			00%			15%			-28%							
'98		15%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	5066	Dec:	25%				
											'91	5265		56%				
											'94	5040		54%				
											'98	3640		22%				
<i>Chrysothamnus depressus</i>																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	8	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	6	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	0	Dec:	-				
											'91	0		-				
											'94	0		-				
											'98	40		-				

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				
Chrysothamnus viscidiflorus																		
Y	'87	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	'91	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	'87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	12	12	1
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	9	16	5
	'98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	11	14	5
D	'87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'91	1	1	-	-	-	-	-	-	-	-	-	1	1	133		2	
	'94	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%			+34%							
'91		33%			00%			67%			-40%							
'94		00%			00%			00%			-17%							
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	132	Dec:	0%				
											'91	199		67%				
											'94	120		17%				
											'98	100		0%				
Echinocereus spp.																		
M	'87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
	'98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	0	Dec:	-				
											'91	0		-				
											'94	40		-				
											'98	0		-				

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total				
		1	2	3	4							
Gutierrezia sarothrae												
S	87	4	-	-	-	-	-	-	4	266		4
	91	-	-	-	-	-	-	-	0	0		0
	94	-	-	-	-	-	-	-	0	0		0
	98	-	-	-	-	-	-	-	0	0		0
Y	87	7	-	-	-	-	-	-	7	466		7
	91	-	-	-	-	-	-	-	0	0		0
	94	2	-	-	-	-	-	-	2	40		2
	98	5	-	-	-	-	-	-	5	100		5
M	87	11	-	-	-	-	-	-	11	733	11 8	11
	91	5	-	-	1	-	-	3	8	600	11 9	9
	94	11	-	-	-	-	-	-	11	220	5 6	11
	98	3	-	-	-	-	-	-	3	60	10 11	3
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>		<u>%Change</u>				
'87		00%		00%		00%		-50%				
'91		00%		00%		11%		-57%				
'94		00%		00%		00%		-38%				
'98		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'87	1199	Dec:	-
									'91	600		-
									'94	260		-
									'98	160		-
Juniperus osteosperma												
S	87	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	1	-	1	66		1
	94	-	-	-	-	-	-	-	-	0		0
	98	-	-	-	-	-	-	-	-	0		0
Y	87	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	0		0
	98	2	-	-	-	-	-	-	2	40		2
M	87	-	-	-	-	-	-	-	-	0	- -	0
	91	-	-	-	-	-	-	-	-	0	- -	0
	94	-	-	-	-	-	-	-	-	0	- -	0
	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%						
'91		00%		00%		00%						
'94		00%		00%		00%						
'98		00%		00%		00%						
Total Plants/Acre (excluding Dead & Seedlings)									'87	0	Dec:	-
									'91	0		-
									'94	0		-
									'98	60		-

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				
Opuntia spp.																		
S	'87	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	'91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	'87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'91	1	-	-	5	-	-	-	-	-	6	-	-	-	400		6	
	'94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	'98	1	-	-	-	-	-	2	-	-	3	-	-	-	60		3	
M	'87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	7	1
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	2	4	6
	'98	5	-	-	1	-	-	1	-	-	7	-	-	-	140	3	10	7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%			+84%							
'91		00%			00%			00%			-65%							
'94		00%			00%			00%			+30%							
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	66	Dec:	-				
											'91	400		-				
											'94	140		-				
											'98	200		-				
Pinus edulis																		
S	'87	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	'91	2	-	-	-	-	2	-	-	-	4	-	-	-	266		4	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'98	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
Y	'87	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	'91	2	-	-	1	-	-	-	-	-	3	-	-	-	200		3	
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	'98	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	'87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'98	3	-	-	-	-	-	2	-	-	5	-	-	-	100	-	-	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%			+ 0%							
'91		00%			00%			00%										
'94		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	200	Dec:	-				
											'91	200		-				
											'94	0		-				
											'98	220		-				

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					
Pinus ponderosa																		
M	87	-	-	-	-	-	-	-	1	-	1	-	-	-	66	393	295	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	264	142	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%			+ 0%							
'91		00%			00%			00%										
'94		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	66	Dec:	-				
											'91	66		-				
											'94	0		-				
											'98	0		-				
Purshia tridentata																		
S	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	1	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	87	6	1	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	-	6	1	-	2	-	-	-	-	9	-	-	-	600			9
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	1	-	-	-	-	-	-	-	4	-	-	-	80			4
M	87	-	-	2	-	-	-	-	-	-	2	-	-	-	133	24	33	2
	91	-	-	-	-	2	-	-	-	-	2	-	-	-	133	20	32	2
	94	81	17	-	1	-	-	-	-	-	99	-	-	-	1980	32	46	99
	98	19	32	2	4	7	-	-	-	-	64	-	-	-	1280	18	40	64
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	1	-	-	-	-	-	-	-	1	66			1
	94	3	-	-	-	-	-	-	-	-	2	-	-	1	60			3
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		11%			22%			00%			+25%							
'91		92%			08%			08%			+61%							
'94		17%			00%			.98%			-32%							
'98		58%			03%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'87	599	Dec:	0%				
											'91	799		8%				
											'94	2040		3%				
											'98	1380		1%				

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
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'98	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	4	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-			
												'91	0		-			
												'94	0		-			
												'98	60		-			
Symphoricarpos oreophilus																		
M	'87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	18	0
	'98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	21	61	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'87		00%			00%			00%										
'91		00%			00%			00%										
'94		00%			00%			00%										
'98		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'87	0	Dec:	-			
												'91	0		-			
												'94	0		-			
												'98	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total									
		1	2	3	4												
Tetradymia canescens																	
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	87	3	-	-	-	-	-	-	-	-	3	-	-	-	200	10 14	3
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266	6 5	4
	94	8	-	-	-	-	-	-	-	-	8	-	-	-	160	10 12	8
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80	10 12	4
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	1	2	-	-	-	-	-	-	-	3	-	-	-	200		3
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
% Plants Showing		<u>Moderate Use</u>		<u>Heavy Use</u>		<u>Poor Vigor</u>				<u>%Change</u>							
'87		00%		00%		00%				+29%							
'91		29%		00%		00%				-53%							
'94		00%		00%		00%				-27%							
'98		00%		00%		00%											
Total Plants/Acre (excluding Dead & Seedlings)										'87	333	Dec:	0%				
										'91	466		43%				
										'94	220		27%				
										'98	160		38%				