

Trend Study 10-9-05

Study site name: Agency Draw .

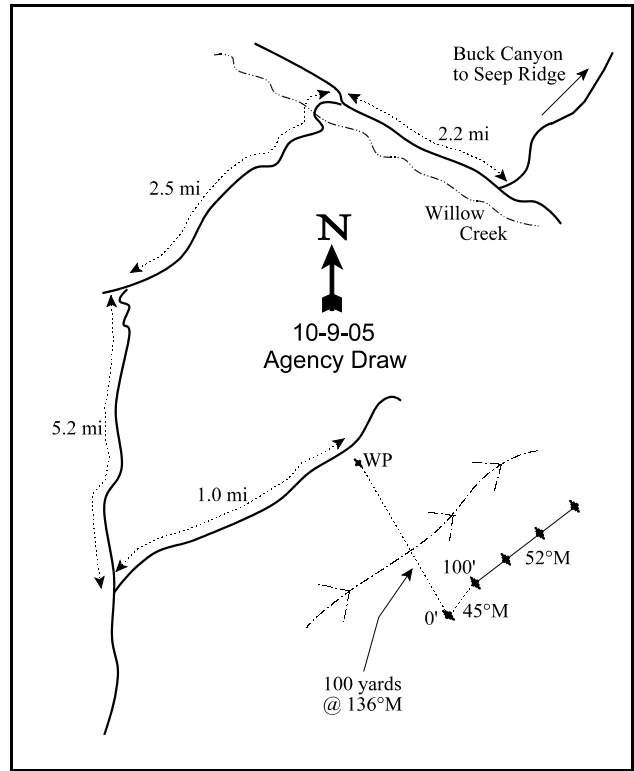
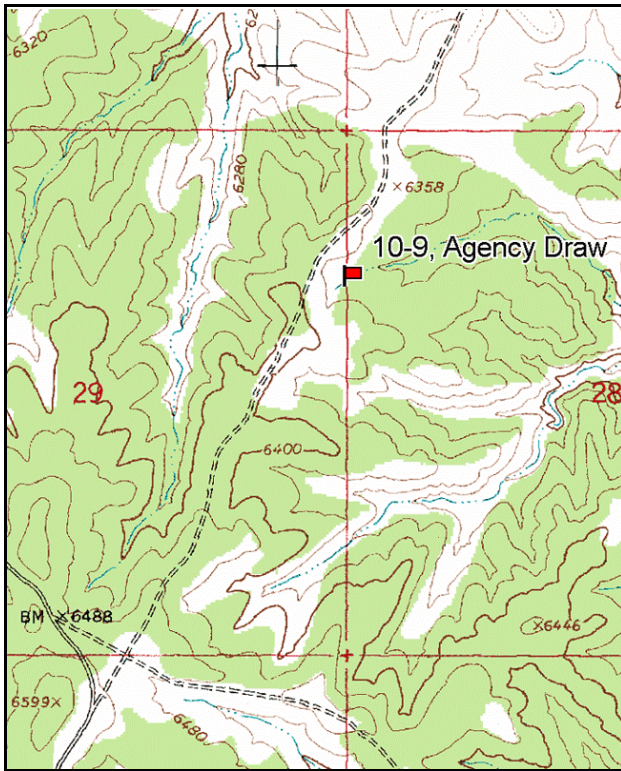
Vegetation type: Desert Shrub .

Compass bearing: frequency baseline 45 degrees magnetic.

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

LOCATION DESCRIPTION

From the Seep Ridge Road, go down Buck Canyon to Willow Creek. Travel north on Willow Creek 2.2 miles to a fork. Bear left, cross Willow Creek then drive up out of the canyon 2.5 miles to a fork. Bear left. Continue 5.2 miles to an intersection. Turn left off the main road. Go down 0.1 miles to a small flat. Continue going straight (NE) down the ridge 0.9 miles to a witness post on the right side of the road. Walk 100 yards down into the draw, at a bearing of 136°. The 0-foot baseline stake is marked with a red browse tag, #9040. The frequency baseline is marked by green fenceposts, 12-18 inches in height.



Map Name: Agency Draw NE

Diagrammatic Sketch

Township 13S, Range 21E, Section 28

GPS: NAD 27, UTM 12S 4390832 N, 621735 E

DISCUSSION

Agency Draw - Trend Study No. 10-9

The Agency Draw study is actually located in the Willow Creek drainage and is representative of the big sagebrush and desert shrub communities found throughout the area. At 6,300 feet in elevation, Agency Draw is the lowest trend study on the northern end of the Book Cliffs management unit and is managed by the BLM. The study site is located in the relatively flat bottom at the head of a draw. Drainage, via a three-foot deep gullied wash, is to the northeast on a 7% slope. Tall black greasewood and basin big sagebrush grow along the wash. The surrounding low ridges are occupied by pinyon- juniper, and black sagebrush. The area has been grazed in the winter by cattle from January 1 to March 31. This is important winter range for deer judging by the abundance of pellet groups. There has been abundant sign of winter use by sage grouse in the past, with a few birds being observed on an adjacent ridge at the time of study establishment in 1988. A small herd of elk has also been observed in the area. Wild horses also frequent the area and were seen in 2000 and 2005. Pellet group transect data from 2000 estimated 49 deer days use/acre (121 ddu/ha), 11 elk days use/acre (27 edu/ha), and 22 horse days use/acre (54 hdu/ha). No cattle pats were sampled in 2000. The pellet transect in 2005 estimated 23 deer days use/acre (58 ddu/ha), 13 elk days use/acre (31 edu/ha), 12 cow days use/acre (29 cdu/ha), and 23 horse days use/acre (57 hdu/ha).

The site occurs between the deep saline soil along the wash and the shallow, very rocky soil on the ridges. The soil on the study site is a shallow, stony clay loam. The shallow, rocky soils allow rapid runoff. Soil loss from the slopes and wash were evident with moderate pedestaling being noted around base of shrubs in 2000. Over most of the study site the vegetation cover helps keep erosion at low levels. The soil is light brown in color and quite variable in depth. Effective rooting depth was estimated at 16 inches, with a hard pan at about 9 inches in depth. A profile stoniness index estimated from penetrometer readings shows the majority of rock to be in the upper portion of the profile, but a few readings were near 36 inches in depth. The soil is slightly alkaline (pH of 7.7) and low in phosphorus (4.1 ppm) (Tiedemann and Lopez 2004).

The key browse species are Wyoming big sagebrush, black sagebrush, and shadscale. Fourwing saltbush and winterfat are both present, but each provide less than one percent average cover. All key species combined provided over 60% of the total browse cover in both 1995 and 2000. All provide winter forage, although winterfat may be unavailable due to snow depth in some years. With drought conditions, Wyoming big sagebrush density has been declining. Density was 3,866 plants/acre in 1988. The 1995 estimate was 2,620 plants/acre. The difference in these two estimates may be due to the increased sample size that gives much better estimates for species with discontinuous and/or clumped distributions. Density remained stable in 2000 at 2,760 plants/acre. The 2005 reading showed a 42% decline to 1,600 plants/acre. Decadence increased from 10% in 1995 to 25% in 2000, and to a very high 53% in 2005. Thirty-eight percent of the population was also classified as dying in 2005. Young recruitment has also declined with each reading. Only 13% of the population was classified as young in 2005. Utilization has been moderate, until the 2005 reading when it was classified as moderate to heavy.

Black sagebrush has been similarly effected by drought. Density declined 13% in both 2000 and 2005, to 980 plants/acre in 2005. Decadence increased from 9% in 1995, to 32% in 2000, and to 45% in 2005. Young recruitment has also declined. No young plants were found in 2005, but 100 seedlings/acre were sampled. Utilization has been mostly moderate on black sagebrush. Black sagebrush cover has averaged from 1-2%.

Shadscale density declined at each reading from 2,200 plants/acre in 1988 to 1,180 plants/acre in 2005. Cover has been ranged from 2-4% since 1995. Utilization has been light each time this site was sampled. Winterfat density appears stable with only a slight increase from 1,780 plants/acre in 1995 to 1,860 plants/acre in 2005. Vigor and recruitment have been good. Utilization was heavy in 2005. The density of mature black greasewood plants was stable from 1995 to 2005. There was a very high number of young plants in 2000.

Prostrate kochia was sampled for the first time in 2005. Density was 700 plants/acre. Sixty-three percent of the plants showed signs of heavy use. Kochia is a very palatable species and is very tolerant of grazing. It is unknown how or when kochia was seeded in this area.

Cheatgrass cover was nearly 12% in 1995. In 2000, cheatgrass declined significantly to less than 1% cover. Cheatgrass nested frequency was unchanged in 2005, but cover was almost 2%. Perennial grasses have not been highly abundant on this site. Thickspike wheatgrass and Sandberg bluegrass have been the most abundant perennial grasses. Sandberg bluegrass significantly increased in 2005. Thickspike wheatgrass and bluebunch wheatgrass may have been lumped together prior to 2005. Other species include: Indian ricegrass, squirreltail, and needle-and-thread. Sum of nested frequency slightly declined in 2000 for perennial grasses, but increased in 2005. Forbs are fairly diverse, but none are abundant.

1988 APPARENT TREND ASSESSMENT

Cheatgrass was counted as litter in 1988 leading to the high value of 60%. Basal vegetation cover was low at 2.5%. Pavement cover was 2.5% and variable over the site. Percent bare ground was 33%. Erosion does not currently appear to be a problem on the site. The key browse species, black sagebrush and Wyoming big sagebrush, appear to have stable populations. Use is mostly moderate, but percent decadence is low and vigor is generally good. Composition of the understory is poor and dominated by annuals. Only 5 species of perennial grasses and 4 species of perennial forbs were encountered.

1995 TREND ASSESSMENT

Litter cover values are lower because cheatgrass was classified as litter during the 1988 reading. Percent cover for pavement has increased while percent bare ground declined slightly. Some surface erosion is evident where bare ground occurs, but it is not a major problem due to the gentle terrain and the abundance of cheatgrass cover. Trend for soil is slightly improved. Trend for black sagebrush and Wyoming big sagebrush is slightly improved. Utilization of black sagebrush is lower and density has increased. Wyoming big sagebrush density has declined slightly but so has percent decadence, and utilization is not as heavy. Reproductive potential and the proportion of the population that are young plants has increased. The herbaceous understory is in poor condition and composition is far from ideal. Cheatgrass dominates the understory by providing 61% of the herbaceous cover. Annual forbs account for 63% of the forb cover with halogeton being the most common. Sum of nested frequency of perennial grasses increased due to a significant increase in frequency of thickspike. Nested frequency of perennial forbs also increased. Trend is slightly up as some of the change may be due to change in sampling methods. The Desirable Components Index (see methods) rated this site as good winter range due to good shrub cover and a fair herbaceous understory.

TREND ASSESSMENT

soil - slightly up (+1)

browse - slightly up (+1)

herbaceous understory - slightly up (+1)

winter range condition (DC Index) - good (47) Lower potential scale

2000 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics appear stable with slight increases in both percent litter and bare ground, and a decrease in percent cover of vegetation. Most of the decrease in vegetation cover is a result the drastic decrease in cheatgrass due to drought. Erosion is not severe due to the gentle slope, although some pedestaling was observed. The ratio of protective ground cover to bare soil is still high enough to warrant a stable trend for soil at this time. Trend for browse is slightly down. The key species, Wyoming big

sagebrush, black sagebrush, and shadscale all show increases in percent decadence and the proportion of plants displaying poor vigor. Heavy use slightly increased on Wyoming big sagebrush in 2000. Young recruitment is moderate for shadscale (8%), moderately high for black sagebrush (16%), and very high for Wyoming big sagebrush (35%). Increases in poor vigor and decadence are likely a result of drought and should improve with normal precipitation patterns. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial species decreased slightly in 2000, but cheatgrass also declined significantly. The Desirable Components Index (see methods) rated this site as good winter range due to good shrub cover and a fair herbaceous understory.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - stable (0)

winter range condition (DC Index) - good (47) Lower potential scale

2005 TREND ASSESSMENT

The soil trend is slightly down as percent bare ground increased from 32% in 2000 to 41% in 2005 and litter cover decreased from 39% to 26%. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) decreased. The browse trend is down. Density declined for black sagebrush, Wyoming big sagebrush, and shadscale. Percent decadence increased and is very high for both sagebrush species. Use has also increased for these two species. Winterfat density has remained fairly stable with good vigor. The trend for the herbaceous understory is up. Nested frequency for perennial grasses increased by 23%, while cover of perennial grasses increased from 6% to 9%. Although not significant, cheatgrass nested frequency was slightly lower in 2005, despite the fact that 2005 was a wet year. Forbs are sparse and only contribute a minimal amount to the total herbaceous cover. The Desirable Components Index (see methods) rated this site as fair to good winter range due to good shrub cover and a fair herbaceous understory.

TREND ASSESSMENT

soil - slightly down (-1)

browse - down (-2)

herbaceous understory - up (+2)

winter range condition (DC Index) - fair to good (42) Lower potential scale

HERBACEOUS TRENDS --

Management unit 10 , Study no: 9

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron dasystachyum	a7	bc110	c132	b96	1.83	3.28	4.09
G	Agropyron spicatum	a-	a-	a-	b20	-	-	.34
G	Bromus tectorum (a)	-	b209	a97	a81	11.78	.77	1.77
G	Carex sp.	-	3	-	-	.01	-	-
G	Oryzopsis hymenoides	b114	a54	a46	a48	.84	.39	.36
G	Poa secunda	a31	c125	b88	c157	1.75	.81	2.70
G	Sitanion hystrix	b85	a56	a46	ab55	1.13	.63	.71
G	Stipa comata	22	23	22	33	.34	.66	.62

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
	Total for Annual Grasses	0	209	97	81	11.78	0.77	1.77
	Total for Perennial Grasses	259	371	334	409	5.93	5.79	8.84
	Total for Grasses	259	580	431	490	17.71	6.57	10.61
F	Allium sp.	-	-	-	2	-	-	.01
F	Antennaria rosea	-	-	-	-	-	-	.00
F	Arenaria fendleri	-	-	3	5	.00	.00	.01
F	Astragalus sp.	a-	b13	a1	a-	.06	.00	-
F	Astragalus utahensis	-	-	1	2	-	.00	.03
F	Chorispora tenella (a)	-	-	-	4	-	-	.03
F	Cordylanthus kingii (a)	-	5	-	-	.01	-	.00
F	Cryptantha sp.	2	5	-	-	.03	-	-
F	Cymopterus sp.	-	-	-	1	-	-	.00
F	Descurainia pinnata (a)	-	b48	a18	a14	.14	.15	.06
F	Erigeron pumilus	-	4	4	-	.01	.01	-
F	Haplopappus acaulis	a-	ab2	b9	ab2	.00	.05	.00
F	Halogeton glomeratus (a)	-	b13	a-	ab8	.71	-	.16
F	Lappula occidentalis (a)	-	a25	a5	b82	.12	.06	2.30
F	Lepidium sp. (a)	c31	bc26	a-	ab7	.11	-	.05
F	Machaeranthera canescens	6	2	-	-	.01	-	-
F	Machaeranthera grindelioides	-	7	4	4	.04	.02	.01
F	Penstemon sp.	-	-	4	-	-	.01	-
F	Petradoria pumila	-	1	-	-	.00	-	-
F	Phlox austromontana	-	8	6	3	.04	.16	.00
F	Phlox longifolia	a-	b41	b37	a8	.11	.10	.04
F	Polygonum douglasii (a)	-	4	-	-	.00	-	-
F	Salsola iberica (a)	-	-	-	1	-	-	.00
F	Schoenocrambe linifolia	-	-	-	3	-	-	.01
F	Sphaeralcea coccinea	6	4	11	12	.03	.09	.08
F	Streptanthus cordatus	-	1	-	-	.00	-	-
F	Townsendia incana	a-	bc12	c14	ab5	.05	.04	.01
	Total for Annual Forbs	31	121	23	116	1.11	0.21	2.62
	Total for Perennial Forbs	14	100	94	47	0.41	0.50	0.24
	Total for Forbs	45	221	117	163	1.52	0.71	2.87

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

BROWSE TRENDS --

Management unit 10 , Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	<i>Artemisia frigida</i>	33	22	12	.15	.17	.01
B	<i>Artemisia nova</i>	24	20	19	2.13	1.35	1.00
B	<i>Artemisia tridentata wyomingensis</i>	44	50	42	5.95	5.68	5.13
B	<i>Atriplex canescens</i>	0	0	0	.00	-	-
B	<i>Atriplex confertifolia</i>	54	49	36	3.14	3.50	2.54
B	<i>Ceratoides lanata</i>	40	36	36	.69	.22	.90
B	<i>Gutierrezia sarothrae</i>	11	12	5	.02	.01	.03
B	<i>Juniperus osteosperma</i>	0	1	2	-	-	.15
B	<i>Kochia prostrata</i>	0	0	8	-	-	.56
B	<i>Opuntia sp.</i>	2	2	2	-	.03	-
B	<i>Pediocactus simpsonii</i>	0	0	1	-	-	-
B	<i>Pinus edulis</i>	0	1	2	-	.03	.03
B	<i>Sarcobatus vermiculatus</i>	19	20	20	6.06	6.24	4.31
Total for Browse		227	213	185	18.17	17.24	14.68

CANOPY COVER, LINE INTERCEPT --

Management unit 10 , Study no: 9

Species	Percent Cover	
	'00	'05
<i>Artemisia frigida</i>	-	.10
<i>Artemisia nova</i>	-	1.04
<i>Artemisia tridentata wyomingensis</i>	-	4.31
<i>Atriplex confertifolia</i>	-	1.45
<i>Ceratoides lanata</i>	-	.75
<i>Juniperus osteosperma</i>	.20	-
<i>Kochia prostrata</i>	-	.13
<i>Opuntia sp.</i>	-	.03
<i>Sarcobatus vermiculatus</i>	-	4.33

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 10 , Study no: 9

Species	Average leader growth (in)
	'05
Artemisia nova	1.1
Artemisia tridentata wyomingensis	2.2
Ceratoides lanata	2.4

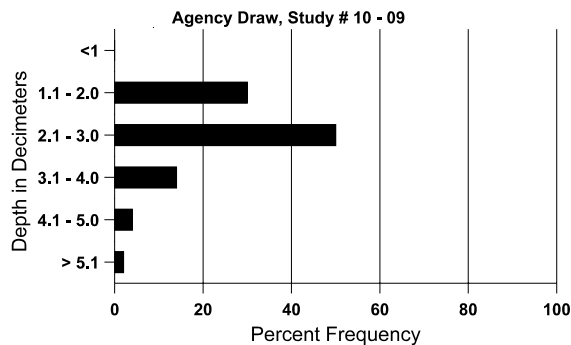
BASIC COVER --
 Management unit 10 , Study no: 9

Cover Type	Average Cover %			
	'88	'95	'00	'05
Vegetation	2.50	36.44	26.27	25.42
Rock	.50	3.76	1.76	2.25
Pavement	2.50	8.98	11.08	14.17
Litter	60.00	33.42	39.20	25.56
Cryptogams	1.50	2.37	5.07	2.11
Bare Ground	33.00	25.00	32.34	40.70

SOIL ANALYSIS DATA --
 Herd Unit 10, Study # 9, Study Name: Agency Draw

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	ppm P	ppm K	dS/m
16.2	58.8 (17.5)	7.7	29.0	40.4	30.6	1.4	4.1	329.6	0.9

Stoniness Index



PELLET GROUP DATA --

Management unit 10 , Study no: 9

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	4	10	28
Horse	5	8	10
Elk	1	3	3
Deer	19	29	45
Cattle	1	-	1

Days use per acre (ha)	
'00	'05
-	-
-	23 (57)
11 (29)	13 (31)
49 (121)	23 (58)
-	12 (29)

BROWSE CHARACTERISTICS --

Management unit 10 , Study no: 9

		Age class distribution (plants per acre)					Utilization						
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)	
<i>Artemisia frigida</i>													
88	5200	866	1400	3800	-	-	0	0	0	-	0	8/3	
95	1060	180	120	940	-	-	0	0	0	-	0	11/7	
00	660	60	160	480	20	-	9	3	3	-	0	5/7	
05	360	-	40	320	-	-	6	0	0	-	0	7/6	
<i>Artemisia nova</i>													
88	666	66	400	266	-	-	10	40	0	-	0	11/21	
95	1280	200	180	980	120	100	64	6	9	6	6	15/18	
00	1120	20	180	580	360	120	38	2	32	11	11	13/20	
05	980	100	-	540	440	440	27	27	45	8	10	8/13	
<i>Artemisia tridentata wyomingensis</i>													
88	3866	66	1400	1733	733	-	31	16	19	-	5	21/25	
95	2620	980	1140	1220	260	160	34	2	10	.76	2	21/29	
00	2760	180	960	1100	700	340	41	17	25	9	12	23/30	
05	1600	140	200	560	840	600	34	53	53	38	38	20/26	
<i>Atriplex canescens</i>													
88	0	-	-	-	-	-	0	0	-	-	0	-/-	
95	0	40	-	-	-	-	0	0	-	-	0	-/-	
00	0	-	-	-	-	-	0	0	-	-	0	-/-	
05	0	-	-	-	-	-	0	0	-	-	0	-/-	
<i>Atriplex confertifolia</i>													
88	2200	-	200	1600	400	-	6	0	18	-	0	16/18	
95	1840	-	180	1200	460	60	11	0	25	5	11	14/21	
00	1600	-	120	960	520	40	9	10	33	13	13	15/20	
05	1180	200	220	700	260	140	8	2	22	10	10	16/22	

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Ceratoides lanata</i>												
88	1266	66	933	200	133	-	5	0	11	-	5	6/6
95	1780	100	340	1420	20	-	4	0	1	-	0	10/9
00	1740	-	520	1120	100	-	13	17	6	3	3	11/9
05	1860	80	240	1580	40	-	8	77	2	2	2	9/10
<i>Gutierrezia sarothrae</i>												
88	800	66	-	800	-	-	0	0	0	-	0	7/5
95	340	240	180	160	-	-	0	0	0	-	0	9/11
00	560	-	80	320	160	20	0	0	29	25	25	5/8
05	180	20	40	140	-	-	0	0	0	-	0	8/9
<i>Juniperus osteosperma</i>												
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	0	-	-	-	-	-	0	0	0	-	0	-/-
00	20	20	20	-	-	-	0	0	0	-	0	-/-
05	40	-	20	-	20	-	0	0	50	-	0	-/-
<i>Kochia prostrata</i>												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	700	-	-	700	-	-	0	63	-	-	0	11/13
<i>Opuntia sp.</i>												
88	66	-	-	66	-	-	0	0	0	-	0	2/3
95	40	-	-	20	20	-	0	0	50	-	0	5/14
00	40	20	-	20	20	-	0	0	50	50	50	2/9
05	40	-	-	40	-	-	0	0	0	-	0	5/16
<i>Pediocactus simpsonii</i>												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	20	-	-	20	-	-	0	0	-	-	0	3/5
<i>Pinus edulis</i>												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	20	-	20	-	-	-	0	0	-	-	0	-/-
05	40	-	40	-	-	-	0	50	-	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Sarcobatus vermiculatus</i>												
88	66	-	-	66	-	-	0	0	0	-	0	54/63
95	680	-	120	520	40	20	0	0	6	-	0	34/49
00	1680	-	1080	560	40	-	0	0	2	1	1	37/54
05	660	40	20	560	80	-	15	3	12	3	3	29/44
<i>Sclerocactus sp.</i>												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	3/3
05	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Tetradymia spinosa</i>												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	23/31