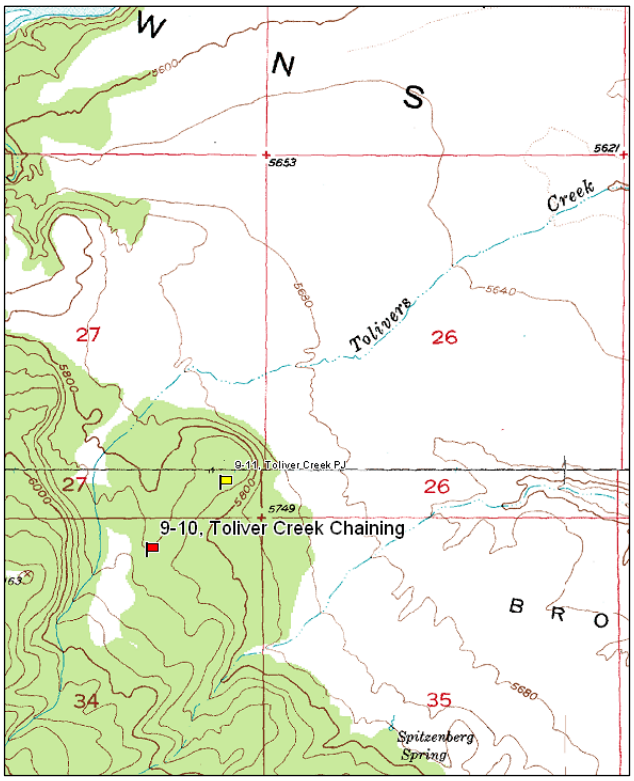
TOLIVER CREEK CHAINING - TREND STUDY NO. 9-10-10

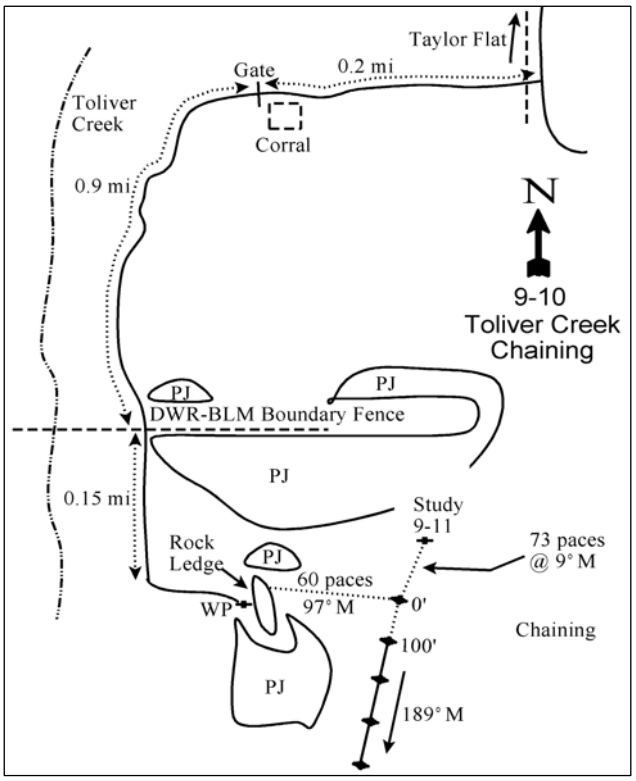
Vegetation Type: Chained, Seeded Pinyon-Juniper
Range Type: Crucial Deer Winter, Crucial Elk Winter
NRCS Ecological Site Description: Semidesert Stony Loam (Utah Juniper-Pinyon), R034XY247UT
Land Ownership: BLM
Elevation: 5870 ft. (1790 m)
Aspect: North
Slope: 7%
Transect bearing: 189° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft.), line 4 (71ft).

Directions:
From the north side of the Green River at the Taylor Flat bridge, go south across the river 1.75 miles. Turn right and go through a gate. Go 0.2 miles to a gate by a corral. Continue south and west 0.7 miles to the DWR-BLM boundary fence. Go through the gate and continue 0.15 miles to the end of the road. There is a Pinyon and Juiper covered, rocky ledge about 75 feet east. From the ledge, walk 60 paces at 97ºM into the chaining to a short green fencepost tagged #909 which marks the start of the frequency baseline.

Map Name: Warren Draw



Diagrammatic Sketch:



Township: 2N Range: 24E Section: 34

GPS: NAD 83, UTM 12T 652548 E 4526066 N

TOLIVER CREEK CHAINING - TREND STUDY NO. 9-10

Site Information

Site Description: The study is located in the foothills above Taylor Flat in the Browns Park area. The study monitor's a large pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining completed during the fall of 1986. The area was two-way chained and seeded with grasses, forbs, and shrubs. The area was treated again by a lop and scatter that was completed in August of 2005, following the reading that year, as part of the Taylor Flat P/J Removal (WRI Project #10), which removed many of the small pinyon and juniper that had begun to reestablish on the site. This area is managed by the Bureau of Land Management as part of the Taylor Flat allotment. Pellet group transect data has estimated moderate use by deer since 2000. Estimated use by elk has fluctuated with light use in 2000, heavy use in 2005 and moderate use in 2010. Estimated use by cattle has been mostly light since 2000 (Table - Pellet Group Data).

Browse: Due to the shallow, rocky nature of the site, the control of pinyon and juniper by the chaining was close to 100%. Few seedlings were observed and none were sampled in the density plots of 1988. A few small pinyon and juniper trees had begun to reestablish on the site, but most of these were removed in the treatment between 2005 and 2010 (Table - Point-Quarter Tree Data). In general, browse species are not abundant on the site. The combined average cover for all browse species has been less than 5% in all sample years (Table - Browse Trends). Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), fourwing saltbush (*Atriplex canescens*) and rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) are found in low densities over the site, but provide limited forage. All three of these species displayed light use, low decadence and good vigor in most of the sample years, but had a marked increase in utilization, decadence and poor vigor in 2010. Recruitment of young mountain big sagebrush plants was very good at the outset of the study, as the population reestablished, and has been good since 2000. Fourwing saltbush also had excellent recruitment early in the study, but has had no new recruitment of young plants since 2000. Other species found include prickly pear cactus (*Opuntia sp.*) and broom snakeweed (*Gutierrezia sarothrae*). Broom snakeweed appeared to be expanding on the site in the initial years of the study, but decreased substantially in 2005 (Table - Browse Characteristics).

Herbaceous Understory: Grasses are dominated by two introduced species, the seeded species crested wheatgrass (*Agropyron cristatum*) and the annual species cheatgrass (*Bromus tectorum*). Crested wheatgrass steadily increased in nested frequency from 1988 to 2000, but has remained stable since that time. Cheatgrass has fluctuated in frequency and cover, but has often been the dominant grass species on the site. There is a good mixture of introduced and native perennial grass species present, but most remain infrequent. These species include intermediate wheatgrass (*Agropyron intermedium*), blue bunch wheatgrass (*A. spicatum*), bottlebrush squirreltail (*Sitanion hystrix*), orchard grass (*Dactylis glomerata*), needle-and-thread (*Stipa comata*) and Sandberg bluegrass (*Poa secunda*). Perennial forbs decreased in 2000 and have been scarce on the site since. The seeded species alfalfa (*Medicago sativa*) was fairly common at the outset of the study, but has not been sampled since 2000 (Table - Herbaceous Trends).

Soil: The soil is a sandy loam with a neutral soil reaction (pH 7.3) (Table - Soil Analysis Data). The site is very rocky with large rocks providing a high amount of cover. Bare ground is moderately low, though it has been higher in years when cheatgrass was not as prevalent (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence and poor vigor remained low in the mountain big sagebrush and fourwing saltbush populations. It appeared, both species

populations began to establish as the density of mature plants increased, but recruitment of young plants remained very high.

- **1995 to 2000 - slightly up (+1):** The density of mountain big sagebrush increased by 37% from 380 plants/acre to 520 plants/acre and cover increased slightly, though cover remained less than 1%. The population was mostly mature, but recruitment of young plants remained good at 12%.
- **2000 to 2005 - slightly down (-1):** There was a 23% decrease in the density of mountain big sagebrush to 400 plants/acre, but cover increased slightly to 2% as the population matures.
- **2005 to 2010 - slightly down (-1):** Density and cover of mountain big sagebrush and fourwing saltbush remained similar, but decadence and poor vigor increased substantially in both species. Decadence increased from 0% to 10% and poor vigor increased from 0% to 43% in sagebrush. Decadence increased from 0% to 60% and poor vigor increased from 0% to 80% in fourwing. Decadence and poor vigor also increased substantially in rubber rabbitbrush.

Grass:

- **1988 to 1995 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 10%. Cheatgrass increased significantly in nested frequency and was the dominant species on the site.
- **1995 to 2000 - up (+2):** The perennial grass sum of nested frequency increased by 42% and cover increased from 6% to 11%. Much of this increase was due to a significant increase in the nested frequency of crested wheatgrass. Cheatgrass decreased significantly in nested frequency and cover decreased from 23% to 5%.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased to 17% due to a large increase in the cover of crested wheatgrass. Cheatgrass decreased significantly in nested frequency and cover decreased to less than 1%.
- **2005 to 2010 - down (-2):** There was only a 9% decrease in the sum of nested frequency of perennial grasses and cover decreased to 15%. However, cheatgrass increased significantly in nested frequency and cover increased to 19%. Cheatgrass was again the dominant species on the site.

Forb:

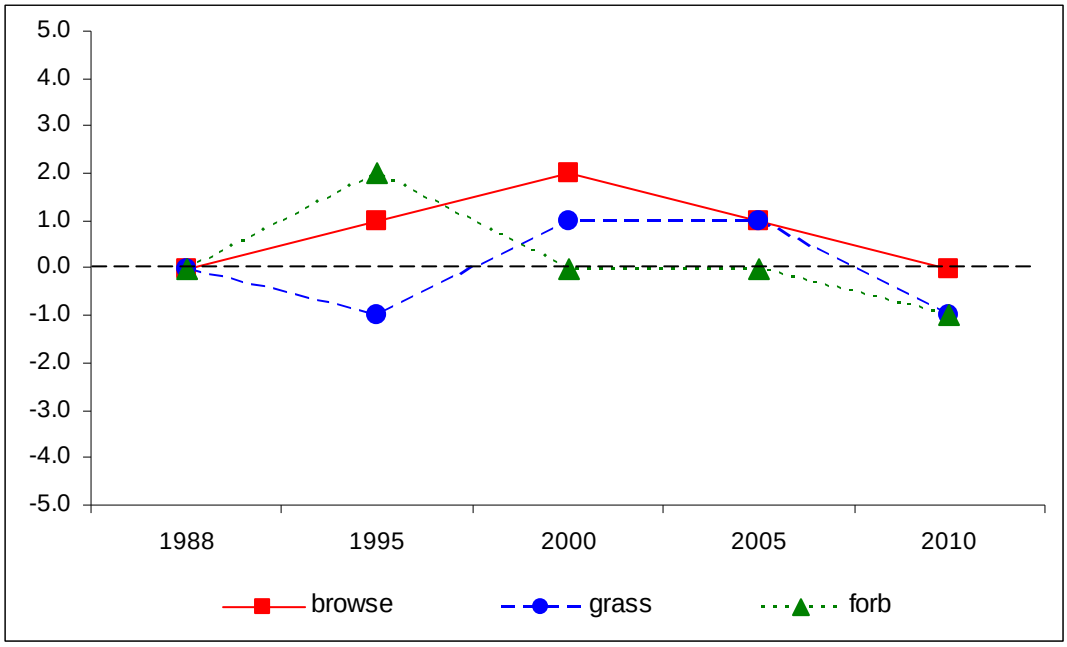
- **1988 to 1995 - up (+2):** There was a two-fold increase in the sum of nested frequency of perennial forbs.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 76% and cover decreased from 3% to less than 1%. No seeded forb species were sampled.
- **2000 to 2005 - stable (0):** Perennial forbs changed little in sum of nested frequency or cover and remained rare on the site.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased and perennial forbs were very rare on the site.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 9, study no: 10

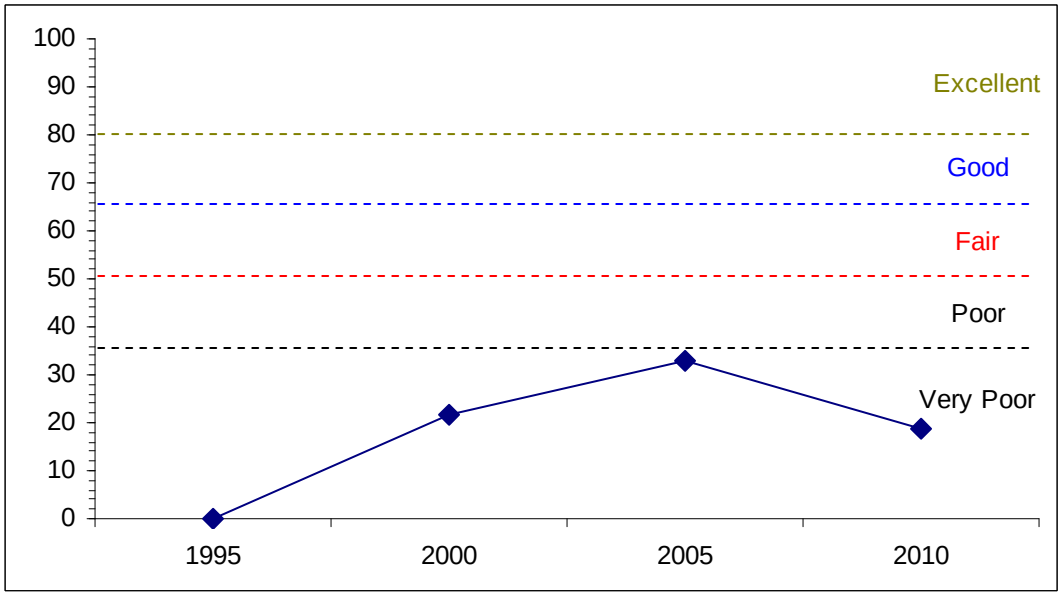
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
95	0.6	0.0	0.0	11.6	-17.2	5.2	0.0	**0.2**	Very Poor
00	2.2	0.0	0.0	22.5	-3.6	0.5	0.0	**21.6**	Very Poor
05	2.5	0.0	0.0	30.0	-0.4	0.7	0.0	**32.8**	Very Poor
10	2.9	0.0	0.0	30.0	-14.6	0.2	0.0	**18.6**	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 10



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 9, Study no: 10



HERBACEOUS TRENDS--
Management unit 09, Study no: 10

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	$_{a}$84	$_{b}$165	$_{c}$248	$_{c}$257	$_{c}$253	4.30	9.80	16.05	13.81
G	Agropyron intermedium	3	25	21	15	22	.55	.38	.31	.44
G	Agropyron spicatum	$_{a}$-	$_{a}$4	$_{b}$25	$_{a}$-	$_{a}$1	.03	.17	-	.15
G	Aristida purpurea	$_{a}$-	$_{a}$-	$_{a}$-	$_{b}$9	$_{ab}$6	.03	-	.12	.33
G	Bromus tectorum (a)	$_{c}$210	$_{e}$363	$_{b}$147	$_{a}$62	$_{d}$286	22.82	4.74	.34	19.27
G	Dactylis glomerata	$_{c}$73	$_{ab}$16	$_{b}$22	$_{a}$-	$_{a}$2	.16	.71	.00	.03
G	Oryzopsis hymenoides	$_{b}$17	$_{a}$-	$_{a}$2	$_{ab}$6	$_{ab}$5	-	.03	.06	.07
G	Poa secunda	11	1	6	6	3	.00	.01	.01	.00
G	Sitanion hystrix	$_{b}$33	$_{a}$-	$_{a}$-	$_{b}$20	$_{a}$-	.00	-	.38	-
G	Sporobolus cryptandrus	2	6	1	5	10	.01	.00	.15	.22
G	Stipa comata	$_{a}$-	$_{b}$20	$_{b}$11	$_{b}$14	$_{a}$-	.69	.11	.14	-
G	Unknown grass - perennial	$_{b}$39	$_{a}$-	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-	-
G	Vulpia octoflora (a)	-	$_{a}$22	$_{a}$4	$_{c}$61	$_{b}$18	.06	.01	.18	.12
Total for Annual Grasses		210	385	151	123	304	22.89	4.75	0.51	19.40
Total for Perennial Grasses		262	237	336	332	302	5.79	11.23	17.24	15.06
Total for Grasses		472	622	487	455	606	28.68	15.98	17.76	34.46
F	Calochortus nuttallii	-	5	-	-	-	.01	-	-	-
F	Chenopodium album (a)	$_{b}$7	$_{a}$-	$_{a}$-	$_{b}$6	$_{a}$-	-	-	.02	-
F	Chenopodium leptophyllum(a)	$_{b}$22	$_{a}$-	$_{a}$-	$_{a}$4	$_{a}$-	-	-	.01	-
F	Collinsia parviflora (a)	-	-	-	2	-	-	-	.01	-
F	Cymopterus longipes	-	3	4	1	-	.01	.01	.01	-
F	Descurainia pinnata (a)	$_{b}$19	$_{b}$20	$_{a}$-	$_{b}$16	$_{a}$-	.44	-	.08	-
F	Draba reptans (a)	$_{a}$7	$_{b}$83	$_{a}$-	$_{a}$3	$_{a}$-	.23	-	.01	-
F	Erodium cicutarium (a)	-	$_{b}$26	$_{a}$6	$_{c}$46	$_{a}$-	.41	.01	1.87	-
F	Gilia sp. (a)	-	$_{b}$18	$_{a}$-	$_{b}$15	$_{a}$-	.05	-	.04	-
F	Lactuca serriola	$_{a}$-	$_{b}$70	$_{a}$-	$_{a}$-	$_{a}$-	.30	-	-	-
F	Lappula occidentalis (a)	-	1	-	-	2	.00	-	-	.00
F	Lepidium densiflorum (a)	-	7	-	2	3	.01	-	.03	.00
F	Leucelene ericoides	$_{b}$37	$_{b}$40	$_{ab}$24	$_{a}$23	$_{a}$14	.73	.18	.06	.07
F	Machaeranthera canescens	-	4	-	3	-	.01	-	.00	-
F	Medicago sativa	$_{b}$24	$_{a}$9	$_{a}$-	$_{a}$-	$_{a}$-	.34	-	-	-
F	Melilotus officinalis	-	7	-	-	-	.21	-	-	-
F	Phlox hoodii	-	6	1	-	-	.06	.00	-	-
F	Sanguisorba minor	5	-	-	-	-	-	-	-	-
F	Sisymbrium altissimum (a)	-	$_{b}$50	$_{a}$2	$_{a}$2	$_{a}$-	.48	.00	.02	-
F	Sphaeralcea coccinea	$_{a}$-	$_{c}$23	$_{bc}$13	$_{c}$26	$_{ab}$3	.71	.05	.28	.03
F	Tragopogon dubius	-	6	-	-	-	.04	-	-	-
F	Unknown forb-annual (a)	7	-	-	-	-	-	-	-	-
F	Unknown forb-perennial	9	3	-	-	-	.15	-	-	-
Total for Annual Forbs		62	205	8	96	5	1.64	0.01	2.10	0.00
Total for Perennial Forbs		75	176	42	53	17	2.59	0.24	0.36	0.11
Total for Forbs		137	381	50	149	22	4.24	0.26	2.46	0.12

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

BROWSE TRENDS--
Management unit 09, Study no: 10

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata vaseyana	6	8	8	8	.33	.98	1.46	1.57
B	Atriplex canescens	5	5	5	5	.15	.66	.51	.78
B	Chrysothamnus depressus	0	3	0	0	-	.15	-	-
B	Chrysothamnus nauseosus hololeucus	3	5	5	3	.41	-	.33	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	0	0	-	-	-	-
B	Echinocereus sp.	0	1	3	2	-	-	.18	.15
B	Gutierrezia sarothrae	35	32	14	3	1.61	.38	.07	.03
B	Juniperus osteosperma	0	5	6	2	.96	.73	1.81	.03
B	Opuntia sp.	21	27	24	27	.57	.25	.27	.43
B	Pinus edulis	0	1	1	0	-	-	-	-
Total for Browse		70	88	66	50	4.03	3.16	4.66	3.00

CANOPY COVER, LINE INTERCEPT--
Management unit 09, Study no: 10

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	1.66	1.10
Atriplex canescens	1.10	.46
Chrysothamnus nauseosus hololeucus	1.61	.45
Echinocereus sp.	.18	.20
Gutierrezia sarothrae	.20	-
Juniperus osteosperma	2.65	.21
Opuntia sp.	.55	.78

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 09, Study no: 10

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata vaseyana	4.0	1.4
Atriplex canescens	5.2	3.5

POINT-QUARTER TREE DATA--
Management unit 09, Study no: 10

Species	Trees per Acre				Average diameter (in)			
	'95	'00	'05	'10	'95	'00	'05	'10
Juniperus osteosperma	8	38	35	26	3.4	2.4	2.1	1.1
Pinus edulis	-	12	-	18	-	1.5	-	-

BASIC COVER--
Management unit 09, Study no: 10

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	3.00	38.45	21.76	22.98	38.56
Rock	12.25	22.84	22.35	23.47	22.70
Pavement	1.50	.37	1.22	.59	.41
Litter	54.75	54.20	42.52	34.02	55.84
Cryptogams	0	.09	1.69	.72	1.26
Bare Ground	28.50	5.06	22.23	27.58	11.67

SOIL ANALYSIS DATA --
Management unit 9, Study no: 10, Study Name: Toliver Creek Chaining

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
7.4	7.3	69.4	17.0	13.6	4.5	14.3	288.0	0.9

PELLET GROUP DATA--
Management unit 09, Study no: 10

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	18	35	82	29
Elk	7	23	36	12
Deer	12	13	12	32
Cattle	3	5	3	3

Days use per acre (ha)		
'00	'05	'10
-	-	-
7 (17)	68 (167)	39 (96)
26 (65)	42 (103)	33 (81)
2 (5)	20 (48)	3 (7)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 10

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia tridentata vaseyana									
88	**33**	100	0	0	-	0	0	0	-/-
95	**380**	74	26	0	120	11	0	0	13/16
00	**520**	12	85	4	-	0	0	0	14/18
05	**400**	15	85	0	-	15	10	0	22/31
10	**420**	10	81	10	-	43	43	43	18/27
Atriplex canescens									
88	**133**	100	0	0	133	0	0	0	-/-
95	**160**	25	75	0	-	0	0	0	27/36
00	**120**	0	100	0	-	17	0	0	28/37
05	**100**	0	100	0	-	20	0	0	38/47
10	**100**	0	40	60	-	40	60	80	32/37

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Chrysothamnus depressus									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	-/-
00	**60**	33	67	-	-	0	0	0	2/8
05	**0**	0	0	-	-	0	0	0	-/-
10	**0**	0	0	-	-	0	0	0	-/-
Chrysothamnus nauseosus hololeucus									
88	**33**	0	100	0	-	0	0	0	11/8
95	**60**	0	100	0	-	0	0	0	28/31
00	**260**	69	23	8	-	0	0	0	34/44
05	**100**	20	80	0	-	0	0	0	36/47
10	**60**	0	67	33	-	67	0	33	36/42
Chrysothamnus viscidiflorus viscidiflorus									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	-/-
00	**20**	0	100	-	-	0	0	0	-/-
05	**0**	0	0	-	-	0	0	0	-/-
10	**0**	0	0	-	-	0	0	0	-/-
Echinocereus sp.									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	2/3
00	**20**	100	0	-	-	0	0	0	3/6
05	**80**	0	100	-	-	0	0	0	3/6
10	**40**	0	100	-	-	0	0	0	5/11
Gutierrezia sarothrae									
88	**199**	0	100	0	-	0	0	0	4/6
95	**1920**	5	95	0	80	0	0	0	11/17
00	**2120**	1	90	9	-	0	0	50	4/7
05	**320**	0	94	6	-	0	0	6	7/11
10	**160**	63	38	0	-	0	0	0	5/6
Juniperus osteosperma									
88	**0**	0	0	0	-	0	0	0	-/-
95	**0**	0	0	0	-	0	0	0	-/-
00	**120**	83	17	0	-	0	0	0	-/-
05	**120**	33	67	0	-	0	0	0	-/-
10	**40**	50	0	50	-	0	0	50	-/-
Opuntia sp.									
88	**1065**	50	34	16	66	0	0	13	4/12
95	**560**	4	96	0	-	0	0	0	3/12
00	**720**	6	92	3	-	0	0	0	3/8
05	**760**	0	100	0	40	0	0	0	3/10
10	**740**	11	89	0	20	0	0	8	4/13

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Pinus edulis									
88	**0**	0	0	-	-	0	0	0	-/-
95	**0**	0	0	-	-	0	0	0	-/-
00	**20**	100	0	-	-	0	0	0	-/-
05	**20**	100	0	-	-	0	0	0	-/-
10	**0**	0	0	-	-	0	0	0	-/-