

DEADMAN - TREND STUDY NO. 11B-1-10

Vegetation Type: Chained, Seeded Pinyon-Juniper

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Semidesert Stony Loam (Utah Juniper-Pinyon), R034XY247UT

Land Ownership: BLM

Elevation: 6600 ft. (2012 m)

Aspect: South

Slope: 3%

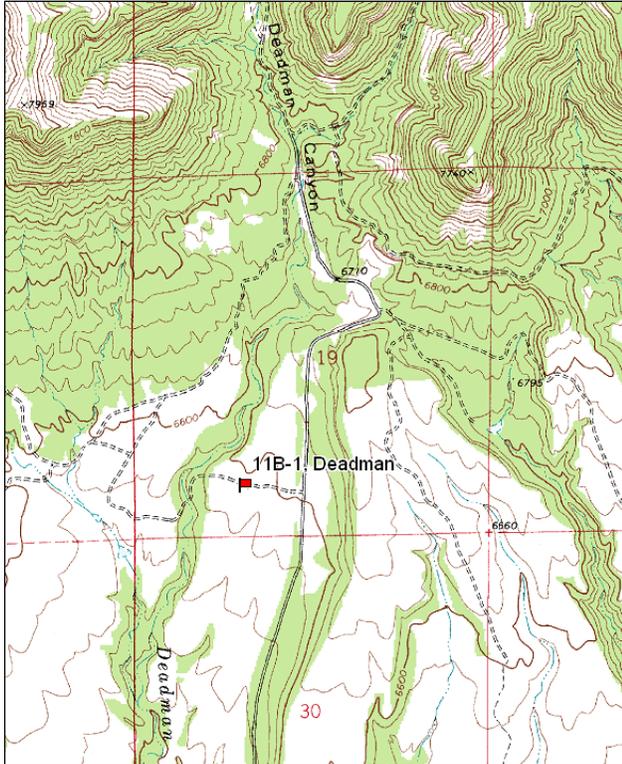
Transect bearing: 165° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 1 rebar @ 1ft, belt 3 rebar @ 10 ft.

Directions:

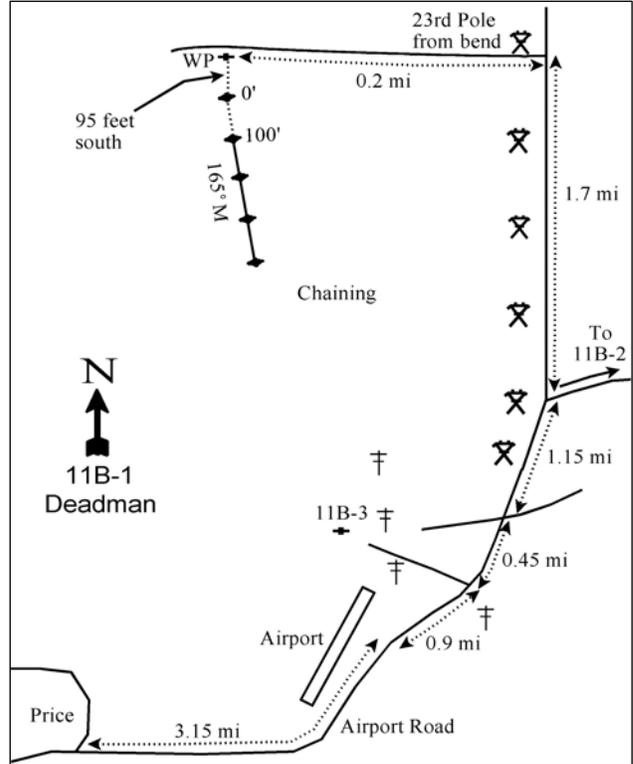
From the southeast end of Price, take the Airport Road east 3.15 miles to the airport. Continue 0.9 miles to a power line (and a left turn to the Airport transect). Proceed 0.45 miles to an intersection. Stay left on the main road for 1.15 miles to a corral and a fork to the right which leads to the Airport Bench transect. There is a bend in the power line on the left. Stay left and proceed up the main road another 1.7 miles (to the 23rd pole from the bend in the power line) and turn left. Proceed 0.2 miles, passing power pole #365, to a witness post on the left side of the road in a chaining. The 0-foot stake is 95 feet south of the witness post and marked with browse tag #7854.

Map Name: Deadman Canyon



Township: 13S Range: 11E Section: 19

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 522861 E 4391842 N

Site Information

Site Description: The study is located near the mouth of Deadman Canyon and samples the bench lands northeast of Price and south of the Book Cliffs. Much of the area, managed by the Bureau of Land Management (BLM) Price River Resource Area, was chained and seeded in 1965-66. Many young surviving pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees had reestablished on the site and the area was retreated as part of the West Coal Creek project ([WRI Project #847](#)) in the fall and winter of 2007 using a bullhog and reseeded (Table - Seed Mix). Seed was aerially applied prior to the bullhog treatment. The study is near Deadman Creek, which only contains water seasonally, and drains south into the Price River. Human activity is high with numerous roads making the area very accessible. There is also activity associated with the coal mines located farther up the canyon. Grazing is managed by the BLM as part of the Coal Creek allotment. Pellet group transect data estimated moderately light use by deer in 2000 and 2010, and was heavy in 2005. Elk use was only sampled in 2010 at moderately light rates. Estimated cattle use has been light since 2000 (Table - Pellet Group Data).

Browse: Preferred browse is fairly limited on the site. Prior to the bullhog treatment, the most abundant key browse species was true mountain mahogany (*Cercocarpus montanus*). However, following the treatment, mahogany cover decreased substantially and was not abundant on the site (Table - Browse Trends). Prior to the treatment, the small mahogany population was decreasing in density and average height and crown measurements. Decadence was low in the mahogany population until 2005, when all of the sampled plants were decadent. Utilization of mahogany was mostly light to moderate at the outset of the study, but increased to mostly heavy use in 2000. Important browse species that were seeded when the area was chained include fourwing saltbush (*Atriplex canescens*) and bitterbrush (*Purshia tridentata*). Individuals of these species are widely scattered and are mostly older plants. They do not appear to be reproducing although the plants are vigorous and putting on good growth. A few mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) plants occur in the area. Green ephedra (*Ephedra viridis*) is fairly common on the site and has been vigorous with mostly light use, though use was very heavy in 2000 and 2010 (Table - Browse Characteristics).

Prior to the treatment, pinyon and juniper trees had reestablished and dominated the overstory. There was evidence of light browsing of juniper. Both the juniper and pinyon appeared to be resuming their dominance of the site and provided nearly all of the browse cover (Table - Browse Trends). Point-quarter data indicated that juniper density had remained similar, but pinyon density was increasing from 1994 to 2005. Following the treatment, density of pinyon and juniper decreased substantially with most of the sampled trees being less than 4 feet tall in 2010 (Table - Point-Quarter Tree Data).

Herbaceous Understory: The seeded species crested wheatgrass (*Agropyron cristatum*) established a fair stand, but declined markedly between 2000 and 2005 and grasses are now rare on the site. A wide variety of forbs are found on the site, although none provide substantial forage. The seeded species alfalfa (*Medicago sativa*) was encountered early in the study, but has not been sampled since 1994. Annual forb species increased substantially in nested frequency in 2005, and had a large increase in cover in 2010, following the treatment. The annual species nodding eriogonum (*Eriogonum cernuum*) and Russian thistle (*Salsola iberica*) were very common in 2010 (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam with a mildly alkaline soil reaction (pH 7.5). Phosphorus may have limited availability for plant growth and development at 4.3 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Much of the rock on the site contains a calcium carbonate coating and some areas have developed a weak hardpan at a depth of about 12 inches. There is also some exposed sandstone bedrock in the area. Prior to the treatment bare ground was high with large areas of bare soil in the shrub and tree interspaces, but the bullhog treatment caused a large increase in litter cover and bare ground cover was low in 2010 (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1986 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. Preferred browse species are limited on the site and there was little change in the populations of the preferred browse that are present. However, recruitment of young true mountain mahogany decreased with no new recruitment.
- **1994 to 2000 - slightly down (-1):** There was little change in the density of preferred browse species, but decadence increased in green ephedra and rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*). The combined cover of pinyon and juniper increased from 8% to 13%.
- **2000 to 2005 - slightly down (-1):** The density and cover of preferred browse species changed little, but decadence of true mountain mahogany increased from 0% to 100%. Pinyon and juniper cover increased to 17%.
- **2005 to 2010 - slightly up (+1):** Preferred browse decreased following the treatment and is very rare on the site. However, the density and cover of pinyon and juniper was decreased substantially as well to 2%.

Grass:

- **1986 to 1994 - down (-2):** The sum of nested frequency of perennial grasses decreased by 22% with a significant decrease in the nested frequency of crested wheatgrass.
- **1994 to 2000 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses
- **2000 to 2005 - down (-2):** The perennial grass sum of nested frequency decreased by 82% and cover decreased from 4% to less than 1%. The only common grass, crested wheatgrass, had a significant decrease in nested frequency and became rare on the site.
- **2005 to 2010 - stable (0):** There was a decrease in the sum of nested frequency of perennial grasses, but cover increased slightly. Perennial grasses are rare on the site.

Forb:

- **1986 to 1994 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 18%.
- **1994 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 28%, though cover remained similar.
- **2000 to 2005 - up (+2):** There was a 55% increase in the sum of nested frequency of perennial forbs with a slight increase in cover. Annual forbs also increased substantially in frequency.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 16%, though cover increased slightly. Annual species increased again in sum of nested frequency and cover increased from 1% to 7%. Nodding eriogonum and Russian thistle are the dominant species on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 11B, study no: 1

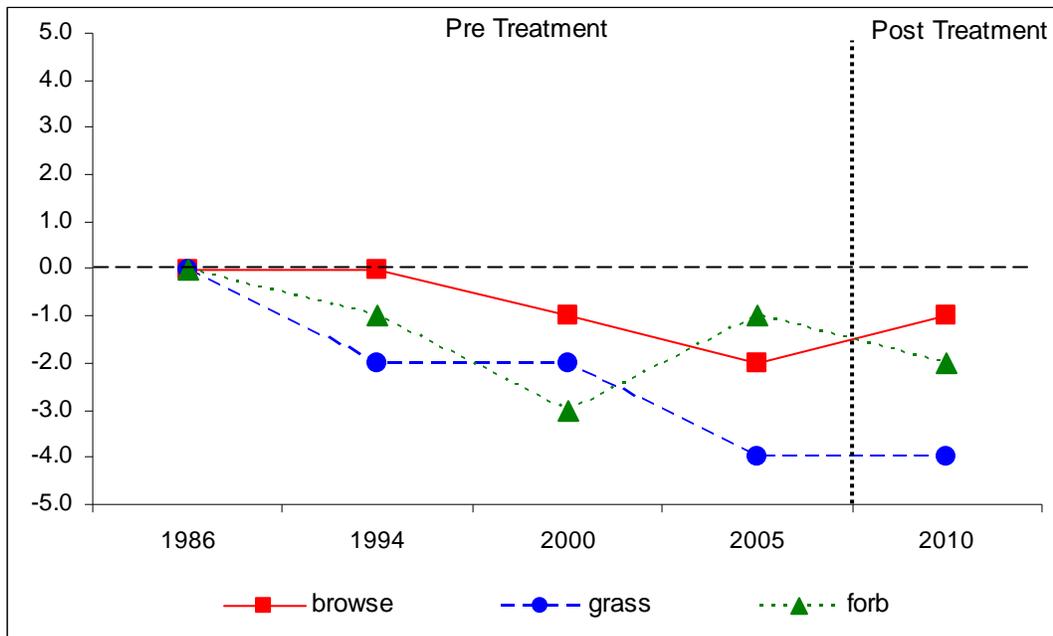
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	2.8	0.0	0.0	10.5	0.0	2.7	0.0	16.0	Poor
00	3.3	0.0	0.0	8.7	0.0	3.3	0.0	15.3	Poor
05	2.4	0.0	0.0	0.3	0.0	4.8	0.0	7.5	Very Poor
10	0.4	0.0	0.0	1.7	0.0	5.7	0.0	7.8	Very Poor

SEED MIX --
 Management Unit 11B, study no: 1

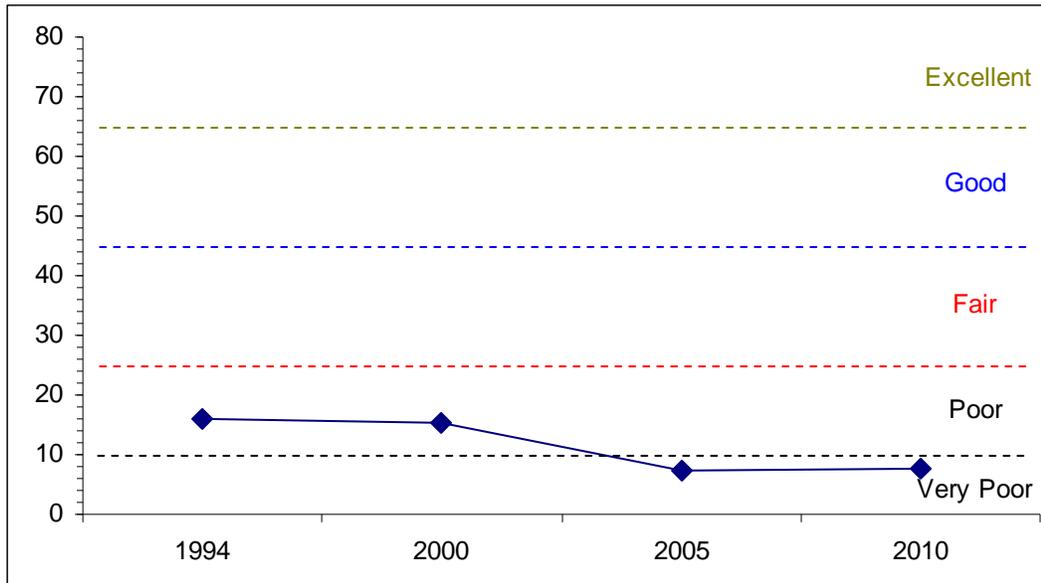
Project name: West Coal Creek		
WRI Database #: 847		
Size (acre): 1912		
Seed type	lbs in mix	lbs/acre
Alfalfa 'Ladak'	600	0.31
Alfalfa 'Ranger'	600	0.31
Alfalfa 'Spredor 4'	600	0.31
Blue Flax 'Appar'	500	0.26
Blue Grama	640	0.33
Forage Kochia 'Immigrant'	900	0.47
Fourwing Saltbush	2312	1.21
Indian Ricegrass 'Rimrock'	3600	1.88
Intermediate Wheatgrass	2581	1.35
Russian Wildrye	2868	1.50
Sand Dropseed	90	0.05
Siberian Wheatgrass 'Vavilov'	2581	1.35
Snake River Wheatgrass 'Secar'	2581	1.35
Big Bluegrass 'Sherman'	100	0.05
Palmer Penstemon	150	0.08
Winterfat	125	0.07
BULK POUNDS:	20828	10.89
PLS POUNDS:		8.41

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 11B, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 11B, Study no: 1



HERBACEOUS TRENDS--
 Management unit 11B, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'86	'94	'00	'05	'10	'94	'00	'05	'10
G	<i>Agropyron cristatum</i>	c292	b223	b237	a37	a4	5.12	4.13	.13	.15
G	<i>Aristida purpurea</i>	-	4	1	-	4	.03	.15	-	.38
G	<i>Bouteloua gracilis</i>	-	-	-	1	-	-	-	.00	-
G	<i>Oryzopsis hymenoides</i>	8	8	10	8	7	.08	.08	.01	.34
Total for Annual Grasses		0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		300	235	248	46	15	5.24	4.36	0.15	0.87
Total for Grasses		300	235	248	46	15	5.24	4.36	0.15	0.87
F	<i>Arabis perennans</i>	b16	a-	a-	a-	a-	-	-	-	-
F	<i>Astragalus convallarius</i>	5	-	1	-	-	.00	.00	-	-
F	<i>Astragalus sp.</i>	-	-	-	-	9	-	-	-	.02
F	<i>Chenopodium fremontii</i> (a)	-	a2	a-	b86	a-	.00	-	.27	-
F	<i>Cryptantha fulvocanescens</i>	b43	b44	bc51	c72	a10	.58	1.02	.58	.42
F	<i>Descurainia pinnata</i> (a)	-	a5	a-	b21	a1	.01	-	.28	.00
F	<i>Eriogonum alatum</i>	a-	a-	a4	a-	b35	-	.01	.00	.16
F	<i>Eriogonum cernuum</i> (a)	-	a-	a-	b104	c172	-	-	.43	3.40
F	<i>Eriogonum umbellatum</i>	19	16	15	9	11	.09	.13	.04	.19
F	<i>Euphorbia fendleri</i>	c80	b24	b30	b14	a-	.07	.11	.03	-
F	<i>Gilia sp.</i> (a)	-	-	-	3	-	-	-	.00	-
F	<i>Hedysarum boreale</i>	5	-	-	-	-	-	-	-	-
F	<i>Ipomopsis aggregata</i>	ab3	ab8	a-	b8	ab2	.01	-	.07	.00
F	<i>Lactuca serriola</i>	a-	a-	a-	a-	b67	-	-	-	.80
F	<i>Lappula occidentalis</i> (a)	-	-	-	1	-	-	-	.00	-
F	<i>Lesquerella ludoviciana</i>	a-	b21	a2	a3	a-	.10	.00	.03	-
F	<i>Lithospermum multiflorum</i>	2	2	-	1	-	.01	-	.03	-

Type	Species	Nested Frequency					Average Cover %			
		'86	'94	'00	'05	'10	'94	'00	'05	'10
F	<i>Machaeranthera canescens</i>	a ⁻	b ²⁰	a ¹	ab ³	c ³⁶	.12	.00	.04	.24
F	<i>Machaeranthera grindelioides</i>	4	5	-	-	-	.01	-	-	-
F	<i>Medicago sativa</i>	b ¹⁸	ab ⁵	a ⁻	a ⁻	a ⁻	.04	-	-	-
F	<i>Penstemon caespitosus</i>	-	3	-	-	-	.01	-	-	-
F	<i>Penstemon cyanocaulis</i>	a ³¹	a ²⁷	a ¹⁴	b ⁹⁶	a ¹¹	.16	.09	1.51	.81
F	<i>Salsola iberica</i> (a)	-	c ⁷⁷	a ⁻	b ¹⁶	d ²⁰¹	.82	-	.04	3.47
F	<i>Sphaeralcea coccinea</i>	5	20	15	19	9	.11	.22	.03	.16
F	<i>Townsendia incana</i>	b ¹⁴	ab ⁷	b ¹²	a ⁻	a ⁻	.01	.03	-	-
Total for Annual Forbs		0	84	0	231	374	0.84	0	1.03	6.88
Total for Perennial Forbs		245	202	145	225	190	1.36	1.64	2.40	2.83
Total for Forbs		245	286	145	456	564	2.21	1.64	3.43	9.71

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

BROWSE TRENDS--

Management unit 11B, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'94	'00	'05	'10	'94	'00	'05	'10
B	<i>Artemisia tridentata vaseyana</i>	0	0	1	0	-	-	.00	-
B	<i>Cercocarpus montanus</i>	5	5	3	2	1.46	2.04	1.37	.15
B	<i>Chrysothamnus nauseosus hololeucus</i>	5	7	4	7	.00	.38	.03	.15
B	<i>Ephedra viridis</i>	4	6	6	5	.03	.18	.30	.15
B	<i>Gutierrezia sarothrae</i>	14	57	17	6	.45	1.75	.03	.03
B	<i>Juniperus osteosperma</i>	0	12	12	4	3.27	5.59	6.90	1.52
B	<i>Opuntia</i> sp.	5	5	3	1	.00	.03	.06	-
B	<i>Pinus edulis</i>	0	8	7	0	4.42	7.23	9.59	.15
B	<i>Purshia tridentata</i>	2	1	0	0	.38	.03	-	-
Total for Browse		35	101	53	25	10.03	17.25	18.29	2.16

CANOPY COVER, LINE INTERCEPT--

Management unit 11B, Study no: 1

Species	Percent Cover		
	'00	'05	'10
<i>Cercocarpus montanus</i>	-	.70	.08
<i>Chrysothamnus nauseosus hololeucus</i>	-	.03	.01
<i>Ephedra viridis</i>	-	.93	.81
<i>Gutierrezia sarothrae</i>	-	.10	.28
<i>Juniperus osteosperma</i>	5.00	9.36	2.78
<i>Pinus edulis</i>	6.59	17.73	1.18

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 11B, Study no: 1

Species	Average leader growth (in)	
	'05	'10
Cercocarpus montanus	0.5	2.8
Ephedra viridis	-	4.6

POINT-QUARTER TREE DATA--

Management unit 11B, Study no: 1

Species	Trees per Acre				Average diameter (in)			
	'94	'00	'05	'10	'94	'00	'05	'10
Cercocarpus montanus	-	-	-	37	-	-	-	0.9
Juniperus osteosperma	208	184	213	34	5.1	2.1	4.3	2.7
Pinus edulis	83	105	118	20	6.7	3.6	5.4	3.8

BASIC COVER--

Management unit 11B, Study no: 1

Cover Type	Average Cover %				
	'86	'94	'00	'05	'10
Vegetation	6.25	17.24	25.72	20.64	11.90
Rock	2.25	8.81	9.61	8.77	7.43
Pavement	10.00	4.03	9.95	8.51	7.18
Litter	58.25	30.11	34.09	36.68	56.17
Cryptogams	0	.18	.13	.53	1.34
Bare Ground	23.25	29.17	37.48	41.76	17.90

SOIL ANALYSIS DATA --

Management unit 11B, Study no: 1, Study Name: Deadman

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.9	7.5	57.3	24.7	18.0	2.6	4.3	70.4	0.8

PELLET GROUP DATA--

Management unit 11B, Study no: 1

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'00	'05	'10	'00	'05	'10
Sheep	-	1	-	-	-	-	-
Rabbit	44	23	49	9	-	-	-
Elk	5	-	-	1	-	-	21 (51)
Deer	42	15	23	24	19 (47)	60 (149)	27 (68)
Cattle	-	2	-	2	3 (7)	2 (4)	6 (14)

BROWSE CHARACTERISTICS--

Management unit 11B, Study no: 1

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>Artemisia tridentata vaseyana</i>									
86	0	0	0	-	-	0	0	0	-/-
94	0	0	0	-	-	0	0	0	6/5
00	0	0	0	-	-	0	0	0	29/62
05	20	100	0	-	20	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Cercocarpus montanus</i>									
86	232	14	86	0	33	29	0	0	83/29
94	100	0	100	0	-	40	0	0	59/78
00	100	0	100	0	-	20	60	0	56/65
05	80	0	0	100	20	0	100	0	42/48
10	40	50	0	50	20	0	50	50	27/38
<i>Chrysothamnus nauseosus hololeucus</i>									
86	0	0	0	0	-	0	0	0	-/-
94	100	0	100	0	-	0	0	0	21/21
00	140	14	43	43	100	14	57	29	24/12
05	80	0	50	50	-	0	100	50	16/21
10	240	67	33	0	20	8	8	0	20/20
<i>Ephedra viridis</i>									
86	0	0	0	0	-	0	0	0	-/-
94	180	56	44	0	-	0	0	0	24/30
00	160	13	63	25	-	13	75	13	31/35
05	320	6	81	13	-	13	0	0	31/40
10	260	38	54	8	-	8	38	8	14/23
<i>Gutierrezia sarothrae</i>									
86	0	0	0	0	-	0	0	0	-/-
94	760	3	97	0	40	0	0	0	8/8
00	9380	9	87	4	120	0	0	1	6/5
05	520	92	4	4	80	0	4	4	3/5
10	200	20	80	0	-	0	0	0	4/8
<i>Juniperus osteosperma</i>									
86	198	50	50	-	-	33	17	0	122/67
94	0	0	0	-	-	0	0	0	-/-
00	260	69	31	-	-	0	0	0	-/-
05	400	55	45	-	-	0	0	0	-/-
10	100	40	60	-	-	0	0	0	-/-

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>Opuntia</i> sp.									
86	0	0	0	0	-	0	0	0	-/-
94	140	0	86	14	-	0	0	0	3/13
00	180	22	56	22	20	0	0	22	4/14
05	80	0	100	0	-	0	0	0	3/12
10	20	0	100	0	-	0	0	0	3/11
<i>Pinus edulis</i>									
86	165	40	60	-	-	0	0	0	59/48
94	0	0	0	-	-	0	0	0	-/-
00	180	11	89	-	-	0	0	0	-/-
05	140	0	100	-	-	0	0	14	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
86	0	0	0	-	-	0	0	0	-/-
94	60	0	100	-	-	67	0	0	6/12
00	20	100	0	-	-	0	0	0	33/72
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-