

GREY WOLF MOUNTAIN - TREND STUDY NO. 17-49-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 7082 ft. (2159 m)

Aspect: East

Slope: 4%

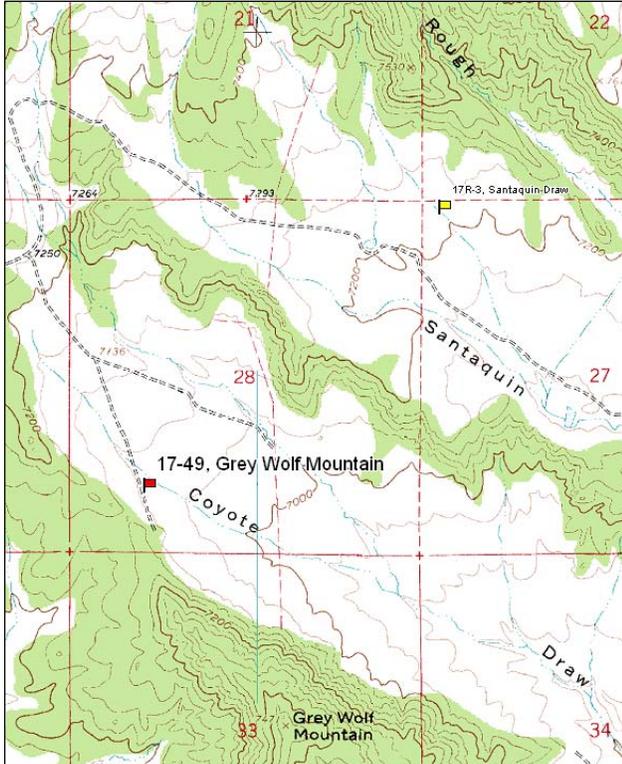
Transect bearing: 97° magnetic

Belt placement: line 1 (15 & 96ft), line 2 (39ft), line 3 (52ft), line 4 (66ft).

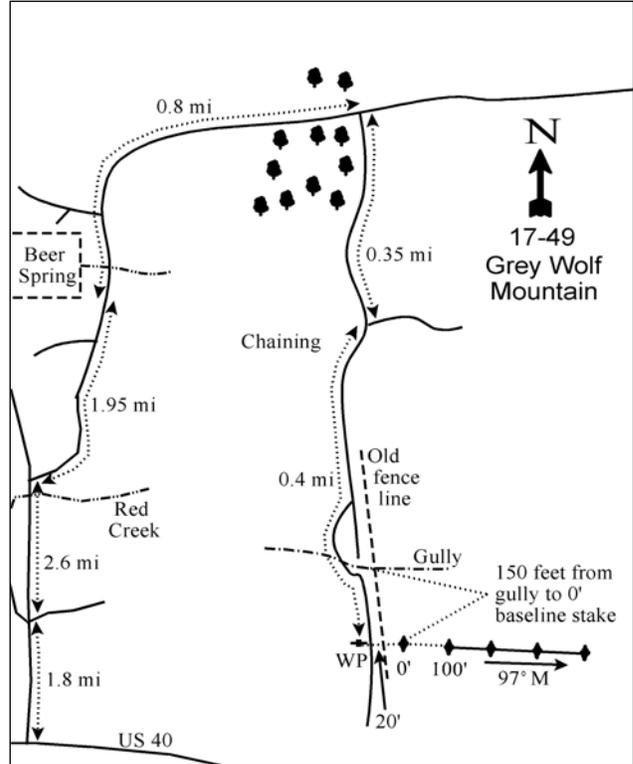
Directions:

From U.S. 40 in Fruitland, travel north up the Red Creek Road 1.8 miles to a 3-way fork. Take the middle fork and go 2.6 miles. After crossing Red Creek, turn right onto a dirt road. Proceed northeast on this road for 1.95 miles to Beer Spring. From the southwest corner of the fenced spring bear right and continue for 0.8 miles. Turn right and go 0.35 miles. Stay right and go 0.4 miles going around the gully to an old fence line to a witness post on the right. It may not be possible to drive across the deep gully. The 0-foot stake is 20 feet east of the witness post and is marked by browse tag #7090. The 0-foot stake is approximately 150 feet south of the gully.

Map Name: Tabby Mountain



Diagrammatic Sketch:



Township: 2S Range: 8W Section: 28

GPS: NAD 83, UTM 12T 517136 E 4458065 N

## Site Information

**Site Description:** The study is located at the north end of Grey Wolf Mountain near the head of Coyote Draw. The study replaced a line-intercept study established in 1981. The land is administered by the Utah Division of Wildlife Resources (UDWR) as part of the Tabby Mountain Wildlife Management Area (WMA) in an area which is utilized as winter range by both deer and elk. The area was disked on contour and seeded in the fall of 1990 as a habitat and watershed improvement project. No seed mix data was available, but several commonly seeded species were sampled in 1995 (Table - Herbaceous Trends). Livestock grazing was removed after the treatment. Cattle and horses grazed the area prior to the treatment and use was reported to be heavy in 1988. Numerous trespassing cattle have been observed in the area during past readings. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse. Stocking rates are very low. Pellet group transect data has estimated moderate use by deer since 2000. Estimated use by elk was light in 2000 and 2010, but more moderate in 2005. Estimated cattle use has been light since 2000, but has also slightly increased over that time (Table - Pellet Group Data).

**Browse:** The key browse species on the site is Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). There appears to be some hybridization with mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) and basin big sagebrush (*A. tridentata* ssp. *tridentata*) since some of the sagebrush display characteristics of both these subspecies. All the sagebrush encountered on the study was classified as Wyoming big sagebrush to alleviate confusion. These shrubs vary considerably in color, size, growth form, and degree of hedging. Typically, the Wyoming big sagebrush occurs more in the flat and the basin big sagebrush type occurs more along the gullies with deeper soils. The big sagebrush population is comprised of mostly mature plants that have experienced heavy use since 2000. The population of big sagebrush is healthy with low decadence and good vigor. Recruitment of young big sagebrush plants was high at the outset of the study, but decreased to only fair levels in 2005. Small populations of winterfat (*Ceratoides lanata*), fourwing saltbush (*Atriplex canescens*) and rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) provide a limited amount of additional forage for wintering big game. Corymbed eriogonum (*Eriogonum corymbosum*) and narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) are also fairly abundant (Table - Browse Characteristics), and it was noted that both species were heavily used in 2010. Forage kochia (*Kochia prostrata*) was first sampled in 2005. Cover and density of kochia had increased by 2010.

**Herbaceous Understory:** Grasses are dominated by the introduced species crested wheatgrass (*Agropyron cristatum*). Crested wheatgrass was reported to be heavily utilized in both 1982 and 1988. After the disking treatment, crested wheatgrass declined significantly in nested frequency, but it continues to be the most abundant grass species. Several other grasses were encountered following the treatment, yet all occur in small numbers. Forbs were also more abundant after treatment with useful species including Lewis flax (*Linum lewisii*), yellow sweet clover (*Melilotus officinalis*), small burnet (*Sanguisorba minor*), low penstemon (*Penstemon humilus*) and scarlet globemallow (*Sphaeralcea coccinea*) sampled regularly in 1995. Only scarlet globemallow remained common in 2010 (Table - Herbaceous Trends).

**Soil:** Soils are alluvial deposited with a clay loam texture and a slightly alkaline soil reaction (pH 7.5). Phosphorus may have limited availability for plant growth and development at 3.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is very high and protective ground cover has been poor in the past, consisting mostly of old mature sagebrush cover (Table - Basic Cover). There is evidence of some overland flow between shrubs and rills, which feed into a large (10' to 12' deep) active gully northeast of the transect. The only factor preventing increased erosion is the cover provided by herbaceous vegetation. The soil erosion condition was classified as stable in 2010, but was slight in 2005 because of small pedestals surrounding shrubs and perennial grasses, gullies covering 2-5% of the site, some minor soil and litter movement, as well as small rills and flow patterns between perennial species.

## Trend Assessments

### Browse:

- **1982 to 1988 - up (+2):** There was a five-fold increase in the density of big sagebrush primarily due to a substantial increase in the recruitment of young plants.
- **1988 to 1995 - stable (0):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of big sagebrush increased slightly from 3% to 10%, but is still considered good and poor vigor decreased from 10% to 5%. Recruitment of young plants decreased, but remained excellent at 45% of the population.
- **1995 to 2000 - slightly up (+1):** The density of big sagebrush increased by 22% from 2,300 plants/acre to 2,800 plants/acre, and cover increased from 3% to 4%. Recruitment of young sagebrush plants decreased to 29% of the population.
- **2000 to 2005 - down (-2):** Big sagebrush density decreased by 30% to 1,960 plants/acre, though cover remained similar. Decadence of big sagebrush increased from 13% to 19% and recruitment of young plants decreased to 9% of the population.
- **2005 to 2010 - stable (0):** There was a slight decrease in the density of big sagebrush to 1,760 plants/acre, but cover increased to 5%. There was a decrease in decadence to 10%, though recruitment of young plants remained low at 7%.

### Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** There was little change in the sum of nested frequency of perennial grasses, though composition improved with many perennial species sampled for the first time in low numbers.
- **1995 to 2000 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 11% and cover increased from 10% to 18%. The increase in frequency was due to a significant increase in the nested frequency of crested wheatgrass.
- **2000 to 2005 - slightly down (-1):** The perennial grass sum of nested frequency decreased by 14% despite an increase in cover to 20%. Many of the perennial species sampled in 1995 were no longer sampled.
- **2005 to 2010 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses.

### Forb:

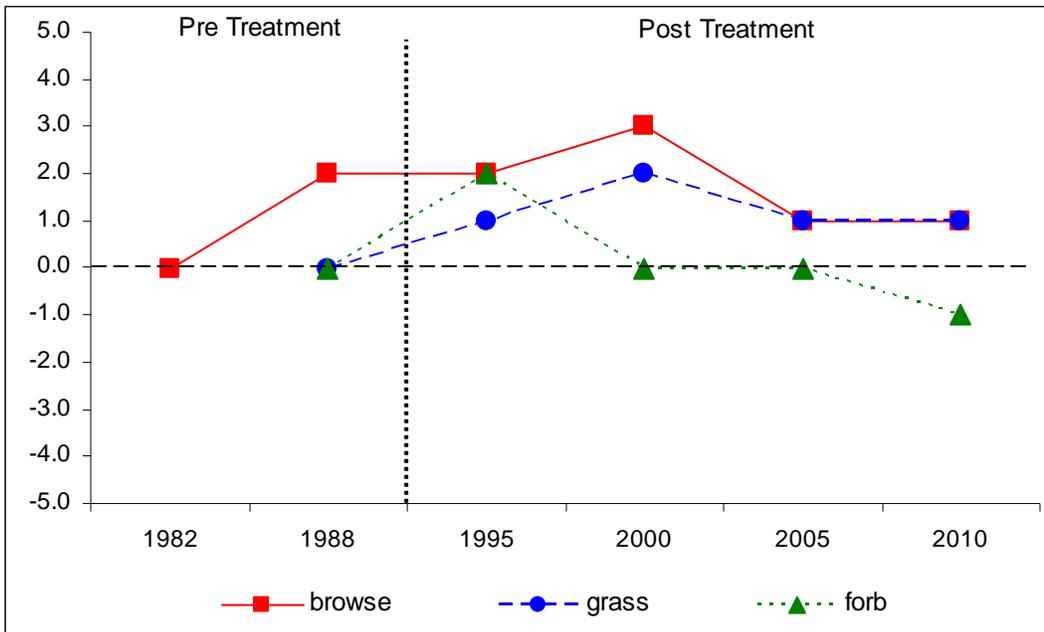
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - up (+2):** The sum of nested frequency of perennial forbs increased by 57% with many useful forbs sampled for the first time.
- **1995 to 2000 - down (-2):** The perennial forb sum of nested frequency decreased by 47% and cover decreased from 8% to 3%. There was a significant decrease in the nested frequency of many of the useful forbs including Lewis flax, yellow sweetclover, and small burnet.
- **2000 to 2005 - stable (0):** The perennial forb sum of nested frequency and cover changed little.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 16% and cover decreased from 4% to 3%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
 Management unit 17, study no: 49

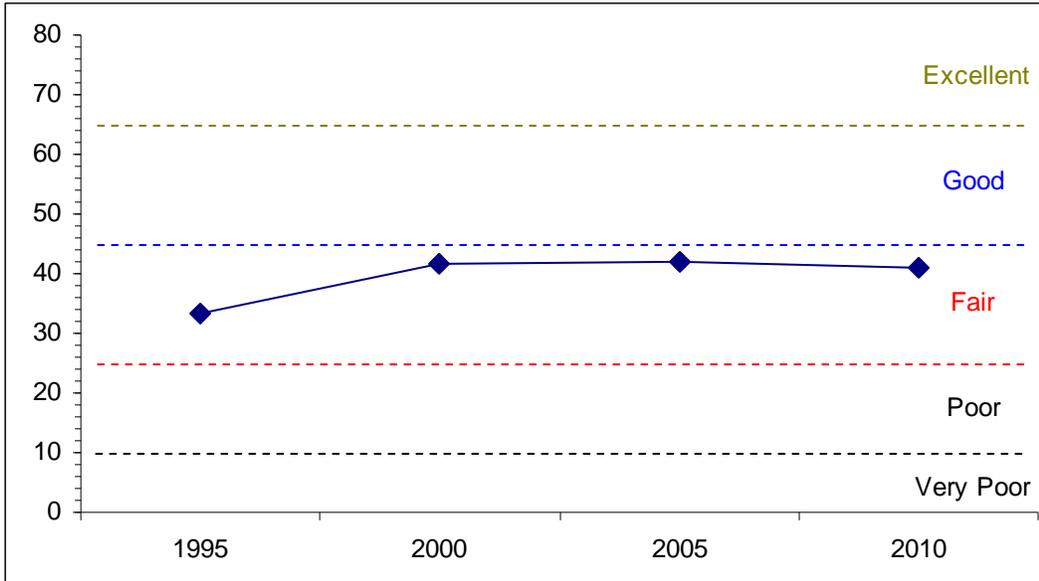
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	3.3	0.0	0.0	20.1	0.0	10.0	0.0	<b>33.3</b>	Fair
00	5.2	0.0	0.0	30.0	0.0	6.5	0.0	<b>41.6</b>	Fair
05	4.5	0.0	0.0	30.0	0.0	7.6	0.0	<b>42.1</b>	Fair
10	6.1	0.0	0.0	30.0	0.0	4.9	0.0	<b>41.1</b>	Fair

**Trend Summary**

CUMULATIVE RANGE TREND ASSESSMENT--  
 Management unit 17, Study no: 49



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--  
 Management unit 17, Study no:49



HERBACEOUS TRENDS--  
 Management unit 17, Study no: 49

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	ab316	a260	b326	ab311	b325	9.44	17.05	19.77	21.57
G	Agropyron dasystachyum	a6	ab21	b31	ab6	ab11	.28	.35	.09	.19
G	Agropyron intermedium	a-	b30	a5	a-	a6	.12	.03	-	.01
G	Bromus inermis	-	4	2	-	-	.01	.03	-	-
G	Carex sp.	-	10	1	-	2	.04	.00	-	.01
G	Dactylis glomerata	-	8	5	-	-	.04	.09	-	-
G	Elymus junceus	-	-	-	5	1	-	-	.33	.00
G	Oryzopsis hymenoides	-	6	-	2	1	.06	-	.03	.03
G	Poa fendleriana	-	-	7	-	-	-	.15	-	-
G	Poa secunda	-	2	-	-	-	.03	-	-	-
G	Secale cereale (a)	-	7	-	-	-	.06	-	-	-
G	Stipa comata	-	-	1	-	-	-	.03	-	-
Total for Annual Grasses		0	7	0	0	0	0.06	0	0	0
Total for Perennial Grasses		322	341	378	324	346	10.04	17.76	20.22	21.82
Total for Grasses		322	348	378	324	346	10.10	17.76	20.22	21.82
F	Agoseris glauca	a-	b61	a-	a-	a-	1.92	-	-	-
F	Allium sp.	-	6	-	4	-	.02	-	.01	-
F	Arabis sp.	-	-	3	-	-	-	.00	-	-
F	Astragalus convallarius	17	23	6	27	17	.21	.07	.36	.13
F	Astragalus mollissimus	-	5	4	-	-	.01	.04	-	-
F	Astragalus sp.	-	-	-	-	3	-	-	-	.03
F	Astragalus tenellus	1	-	-	3	-	-	-	.03	-
F	Calochortus nuttallii	a-	b7	a-	b17	b8	.03	-	.04	.03
F	Chaenactis douglasii	-	-	3	-	-	-	.00	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Chenopodium fremontii</i> (a)	-	7	-	-	-	.01	-	-	-
F	<i>Chenopodium leptophyllum</i> (a)	-	b10	a-	a-	a-	.02	-	-	-
F	<i>Cirsium</i> sp.	-	-	3	-	-	.15	.00	-	-
F	<i>Cordylanthus kingii</i> (a)	-	b11	a-	ab5	ab1	.08	-	.01	.00
F	<i>Crepis acuminata</i>	-	-	-	2	2	-	-	.00	.00
F	<i>Cymopterus</i> sp.	-	-	1	3	-	-	.15	.00	-
F	<i>Descurainia pinnata</i> (a)	-	5	-	2	-	.01	-	.01	-
F	<i>Erigeron eatonii</i>	-	3	-	-	2	.00	-	-	.03
F	<i>Hedysarum boreale</i>	-	7	5	-	-	.08	.07	-	-
F	<i>Lactuca serriola</i>	-	1	-	-	-	.01	-	-	-
F	<i>Lappula occidentalis</i> (a)	-	a-	a-	b16	ab7	-	-	.21	.01
F	<i>Linum lewisii</i>	a-	c69	b19	a-	a-	1.16	.36	-	-
F	<i>Lygodesmia grandiflora</i>	-	3	-	5	-	.00	-	.09	-
F	<i>Machaeranthera canescens</i>	b21	a4	a4	a7	a-	.03	.03	.12	-
F	<i>Machaeranthera grindelioides</i>	4	-	-	2	-	.00	-	.01	-
F	<i>Melilotus officinalis</i>	a-	b16	a3	a-	a3	.32	.15	-	.03
F	<i>Penstemon humilis</i>	10	11	8	3	1	.65	.05	.15	.03
F	<i>Phlox hoodii</i>	c101	b35	b38	a5	a10	.43	.96	.19	.32
F	<i>Phlox longifolia</i>	b70	b76	a20	b53	ab51	.29	.13	.55	.20
F	<i>Sanguisorba minor</i>	a-	b28	a2	a-	a-	.21	.03	-	-
F	<i>Sphaeralcea coccinea</i>	c183	c166	bc152	ab117	a110	2.40	.98	1.02	.77
F	<i>Tragopogon dubius</i>	ab4	b8	a-	a-	ab4	.18	-	-	.04
F	<i>Trifolium gymnocarpon</i>	a8	bc46	ab33	c68	bc55	.19	.17	1.19	.84
Total for Annual Forbs		0	33	0	23	8	0.12	0	0.22	0.01
Total for Perennial Forbs		419	575	304	316	266	8.34	3.24	3.79	2.47
Total for Forbs		419	608	304	339	274	8.47	3.24	4.02	2.49

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

BROWSE TRENDS--

Management unit 17, Study no: 49

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	<i>Artemisia tridentata wyomingensis</i>	50	65	55	54	2.61	3.95	3.40	4.51
B	<i>Atriplex canescens</i>	0	1	0	0	-	-	-	-
B	<i>Ceratoides lanata</i>	9	6	9	8	.03	.18	.18	.18
B	<i>Chrysothamnus depressus</i>	2	2	0	0	.01	-	-	-
B	<i>Chrysothamnus nauseosus hololeucus</i>	3	5	1	0	.03	.03	.00	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	54	61	56	49	1.96	2.41	2.04	1.08
B	<i>Eriogonum corymbosum</i>	71	72	70	64	1.45	2.00	2.38	.76
B	<i>Gutierrezia sarothrae</i>	1	4	16	7	-	.03	.28	.16
B	<i>Kochia prostrata</i>	0	0	8	10	-	-	.03	.18
B	<i>Opuntia sp.</i>	15	14	3	3	.01	.00	.00	-
B	<i>Pinus edulis</i>	0	1	1	0	-	-	-	-
Total for Browse		205	231	219	195	6.11	8.63	8.34	6.88

CANOPY COVER, LINE INTERCEPT--

Management unit 17, Study no: 49

Species	Percent Cover	
	'05	'10
<i>Artemisia tridentata wyomingensis</i>	4.11	4.46
<i>Ceratoides lanata</i>	.28	-
<i>Chrysothamnus nauseosus hololeucus</i>	.05	-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	2.78	1.01
<i>Eriogonum corymbosum</i>	2.66	1.23
<i>Gutierrezia sarothrae</i>	.56	-
<i>Kochia prostrata</i>	.18	.23

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17, Study no: 49

Species	Average leader growth (in)	
	'05	'10
<i>Artemisia tridentata wyomingensis</i>	1.5	1.2

BASIC COVER--

Management unit 17, Study no: 49

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	6.25	8.00	23.68	30.28	29.74	29.97
Rock	0	0	0	.00	0	0
Pavement	0	0	0	.11	.04	0
Litter	40.25	36.00	21.52	33.00	23.30	28.74
Cryptogams	0	6.25	.23	.49	.90	.14
Bare Ground	53.50	49.75	54.37	58.32	56.52	58.84

SOIL ANALYSIS DATA --

Management unit 17, Study no: 49, Study Name: Grey Wolf Mountain

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.5	7.5	42.9	26.8	30.3	2.1	3.6	204.8	0.7

PELLET GROUP DATA--

Management unit 17, Study no: 49

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	2	1	6	6	-	-	-
Elk	7	15	32	18	13 (31)	47 (116)	20 (50)
Deer	11	25	14	18	34 (84)	58 (144)	40 (78)
Cattle	1	2	7	7	6 (14)	15 (26)	20 (48)

BROWSE CHARACTERISTICS--

Management unit 17, Study no: 49

		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 tridentata wyomingensis</i>										
82	<b>1265</b>	11	84	5	1133	42	5	5	23/27	
88	<b>6465</b>	73	24	3	5599	14	11	10	20/17	
95	<b>2300</b>	45	45	10	180	14	3	5	15/20	
00	<b>2800</b>	29	58	13	40	39	21	1	15/22	
05	<b>1960</b>	9	71	19	80	35	35	8	16/21	
10	<b>1760</b>	7	83	10	-	55	27	11	17/22	
<i>Atriplex canescens</i>										
82	<b>0</b>	0	0	-	-	0	0	0	-/-	
88	<b>0</b>	0	0	-	-	0	0	0	-/-	
95	<b>0</b>	0	0	-	-	0	0	0	-/-	
00	<b>20</b>	0	100	-	-	100	0	0	-/-	
05	<b>0</b>	0	0	-	-	0	0	0	-/-	
10	<b>0</b>	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)	
<b>Ceratoides lanata</b>										
82	<b>332</b>	20	80	0	-	40	0	0	8/8	
88	<b>199</b>	33	67	0	-	0	67	0	7/7	
95	<b>360</b>	6	94	0	-	22	0	0	10/12	
00	<b>220</b>	0	100	0	-	18	55	0	5/9	
05	<b>320</b>	0	94	6	-	56	44	6	10/12	
10	<b>280</b>	14	79	7	-	50	7	7	7/11	
<b>Chrysothamnus depressus</b>										
82	<b>0</b>	0	0	-	-	0	0	0	-/-	
88	<b>0</b>	0	0	-	-	0	0	0	-/-	
95	<b>40</b>	50	50	-	-	0	0	0	6/8	
00	<b>40</b>	0	100	-	-	0	0	0	-/-	
05	<b>0</b>	0	0	-	-	0	0	0	-/-	
10	<b>0</b>	0	0	-	-	0	0	0	-/-	
<b>Chrysothamnus nauseosus hololeucus</b>										
82	<b>0</b>	0	0	-	-	0	0	0	-/-	
88	<b>0</b>	0	0	-	-	0	0	0	-/-	
95	<b>60</b>	67	33	-	-	0	0	0	17/14	
00	<b>280</b>	29	71	-	-	0	0	0	9/14	
05	<b>20</b>	100	0	-	-	0	0	0	13/21	
10	<b>0</b>	0	0	-	-	0	0	0	7/9	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
82	<b>1933</b>	0	100	0	-	0	0	0	10/12	
88	<b>3531</b>	26	34	40	399	21	4	9	7/5	
95	<b>3200</b>	18	83	0	20	1	0	0	11/14	
00	<b>2960</b>	3	96	1	20	0	0	0	7/12	
05	<b>2720</b>	10	89	1	20	4	5	1	10/14	
10	<b>2300</b>	5	95	0	-	16	44	0	6/10	
<b>Eriogonum corymbosum</b>										
82	<b>2533</b>	0	100	0	-	37	0	16	13/15	
88	<b>3464</b>	12	54	35	66	33	13	0	14/13	
95	<b>2960</b>	19	81	0	100	0	0	0	14/16	
00	<b>2760</b>	7	91	2	40	0	0	.72	12/16	
05	<b>3020</b>	23	73	5	60	15	4	3	12/16	
10	<b>2340</b>	6	91	3	100	40	11	7	10/12	
<b>Gutierrezia sarothrae</b>										
82	<b>0</b>	0	0	0	-	0	0	0	-/-	
88	<b>399</b>	0	67	33	-	0	0	17	8/8	
95	<b>20</b>	0	100	0	-	0	0	0	-/-	
00	<b>120</b>	0	100	0	-	0	0	0	6/9	
05	<b>1040</b>	6	94	0	-	0	0	0	6/7	
10	<b>300</b>	7	93	0	-	7	0	0	5/5	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Kochia prostrata</b>										
82	<b>0</b>	0	0	-	-	0	0	0	-/-	
88	<b>0</b>	0	0	-	-	0	0	0	-/-	
95	<b>0</b>	0	0	-	-	0	0	0	-/-	
00	<b>0</b>	0	0	-	-	0	0	0	-/-	
05	<b>480</b>	75	25	-	4160	13	4	0	9/18	
10	<b>1000</b>	50	50	-	260	8	8	0	8/16	
<b>Opuntia sp.</b>										
82	<b>599</b>	0	100	0	-	0	0	0	3/7	
88	<b>732</b>	18	36	45	599	0	0	0	4/10	
95	<b>360</b>	11	89	0	-	0	0	0	4/6	
00	<b>300</b>	0	93	7	20	0	0	0	3/3	
05	<b>80</b>	25	75	0	-	0	0	0	4/8	
10	<b>100</b>	0	100	0	-	0	0	0	4/7	
<b>Pinus edulis</b>										
82	<b>0</b>	0	0	-	-	0	0	0	-/-	
88	<b>0</b>	0	0	-	-	0	0	0	-/-	
95	<b>0</b>	0	0	-	-	0	0	0	-/-	
00	<b>20</b>	100	0	-	-	0	0	0	-/-	
05	<b>20</b>	100	0	-	-	0	0	0	-/-	
10	<b>0</b>	0	0	-	-	0	0	0	-/-	