

ROSETTE - TREND STUDY NO. 1-2-11

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: [Semidesert Loam \(Wyoming Big Sagebrush\), R028AY220UT](#)

Land Ownership: BLM

Elevation: 5,500 ft. (1,676 m)

Aspect: South

Slope: 1%

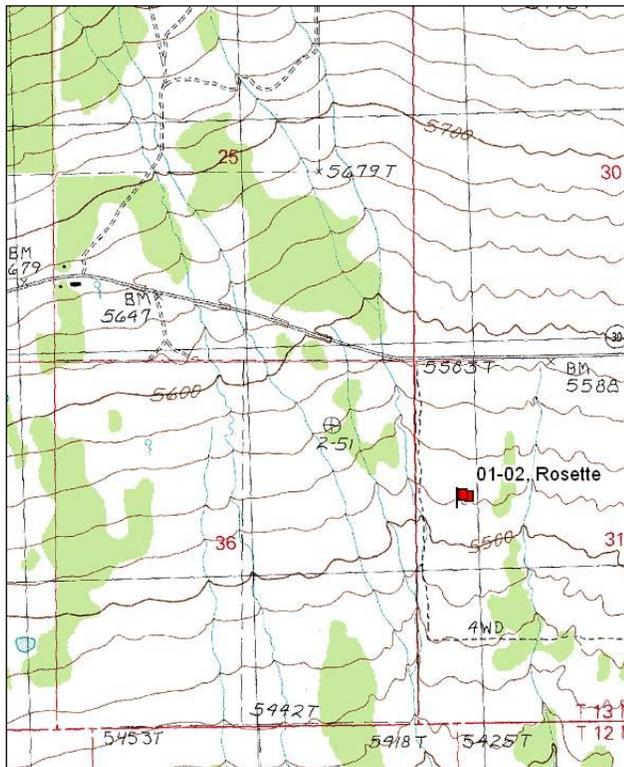
Transect bearing: 0° magnetic

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

Directions:

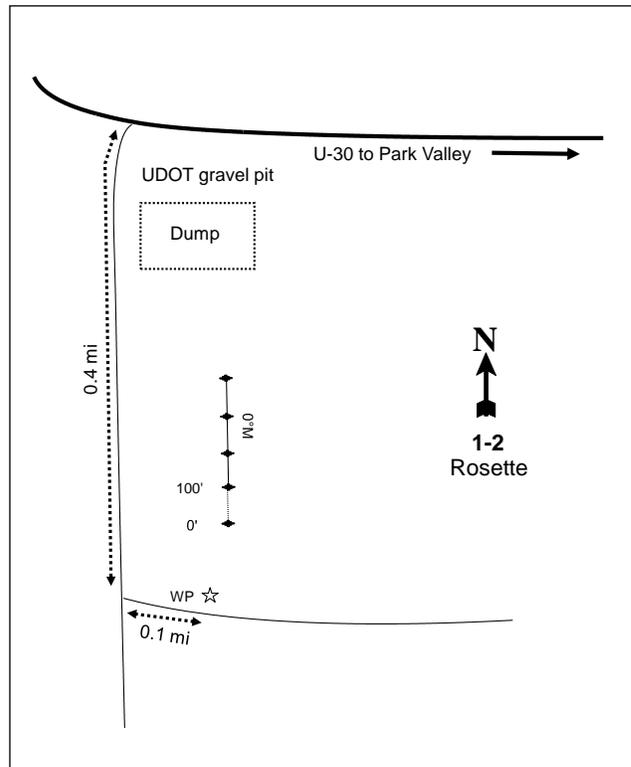
From Rosette, Utah and mile marker 51, proceed northeast on U-30 approximately 1.0 miles and turn right. Proceed through the Utah Department of Transportation gravel dump and find a dirt road on the west side of gravel pile area. Proceed south on this road for 0.4 miles (passing a left fork) to a left fork. Turn left (i.e., east) and proceed 0.1 miles to a witness post on the left side of the road and stop. From the witness post take a bearing of 9 degrees magnetic and walk 22 paces to the 0-foot stake of the frequency baseline. The 0-foot stake is wired with a red browse tag number 7906.

Map Name: Rosette



Township: 13N Range: 13W Section: 31

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 301847 E 4631470 N

ROSETTE - TREND STUDY NO. 1-2

Site Information

Site Description: The trend study is located approximately two miles east of Rosette, on crucial deer winter range. The area is a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) type, which also contains some scattered Utah juniper (*Juniperus osteosperma*) trees and a few pockets of black sagebrush (*A. nova*). The land is administered by the Bureau of Land Management (BLM) as part of the Hirschi allotment. Deer pellet groups have been sampled in moderate abundance since 2001. Cattle also graze the area, and were on site when the study was established in 1984. However, sampled cattle sign has been minimal since 2001 (Table - Pellet Group Data).

Browse: The key browse species on the site is Wyoming big sagebrush, which provides the majority of the browse cover on the site (Table - Browse Trends). The Wyoming big sagebrush population also shows characteristics of basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), but for the purposes of this study all of the big sagebrush plants were classified as Wyoming big sagebrush. The Wyoming big sagebrush stand is a fairly dense population that has had mostly light to moderate use through the sample years, with the exception of 1984 when the population displayed heavy use. The big sagebrush population has displayed moderately high amounts of decadence throughout the sample years, with very high decadence in 1990. Sagebrush plants in the population displaying poor vigor have also been moderately high over the course of the study. Recruitment of young sagebrush plants was very good in 1996 and 2001, but young plants have comprised less than 10% of the population in all other sample years (Table - Browse Characteristics).

Other shrubs sampled that produce additional forage consists of a small number of black sagebrush and rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *consimilis*). Narrowleaf low rabbitbrush (*C. viscidiflorus* ssp. *stenophyllus*), considered in this study to be a weedy increaser, is common on the site and provides a moderate amount of cover (Table - Browse Trends) and density (Table - Browse Characteristics). Utah juniper is found on the site at moderate density (Table - Point-Quarter Tree Data) and canopy cover (Table - Canopy Cover).

Herbaceous Understory: Sandberg bluegrass (*Poa secunda*) and western wheatgrass (*Agropyron smithii*) are the most abundant perennial grasses, but the annual grass species cheatgrass (*Bromus tectorum*) has been sampled at higher frequency than both perennial species since 1996. Cheatgrass has also provided the majority of the grass cover since 2001. Other grass species are rare on the study. Forbs are diverse, but are sparse. The most common perennial forb species and the only perennial forb species that has had consistent frequency and cover over the sample years is Hoods phlox (*Phlox hoodii*) (Table - Herbaceous Trends).

Soil: The soil is classified as part of the the Lembos-Taylor's flat complex, which is found on fan remnants. The parent material consists of alluvium derived from limestone, sandstone, and quartzite. The soils within this classification are characterized as deep, well drained soils, with a slow infiltration rate (Soil Survey Staff 2011). Soil texture is a clay loam with a neutral soil reaction (pH 7.3) (Table - Soil Analysis Data). Bare ground cover is moderate on the study site, though there is a large amount of vegetation and litter cover providing protective ground cover (Table - Basic Cover). Due to high amounts of pedestalling, flow patterns, and rills, the soil erosion condition was classified as moderate in 2001 and 2006. The soil erosion condition was classified as stable in 2011, but pedestalling was still deemed to be fairly high.

Trend Assessments

Browse:

- **1984 to 1990 - down (-2):** The density of Wyoming big sagebrush decreased by 40% from 6,331 plants/acre to 3,799 plants/acre. Decadence of sagebrush increased from 23% to 77%, and poor vigor increased from 21% to 28% of the population. Recruitment of young sagebrush plants decreased from 9% to 0% of the population.

- **1990 to 1996 - up (+2):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Decadence of Wyoming big sagebrush decreased to 29%, and poor vigor decreased to 9% of the population. Recruitment of young sagebrush plants comprised 49% of the population, therefore, density estimates are likely inflated for the 1996 sample year.
- **1996 to 2001 - stable (0):** There was a 13% decrease in the density of Wyoming big sagebrush from 6,160 plants/acre to 5,380 plants/acre, though most of the decrease was due to a decrease in the recruitment of young sagebrush plants. Recruitment of young sagebrush plants remained good, however, at 23% of the population. Cover of sagebrush increased from 14% to 19%. Decadence within the sagebrush population decreased to 18%, and plants displaying poor vigor decreased to 7%.
- **2001 to 2006 - down (-2):** The density of Wyoming big sagebrush decreased by 22% to 4,180 plants/acre, with a slight decrease in cover to 16%. Decadence of sagebrush increased to 35%, and poor vigor increased to 16%. Recruitment of young sagebrush plants decreased to 7% of the population.
- **2006 to 2011 - slightly down (-1):** Wyoming big sagebrush density decreased by 14% to 3,600 plants/acre, though cover remained similar at 15%. Decadence, poor vigor, and recruitment of young plants remained similar at 23%, 18%, and 6%, respectively.

Grass:

- **1984 to 1990 - up (+2):** There was a 31% increase in the sum of nested frequency of perennial grasses. Bottlebrush squirreltail (*Sitanion hystrix*) increased significantly in nested frequency, and Sandberg bluegrass also increased substantially.
- **1990 to 1996 - stable (0):** The sum of nested frequency of perennial grasses remained similar.
- **1996 to 2001 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased from 6% to 9%. There was a significant decrease in the nested frequency of bottlebrush squirreltail, but this species was never prevalent on the site.
- **2001 to 2006 - slightly down (-1):** Perennial grass sum of nested frequency decreased by 7%, but has decreased by 16% since 1990. Cover of perennial grasses decreased to 6%. The nested frequency of the weedy annual species cheatgrass increased significantly, and cheatgrass became the dominant grass species in cover on the site at 5%.
- **2006 to 2011 - stable (0):** There was little change in the sum of nested frequency of perennial grasses, though cover increased to 11%. Cheatgrass decreased significantly in nested frequency, but increased in cover to 11% and remained the dominant grass species on the site.

Forb:

- **1984 to 1990 - slightly up (+1):** There was a 10% increase in the nested frequency of perennial forbs, though perennial forbs remain sparse.
- **1990 to 1996 - stable (0):** There was little change in the sum of nested frequency of perennial forbs.
- **1996 to 2001 - down (-2):** The sum of nested frequency of perennial forbs decreased by 41%, though cover remained similar. Annual forbs increased substantially in nested frequency, but cover remained similar.
- **2001 to 2006 - down (-2):** The sum of nested frequency for perennial forbs decreased by 35%, and cover decreased from 2% to 1%.
- **2006 to 2011 - up (+2):** The sum of nested frequency of perennial forbs increased by 51%, and cover increased to 2%. However, annual forb sum of nested frequency also increased substantially, and cover increased from less than 1% to 3%.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

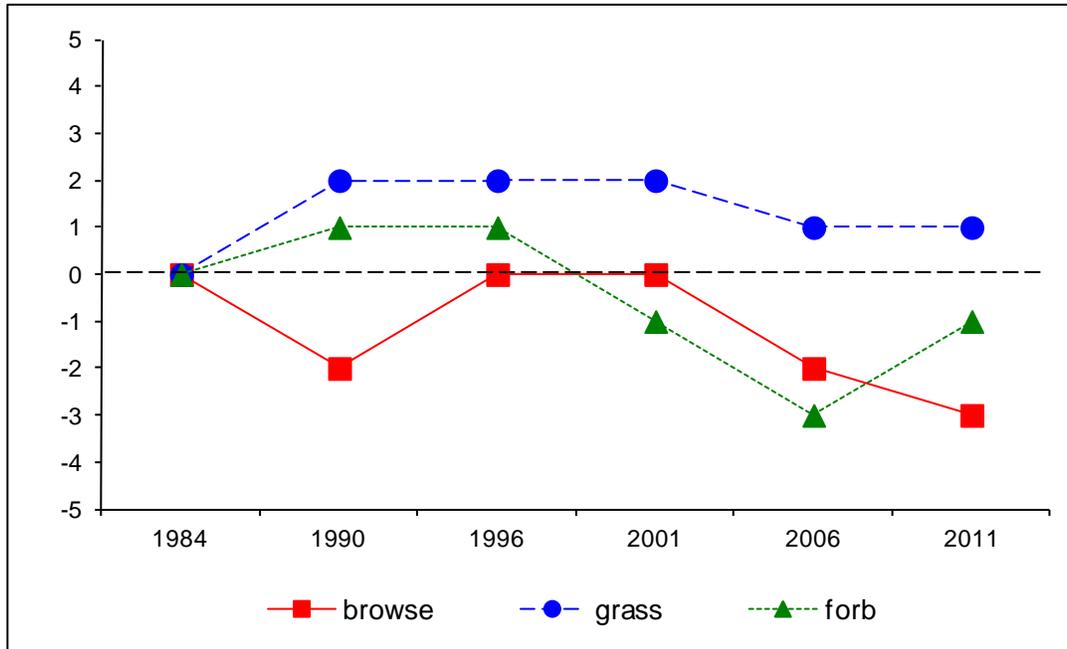
Management unit 1, study no: 2

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	17.6	6.3	15.0	12.8	-2.4	3.4	0.0	52.6	Good
01	23.2	9.6	11.5	18.4	-2.7	3.7	0.0	63.6	Good-Excellent
06	19.9	4.5	3.5	11.4	-4.0	1.9	0.0	37.2	Fair
11	18.7	8.1	3.0	21.1	-8.3	3.8	0.0	46.3	Fair-Good

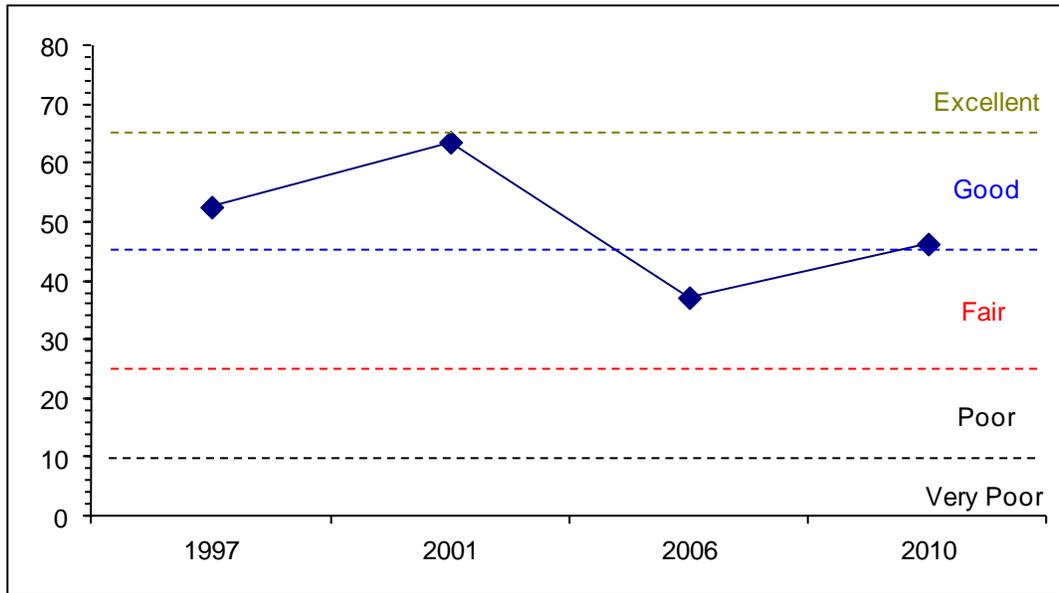
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 1 Study no: 2



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 1, Study no: 2



HERBACEOUS TRENDS--
 Management unit 01, Study no: 2

Type	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron smithii	abc73	a51	ab67	abc83	bc102	c113	.57	1.12	1.36	2.16
G	Agropyron spicatum	a-	a1	b14	a-	a-	a-	.05	-	-	-
G	Bromus tectorum (a)	-	-	a259	a227	b296	a204	3.20	3.66	5.34	11.09
G	Oryzopsis hymenoides	1	2	-	1	6	3	-	.00	.19	.03
G	Poa pratensis	-	-	-	-	-	4	-	-	-	.15
G	Poa secunda	abc180	c231	abc189	bc212	ab171	a156	5.15	7.40	3.74	7.80
G	Sitanion hystrix	a21	b74	b70	a29	a22	a29	.61	.68	.42	.39
G	Vulpia octoflora (a)	-	-	3	-	6	-	.00	-	.01	-
Total for Annual Grasses		0	0	262	227	302	204	3.21	3.66	5.36	11.09
Total for Perennial Grasses		275	359	340	325	301	305	6.38	9.22	5.71	10.53
Total for Grasses		275	359	602	552	603	509	9.59	12.88	11.07	21.62
F	Agoseris glauca	-	-	3	-	-	-	.01	-	-	-
F	Allium acuminatum	b23	a-	a-	ab9	a3	b28	-	.04	.00	.21
F	Alyssum alyssoides (a)	-	-	a4	a-	b18	b17	.03	-	.06	.06
F	Antennaria rosea	-	-	3	7	3	4	.03	.07	.03	.03
F	Arabis sp.	-	-	6	3	2	-	.01	.03	.00	-
F	Astragalus beckwithii	-	-	2	-	1	-	.00	-	.03	-
F	Astragalus sp.	-	-	3	-	-	1	.00	-	-	.03
F	Astragalus utahensis	-	2	6	7	4	4	.07	.04	.04	.03
F	Balsamorhiza hookeri	-	-	2	7	-	-	.18	.33	-	-
F	Calochortus nuttallii	-	3	-	-	-	4	-	-	-	.01
F	Chaenactis douglasii	a10	a4	b32	a5	a3	a3	.08	.01	.00	.03
F	Collinsia parviflora (a)	-	-	a-	a-	a2	b42	-	-	.00	.12

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Cryptantha sp.	a-	ab ⁵	c ⁴⁴	a-	ab ⁹	b ¹²	.19	-	.01	.02
F	Cymopterus longipes	b ⁵³	b ⁵⁵	ab ²³	ab ²⁸	a ⁹	ab ²⁸	.06	.22	.03	.33
F	Delphinium nuttallianum	b ¹⁷	a-	a-	a-	a-	a ⁵	-	-	-	.06
F	Descurainia pinnata (a)	-	-	a ³	b ⁴¹	a ⁵	c ¹⁵⁵	.00	.15	.01	.95
F	Erigeron pumilus	-	-	-	1	-	-	-	.00	-	-
F	Eriogonum caespitosum	a ²	b ¹⁶	a ³	a-	a ²	a ²	.00	-	.03	.06
F	Eriogonum cernuum (a)	-	-	b ²¹	a ⁶	a ⁶	a ²	.06	.03	.01	.00
F	Gayophytum ramosissimum(a)	-	-	a-	a-	ab ⁴	b ⁹	-	-	.01	.08
F	Gilia sp. (a)	-	-	b ¹³	ab ⁵	a-	b ¹⁰	.05	.01	-	.02
F	Lactuca serriola (a)	-	-	-	-	2	-	-	-	.00	-
F	Lappula occidentalis (a)	-	-	17	11	12	21	.09	.03	.02	.10
F	Machaeranthera canescens	-	-	4	-	-	-	.07	-	.00	-
F	Navarretia intertexta (a)	-	-	a ⁴	a-	a-	b ¹⁷	.01	-	-	.22
F	Pedicularis sp.	-	-	-	-	-	3	-	-	-	.41
F	Penstemon sp.	-	1	-	-	-	-	-	-	-	-
F	Phlox hoodii	a ²⁷	b ⁵¹	ab ³⁶	ab ³⁰	ab ⁴⁸	ab ³⁴	.77	.97	.74	.62
F	Phlox longifolia	bc ⁴⁸	c ⁶⁶	bc ⁵⁷	b ³³	a ¹	a ²	.18	.09	.00	.01
F	Polygonum douglasii (a)	-	-	4	-	-	-	.01	-	-	-
F	Ranunculus testiculatus (a)	-	-	a ⁹	b ⁶⁹	c ⁹⁰	c ¹²⁵	.01	.23	.24	1.39
F	Salsola iberica (a)	-	-	-	-	-	3	-	-	-	.03
F	Sisymbrium altissimum (a)	-	-	3	-	-	-	.03	-	-	-
F	Streptanthus cordatus	8	4	-	-	-	-	-	-	-	-
F	Zigadenus paniculatus	-	-	-	2	1	3	-	.01	.00	.03
Total for Annual Forbs		0	0	78	132	139	401	0.31	0.45	0.37	3.00
Total for Perennial Forbs		188	207	224	132	86	133	1.68	1.84	0.94	1.90
Total for Forbs		188	207	302	264	225	534	2.00	2.30	1.32	4.91

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

BROWSE TRENDS--

Management unit 01, Study no: 2

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia nova	0	0	2	1	-	-	.00	-
B	Artemisia tridentata wyomingensis	90	88	84	73	14.07	18.53	15.91	14.94
B	Chrysothamnus nauseosus consimilis	2	1	0	0	-	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	81	64	66	66	5.62	3.02	1.58	3.62
B	Juniperus osteosperma	8	7	7	7	2.50	1.51	3.14	1.41
B	Leptodactylon pungens	31	32	40	37	2.04	2.83	1.22	1.27
B	Opuntia sp.	8	3	4	4	.21	.06	.06	.00
Total for Browse		220	195	203	188	24.47	25.96	21.91	21.26

CANOPY COVER, LINE INTERCEPT--

Management unit 01, Study no: 2

Species	Percent Cover		
	'01	'06	'11
Artemisia tridentata wyomingensis	-	18.00	19.29
Chrysothamnus viscidiflorus stenophyllus	-	3.25	4.09
Juniperus osteosperma	7.00	6.33	6.11
Leptodactylon pungens	-	1.86	1.23

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 01, Study no: 2

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata wyomingensis	1.3	1.8	1.1

POINT-QUARTER TREE DATA--

Management unit 01, Study no: 2

Species	Trees per Acre				Average diameter (in)			
	'96	'01	'06	'11	'96	'01	'06	'11
Juniperus osteosperma	55	56	56	47	3.9	7.8	5.5	4.9

BASIC COVER--

Management unit 01, Study no: 2

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	4.25	8.25	35.01	42.59	35.93	40.11
Rock	0	.50	1.20	.37	.32	.19
Pavement	9.25	4.00	4.63	3.88	5.82	3.58
Litter	37.25	26.25	39.15	38.11	47.36	22.93
Cryptogams	7.25	11.50	4.57	2.85	5.06	3.57
Bare Ground	42.00	49.50	22.06	28.75	19.75	30.19

SOIL ANALYSIS DATA --

Management unit 1, Study no: 2, Study Name: Rosette

Effective rooting depth (in)	pH	Sandy-Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.3	7.3	46.6	25.4	28.0	1.5	7.2	236.8	0.7

PELLET GROUP DATA--

Management unit 01, Study no: 2

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	19	6	55	9	-	-	-
Moose	1	-	-	-	-	-	-
Deer	21	11	22	15	26 (65)	25 (61)	24 (60)
Cattle	-	-	-	-	-	-	2 (4)

BROWSE CHARACTERISTICS--

Management unit 01, Study no: 2

		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	66	0	100	-	-	100	0	0	10/10	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	40	50	50	-	-	50	0	0	6/10	
11	20	0	100	-	-	0	0	0	6/17	
<i>Artemisia tridentata wyomingensis</i>										
84	6331	9	67	23	66	41	52	21	19/20	
90	3799	0	23	77	66	14	11	28	27/28	
96	6160	49	21	29	2620	22	0	9	25/37	
01	5380	23	59	18	20	1	0	7	22/27	
06	4180	7	58	35	2940	21	2	16	23/30	
11	3600	6	71	23	20	39	2	18	19/30	
<i>Atriplex canescens</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	13/11	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
<i>Chrysothamnus nauseosus consimilis</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	17/19	
01	20	0	0	100	-	0	0	0	-/-	
06	0	0	0	0	-	0	0	0	-/-	
11	0	0	0	0	-	0	0	0	-/-	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
84	3465	15	63	21	399	65	4	15	7/13	
90	4198	30	35	35	466	8	17	8	9/8	
96	5900	20	78	2	1660	2	0	.33	11/18	
01	3160	11	63	26	80	0	0	.63	10/14	
06	3560	9	76	15	800	11	12	2	10/13	
11	4160	19	80	1	-	0	0	.48	10/14	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Juniperus osteosperma										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	66	0	0	0	-/-	
96	160	38	63	-	-	0	0	0	-/-	
01	140	43	57	-	20	0	0	0	-/-	
06	140	29	71	-	20	0	0	0	-/-	
11	140	14	86	-	20	0	0	0	-/-	
Leptodactylon pungens										
84	0	0	0	0	-	0	0	0	-/-	
90	465	72	14	14	133	0	0	0	5/5	
96	2520	10	89	1	40	0	0	.79	12/15	
01	2660	9	86	5	60	0	0	.75	7/8	
06	2700	19	77	4	360	0	0	0	6/9	
11	2360	7	92	2	-	0	0	.84	6/10	
Opuntia sp.										
84	66	0	100	0	-	0	0	0	6/4	
90	66	0	100	0	-	0	0	0	6/10	
96	160	13	75	13	-	0	0	0	4/12	
01	140	0	100	0	-	0	0	0	-/-	
06	80	0	75	25	-	0	0	25	5/9	
11	80	0	100	0	-	0	0	0	3/8	
Pinus edulis										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	20	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	