

NORTH EDEN - TREND STUDY NO. 2-28-11

Vegetation Type: Wyoming Big Sagebrush

Range Type: Deer Winter

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

Land Ownership: UDP & R

Elevation: 6,140 ft (1,872 m)

Aspect: West

Slope: 20-25%

Transect bearing: 160° magnetic

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

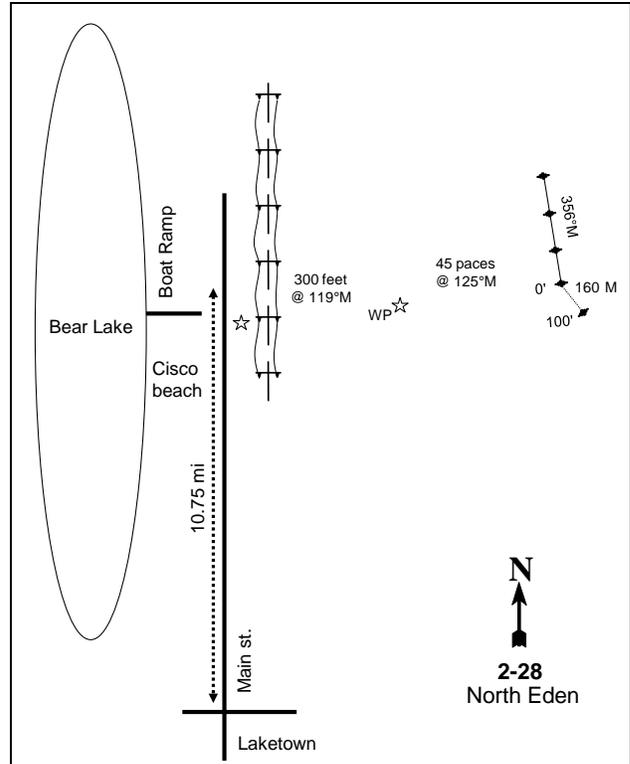
Directions:

From Bear Lake road and Main Street in Laketown, proceed north on Main Street 10.75 miles along the east shore. Turn right onto a dirt road proceeding to a power line. From the power line, walk up the slope on a bearing of 119 degrees magnetic for 300 feet to a witness post. From the witness post, walk 45 paces at 119 degrees magnetic to the 0-foot stake of the baseline, marked with browse tag #9157. The first 100 feet of the baseline runs 160 degrees magnetic. The rest of the baseline runs off the 0-foot baseline stake and runs in a direction of 356 degrees magnetic.

Map Name: Bear Lake South



Diagrammatic Sketch:



Township: 14N Range: 6E Section: 9

GPS: NAD 83, UTM 12S 477684 E 4646044 N

NORTH EDEN - TREND STUDY NO. 2-28

Site Information

Site Description: This study is located on the east side of Bear Lake between North and South Eden Canyons. This study is located on the border of private land and land administered by the State Institutional Trust Land Administration (SITLA). The vegetation is a mixture of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and black sagebrush (*Artemisia nova*) interspersed with Utah juniper (*Juniperus osteosperma*) trees. Deer pellet groups have been sampled in high abundance since 2001. Elk pellet groups were detected in quadrat frequency in 2006, but have been minimal on the site. Sampled cattle sign was minimal in 2001 (Table - Pellet Group Data).

Browse: The key browse species are Wyoming big sagebrush and black sagebrush. Wyoming big sagebrush density has decreased every reading since 1984. Wyoming big sagebrush has been a moderately dense, mature population with high decadence throughout the duration of the study. Utilization of Wyoming big sagebrush has been light to moderate over the course of the study. Poor vigor has been high within the population over the sample years. Recruitment of young sagebrush plants to the population has been mostly poor over the sample year, though recruitment was good in 1990 and 2006. Density of black sagebrush is diffuse, with a mostly mature population. There was a steep decline in density between 1990 and 1996, this change in density is likely the result of the larger sample used in 1996. Regardless of the change in sample method, the population has steadily decreased in density over the duration of the study. Utilization has been light to moderate over the course of the study. Poor vigor has increased over the sample years. Recruitment of young black sagebrush has been poor since the outset of the study, though recruitment was good in 1990 and 2011. Other shrub species include stickleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), rubber rabbitbrush (*Chrysothamnus nauseosus*), plains pricklypear (*Opuntia polyacantha*), and Utah juniper; and none occur frequently or sustain much browsing use (Table - Browse Characteristics).

Herbaceous Understory: Herbaceous cover consists primarily of perennial grasses, namely bluebunch wheatgrass (*Agropyron spicatum*) and Sandberg bluegrass (*Poa secunda*), both of which have maintained stable populations over the duration of the study. The weedy annual species cheatgrass (*Bromus tectorum*) is also abundant and has high cover. Forbs are uncommon and provide a minor component of the herbaceous understory (Table - Herbaceous Trends).

Soil: The soil is within the Dagan-Rubble land complex series, likely as part of Dagan component, which occurs on canyons and escarpments. The parent material consists of colluvium derived from conglomerate and/or sandstone. This is a moderately calcareous soil with low water holding capability. All the Dagan soils are subject to rapid runoff and have high erosion hazards (Soil Survey Staff 2011). The soil texture is a clay loam with a neutral soil reaction (pH 7.2). Bare ground cover is moderate with a large amount of vegetation and litter providing protective ground cover (Table - Basic Cover). There is some erosion occurring in the form of pedestalling, flow patterns, rills, and soil movement, but is localized and not severe. Thus, the soil erosion condition was determined to be slight in 2001 and 2006, but stable in 2011.

Trend Assessments

Browse:

- **1984 to 1990 - down (-2):** The density for Wyoming big sagebrush decreased 35% from 5,331 plants to 3,465 plants/acre. Decadence within the Wyoming big sagebrush population increased from 53% to 60%. Poor vigor within the Wyoming big sagebrush population increased from 10% to 33%. The density for black sagebrush decreased 38 % from 3,332 plants/acre to 2,065 plants/acre. Black sagebrush decreased in decadence from 70% to 32%. Poor vigor within the black sagebrush population decreased from 12% to 3%.

- **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 for Wyoming big sagebrush decreased to 46%, but is still considered to be very high. Poor vigor within the Wyoming big sagebrush population decreased to 26%, but is still considered to be high. Decadence for black sagebrush decreased to 14%. Poor vigor within the black sagebrush population increased to 9%.
- **1996 to 2001 - slightly down (-1):** %. The density for Wyoming big sagebrush decreased by 9% from 2,800 plants/acre to 2,560 plants/acre. Cover for Wyoming big sagebrush decreased from 14% to 11%. Health of the Wyoming big sagebrush population is mixed with an increase in decadence to 56%, while poor vigor within the population decreased to 16%. The density for black sagebrush decreased 45% from 440 plants/acre to 240 plants/acre. Black sagebrush increased in decadence to 25%, and poor vigor within the black sagebrush population increased to 17
- **2001 to 2006 - slightly down (-1):** The density for Wyoming big sagebrush decreased 11% to 2,280 plants/acre. Cover for Wyoming big sagebrush decreased to 7%. Decadence within the Wyoming big sagebrush population increased to 62%. Poor vigor within the Wyoming big sagebrush population increased to 40%. The density for black sagebrush increased 17% to 280 plants/acre. Both decadence and poor vigor within the black sagebrush population increased to 29%.
- **2006 to 2011 - slightly down (-1):** The density for Wyoming big sagebrush increased 2% to 2,330 plants/acre. Cover for Wyoming big sagebrush decreased to 5%. Wyoming big sagebrush increased in decadence to 68%. Poor vigor within the Wyoming big sagebrush population increased to 59%. The density for black sagebrush decreased 36% to 180 plants/acre. Decadence within the black sagebrush population increased to 56%. Poor vigor within the black sagebrush population increased to 67%.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial grasses increased 30%. The preferred perennial grass species bluebunch wheatgrass and Sandberg bluegrass both increased significantly in nested frequency.
- **1990 to 1996 - slightly down (-1):** The sum of nested frequency for perennial grasses decreased 10%. Bluebunch wheatgrass decreased significantly in nested frequency, and had a cover of 7%. Sandberg bluegrass remained the dominant grass on the site, and had a cover of 8%. Annual grasses were included in the sample for the first time in 1996. The weedy annual grass cheatgrass was common on the site, and had a cover of 4%.
- **1996 to 2001 - stable (0):** The sum of nested frequency for perennial grasses decreased 9%. Sandberg bluegrass decreased significantly in nested frequency, and decreased in cover to 7%. Although a minor component of the perennial grass composition, bottlebrush squirreltail (*Sitanion hystrix*) decreased significantly in nested frequency, and cover remained similar at 1%.
- **2001 to 2006 - up (+2):** The sum of nested frequency for perennial grasses increased 28%. Bluebunch wheatgrass increased significantly in nested frequency, and increased in cover from 10% to 18%. Sandberg bluegrass increased in cover to 14%.
- **2006 to 2011 - slightly down (-1):** The sum of nested frequency for perennial grasses decreased 13%. The preferred species bluebunch wheatgrass decreased significantly in nested frequency, and decreased in cover to 14%. The weedy annual species cheatgrass increased significantly in nested frequency, and increased in cover from 3% to 7%.

Forb:

- **1984 to 1990 - up (+2):** The sum of nested frequency for perennial forbs increased over eight-fold. Tapertip hawksbeard (*Crepis acuminata*), Hoods phlox (*Phlox hoodii*), and longleaf phlox (*P. longifolia*) all had a significant increase in nested frequency.
- **1990 to 1996 - down (-2):** The sum of nested frequency for perennial forbs decreased 64%. Longleaf phlox had a significant decrease in nested frequency, and had a cover of less than 1%.

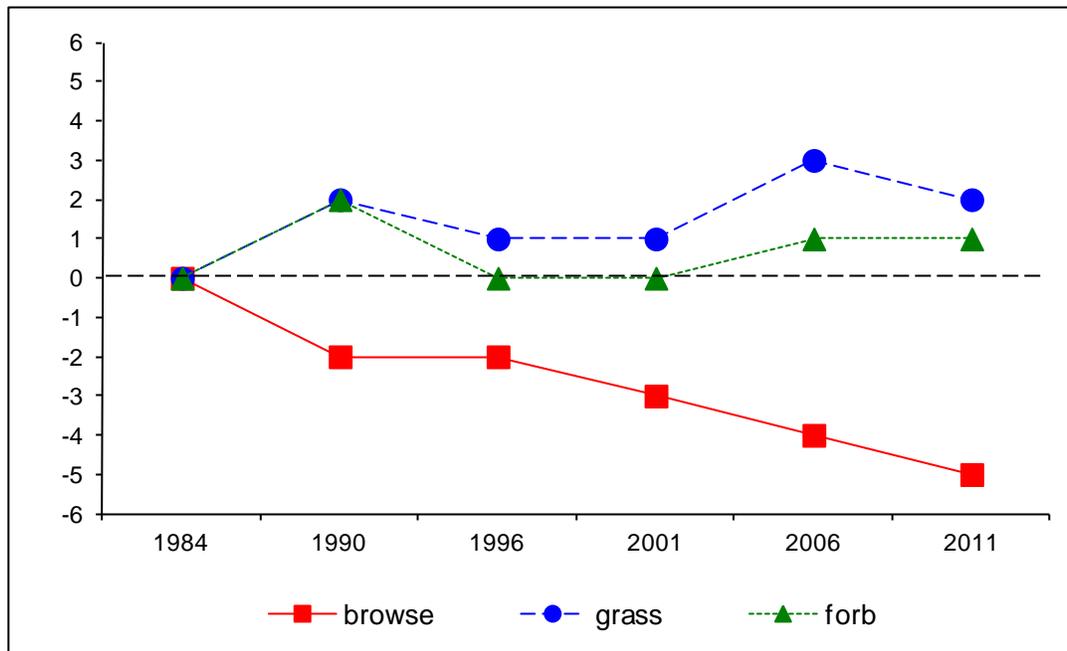
- **1996 to 2001 - stable (0):** The sum of nested frequency for perennial forbs decreased 23%, but perennial forbs were already rare. Longleaf phlox decreased significantly in nested frequency. The annual species bush birdbeak (*Cordylanthus ramosus*) dominated the forb community in cover at 8%.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 83%, but remain fairly rare on the site. Cover of perennial forbs increased from 1% to 2%. Pale agoseris (*Agoseris glauca*) had a significant increase in nested frequency. The annual species bush bird beak decreased in cover to less than 1%.
- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial forbs remained similar, but cover increased to 4%. The annual species bush birdbeak increased significantly in nested frequency, and increased in cover to 3%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 2, study no: 28

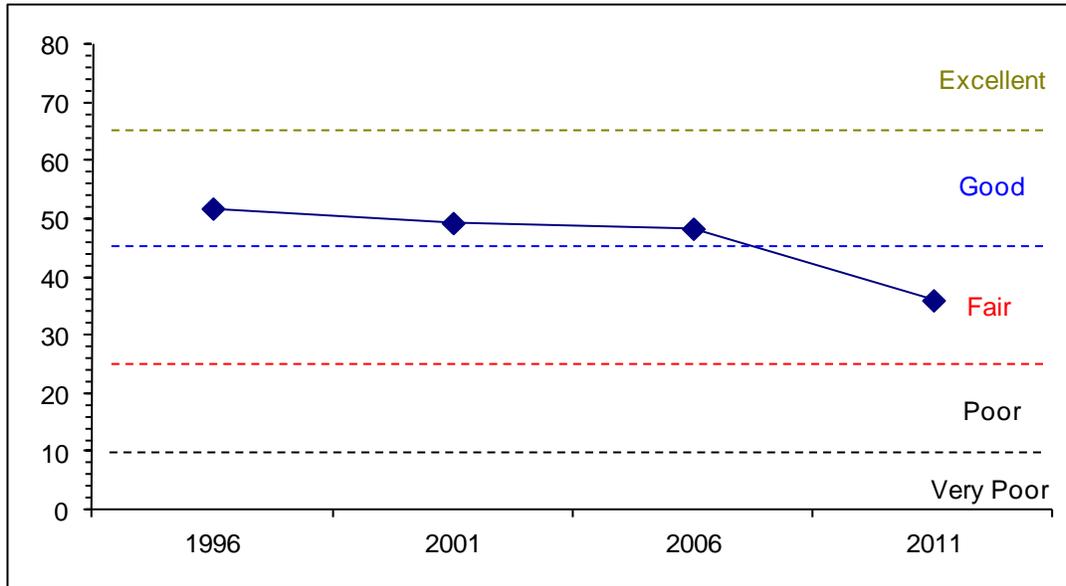
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	19.5	2.2	1.6	30.0	-3.2	1.8	0.0	51.8	Good
01	16.9	0.0	1.4	30.0	-1.6	2.7	0.0	49.3	Good
06	10.2	-2.3	8.7	30.0	-2.6	4.3	0.0	48.3	Good
11	5.9	-5.4	2.1	30.0	-4.9	8.4	0.0	36.0	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 2 Study no: 28



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 2, Study no: 28



HERBACEOUS TRENDS--
 Management unit 02, Study no: 28

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron spicatum	a161	bc210	a137	ab155	c222	ab174	7.19	10.05	17.88	13.67
G	Bromus tectorum (a)	-	-	a152	a173	a168	b239	4.32	2.15	3.40	6.58
G	Oryzopsis hymenoides	ab3	a-	a-	ab14	ab7	b15	.03	.86	.77	.69
G	Poa secunda	a210	c303	c284	b239	bc280	ab237	8.09	7.41	14.00	7.99
G	Sitanion hystrix	abc26	a5	c47	ab20	bc39	c50	1.29	.75	1.85	1.80
G	Stipa comata	-	-	-	-	-	-	-	-	-	.00
Total for Annual Grasses		0	0	152	173	168	239	4.32	2.15	3.40	6.58
Total for Perennial Grasses		400	518	468	428	548	476	16.61	19.08	34.50	24.16
Total for Grasses		400	518	620	601	716	715	20.94	21.24	37.91	30.75
F	Agoseris glauca	a-	a-	a-	a-	b10	a-	-	-	.05	-
F	Arabis sp.	-	-	-	1	3	5	-	.00	.00	.01
F	Astragalus convallarius	9	-	-	9	11	1	-	.02	.11	.00
F	Astragalus sp.	2	-	-	-	3	-	-	-	.00	.00
F	Balsamorhiza sagittata	-	-	1	4	5	4	.30	.21	.24	.68
F	Calochortus nuttallii	-	3	-	-	2	-	-	-	.00	-
F	Chaenactis douglasii	-	-	3	-	-	-	.00	-	-	-
F	Collinsia parviflora (a)	-	-	7	5	3	12	.18	.01	.00	.02
F	Collomia linearis (a)	-	-	-	-	8	-	-	-	.02	-
F	Cordylanthus ramosus (a)	-	-	ab30	b55	a16	b47	.48	7.51	.09	2.45
F	Crepis acuminata	a9	bc33	ab16	abc25	c35	c41	.14	.56	1.00	1.70
F	Cryptantha sp.	1	2	-	-	7	2	-	-	.02	.03
F	Descurainia pinnata (a)	-	-	-	3	6	47	-	.00	.04	.30
F	Draba sp. (a)	-	-	-	-	3	6	-	-	.00	.01
F	Erigeron sp.	a-	a5	a6	a11	ab21	b34	.09	.48	.52	1.55

Type	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Gayophytum ramosissimum(a)	-	-	-	-	-	7	-	-	-	.01
F	Hackelia patens	-	-	-	1	-	1	-	.00	-	.00
F	Holosteum umbellatum (a)	-	-	a1	a-	a12	b85	.00	-	.03	3.00
F	Lithophragma sp.	-	-	-	-	-	2	-	-	-	.00
F	Penstemon sp.	-	-	-	5	-	3	-	.01	.03	.04
F	Phlox hoodii	a6	b26	a-	a6	ab12	a6	-	.03	.08	.06
F	Phlox longifolia	a-	c149	b53	a1	a6	a15	.19	.00	.04	.09
F	Sphaeralcea grossulariifolia	-	-	3	-	-	-	.15	-	-	-
F	Tragopogon dubius (a)	b10	a-	a-	a-	a1	a-	-	-	.03	-
F	Unknown forb-perennial	a-	b12	a-	a-	a-	a-	-	-	-	-
Total for Annual Forbs		10	0	38	63	49	204	0.67	7.53	0.23	5.81
Total for Perennial Forbs		27	230	82	63	115	114	0.88	1.34	2.14	4.19
Total for Forbs		37	230	120	126	164	318	1.55	8.88	2.37	10.01

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

BROWSE TRENDS--

Management unit 02, Study no: 28

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia nova	10	8	7	4	1.60	1.92	1.06	.03
B	Artemisia tridentata wyomingensis	80	72	70	68	14.01	11.19	7.11	4.67
B	Atriplex canescens	0	0	0	0	-	.38	-	-
B	Chrysothamnus nauseosus	0	0	1	0	-	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	13	17	13	19	1.30	2.28	.86	.99
B	Eriogonum microthecum	2	0	2	1	-	-	-	-
B	Gutierrezia sarothrae	0	1	0	0	-	-	-	-
B	Juniperus osteosperma	3	3	5	5	3.94	5.14	5.63	2.87
B	Opuntia polyacantha	3	3	3	4	.03	-	.18	.38
Total for Browse		111	104	101	101	20.89	20.92	14.85	8.94

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 28

Species	Percent Cover		
	'01	'06	'11
Artemisia nova	-	1.41	.76
Artemisia tridentata wyomingensis	-	9.60	6.46
Chrysothamnus viscidiflorus viscidiflorus	-	.96	1.29
Juniperus osteosperma	9.00	8.88	9.31

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 28

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata wyomingensis	1.0	1.5	2.1

POINT-QUARTER TREE DATA--

Management unit 02, Study no: 28

Species	Trees per Acre				Average diameter (in)			
	'96	'01	'06	'11	'96	'01	'06	'11
Juniperus osteosperma	40	72	40	50	4.1	3.1	8.3	6.3

BASIC COVER--

Management unit 02, Study no: 28

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	2.25	10.00	43.52	45.41	57.80	46.74
Rock	1.00	1.00	.74	.28	1.01	.77
Pavement	0	0	.75	1.60	1.26	.27
Litter	54.25	43.25	44.15	61.11	39.27	40.31
Cryptogams	20.50	16.00	11.19	6.84	12.67	7.21
Bare Ground	22.00	29.75	12.75	12.17	11.55	19.13

SOIL ANALYSIS DATA --

Management unit 02, Study no: 28, Study Name: North Eden

Effective rooting depth (in)	pH	Sandy Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11.8	7.2	34.9	36.1	29.0	1.8	9.7	134.4	0.6

PELLET GROUP DATA--

Management unit 02, Study no: 28

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	25	41	46	33	-	-	-
Elk	-	-	1	9	-	-	-
Deer	39	36	60	37	108 (266)	169 (417)	60 (149)
Cattle	7	1	-	-	3 (7)	-	-

BROWSE CHARACTERISTICS--
Management unit 02, Study no: 28

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia nova</i>										
84	3332	2	28	70	-	40	60	12	13/14	
90	2065	16	52	32	66	0	0	3	15/19	
96	440	5	82	14	-	82	0	9	13/21	
01	240	8	67	25	-	17	0	17	15/29	
06	280	7	64	29	-	0	0	29	19/31	
11	180	33	11	56	-	0	0	67	10/24	
<i>Artemisia tridentata wyomingensis</i>										
84	5331	5	43	53	533	30	65	10	24/25	
90	3465	10	31	60	66	23	17	33	22/20	
96	2800	3	51	46	-	40	10	26	29/38	
01	2560	2	41	56	40	43	12	16	27/39	
06	2280	19	18	62	80	23	5	40	26/38	
11	2320	4	28	68	80	43	4	59	20/28	
<i>Ceratoides lanata</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	14/17	
<i>Chrysothamnus nauseosus</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	20	100	0	-	-	0	0	0	28/31	
11	0	0	0	-	-	0	0	0	28/56	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
84	199	0	33	67	-	0	0	67	21/11	
90	199	0	33	67	-	33	33	33	6/7	
96	400	5	85	10	-	20	0	45	15/23	
01	360	0	61	39	-	0	0	11	15/26	
06	360	11	44	44	20	22	0	17	14/24	
11	500	16	84	0	-	0	0	0	13/18	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Eriogonum microthecum</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	0	0	0	0	-	0	0	0	-/-	
96	40	0	100	0	-	0	0	0	8/9	
01	0	0	0	0	-	0	0	0	-/-	
06	40	0	50	50	-	0	0	50	9/11	
11	20	0	100	0	-	0	0	0	6/8	
<i>Gutierrezia sarothrae</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	20	0	100	-	-	0	0	0	6/4	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
<i>Juniperus osteosperma</i>										
84	133	0	100	-	66	0	0	0	69/49	
90	132	50	50	-	-	0	0	0	93/63	
96	60	33	67	-	-	0	0	0	-/-	
01	60	33	67	-	-	0	0	0	-/-	
06	100	40	60	-	20	0	0	0	-/-	
11	100	40	60	-	-	0	0	0	-/-	
<i>Opuntia polyacantha</i>										
84	199	0	100	-	-	0	0	0	6/7	
90	399	0	100	-	66	0	0	0	4/7	
96	80	0	100	-	-	0	0	0	6/20	
01	60	0	100	-	-	0	0	0	6/15	
06	100	20	80	-	-	0	0	0	6/12	
11	120	0	100	-	-	0	0	0	5/10	
<i>Symphoricarpos oreophilus</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	26/57	
11	0	0	0	-	-	0	0	0	20/36	