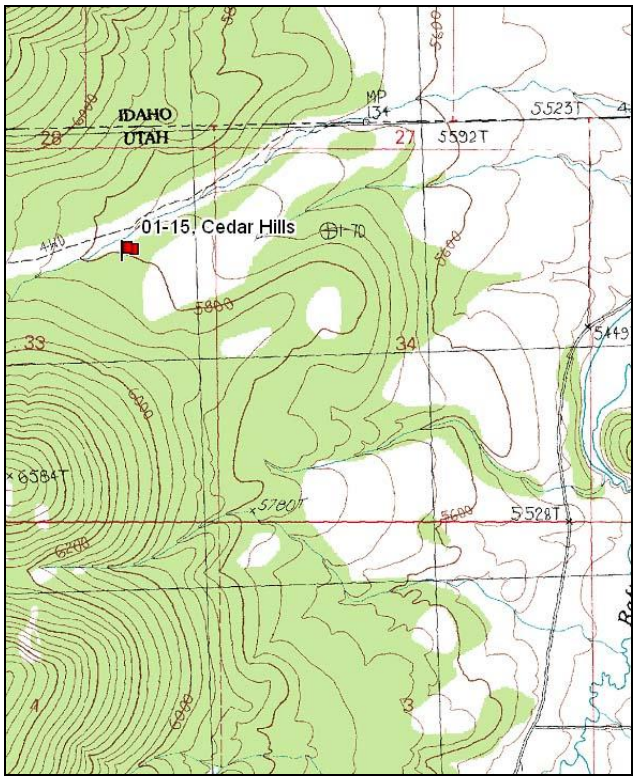
CEDAR HILLS - TREND STUDY NO. 1-15-11

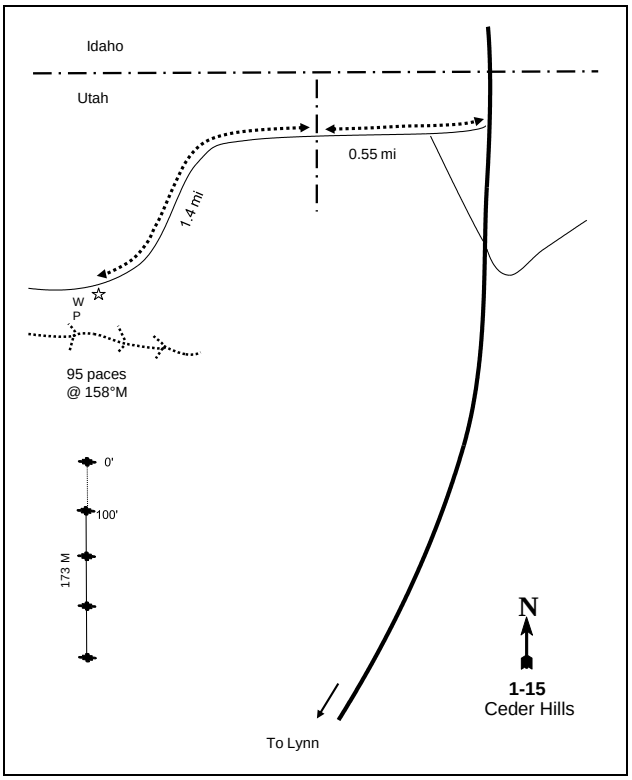
Vegetation Type: Pinyon-Juniper
Range Type: Crucial Deer Winter
NRCS Ecological Site Description: Not Available
Land Ownership: BLM
Elevation: 5,800 ft. (1,768 m)
Aspect: Southwest
Slope: 5%
Transect bearing: 173° magnetic
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 1 on 5ft.

Directions:
From the town of Lynn, drive north to the cattleguard at the Utah-Idaho border. From the cattleguard at the border, follow a faint road along a fence (on south side) for 0.55 miles to a gate. Go through the next seeded pasture 0.65 miles and continue as the road turns away from the fence. Proceed 0.75 miles to a small rock pile and a witness post on the south side of the road. Cross the drainage walking about 95 paces southeast to the 0-foot stake off the baseline in the trees. The 0-foot baseline stake is labeled with browse tag #49.

Map Name: Buck Hollow, Utah-Idaho



Diagrammatic Sketch:



Township: 15N Range: 16W Section: 33

GPS: NAD 83, UTM 12S 277610 E 4651636 N

CEDAR HILLS - TREND STUDY NO. 1-15

Site Information

Site Description: The trend study is located west of Yost in the Albion Mountains, in an area called Cedar Hills, on the Utah-Idaho border. The area was dominated by singleleaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) when the study was established in 1990. In 2000, a large wildfire burned the area and changed the area from tree dominance to herbaceous species. It is apparent that the burned area was aerially seeded, but no method was used to cover seed with many dead standing trees remaining on the study. Seed mix information was not available. The area is managed by the Bureau of Land Management as part of the Junction Creek allotment. Pellet group frequency indicated only minor presence by wildlife. However, sampled cattle sign was moderate in 2006, though it was low in 2011. Following the fire in 2001, pellet groups by wildlife or livestock were not observed (Table - Pellet Group Data).

Browse: Singleleaf pinyon and Utah juniper dominated the area prior to the fire, with very high densities for both species (Table - Point-Quarter Tree Data). The populations of both trees were mostly mature. The wildfire in 2000 eliminated all juniper and pinyon trees. Prior to the fire, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) was the most abundant browse species. The sagebrush population was moderately dense, with high decadence and poor vigor. Following the fire, only a small population of mountain big sagebrush has reestablished on the site. Decadence is low, and vigor is good within the population. Without competition from pinyon and juniper trees, sagebrush plants have been much larger since 2006 than they were prior to the fire. Utilization of sagebrush has been light throughout the study years. Other browse species are rare on the site (Table - Browse Characteristics)

Herbaceous Understory: Prior to the fire, the herbaceous understory was fair for a pinyon-juniper dominated site. Sandberg bluegrass (*Poa secunda*) was the most abundant grass, but thickspike wheatgrass (*Agropyron dasystachyum*) and bluebunch wheatgrass (*A. spicatum*) were also common. Following the fire, thickspike wheatgrass and bluebunch wheatgrass increased, and Sandberg bluegrass decreased. Thickspike wheatgrass is now the dominant grass on the site. No seed mix was available, but likely seeded perennial grasses sampled following the fire include crested wheatgrass (*A. cristatum*), Basin wildrye (*Elymus cinereus*), Russian wildrye (*E. junceus*), and Indian ricegrass (*Oryzopsis hymenoides*). All have occurred at low frequency and cover. The weedy species cheatgrass (*Bromus tectorum*) and bulbous bluegrass (*Poa bulbosa*) have also been sampled following the fire. Forbs are diverse, but are only moderately abundant. At least four different milkvetch (*Astragalus spp.*) species have been sampled. Hoods phlox (*Phlox hoodii*) was abundant prior to the fire, but was rare in 2006. Lewis flax (*Linum lewisii*) was first sampled in 2006, and may have been seeded after the fire.

Soil: The soil is in the Solak-Rock outcrop association, which occurs on mountain slopes. Parent material consists of colluvium and residuum derived from quartzite, limestone, and schist (Soil Survey Staff 2011). The soil is a fine-textured clay loam, with a slightly alkaline soil reaction (pH 7.8) (Table - Soil Analysis Data). Bare ground cover was high immediately following the fire, but has been low in the other sample years. The fire also reduced the cryptogam cover. Vegetation and litter cover have been high since 2006 (Table - Basic Cover). The soil erosion condition was classified as moderate in 2001, with erosion limited only by the gentle terrain, but has been stable since 2006.

Trend Assessments

Browse:

- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence of mountain big sagebrush decreased from 87% to 45%, and poor vigor decreased from 57% to 22%.

- **1996 to 2001 - down (-2):** A wildfire burned the site and surrounding area, effectively removing all browse from the site.
- **2001 to 2006 - slightly up (+1):** A small population of sagebrush has reestablished on the site at 120 plants/acre. The plants are healthy, with vigorous growth.
- **2006 to 2011 - slightly up (+1):** Density of sagebrush increased three-fold to 360 plants/acre. Decadence and poor vigor remained low.

Grass:

- **1990 to 1996 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1996 to 2001 - down (-2):** Following the fire, the sum of nested frequency of perennial grass decreased 47%, and cover decreased slightly from 6% to 4%. There was a significant decrease in the nested frequency of Sandberg bluegrass, but a significant increase in nested frequency of thickspike wheatgrass.
- **2001 to 2006 - up (+2):** The sum of nested frequency of perennial grasses increased over two-fold, and cover increased to 37%. Crested wheatgrass, thickspike wheatgrass, and Sandberg bluegrass increased significantly in nested frequency. However, cheatgrass also increased significantly in nested frequency, and cover increased from no sampled cover to 3%.
- **2006 to 2011 - up (+2):** The sum of nested frequency of perennial grasses increased 32%, though cover decreased to 27%. There was a significant increase in the nested frequency of crested wheatgrass and Sandberg bluegrass. Cheatgrass decreased significantly, and cover decreased to near 0%.

Forb:

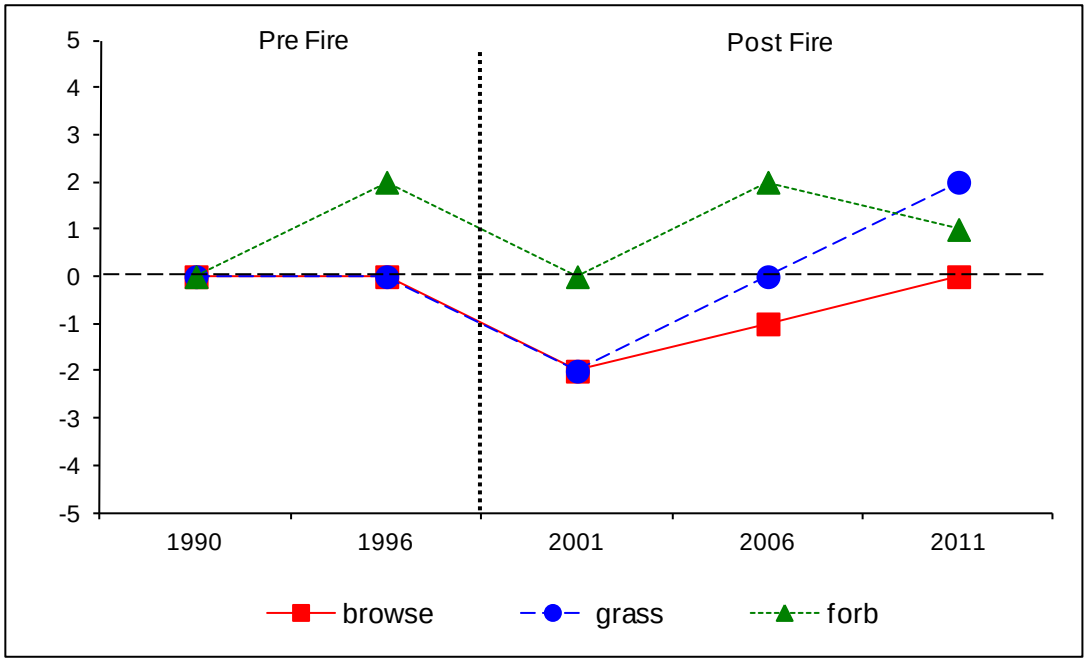
- **1990 to 1996 - up (+2):** The sum of nested frequency of perennial forbs increased nearly two-fold.
- **1996 to 2001 - down (-2):** Following the fire, there was an 87% decrease in the sum of nested frequency of perennial forbs, and cover decreased from 8% to less than 1%.
- **2001 to 2006 - up (+2):** The sum of nested frequency of perennial forbs increased over four-fold, and cover increased to 5%. The sum of nested frequency of annual forbs and cover also increased substantially.
- **2006 to 2011 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 19%, but cover remained similar.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 1, study no: 15

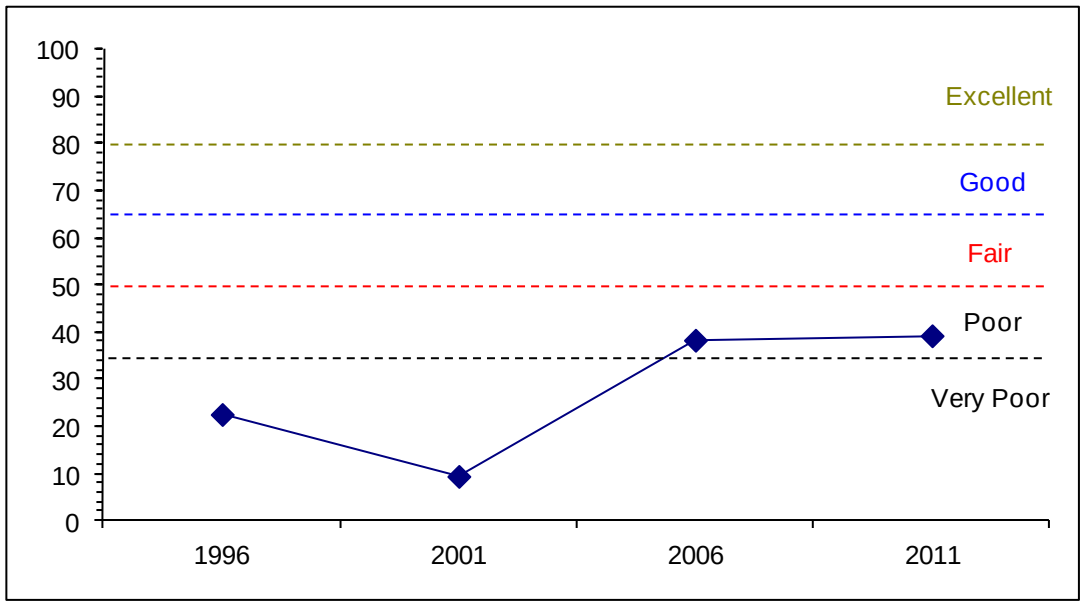
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
96	1.6	0.0	0.0	11.0	0.0	10.0	0.0	**22.6**	Very Poor
01	0.0	0.0	0.0	8.4	0.0	1.0	0.0	**9.4**	Very Poor
06	1.3	0.0	0.0	30.0	-2.5	9.6	0.0	**38.3**	Poor
11	0.3	0.0	0.0	30.0	0.0	9.0	0.0	**39.3**	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 1, Study no: 15



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
Management unit 1, Study no: 15



HERBACEOUS TRENDS--
Management unit 01, Study no: 15

Type	Species	Nested Frequency					Average Cover %			
		'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	a-	a-	a-	b26	c37	-	-	1.18	2.34
G	Agropyron dasystachyum	a76	a60	b135	c292	c309	.76	3.40	29.27	16.03
G	Agropyron spicatum	abc37	c71	a12	ab24	bc52	.48	.33	4.19	2.99
G	Bromus tectorum (a)	-	a-	a-	c87	b29	-	-	3.37	.06
G	Elymus cinereus	-	-	-	-	5	-	-	-	.03
G	Elymus junceus	-	-	-	2	6	-	-	.15	.48
G	Oryzopsis hymenoides	-	-	-	3	5	-	-	.18	.30
G	Poa bulbosa	-	-	-	-	3	-	-	-	.00
G	Poa canbyi	-	-	-	6	-	-	-	.30	-
G	Poa secunda	d256	d269	a66	b116	c200	4.23	.47	1.98	4.84
G	Sitanion hystrix	-	2	-	3	4	.01	-	.15	.09
Total for Annual Grasses		0	0	0	87	29	0	0	3.37	0.06
Total for Perennial Grasses		369	402	213	472	621	5.49	4.21	37.43	27.12
Total for Grasses		369	402	213	559	650	5.49	4.21	40.81	27.18
F	Agoseris glauca	a-	a2	a5	b44	ab20	.00	.04	.20	.04
F	Allium sp.	-	-	-	4	1	-	-	.01	.00
F	Alyssum alyssoides (a)	-	a-	a-	b146	c271	-	-	.73	2.03
F	Antennaria rosea	a1	b10	a-	a-	a-	.08	-	-	-
F	Arabis sp.	a3	b19	a-	a1	a-	.04	-	.00	-
F	Astragalus beckwithii	-	116	-	35	110	2.27	-	1.70	3.53
F	Astragalus calycosus	-	-	-	2	-	-	-	.00	-
F	Astragalus cibarius	a-	a-	a-	b53	a8	-	-	1.19	.12
F	Astragalus convallarius	-	3	-	-	2	.00	-	-	.00
F	Astragalus sp.	ab6	b11	ab7	a-	a-	.08	.02	-	-
F	Astragalus utahensis	a3	b21	a6	a5	a-	.13	.01	.03	.00
F	Camelina microcarpa (a)	-	a-	a-	b40	a-	-	-	.18	-
F	Castilleja chromosa	-	4	-	-	-	.01	-	-	-
F	Caulanthus crassicaulis	-	-	-	-	-	.00	-	-	-
F	Chaenactis douglasii	a10	a13	a4	b35	a6	.05	.01	.26	.01
F	Chenopodium album (a)	-	-	3	-	-	-	.00	-	-
F	Chenopodium leptophyllum(a)	-	-	-	4	7	-	-	.01	.01
F	Collinsia parviflora (a)	-	a87	a127	b225	b219	.18	.65	1.72	.67
F	Crepis acuminata	a3	a9	a6	ab16	b27	.10	.02	.42	.50
F	Cryptantha sp.	ab7	ab5	a-	b16	a-	.04	-	.03	-
F	Descurainia pinnata (a)	-	a-	a1	a4	b44	-	.03	.01	.12
F	Epilobium brachycarpum (a)	-	a-	a-	c81	b16	-	-	.25	.06
F	Erigeron pumilus	-	1	-	1	1	.00	-	.00	.00
F	Erigeron sp.	2	6	-	-	-	.04	-	-	-
F	Fritillaria atropurpurea	-	-	5	1	-	-	.01	.00	-
F	Gayophytum ramosissimum(a)	-	-	-	8	-	-	-	.04	-
F	Hackelia patens	-	-	1	-	-	-	.00	-	-
F	Haplopappus acaulis	b9	c25	a-	a-	a-	.38	-	-	-
F	Lactuca serriola (a)	-	a-	a-	b71	a4	-	-	.23	.01

Type	Species	Nested Frequency					Average Cover %			
		'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Lappula occidentalis (a)	-	-	-	5	2	-	-	.01	.00
F	Linum lewisii	-	-	-	9	5	-	-	.21	.01
F	Machaeranthera grindelioides	-	-	-	1	3	-	-	.00	.00
F	Microsteris gracilis (a)	-	$_{a}$-	$_{a}$-	$_{a}$13	$_{b}$95	-	-	.02	.20
F	Penstemon sp.	$_{ab}$2	$_{b}$14	$_{a}$-	$_{ab}$8	$_{ab}$7	.43	-	.22	.07
F	Phlox hoodii	$_{b}$111	$_{c}$178	$_{a}$3	$_{a}$3	$_{a}$5	3.77	.00	.01	.07
F	Ranunculus testiculatus (a)	-	$_{a}$-	$_{a}$-	$_{a}$-	$_{b}$12	-	-	-	.03
F	Senecio multilobatus	$_{ab}$14	$_{b}$29	$_{a}$3	$_{b}$21	$_{a}$5	.07	.00	.39	.01
F	Sisymbrium altissimum (a)	-	$_{a}$-	$_{a}$-	$_{b}$30	$_{a}$2	-	-	.19	.00
F	Taraxacum officinale	-	-	1	-	3	-	.00	-	.03
F	Townsendia sp.	-	4	-	-	-	.01	-	-	-
F	Tragopogon dubius (a)	-	-	-	-	1	-	-	-	.03
F	Zigadenus paniculatus	$_{a}$-	$_{a}$-	$_{b}$20	$_{a}$5	$_{ab}$8	.01	.37	.03	.05
Total for Annual Forbs		0	87	131	627	673	0.18	0.68	3.42	3.20
Total for Perennial Forbs		171	470	61	260	211	7.55	0.50	4.77	4.49
Total for Forbs		171	557	192	887	884	7.73	1.19	8.19	7.69

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

BROWSE TRENDS--
Management unit 01, Study no: 15

Type	Species	Strip Frequency			Average Cover %		
		'96	'06	'11	'96	'06	'11
B	Artemisia tridentata vaseyana	35	4	12	1.05	1.02	.24
B	Chrysothamnus nauseosus consimilis	1	2	4	.03	.03	.18
B	Chrysothamnus viscidiflorus viscidiflorus	7	4	5	.04	.03	.91
B	Juniperus osteosperma	34	0	0	9.75	-	-
B	Opuntia sp.	1	0	0	-	-	-
B	Pinus monophylla	9	0	0	1.65	-	-
B	Symphoricarpos oreophilus	7	4	3	.30	.41	.03
Total for Browse		94	14	24	12.84	1.50	1.37

CANOPY COVER, LINE INTERCEPT--
Management unit 01, Study no: 15

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	1.11	1.35
Chrysothamnus nauseosus consimilis	-	.41
Chrysothamnus viscidiflorus viscidiflorus	.28	.86
Symphoricarpos oreophilus	.03	.05

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 01, Study no: 15

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	-	3.0	1.7

POINT-QUARTER TREE DATA--
Management unit 01, Study no: 15

Species	Trees per Acre				Average diameter (in)			
	'96	'01	'06	'11	'96	'01	'06	'11
Juniperus osteosperma	407	-	-	-	3.8	-	-	-
Pinus monophylla	101	-	-	-	5.1	-	-	-

BASIC COVER--
Management unit 01, Study no: 15

Cover Type	Average Cover %				
	'90	'96	'01	'06	'11
Vegetation	4.00	26.79	6.07	48.36	43.20
Rock	1.50	.71	.24	.93	.33
Pavement	11.25	9.01	13.58	3.52	2.82
Litter	54.75	40.83	11.15	38.81	56.55
Cryptogams	7.75	12.89	0	1.12	5.95
Bare Ground	20.75	9.32	72.24	17.68	12.36

SOIL ANALYSIS DATA --
Management unit 01, Study no: 15, Study Name: Cedar Hills

Effective rooting depth (in)	pH	Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.7	7.8	30.7	40.0	29.3	3.0	6.7	390.4	0.6

PELLET GROUP DATA--
Management unit 01, Study no: 15

Type	Quadrat Frequency			Days use per acre (ha)	
	'96	'06	'11	'06	'11
Rabbit	14	4	1	-	-
Deer	4	2	-	1 (2)	-
Cattle	-	7	5	30 (73)	3 (7)

BROWSE CHARACTERISTICS--
Management unit 01, Study no: 15

		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									
90	**2232**	1	12	87	-	1	0	57	20/18
96	**1160**	9	47	45	-	7	0	22	15/18
01	**0**	0	0	0	-	0	0	0	-/-
06	**120**	0	100	0	2280	0	0	0	31/31
11	**360**	22	72	6	340	17	0	0	33/31
Chrysothamnus nauseosus consimilis									
90	**0**	0	0	-	-	0	0	0	-/-
96	**20**	100	0	-	-	0	0	0	-/-
01	**0**	0	0	-	-	0	0	0	-/-
06	**80**	100	0	-	-	0	0	0	22/26
11	**120**	17	83	-	-	0	0	0	25/32
Chrysothamnus viscidiflorus viscidiflorus									
90	**665**	30	5	65	-	0	0	30	7/8
96	**200**	20	80	0	-	0	0	0	7/7
01	**0**	0	0	0	-	0	0	0	-/-
06	**120**	0	100	0	-	0	0	0	13/16
11	**120**	0	100	0	-	0	0	0	16/23
Juniperus osteosperma									
90	**499**	7	87	7	-	0	0	7	108/61
96	**900**	18	80	2	-	0	0	2	-/-
01	**0**	0	0	0	-	0	0	0	-/-
06	**0**	0	0	0	-	0	0	0	-/-
11	**0**	0	0	0	-	0	0	0	-/-
Opuntia sp.									
90	**0**	0	0	-	-	0	0	0	-/-
96	**20**	0	100	-	-	0	0	0	5/9
01	**0**	0	0	-	-	0	0	0	-/-
06	**0**	0	0	-	-	0	0	0	-/-
11	**0**	0	0	-	-	0	0	0	-/-
Pinus monophylla									
90	**66**	0	100	-	166	0	0	0	157/97
96	**180**	56	44	-	180	0	0	0	-/-
01	**0**	0	0	-	-	0	0	0	-/-
06	**0**	0	0	-	-	0	0	0	-/-
11	**0**	0	0	-	-	0	0	0	-/-

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Symphoricarpos oreophilus									
90	**33**	0	100	-	-	0	0	0	6/9
96	**160**	75	25	-	20	0	0	0	11/17
01	**0**	0	0	-	-	0	0	0	-/-
06	**140**	57	43	-	-	0	0	0	12/22
11	**80**	0	100	-	-	0	0	0	14/31