

Trend Study 25C-9-08

Study site name: Dry Wash.

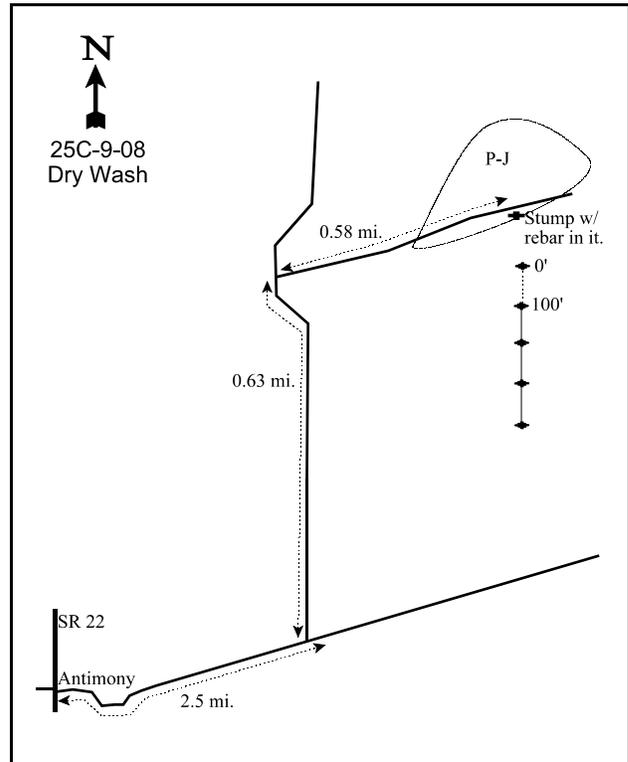
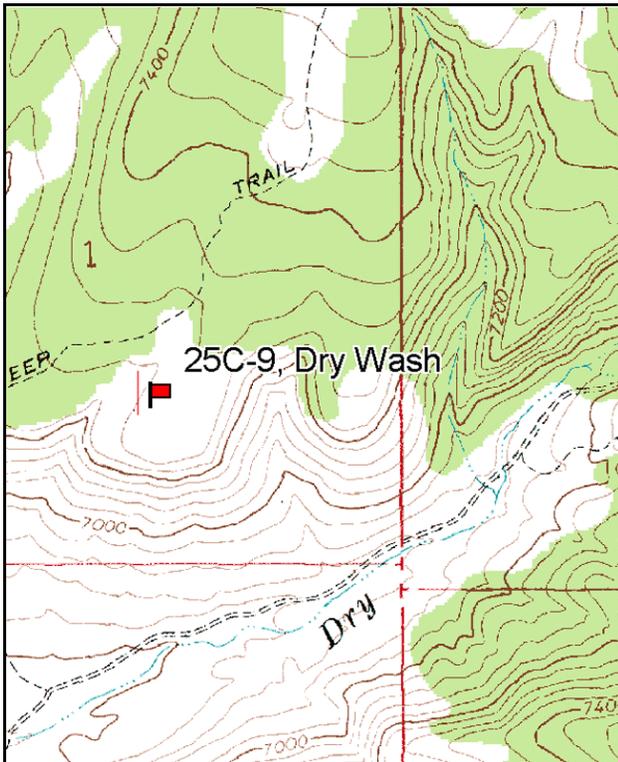
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

From the town of Antimony, go east on the dump road (off Main between the Antimony school and Antimony mercantile) 2.5 miles up Dry Wash Canyon then turn left. Go up the hill 0.63 miles to the top of the ridge and turn right. Go 0.58 miles to a small stump on the right side with tagged rebar #7176 on it. The baseline stake is 688 feet away at 165 degrees magnetic. Measure with a tape to make it easier to find the short rebar that marks the baseline. The 0-foot baseline stake is tagged #7177. The 100-foot end of the baseline is marked by a rebar that is actually 101 feet away because of rocks.



Map Name: Angle

Diagrammatic Sketch

Township 31S, Range 2W, Section 1

GPS: NAD 83, UTM 12S 416121 E, 4221253 N

DISCUSSION

Dry Wash - Trend Study No. 25C-9

Study Information

This study is located on a rocky knoll east of the town of Antimony [elevation: 7,300 feet (2,225 m), slope: 10%, aspect: north]. The transect runs up the slope which drops off at a steep, boulder-strewn cliff. The range type is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*)/grass. The trend study samples an island of Wyoming big sagebrush which receives concentrated use. Surrounding areas are dominated by increaser species including rabbitbrush (*Chrysothamnus* spp.), broom snakeweed (*Gutierrezia sarothrae*), pinyon pine (*Pinus edulis*), and juniper (*Juniperus osteosperma*). Grazing pressure from livestock has been very heavy on this BLM administered land in the past. There is also considerable use from deer, with an estimated 22 deer days use/acre estimated in 1991 (54 ddu/ha). Elk use was estimated to be lower at only 5 days use/acre (12 edu/ha) in 1991. Deer use was estimated to be heavy in 1998 and 2003 (40 ddu/acre:99 ddu/ha and 66 ddu/acre:164 ddu/ha, respectively), decreasing to moderate use in 2008 (22 ddu/acre:55 ddu/ha). Elk use was estimated to be heavy from 1998 to 2008 with an average of 67 days use/acre (165 edu/ha). Cattle use was light in 1998 and 2003 (4 cdu/acre:10 cdu/ha and 3 cdu/acre:7 cdu/ha, respectively), and no cattle pats were encountered in 2008.

Soil

The site is very rocky but soils have fair depth with an effective rooting depth of 12 inches. Soil texture is a sandy loam which is slightly acidic (pH 6.3). Parent material is basalt and these dark colored rocks cover half of the ground surface. Rocks are also common within the profile. Relative combined vegetation and litter cover ranged from 42%-47% from 1994 to 2008. Relative combined rock and pavement cover ranged from 43%-48% from 1994 to 2008. Relative bare ground cover decreased from a high of 15% in 1998 to 4% in 2003, and increased to 7% in 2008. The erosion condition class was considered to be stable in 2003 and 2008.

Browse

The dominant browse species is Wyoming big sagebrush which provided 58% of the total shrub cover in 2003. There is also some black sagebrush (*Artemisia nova*) on the site and hybridizing between the two species is taking place. Because of this, identification was difficult and all sagebrush has been classified as Wyoming big sagebrush. Population density was estimated at 4,080 plants/acre in 2008. The population was dynamic with excellent young recruitment during early readings, but recruitment has steadily declined and young plants comprised only 1% of the population in 2008. Utilization has been moderate to heavy with good vigor on most plants, but plants displaying poor vigor increased to 21% in 2008. The number of decadent plants has remained acceptable at around 15% with higher levels of 31%, 37%, and 43% during the drought years of 1991, 2003, and 2008 respectively.

Other important browse species found on the site include winterfat (*Ceratoides lanata*) and fourwing saltbush (*Atriplex canescens*). Individual winterfat plants are small, averaging only 4 to 5 inches in height. It appears that much of the annual growth is utilized each year. Winterfat population density was fairly stable from 1985 to 1998, but declined substantially in 2003 and further still in 2008 to 2,880 plants/acre. Utilization of winterfat was heavy in 1985, 2003, and 2008, moderate in 1991 and 1994, and moderate to heavy in 1998. Winterfat vigor remained good and few decadent plants were found on the site until 2008 when decadence increased to 31% and plants displaying poor vigor increased to 19%. Fourwing saltbush occurs in low numbers of about 480 plants/acre. It has showed continued heavy use, yet shows mostly normal vigor, but has begun to show high decadence at 67% in 2008.

The site also supports fairly large populations of broom snakeweed and narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*). Pinyon and juniper trees are found scattered on the site at an estimated density of 33 pinyon and 18 juniper trees/acre in 1998. Average trunk diameter was 3.5 inches for both species. Pinyon density was estimated to be 40 trees/acre in 2008 with an average diameter of 5.9 inches.

Herbaceous Understory

The herbaceous understory is not very productive. Perennial grasses combined to produce an average of 6% cover from 1994 to 2008. The most common perennial grasses are blue grama (*Bouteloua gracilis*) and needle-and-thread grass (*Stipa comata*). Indian ricegrass (*Oryzopsis hymenoides*) is also fairly abundant. Cheatgrass (*Bromus tectorum*) was found in small numbers in 1994, but increased nearly 10 fold in nested frequency by 1998. Cheatgrass provided only 1% cover in 1998, increasing to 4% in 2003, and decreasing to a small amount again in 2008. Forbs are lacking and produced less than 0.5% cover in 1994, 1998, and 2003, and were not encountered in 2008.

1991 TREND ASSESSMENT

The Wyoming big sagebrush population has declined by 18%, fourwing saltbush has declined by 34%, winterfat has declined by 33%, all indicating a slightly downward trend for browse. In addition, decadence increased to 31% for Wyoming big sagebrush. Broom snakeweed has decreased by a remarkable 94%, which is the only decrease that would be welcome on this site. Low rabbitbrush was the only browse species that increased in density since 1985 (42%). Overall trend for browse is considered slightly down. There are 10 herbaceous understory species, and only 3 species showed any increase. Dominant grasses, blue grama and needle-and-thread, declined but only needle-and-thread showed a significant decline in nested frequency. The trend for grasses is slightly down. The sum of nested frequency decreased for perennial forbs and increased significantly for many weedy annual forbs. The trend for forbs is considered down.

browse - slightly down (-1) grass - slightly down (-1) forb - down (-2)

1994 TREND ASSESSMENT

The browse trend is mixed with broom snakeweed having an overall declining trend from 1985 and narrowleaf low rabbitbrush having remained fairly steady since 1991. Winterfat has had an interesting up and down change in it's density since 1985. Overall, it has increased by 8% since 1985. The key species with the highest relative cover value is Wyoming big sagebrush. It shows a slight decrease in it's density. Decadence has decreased to only 14% and the percentage of plants being moderately to heavily hedged has also decreased. Trend for browse is considered stable with the losses of sagebrush counterbalanced by the increase in winterfat and fourwing saltbush. The trend for grasses is slightly up, considering the increase in sum of nested frequency for perennial grasses. Nested frequency of blue grama increased significantly. The trend for forbs is stable. The sum of nested frequency increased for perennial forbs, but increased for annual forbs, as well, which still comprise the majority of forbs on the site. Forbs are still rare.

winter range condition (DCI) - good (50) Low potential scale
browse - stable (0) grass - slightly up (+1) forb - stable (0)

1998 TREND ASSESSMENT

The browse trend is stable for the key species, Wyoming big sagebrush and winterfat. Density of Wyoming big sagebrush declined from 4,440 plants/acre in 1994 to 2,660 by 1998. Some of the change is due to a decline in young plants. Sagebrush decadence is still low at only 15%, and recruitment is good, with enough young plants present to replace the decadent and/or dying individuals. Winterfat density has declined 26% from the extremely high number of 18,520 plants/acre estimated in 1994. However, strip frequency and cover of winterfat increased suggesting that density estimates in 1994 may have been overestimated. Utilization of winterfat is heavier but vigor is good and there are no decadent plants. In addition, reproduction is good with 23% of the population consisting of young plants. Fourwing saltbush also shows heavier use compared to 1994 estimates and a slight decline in density. Overall, trend for browse is considered stable. Trend for the grasses is slightly down. Sum of nested frequency of perennial grasses has remained similar to 1994 estimates, but the invasive annual, cheatgrass, has increased 10 fold in its frequency on the site. Cheatgrass produces just over 1% cover. Forb trend is stable, but they are rare.

winter range condition - good (49) Low potential scale
browse - stable (0) grass - slightly down (-1) forb - stable (0)

2003 TREND ASSESSMENT

Trend is stable for Wyoming big sagebrush but down for winterfat. Density of sagebrush is similar to 1994 estimates. The number of decadent sagebrush plants increased to 37% of the population. Recruitment is fair with 6% of the sagebrush population consisting of young plants. However, this is not enough to replace all of the decadent and/or dying plants. Winterfat has declined 60% since 1998 from nearly 12,000 plants/acre to 4,760 plants/acre. Vigor remained good and decadence low. Another preferred shrub, fourwing saltbush, shows a stable trend. Taking all of these factors into consideration, trend for browse is considered slightly down. Trend for grasses is down slightly. Sum of nested frequency of perennial grasses declined slightly with a significant decline in the frequency of Indian ricegrass and bottlebrush squirreltail. The most abundant perennial grasses, blue grama and needle-and-thread increased slightly. The trend for forbs is down. Perennial forbs are rare and have declined in nested frequency. Only 1 perennial forb was found on the site in 2003.

winter range condition (DCI) - fair (31) Low potential scale

browse - slightly down (-1)

grass - slightly down (-1)

forb - down (-2)

2008 TREND ASSESSMENT

Trend for browse is down. Density of Wyoming big sagebrush declined slightly, decadence increased to 43%, and plants displaying poor vigor increased to 21%. Sagebrush had heavy utilization and recruitment was minimal. The density of winterfat continued to decrease to 2,880 plants/acre, decadence increased to 31%, and plants displaying poor vigor increased to 19%. Utilization of winterfat continued to be heavy and recruitment was minimal. Fourwing saltbush density increased slightly, but decadence increased to 67% and recruitment is low. Broom snakeweed density has increased from 1,320 plants/acre in 1998 to 5,940 plants/acre in 2008. Trend for grasses is slightly up. The nested frequency of perennial grasses increased and frequency of cheatgrass decreased significantly. The significant increase in the frequency of sand dropseed (*Sporobolus cryptandrus*) accounted for much of the change. The trend for forbs is stable. Only one forb was encountered and it was an annual species.

winter range condition (DCI) - poor-fair (26) Low potential scale

browse - down (-2)

grass - slightly up (+1)

forb - stable (0)

HERBACEOUS TRENDS --
 Management unit 25C, Study no: 9

T y p e	Species	Nested Frequency						Average Cover %			
		'85	'91	'94	'98	'03	'08	'94	'98	'03	'08
G	<i>Bouteloua gracilis</i>	_{ab} 66	_a 54	_b 100	_{ab} 53	_{ab} 91	_{ab} 76	3.13	2.19	2.37	2.34
G	<i>Bromus tectorum</i> (a)	-	-	_a 16	_b 154	_b 151	_a 37	.06	1.20	3.86	.08
G	<i>Oryzopsis hymenoides</i>	_b 116	_b 98	_b 109	_b 99	_a 46	_a 40	1.21	1.02	.74	.95
G	<i>Sitanion hystrix</i>	_{cd} 76	_{cd} 74	_{cd} 79	_c 95	_a 32	_{ab} 56	.85	1.06	.31	.75
G	<i>Sporobolus cryptandrus</i>	_b 31	_{ab} 12	_a 3	_a 5	_a -	_b 36	.03	.18	-	1.22
G	<i>Stipa comata</i>	_b 100	_a 59	_{ab} 75	_{ab} 97	_b 111	_b 111	.85	2.24	1.75	1.60
Total for Annual Grasses		0	0	16	154	151	37	0.06	1.20	3.86	0.07
Total for Perennial Grasses		389	297	366	349	280	319	6.08	6.72	5.19	6.87
Total for Grasses		389	297	382	503	431	356	6.15	7.92	9.05	6.95
F	<i>Arabis demissa</i>	3	-	-	-	-	-	-	-	-	-
F	<i>Astragalus</i> sp.	-	1	3	4	-	-	.03	.01	-	-
F	<i>Castilleja</i> sp.	-	-	-	1	-	-	-	.00	-	-
F	<i>Chenopodium album</i> (a)	-	_b 58	_a 20	_a -	_a -	_a 1	.08	-	-	.00
F	<i>Cryptantha</i> sp.	-	-	4	5	-	-	.01	.02	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	_b 82	_a -	_b 94	_a -	.17	-	.60	-
F	<i>Erigeron pumilus</i>	9	2	12	17	1	-	.05	.06	.03	-
F	<i>Lappula occidentalis</i> (a)	-	-	_c 61	_b 15	_c 61	_a -	.11	.03	.30	-
F	<i>Salsola iberica</i> (a)	3	_b 59	_a -	_a -	_a -	_a -	-	-	-	-
Total for Annual Forbs		3	117	163	15	155	1	0.36	0.03	0.90	0.00
Total for Perennial Forbs		12	3	19	27	1	0	0.09	0.10	0.03	0
Total for Forbs		15	120	182	42	156	1	0.45	0.13	0.93	0.00

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

BROWSE TRENDS --
 Management unit 25C, Study no: 9

Type	Species	Strip Frequency				Average Cover %			
		'94	'98	'03	'08	'94	'98	'03	'08
B	<i>Artemisia tridentata wyomingensis</i>	71	57	83	78	8.25	5.23	9.92	7.28
B	<i>Atriplex canescens</i>	15	12	13	17	2.01	.98	1.58	.76
B	<i>Ceratoides lanata</i>	52	56	47	36	2.40	4.69	.78	.24
B	<i>Chrysothamnus nauseosus</i>	0	1	2	0	-	.00	.00	-
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	24	34	31	24	1.63	2.69	.67	.42
B	<i>Gutierrezia sarothrae</i>	33	38	59	75	.51	.97	1.05	3.45
B	<i>Juniperus osteosperma</i>	0	0	0	0	-	.15	-	-
B	<i>Opuntia sp.</i>	3	2	3	1	.00	.00	.00	.00
B	<i>Pediocactus simpsonii</i>	0	1	0	1	-	.03	-	.00
B	<i>Pinus edulis</i>	0	1	8	7	1.00	2.11	3.06	3.54
Total for Browse		198	202	246	239	15.82	16.87	17.09	15.70

CANOPY COVER, LINE INTERCEPT --
 Management unit 25C, Study no: 9

Species	Percent Cover		
	'98	'03	'08
<i>Artemisia tridentata wyomingensis</i>	-	7.58	8.58
<i>Atriplex canescens</i>	-	.96	.78
<i>Ceratoides lanata</i>	-	.41	.40
<i>Chrysothamnus viscidiflorus stenophyllus</i>	-	1.70	.76
<i>Gutierrezia sarothrae</i>	-	.40	3.61
<i>Opuntia sp.</i>	-	.08	.15
<i>Pinus edulis</i>	4.59	6.94	6.48

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 25C, Study no: 9

Species	Average leader growth (in)	
	'03	'08
<i>Ceratoides lanata</i>	3.6	1.7
<i>Artemisia tridentata wyomingensis</i>	1.7	1.5

POINT-QUARTER TREE DATA --

Management unit 25C, Study no: 9

Species	Trees per Acre		
	'98	'03	'08
Pinus edulis	40	-	40

Average diameter (in)		
'98	'03	'08
3.5	-	5.9

BASIC COVER --

Management unit 25C, Study no: 9

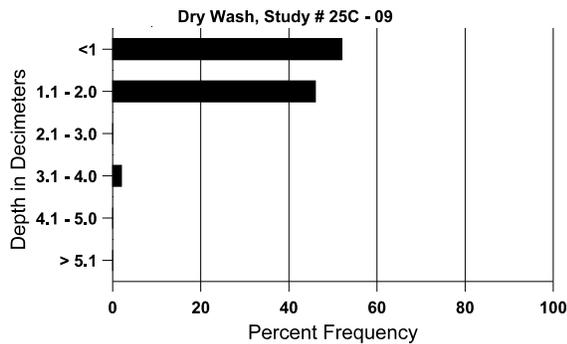
Cover Type	Average Cover %					
	'85	'91	'94	'98	'03	'08
Vegetation	4.00	4.50	23.49	25.56	27.10	21.81
Rock	24.75	36.75	29.15	29.29	35.18	29.46
Pavement	24.75	20.75	11.21	20.95	21.31	20.69
Litter	34.50	30.50	27.61	23.70	24.66	30.23
Cryptogams	.75	0	.00	0	.66	.57
Bare Ground	11.25	7.50	11.68	17.37	4.47	7.47

SOIL ANALYSIS DATA --

Management unit 25C, Study no: 9, Study Name: Dry Wash

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
11.9	64.0 (11.7)	7.2	48.0	29.4	22.6	3.5	9.7	179.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 25C, Study no: 9

Type	Quadrat Frequency			
	'94	'98	'03	'08
Rabbit	33	38	8	83
Horse	-	1	-	-
Elk	30	37	26	57
Deer	33	37	23	32
Cattle	-	4	1	-

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	-	-
54 (133)	78 (193)	69 (170)
40 (99)	66 (164)	22 (55)
4 (10)	3 (7)	-

BROWSE CHARACTERISTICS --

Management unit 25C, 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 tridentata wyomingensis</i>												
85	6598	5666	3666	1866	1066	-	46	19	16	.30	8	14/18
91	5398	-	1599	2133	1666	-	48	15	31	2	9	13/20
94	4440	240	1080	2820	540	760	10	11	12	7	7	16/27
98	2660	240	700	1580	380	440	32	.75	14	9	9	13/21
03	4660	-	280	2660	1720	720	35	22	37	12	12	13/22
08	4080	-	60	2260	1760	480	47	46	43	21	21	12/22
<i>Atriplex canescens</i>												
85	199	-	-	133	66	-	33	67	33	-	0	13/14
91	132	-	66	66	-	-	0	50	0	-	0	23/9
94	460	-	40	360	60	-	22	4	13	9	9	22/28
98	340	-	60	240	40	-	65	12	12	6	6	20/27
03	360	-	20	240	100	-	44	33	28	6	6	22/27
08	480	20	40	120	320	-	58	21	67	17	17	29/39
<i>Ceratoides lanata</i>												
85	17064	3733	9199	7799	66	-	41	51	0	-	11	2/3
91	11399	-	3733	7666	-	-	68	0	0	-	0	8/5
94	18520	-	2040	16480	-	-	17	11	0	-	0	5/6
98	11900	-	2740	9160	-	-	62	29	0	-	0	4/5
03	4760	-	60	4680	20	120	21	71	0	-	0	5/5
08	2880	-	40	1940	900	200	28	69	31	19	19	4/5

		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)
Chrysothamnus nauseosus												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
98	60	-	60	-	-	-	0	0	-	-	0	-/-
03	60	-	40	20	-	-	67	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Chrysothamnus viscidiflorus stenophyllus												
85	732	66	133	533	66	-	9	0	9	-	0	8/13
91	1265	-	333	533	399	-	21	0	32	-	5	7/11
94	1260	60	560	700	-	-	5	5	0	-	0	9/16
98	2820	-	480	2340	-	20	0	0	0	-	0	9/13
03	1480	-	-	1360	120	80	0	0	8	-	0	7/12
08	1240	-	-	540	700	40	2	0	56	21	21	6/11
Gutierrezia sarothrae												
85	7798	4066	2866	4866	66	-	0	0	1	-	2	7/7
91	465	333	199	266	-	-	0	0	0	-	0	6/5
94	1360	-	300	1040	20	-	0	0	1	-	0	7/9
98	1320	20	260	1040	20	60	0	0	2	2	2	9/10
03	4040	160	1840	2080	120	160	2	0	3	1	1	6/7
08	5940	20	20	4200	1720	1460	0	0	29	11	11	7/9
Opuntia sp.												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
94	60	-	-	60	-	-	0	0	-	-	0	4/11
98	40	-	-	40	-	-	0	0	-	-	0	5/11
03	60	-	-	60	-	-	0	0	-	-	0	3/11
08	20	-	-	20	-	-	0	0	-	-	0	4/10
Pediocactus simpsonii												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
98	20	-	-	20	-	-	0	0	-	-	0	1/4
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	20	-	-	20	-	-	0	0	-	-	0	2/3

		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)
Pinus edulis												
85	133	-	133	-	-	-	0	0	-	-	0	-/-
91	133	-	133	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
98	20	-	20	-	-	-	0	0	-	-	0	-/-
03	160	-	20	140	-	-	0	0	-	-	0	-/-
08	140	-	-	140	-	-	0	0	-	-	0	-/-
Yucca sp.												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	7/10