

SOUTH CRAWFORD MOUNTAINS - TREND STUDY NO. 2-31-11

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: [Semidesert Loam \(Wyoming Big Sagebrush\), R034XY212UT](#)

Land Ownership: BLM

Elevation: 6,450 ft (1,966 m)

Aspect: South

Slope: 4%

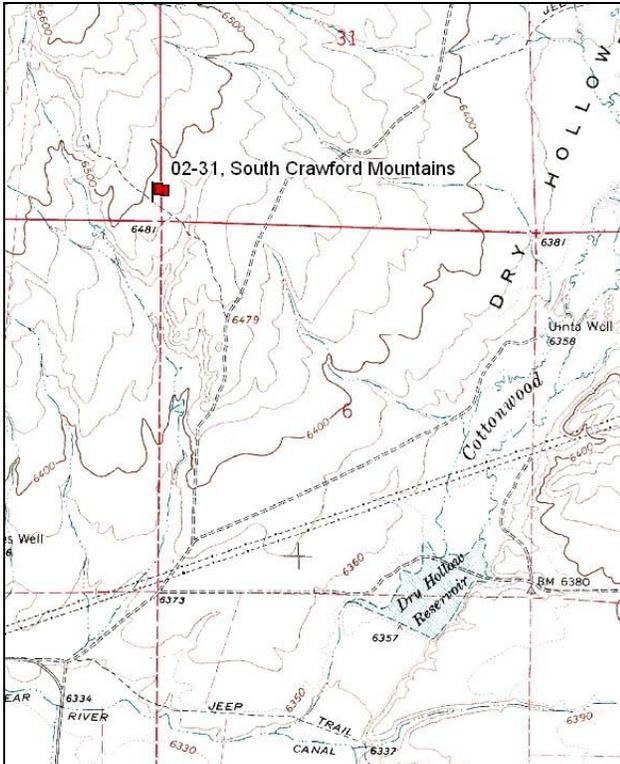
Transect bearing: 65° magnetic

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

Directions:

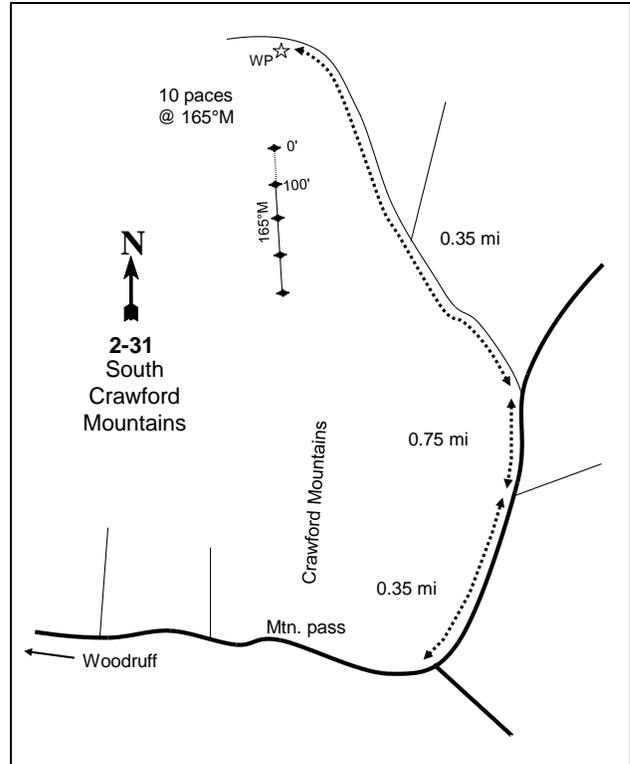
From the intersection of Wilson Lane and Little Crawford Road east of Woodruff proceed east 1.6 miles through the small pass to the east side of the mountains. Take the left fork and travel northeast for 0.35 miles. Turn left here and proceed northeast for 0.75 miles. At this point, turn left onto a lightly used jeep trail and travel northwest for an additional 0.35 miles to a witness post on the left hand side of the road. From the witness post walk 10 paces at 165 degrees magnetic to the 0-foot baseline stake of the baseline. The baseline is marked by browse tag #7940.

Map Name: Woodruff Narrows



Township: 10N Range: 7E Section: 36

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 492346. E 4600430 N

SOUTH CRAWFORD MOUNTAINS - TREND STUDY NO. 2-31

Site Information

Site Description: This study is located on the southeastern foothills of the Crawford Mountains, just northeast of Woodruff. The area is administered by the Bureau of Land Management (BLM) as part of the Cumberland/Uinta allotment. The study samples a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community and is an important wintering area for deer and elk. It is also used intermittently year-round by pronghorn and sage-grouse. Cattle graze the area in spring and summer, and were present in 1996. Due to their similarity in pellet appearance, deer and pronghorn pellet groups were combined. Deer/pronghorn pellet groups were sampled in moderate abundance in 2001 and 2011, but low abundance in 2006. Sampled elk and cattle sign has been minimal since 2001. Three sage grouse pellet groups were also sampled in 2001 and 2006. Pellet groups for sage grouse were seen, but not sampled in 2011 (Table - Pellet Group Data).

Browse: The dominant preferred browse species is a fairly dense stand of Wyoming big sagebrush. The Wyoming big sagebrush population is mostly mature, but was classified as mostly decadent in 1990. The Wyoming big sagebrush population has varied slightly in density throughout the course of the study. Wyoming big sagebrush has received light to moderate use over the course of the study. Recruitment of young Wyoming big sagebrush plants to the population has been mostly poor over the sample years, though 1990 and 2011 had good recruitment within the population. Other shrubs of secondary importance that appear to have relatively stable populations include black sagebrush (*Artemisia nova*), narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*), slenderbush eriogonum (*Eriogonum microthecum*), prickly phlox (*Leptodactylon pungens*), pricklypear cactus (*Opuntia* sp.), and gray horsebrush (*Tetradymia canescens*) (Table - Browse Characteristics).

Herbaceous Understory: Grasses and forbs are sparsely distributed and include a mix of species common in a Wyoming big sagebrush type. The two perennial grass species that provide the bulk of the herbaceous forage include Sandberg bluegrass (*Poa secunda*) and needle-and-thread (*Stipa comata*). Other common perennial grass species include western wheatgrass (*Agropyron smithii*), bluebunch wheatgrass (*A. spicatum*), Indian ricegrass (*Oryzopsis hymenoides*), and bottlebrush squirreltail (*Sitanion Hystrix*). The weedy annual grass species cheatgrass (*Bromus tectorum*) is found on the site, but is rare. Forbs are rare, but fairly diverse for a Wyoming big sagebrush community. Hood's phlox (*Phlox hoodii*) is the most abundant perennial forb (Table - Herbaceous Trends).

Soil: The soil is classified in the Woodpass series, a widely distributed series in this area. The parent material consists of alluvial deposits derived from sandstone and limestone (Soil Survey Staff 2011). Soil texture is a sandy clay loam with a neutral soil reaction (pH 7.1). Potassium may have limited availability for plant growth and development at 51 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Exposed bare ground cover is common and is found primarily between the interspaces of browse cover. Adequate protective ground cover is provided by high amounts of vegetation and litter (Table - Basic Cover). Wind and water erosion are not severe due to the gentle terrain, but are apparent. The soil erosion condition was classified as slight in 2006, but stable in 2001 and 2011.

Trend Assessments

Browse:

- **1984 to 1990 - slightly down (-1):** The density for Wyoming big sagebrush decreased slightly from 8,265 plants/acre to 7,798 plants/acre. Decadence for big sagebrush increased from 21% to 72%. The big sagebrush population increased in poor vigor from 5% to 50%.
- **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 Wyoming big sagebrush

population decreased in decadence to 30%, but is still considered to be high. Poor vigor within the big sagebrush population decreased to 11%

- **1996 to 2001 - slightly up (+1):** The density for Wyoming big sagebrush increased 16% from 6,420 plants/acre to 7,420 plants/acre. The big sagebrush population decreased in decadence to 20%, but is still considered to be moderately high. Poor vigor within the big sagebrush population decreased to 7%.
- **2001 to 2006 - slightly down (-1):** The density for Wyoming big sagebrush decreased 16% to 6,260 plants/acre. The big sagebrush population increased in decadence to 23%, and poor vigor within the big sagebrush population increased to 19%.
- **2006 to 2011 - slightly up (+1):** The density for Wyoming big sagebrush increased 19% to 7,480 plants/acre. The sagebrush population decreased in decadence to 18%. Poor vigor within the big sagebrush population increased to 24%.

Grass:

- **1984 to 1990 - slightly down (-1):** The sum of nested frequency for perennial grasses decreased 14%. The perennial species Sandberg bluegrass increased significantly in nested frequency; however, bluebunch wheatgrass and bottlebrush squirreltail decreased significantly in nested frequency.
- **1990 to 1996 - stable (0):** The sum of nested frequency for perennial grasses remained similar. The perennial grass species mutton bluegrass (*Poa fendleriana*) increased significantly in nested frequency and had a cover of 1%. The perennial species Sandberg bluegrass had a cover of 5%, and was the most dominant grass on the study site. Annual grasses were included in the sample for the first time in 1996. The weedy annual species cheatgrass had minimal cover.
- **1996 to 2001 - stable (0):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass increased in cover to 6%. Bluebunch wheatgrass maintained cover near 1%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial grasses remained similar. Sandberg bluegrass maintained cover near 6%, and needle-and-thread increased significantly in nested frequency, and increased in cover from 1% to 3%.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial grasses increased 31%. Western wheatgrass, bottlebrush squirreltail, and needle-and-thread increased significantly in nested frequency, and had covers of 1%, 6%, and 4%, respectively.

Forb:

- **1984 to 1990 - down (-2):** The sum of nested frequency for perennial forbs decreased 41%. Drummond rockcress (*Arabis drummondi*), timber poisonvetch (*Astragalus convallarius*), cryptantha (*Cryptantha sp.*), and clover (*Trifolium sp.*) decreased significantly in nested frequency.
- **1990 to 1996 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 15%. Hoods phlox had a significant decrease in nested frequency, and had a cover of 3%.
- **1996 to 2001 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 10%. Hoods phlox increased in cover to 4%.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 16%. Rose pussytoes (*Antennaria rosea*) increased significantly in nested frequency, and increased in cover from 0% to near 1%. Hoods phlox increased in cover to 5%.
- **2006 to 2011 - slightly up (+1):** The sum of nested frequency for perennial forbs increased 19%. Low fleabane (*Erigeron pumilus*) increased significantly in nested frequency, but had minimal cover. The annual forb species pale alyssum (*Alyssum alyssoides*) and bush birdbeak (*Cordylanthus ramosus*) were common on the site and had covers of 2% and 5%, respectively.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

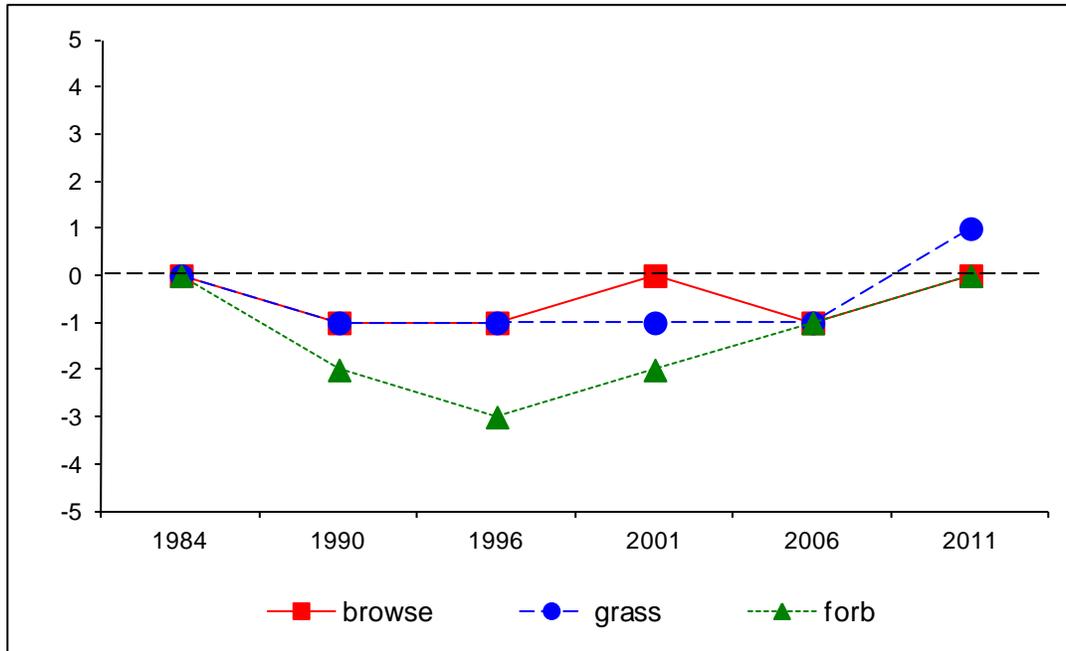
Management unit 2, study no: 31

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	21.0	6.2	2.9	16.1	0.0	7.2	0.0	53.4	Good
01	27.9	9.3	1.5	17.4	0.0	8.3	0.0	64.5	Good-Excellent
06	24.9	8.4	1.9	22.7	0.0	10.0	0.0	67.9	Excellent
11	29.1	9.4	9.0	24.0	0.0	10.0	0.0	81.4	Excellent

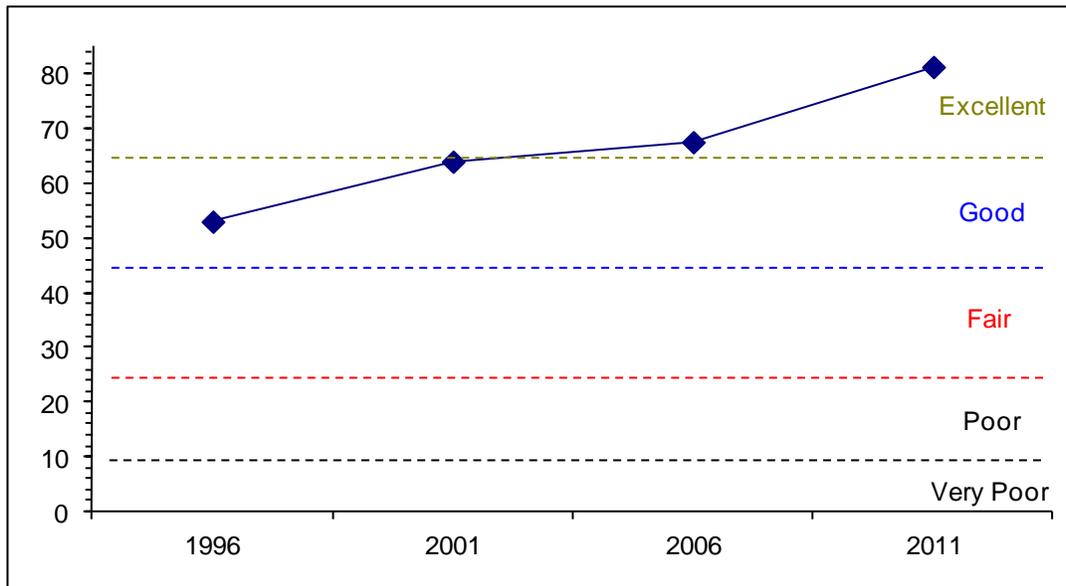
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 2 Study no: 31



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 2, Study no: 31



HERBACEOUS TRENDS--
Management unit 02, Study no: 31

Type	Species	Nested Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron smithii	a-	a-	a-	a ⁴	a ¹⁶	d ⁷⁷	-	.06	.03	.65
G	Agropyron spicatum	c ¹⁴⁰	a ⁵³	ab ⁸¹	b ⁹⁷	ab ⁷³	a ⁴⁶	.84	1.12	1.32	.34
G	Bromus tectorum (a)	-	-	1	-	1	5	.00	-	.00	.04
G	Carex sp.	a-	a-	a-	b ¹²	bc ³⁰	c ³⁹	-	.07	.18	.39
G	Oryzopsis hymenoides	b ⁶⁰	ab ⁴⁵	a ²¹	ab ³⁰	a ³⁴	ab ³⁶	.21	.64	.68	.54
G	Poa fendleriana	a-	a-	b ³⁰	a ²	a ³	a ⁷	.50	.00	.03	.05
G	Poa secunda	a ²³¹	b ²⁷⁵	ab ²⁴⁶	b ²⁷²	a ²²⁶	ab ²⁵⁴	5.18	6.03	6.13	5.53
G	Sitanion hystrix	c ¹⁰⁷	a ³	ab ²⁹	a ¹⁷	a ¹⁰	b ⁴⁷	.22	.13	.07	.52
G	Stipa comata	a ¹⁶	c ⁹⁸	bc ⁷⁹	ab ⁵⁶	c ¹¹⁶	d ¹⁵⁹	1.06	.64	2.90	3.95
Total for Annual Grasses		0	0	1	0	1	5	0.00	0	0.00	0.03
Total for Perennial Grasses		554	474	486	490	508	665	8.03	8.72	11.35	11.98
Total for Grasses		554	474	487	490	509	670	8.03	8.72	11.36	12.02
F	Agoseris glauca	1	-	-	-	-	-	-	-	-	-
F	Alyssum alyssoides (a)	-	-	a-	b ¹⁵	c ⁷⁴	d ²⁸⁶	-	.04	.16	1.47
F	Antennaria rosea	a-	ab ¹²	a ³	a-	b ²⁰	ab ¹⁷	.04	-	.52	.19
F	Arabis drummondii	b ³¹	a-	a ⁶	a ⁴	a ⁴	a ¹²	.07	.01	.01	.03
F	Astragalus convallarius	c ⁶⁰	a ¹	ab ⁸	ab ¹⁹	b ²⁸	b ³³	.04	.12	.15	.69
F	Astragalus sp.	-	-	-	-	10	8	-	-	.05	.19
F	Astragalus utahensis	10	8	13	10	9	15	.19	.09	.05	.13
F	Cordylanthus ramosus (a)	-	-	a ²	b ²⁹	ab ¹⁰	c ¹⁶⁶	.01	.27	.15	5.19
F	Cryptantha sp.	c ⁸⁰	b ⁴⁰	ab ²⁴	a ¹¹	ab ¹⁹	ab ²⁵	.19	.02	.28	.09
F	Draba sp. (a)	-	-	-	2	3	2	-	.00	.00	.00
F	Epilobium brachycarpum (a)	-	-	-	-	1	-	-	-	.00	-
F	Erigeron pumilus	a ⁸	a-	a ⁶	a ²	a ³	b ¹⁹	.01	.00	.03	.16

Type	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Erigeron sp.	-	-	-	-	-	4	-	-	-	.06
F	Eriogonum umbellatum	-	-	1	1	2	7	.00	.00	.15	.59
F	Haplopappus acaulis	3	-	1	1	1	1	.03	.03	.03	.03
F	Lappula occidentalis (a)	-	-	a-	b31	a4	a-	-	.08	.01	-
F	Melilotus officinalis	-	-	-	-	2	-	-	-	.00	-
F	Microsteris gracilis (a)	-	-	-	-	1	-	-	-	.00	-
F	Phlox hoodii	c220	bc200	a153	abc180	abc183	ab168	3.00	3.80	5.26	3.43
F	Phlox longifolia	-	-	8	2	3	10	.01	.01	.01	.02
F	Tragopogon dubius (a)	4	-	-	-	-	-	-	-	-	-
F	Trifolium sp.	b26	a2	a-	ab15	a-	b19	-	.06	-	.07
Total for Annual Forbs		4	0	2	77	93	454	0.00	0.39	0.33	6.67
Total for Perennial Forbs		439	263	223	245	284	338	3.61	4.17	6.57	5.70
Total for Forbs		443	263	225	322	377	792	3.62	4.57	6.91	12.38

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

BROWSE TRENDS--

Management unit 02, Study no: 31

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia nova	7	7	10	11	.19	1.24	1.50	1.08
B	Artemisia tridentata wyomingensis	98	98	98	98	16.34	20.70	18.17	22.07
B	Chrysothamnus viscidiflorus stenophyllus	70	62	76	75	1.77	1.83	2.78	3.44
B	Eriogonum microthecum	23	15	23	14	.29	.34	.24	.12
B	Gutierrezia sarothrae	0	0	3	0	-	-	.03	-
B	Leptodactylon pungens	14	11	15	11	.24	.19	.31	.72
B	Opuntia sp.	4	5	7	6	.03	-	.04	-
B	Tetradymia canescens	1	1	1	1				
Total for Browse		217	199	233	216	18.87	24.31	23.08	27.44

CANOPY COVER, LINE INTERCEPT--

Management unit 02, Study no: 31

Species	Percent Cover	
	'06	'11
Artemisia nova	1.79	1.91
Artemisia tridentata wyomingensis	24.85	27.00
Chrysothamnus viscidiflorus stenophyllus	2.59	4.63
Eriogonum microthecum	.16	.55
Leptodactylon pungens	.30	.38
Opuntia sp.	-	.06

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02, Study no: 31

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

BASIC COVER--

Management unit 02, Study no: 31

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	9.25	9.75	29.03	37.43	40.09	42.79
Rock	.25	.75	1.10	.13	.10	.13
Pavement	8.00	3.00	7.37	2.61	5.19	3.65
Litter	52.25	26.00	30.34	34.68	30.29	33.19
Cryptogams	5.00	25.25	9.66	7.50	5.74	3.36
Bare Ground	25.25	35.25	32.97	37.84	39.94	33.54

SOIL ANALYSIS DATA --

Management unit 02, Study no: 31, Study Name: South Crawford Mountains

Effective rooting depth (in)	pH	Sandy Clay Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.5	7.1	55.3	17.4	27.4	1.9	160.3	51.2	0.6

PELLET GROUP DATA--

Management unit 02, Study no: 31

Type	Quadrat Frequency			
	'96	'01	'06	'11
Rabbit	3	7	16	9
Grouse	-	2	1	1
Elk	2	-	4	5
Deer/Pronghorn	31	13	15	24
Cattle	1	1	7	3

Days use per acre (ha)		
'01	'06	'11
-	-	-
26 groups/acre	26 groups/acre	-
1 (2)	9 (22)	5 (13)
23 (56)	8 (20)	36 (89)
13 (32)	10 (25)	2 (5)

BROWSE CHARACTERISTICS--
Management unit 02, Study no: 31

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia nova</i>									
84	0	0	0	0	-	0	0	0	-/-
90	0	0	0	0	-	0	0	0	-/-
96	320	6	88	6	-	6	0	6	9/14
01	440	5	91	5	-	86	0	0	12/16
06	660	0	91	9	340	0	0	9	10/16
11	460	0	65	35	-	13	48	9	8/17
<i>Artemisia tridentata wyomingensis</i>									
84	8265	16	63	21	2333	68	26	5	14/21
90	7798	2	26	72	66	50	40	50	12/19
96	6420	6	65	30	40	63	4	11	15/27
01	7420	3	77	20	-	23	3	7	16/25
06	6260	4	73	23	2160	18	3	19	16/26
11	7480	19	64	18	160	11	34	24	17/32
<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	4/6
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
84	6998	11	87	2	-	42	0	0	9/12
90	6465	10	39	51	-	36	14	21	6/6
96	2880	5	83	12	-	3	7	9	9/11
01	2940	1	88	10	-	5	2	4	8/10
06	3840	4	93	4	-	.52	0	2	8/12
11	3940	1	97	3	-	0	0	2	12/13
<i>Eriogonum microthecum</i>									
84	333	0	100	0	-	60	0	0	5/8
90	732	18	82	0	-	27	9	0	5/7
96	700	0	97	3	-	0	0	0	6/9
01	540	0	93	7	-	4	0	0	4/7
06	680	6	79	15	-	12	3	3	5/8
11	320	0	100	0	-	0	0	6	6/10

		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>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	0	0	0	-	-	0	0	0	-/-	
06	80	0	100	-	20	0	0	0	6/13	
11	0	0	0	-	-	0	0	0	-/-	
<i>Leptodactylon pungens</i>										
84	0	0	0	0	-	0	0	0	-/-	
90	133	0	0	100	-	0	0	100	-/-	
96	400	0	95	5	-	0	0	0	6/12	
01	440	0	91	9	-	0	0	0	4/9	
06	420	10	86	5	-	0	0	10	5/11	
11	460	0	100	0	-	0	0	0	5/8	
<i>Opuntia sp.</i>										
84	266	0	100	0	-	0	0	0	4/5	
90	532	88	12	0	-	0	0	0	3/6	
96	80	0	75	25	-	0	0	0	4/12	
01	100	0	100	0	-	0	0	0	3/10	
06	160	13	75	13	-	0	0	13	4/9	
11	140	0	100	0	-	0	0	0	4/11	
<i>Tetradymia canescens</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	0	100	-	-	0	0	0	4/9	
01	20	0	100	-	-	0	0	0	3/13	
06	20	0	100	-	-	0	0	0	4/7	
11	20	100	0	-	-	0	0	0	4/13	