

WOODRUFF CREEK - TREND STUDY NO. 2-29-11

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Substantial Elk Winter

NRCS Ecological Site Description: [Upland Stony Loam \(Wyoming Big Sagebrush\), R047XA338UT](#)

Land Ownership: BLM

Elevation: 6,699 ft (2,042 m)

Aspect: Northeast

Slope: 3%

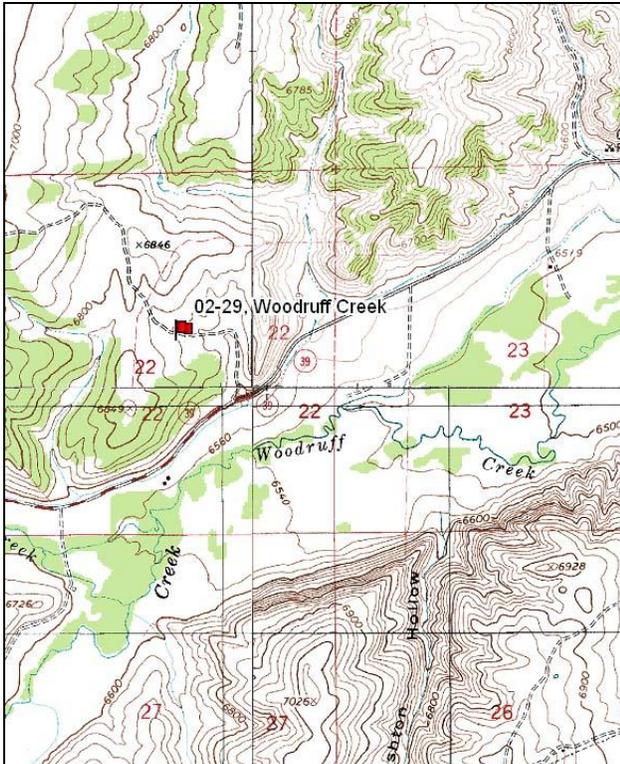
Transect bearing: 162° magnetic

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

Directions:

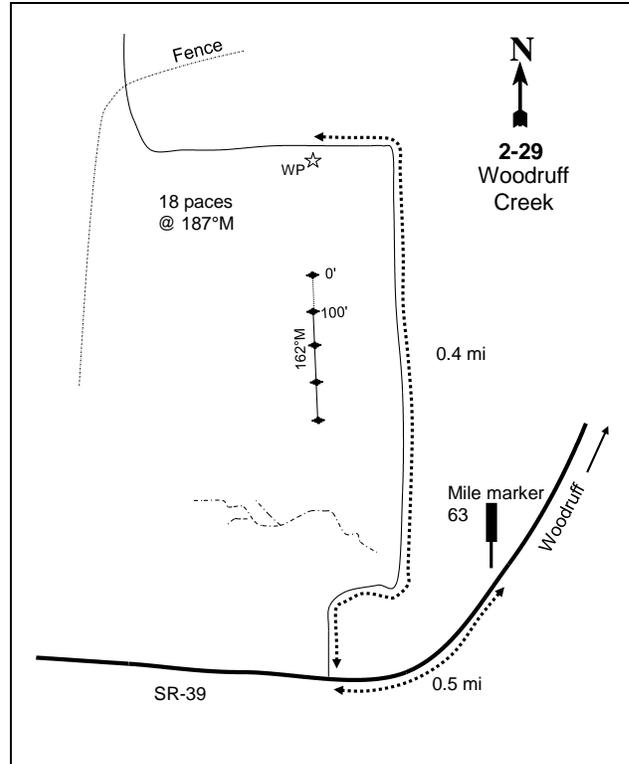
From the junction of SR-39 and SR-16 in Woodruff, proceed west on SR-39 for 5.05 miles, and turn right onto a dirt road. This road should be 0.05 miles past marker 63. Proceed north on this road stopping after 0.4 miles at a witness post on the left (south). From the witness post, walk 18 paces at 187 degrees magnetic to the 0-foot stake of the baseline marked by browse tag #7989.

Map Name: Birch Creek Reservoir



Township: 9N Range: 6E Section: 22

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 478732 E 4594493 N

WOODRUFF CREEK - TREND STUDY NO. 2-29

Site Information

Site Description: This study is located north of Woodruff Creek on crucial winter range in a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and scattered Utah juniper (*Juniperus osteosperma*) woodland. Prior to the establishment of the study in 1984, the surrounding habitat was chained and seeded; however, the study area was left unchained. The design of the chaining resulted in an extremely large open area, which has little edge and browse cover. Because of the lack of browse species in the chained area, wildlife occupancy may have increased on the unchained study plot. Cattle presence appeared most abundant in the chained area. Deer pellet groups were sampled in high abundance in 2001 and 2006, but moderate abundance in 2011. Three deer carcasses were found near the study in 2006. Elk pellet groups were sampled in low abundance in 2011. Cattle pats have been sampled in low abundance since 2001 (Table - Pellet Group Data).

Browse: Available browse forage comes primarily from Wyoming big sagebrush, which has a moderately dense population. The Wyoming big sagebrush has been a highly decadent, mature population, and recruitment of young to the population has been poor over the course of the study. The sagebrush plants have been lightly to moderately hedged throughout the length of the study; however, utilization was heavy in 1984 and 1990. Other browse species include Saskatoon serviceberry (*Amelanchier alnifolia*), stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), mountain snowberry (*Symphoricarpos oreophilus*), and gray horsebrush (*Tetradymia canescens*). Except for stickyleaf low rabbitbrush, all occur in small numbers (Table - Browse Characteristics). Thick juniper encroachment may be limiting available resources for sagebrush (Table - Point Quarter Tree Data).

Herbaceous Understory: The herbaceous understory is diverse, but not particularly abundant. The most common perennial grass species are thickspike wheatgrass (*Agropyron dasystachyum*), mutton bluegrass (*Poa fendleriana*), and Sandberg bluegrass (*P. secunda*). The weedy annual grass species cheatgrass (*Bromus tectorum*) is present, but occurs in low abundance. Forbs are fairly diverse, but comprise a minor part of the herbaceous understory. However, in 2011, total forb cover equaled that of total grass cover (Table - Herbaceous Trends).

Soil: Soil is within the Cutoff component, which occurs on hilltops. The parent material consists of colluvium and/or residuum weathered from sandstone (Soil Survey Staff 2011). The soil texture is a clay loam with a neutral soil reaction (pH 7.3) (Table- Soil Analysis Data). Bare ground cover is moderate, with a moderate amount of vegetation and litter providing protective ground cover (Table - Basic Cover). The interspaces are mostly unprotected and have a higher amount of bare ground. Soil pedestalling is evident and sheet erosion has occurred, thus the soil erosion condition was determined to be slight in 2001, moderate in 2006, but stable in 2011.

Trend Assessments

Browse:

- **1984 to 1990 - stable (0):** The density for Wyoming big sagebrush displayed no change and maintained a density of 6,465 plants/acre. Decadence within the sagebrush population was sustained at 57%. Sagebrush increased in poor vigor from 6% to 28%.
- **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. The sagebrush population decreased in decadence to 41%, but is still considered to be very high. Poor vigor within the sagebrush population decreased to 25%, and is also considered to be high.

- **1996 to 2001 - slightly up (+1):** The density for Wyoming big sagebrush increased 12% from 2,260 plants/acre to 2,540 plants/acre. Decadence within the sagebrush population increased to 57%. The sagebrush population decreased in poor vigor to 9%.
- **2001 to 2006 - down (-2):** The density for Wyoming big sagebrush decreased 27% to 1,860 plants/acre. The sagebrush population increased in decadence to 66%. Poor vigor within the sagebrush population increased to 68%.
- **2006 to 2011 - up (+2):** The density for Wyoming big sagebrush increased 25% to 2,320 plants/acre. Decadence within the sagebrush population decreased to 52%, but is still considered to be very high. Poor vigor within the sagebrush population decreased to 35%, and is considered to be very high.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 42%. The increase is primarily due to the significant increase in nested frequency for mutton bluegrass.
- **1990 to 1996 - down (-2):** The sum of nested frequency for perennial grasses decreased 28%. Thickspike wheatgrass and Sandberg bluegrass decreased significantly in nested frequency, and had covers of 1% and 3%, respectively.
- **1996 to 2001 - stable (0):** The sum of nested frequency for perennial grasses remained similar.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial grasses remained similar. Thickspike wheatgrass decreased significantly in nested frequency, and decreased in cover from 2% to less than 1%.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial grasses increased 34%. Thickspike wheatgrass and Sandberg bluegrass increased significantly in nested frequency, and increased in cover from less than 1% to 2%, and 2% to 3%, respectively.

Forb:

- **1984 to 1990 - down (-2):** The sum of nested frequency for perennial forbs decreased 37%. Lobedleaf groundsel (*Senecio multilobatus*), Douglas chaenactis (*Chaenactis douglasii*), and Utah locoweed (*Astragalus utahensis*) decreased significantly in nested frequency.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 13%. Lobedleaf groundsel increased significantly in nested frequency, and had a cover of 1%. The weedy perennial species showy milkweed (*Asclepias speciosa*) was observed for the first time, and had a cover of less than 1%.
- **1996 to 2001 - stable (0):** The sum of nested frequency for perennial forbs remained similar. Lobedleaf groundsel decreased significantly in nested frequency, and had a cover of less than 1%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial forbs remained similar. Beckwith milkvetch (*Astragalus beckwithii*) and scarlet gilia (*Ipomopsis aggregata*) increased significantly in nested frequency, and each species provided less than 1% cover.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial forbs increased 42%. Timber poisonvetch (*Astragalus convallarius*), longleaf phlox, and low penstemon (*Penstemon humilis*) increased significantly in nested frequency. Low penstemon increased in cover from less than 1% to 2%.

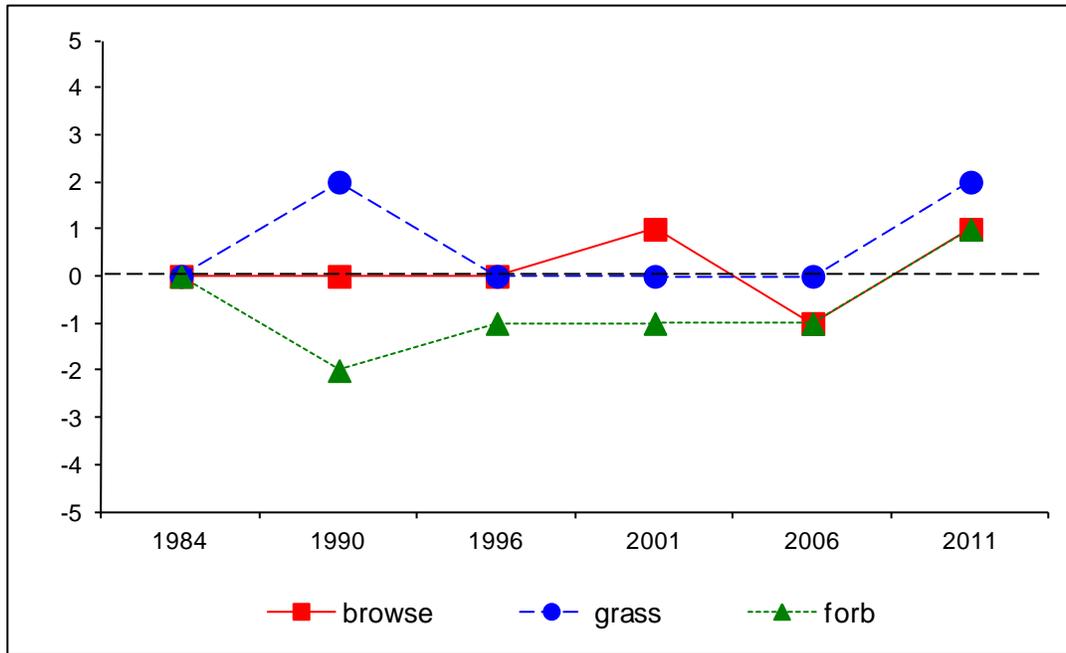
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
 Management unit 2, study no: 29

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	6.9	2.7	0.0	19.9	-0.1	8.2	0.0	37.6	Fair
01	6.6	-2.1	3.5	21.5	0.0	6.7	0.0	36.2	Fair
06	5.7	-4.8	3.0	24.1	0.0	10.0	0.0	38.0	Fair
11	4.6	-0.6	4.5	23.5	0.0	10.0	0.0	41.9	Fair

Trend Summary

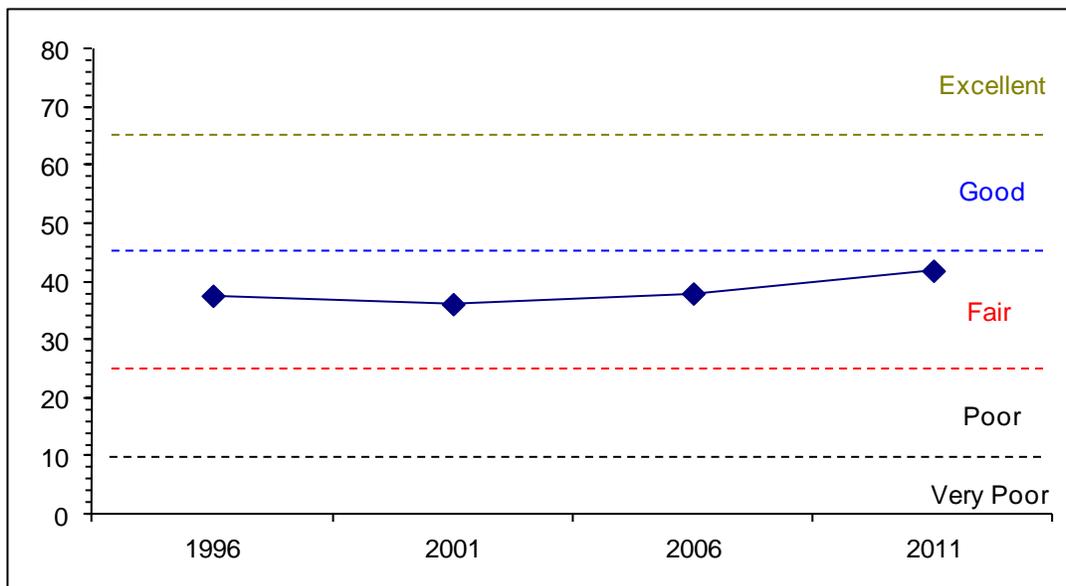
CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 2 Study no: 29



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--

Management unit 2, Study no: 29



HERBACEOUS TRENDS--
Management unit 02, Study no: 29

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	a-	a-	a1	ab12	b22	b32	.03	.51	1.08	1.22
G	Agropyron dasystachyum	d195	d201	b101	bc142	a10	bd176	.54	1.97	.27	2.06
G	Agropyron smithii	-	-	a-	a-	b114	a2	-	-	2.20	.00
G	Agropyron spicatum	a1	a7	b24	a8	a11	a8	.36	.41	.45	.18
G	Bromus tectorum (a)	-	-	11	6	3	5	.16	.01	.01	.04
G	Oryzopsis hymenoides	a1	ab20	ab11	b24	ab14	ab17	.61	1.22	.74	.59
G	Poa fendleriana	a46	d141	cd133	bc102	ab86	abc85	5.24	4.10	3.74	2.06
G	Poa pratensis	a-	a-	a1	a-	b23	a-	.03	-	.63	-
G	Poa secunda	bc123	c161	ab102	abc111	a77	bc121	2.53	2.26	2.50	2.90
G	Sitanion hystrix	a22	a22	a27	a9	a17	b72	.57	.24	.30	2.66
G	Stipa comata	-	-	-	-	10	1	-	-	.12	.03
Total for Annual Grasses		0	0	11	6	3	5	0.16	0.01	0.01	0.03
Total for Perennial Grasses		388	552	400	408	384	514	9.94	10.73	12.07	11.73
Total for Grasses		388	552	411	414	387	519	10.10	10.75	12.09	11.77
F	Achillea millefolium	-	-	1	-	3	2	.00	-	.03	.03
F	Allium acuminatum	ab14	a-	a-	a-	a7	b25	-	-	.04	.15
F	Alyssum alyssoides (a)	-	-	-	1	-	2	-	.00	-	.01
F	Antennaria rosea	7	10	3	2	10	7	.00	.03	.07	.07
F	Arabis holboellii	a2	a-	ab4	a-	ab11	b12	.01	-	.04	.03
F	Asclepias speciosa	a-	a-	b12	a-	a-	a-	.36	-	-	-
F	Astragalus beckwithii	ab13	a-	a-	a3	b29	ab12	-	.03	.52	.05
F	Astragalus convallarius	a13	a-	ab12	bc34	ab14	c41	.05	.33	.06	.44
F	Astragalus utahensis	b18	a6	a2	ab12	a1	a4	.00	.12	.03	.01
F	Calochortus nuttallii	1	-	-	-	-	2	-	-	-	.00
F	Chaenactis douglasii	b34	a2	a6	a7	a5	a16	.01	.02	.10	.06
F	Chenopodium fremontii (a)	-	-	a-	a-	a-	b8	-	-	-	.03
F	Collinsia parviflora (a)	-	-	-	-	-	3	-	-	-	.00
F	Comandra pallida	35	21	23	24	25	24	.13	.17	.33	.33
F	Cordylanthus ramosus (a)	-	-	a12	a20	a21	b125	.07	.09	.25	4.29
F	Crepis acuminata	3	-	4	3	-	4	.00	.03	-	.01
F	Cryptantha sp.	26	22	26	32	27	50	.46	1.08	.50	1.35
F	Cymopterus sp.	-	-	10	-	-	-	.02	-	-	-
F	Descurainia pinnata (a)	-	-	a3	a-	a-	b10	.00	-	-	.03
F	Draba sp. (a)	-	-	-	-	2	-	-	-	.00	-
F	Erigeron pumilus	b11	a-	a-	a2	a3	a2	-	.00	.03	.03
F	Eriogonum racemosum	-	-	-	-	1	2	-	-	.03	.00
F	Eriogonum umbellatum	4	-	5	-	11	-	.04	-	.10	-
F	Halogeton glomeratus (a)	-	-	1	-	-	-	.00	-	-	-
F	Ipomopsis aggregata	a7	a-	a4	a-	b18	a13	.01	-	.14	.06
F	Lappula occidentalis (a)	-	-	-	-	2	2	-	-	.00	.03
F	Lithospermum ruderales	3	-	-	4	-	-	-	.15	.03	-
F	Microsteris gracilis (a)	-	-	-	4	-	-	-	.01	-	-
F	Penstemon humilis	c86	c85	a46	ab53	a43	bc81	.58	.40	.31	1.78

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Phlox hoodii	88	103	80	80	72	71	1.41	.74	2.25	2.01
F	Phlox longifolia	ab62	a48	a33	a58	a51	b92	.08	.15	.24	.49
F	Polygonum douglasii (a)	-	-	-	-	-	4	-	-	-	.00
F	Ranunculus testiculatus (a)	-	-	a1	a-	a3	b37	.00	-	.00	.11
F	Senecio multilobatus	b61	a10	b75	a20	a13	a28	.89	.07	.11	.29
Total for Annual Forbs		0	0	17	25	28	191	0.08	0.11	0.26	4.52
Total for Perennial Forbs		488	307	346	334	344	488	4.11	3.37	5.00	7.25
Total for Forbs		488	307	363	359	372	679	4.19	3.48	5.26	11.78

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

BROWSE TRENDS--

Management unit 02, Study no: 29

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata wyomingensis	60	60	57	58	5.53	5.25	4.52	3.65
B	Chrysothamnus viscidiflorus viscidiflorus	77	74	80	84	4.97	4.13	7.97	8.74
B	Juniperus osteosperma	8	8	11	11	4.42	4.32	3.76	5.65
B	Symphoricarpos oreophilus	3	1	1	3	.15	.30	.06	.03
B	Tetradymia canescens	19	18	18	24	1.01	.85	1.47	1.04
Total for Browse		167	161	167	180	16.11	14.86	17.79	19.13

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 29

Species	Percent Cover		
	'01	'06	'11
Artemisia tridentata wyomingensis	-	4.09	4.71
Chrysothamnus viscidiflorus viscidiflorus	-	6.61	7.91
Juniperus osteosperma	9.80	15.96	16.58
Tetradymia canescens	-	.60	1.03

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 29

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata wyomingensis	1.0	0.7	1.6

POINT-QUARTER TREE DATA--

Management unit 02, Study no: 29

Species	Trees per Acre				Average diameter (in)			
	'96	'01	'06	'11	'96	'01	'06	'11
Juniperus osteosperma	206	218	226	230	5.5	7.1	6.4	1.6

BASIC COVER--

Management unit 02, Study no: 29

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	4.75	7.50	30.55	31.23	36.56	39.02
Rock	1.75	2.50	1.46	.78	.95	.96
Pavement	10.50	21.75	9.37	9.81	13.93	9.84
Litter	47.25	33.50	38.38	42.15	28.74	30.59
Cryptogams	3.00	13.75	2.05	3.30	3.23	2.99
Bare Ground	32.75	21.00	27.75	31.45	26.09	29.25

SOIL ANALYSIS DATA --

Management unit 02, Study no: 29, Study Name: Woodruff Creek

Effective rooting depth (in)	pH	Clay Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.2	7.3	34.6	32.1	33.4	2.5	6.2	25.6	0.6

PELLET GROUP DATA--

Management unit 02, Study no: 29

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	21	15	28	30	-	-	-
Elk	6	2	6	18	-	-	5 (13)
Deer	38	42	32	32	103 (255)	88 (218)	37 (91)
Cattle	-	-	2	1	2 (5)	4 (11)	6 (14)

BROWSE CHARACTERISTICS--

Management unit 02, Study no: 29

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Amelanchier alnifolia										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	16/24	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	20/27	
11	0	0	0	-	-	0	0	0	17/26	
Artemisia tridentata wyomingensis										
84	6465	5	38	57	-	11	78	6	13/16	
90	6465	4	39	57	-	51	41	28	19/21	
96	2260	0	59	41	60	41	11	25	16/27	
01	2540	7	36	57	100	57	2	9	16/25	
06	1860	6	28	66	80	16	1	68	14/26	
11	2320	9	40	52	20	51	13	35	14/21	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Chrysothamnus viscidiflorus viscidiflorus									
84	2998	4	80	16	-	0	0	2	7/10
90	3598	28	54	19	-	43	2	0	7/12
96	4900	3	95	2	-	0	0	.81	9/15
01	4720	2	89	9	-	.42	0	3	9/13
06	5240	8	85	7	40	.38	0	5	9/15
11	6920	8	92	0	80	0	0	0	10/15
Juniperus osteosperma									
84	266	50	50	0	66	0	25	0	57/22
90	332	80	20	0	-	40	20	0	89/51
96	160	0	100	0	-	25	0	0	-/-
01	160	38	63	0	40	0	0	0	-/-
06	220	27	73	0	20	0	0	0	51/51
11	240	17	58	25	40	0	0	0	-/-
Symphoricarpos oreophilus									
84	0	0	0	-	-	0	0	0	-/-
90	0	0	0	-	-	0	0	0	-/-
96	80	0	100	-	-	0	0	25	11/21
01	20	0	100	-	-	0	0	0	10/29
06	20	0	100	-	-	0	0	0	14/30
11	120	50	50	-	-	83	17	0	15/30
Tetradymia canescens									
84	133	0	100	0	-	50	50	0	9/16
90	199	0	0	100	-	67	33	0	-/-
96	440	0	91	9	-	9	0	5	12/20
01	400	0	80	20	-	0	0	0	12/21
06	440	14	68	18	40	9	0	23	11/18
11	600	3	97	0	-	23	0	0	12/21