

WOLF DEN - TREND STUDY NO. 10-12-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Upland Stony Loam (Wyoming Big Sagebrush), R034XY334UT

Land Ownership: BLM

Elevation: 6437 ft. (1963 m)

Aspect: North

Slope: 3-5%

Transect bearing: 167° magnetic

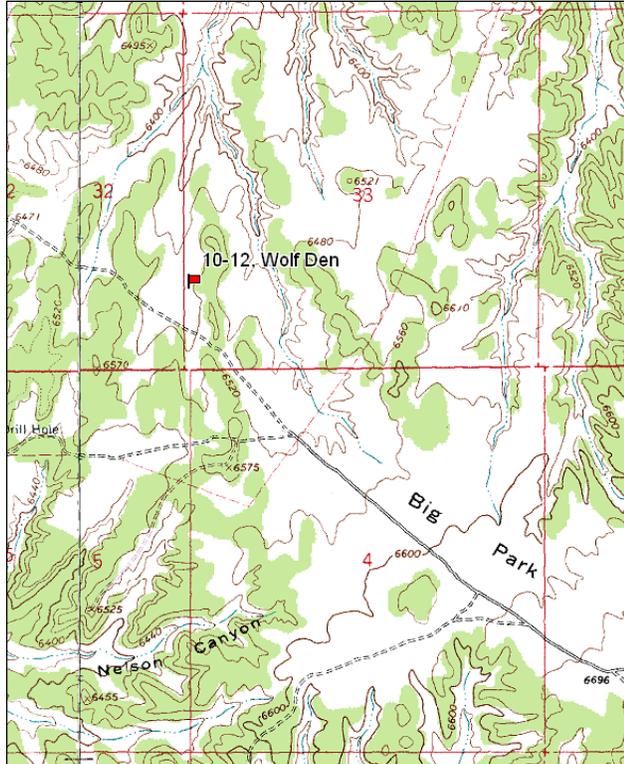
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

Directions:

From the Seep Ridge Road, about 10 miles north of Pine Spring, turn onto the Bitter Creek Road near McCoy Reservoir. Drive easterly on this road for 2.4 miles to a cattle guard. Continue 5.4 miles to a corral in the bottom of Bitter Creek. Drive up out of the Bitter Creek canyon 3.5 miles. Where the road tops out, turn right off the main road. Go 2.7 miles to a minor fork. Continue straight on the main road for 2.65 miles to the east edge of a sagebrush/greasewood draw. There is a witness post 15 feet off the north side of the road. From the witness post walk 38 paces bearing 40°M to the 400 ft. baseline stake. The 0-foot baseline stake, tagged #9098, is 400 feet north.

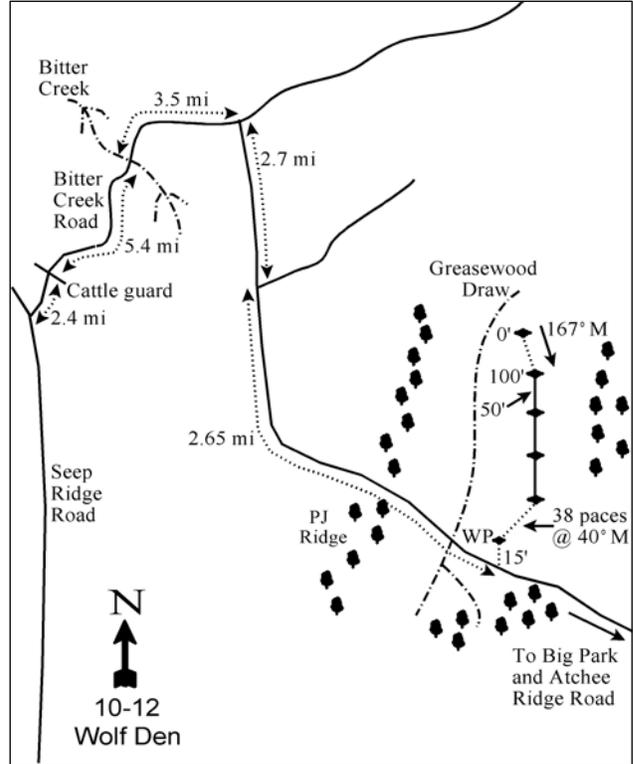
Alternate route: From the intersection of Atchee Ridge Road and Big Park Road travel north toward Big Park 3.45 miles to a fork. Stay left and continue 0.15 to another fork. Go straight to Big Park for 5.7 miles to a cattle guard and a fork. Proceed right for 0.4 miles to the witness post.

Map Name: Burnt Timber Canyon



Township: 12S Range: 24E Section: 33

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 650422 E 4398983 N

## WOLF DEN - TREND STUDY NO. 10-12

### Site Information

Site Description: The study is located in a very dense stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) along a wide swale between low ridges of pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). This area, near Big Park, is considered crucial deer winter range. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Asphalt Draw allotment. Pellet group transect data has estimated very high use by deer since 2000 with some very light use by elk (Table - Pellet Group Data). No cattle pats have been sampled on the study, although cows were in the general area when the site was read in 2000.

Browse: The cover on the study site is dominated by Wyoming big sagebrush, though black greasewood (*Sarcobatus vermiculatus*) provides moderate amounts of cover along the lower reaches of the depression (Table - Browse Trends). Shadscale (*Atriplex confertifolia*) was common on the site at the outset of the study in 1988, but has decreased since 2000 and is now rare on the site. The sagebrush on the site is so dense that it is difficult to walk through it. The Wyoming big sagebrush population is mostly mature and has had moderate to high decadence over the sample years. Recruitment of young sagebrush plants has been low over most sample years, but increased to a large portion of the population in 2010. Utilization of sagebrush has been mostly moderate with some years of heavier use (Table - Browse Characteristics).

Herbaceous Understory: The high sagebrush density and cover severely limits understory plants. Grasses and forbs are very rare on the site (Table - Herbaceous Trends).

Soil: The soil is a loam with a moderately alkaline soil reaction (pH 8). Phosphorus has a low availability for plant growth and development at 3.5 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderately low as the dense sagebrush provides excellent cover, but the understory is very limited and the low amounts of litter are easily displaced. Cryptogam cover is high, but exists almost entirely underneath the sagebrush crowns. The soil erosion condition was classified as slight in 2005 due to pedestaling of plants and flow patterns. The soil erosion condition was classified as stable in 2010.

### Trend Assessments

#### Browse:

- **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 sagebrush remained moderate and recruitment of young plants remained low.
- **1995 to 2000 - stable (0):** There was little change in the density or cover of sagebrush, but decadence increased from 19% to 42%. There was a 37% increase in the density of shadscale from 380 plants/acre to 520 plants/acre, though cover decreased slightly.
- **2000 to 2005 - slightly down (-1):** The density of sagebrush increased slightly, but cover decreased from 33% to 27%. Decadence of sagebrush remained high at 45% and recruitment of young plants decreased to just 1% of the population. Shadscale decreased by 69% to 160 plants/acre and cover decreased to near 0%. Decadence in shadscale increased from 19% to 50%.
- **2005 to 2010 - slightly up (+1):** There was a 20% increase in the density of sagebrush to 9,280 plants/acre due to a large increase in the recruitment of young plants. Cover of sagebrush decreased slightly to 24%. Shadscale density decreased to just 20 plants/acre and no cover was sampled.

#### Grass:

- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1995 to 2000 - up (+2):** The sum of nested frequency of perennial grasses increased by 45% due to a significant increase in the nested frequency of mutton bluegrass (*Poa fendleriana*). Bottlebrush squirreltail (*Sitanion hystrix*) increased substantially in cover increasing the cover of perennial grasses.

- **2000 to 2005 - down (-2):** The perennial grass sum of nested frequency decreased by 70% and cover decreased beneath 1%. There was a significant decrease in the nested frequency of mutton bluegrass and bottlebrush squirreltail. Grasses are very rare on the site.
- **2005 to 2010 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial grasses, but grasses were already so rare that it makes little impact on the community.

Forb:

- **1988 to 1995 - stable (0):** Forbs are very rare.
- **1995 to 2000 - stable (0):** Forbs are very rare.
- **2000 to 2005 - stable (0):** Forbs are very rare.
- **2005 to 2010 - stable (0):** Forbs are very rare.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

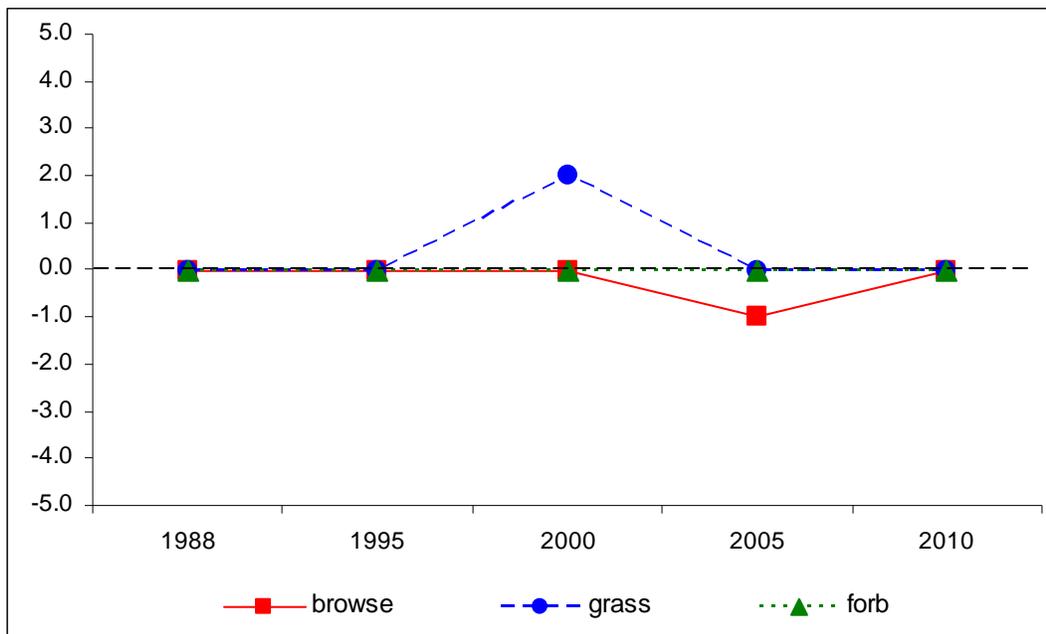
Management unit 10, study no: 12

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	30.0	9.6	1.7	0.9	0.0	0.0	0.0	<b>42.2</b>	Fair
00	30.0	3.6	3.5	4.2	0.0	0.0	0.0	<b>41.3</b>	Fair
05	30.0	1.6	0.6	0.4	0.0	0.1	0.0	<b>32.7</b>	Fair
10	30.0	9.0	15.0	0.3	0.0	0.5	0.0	<b>54.8</b>	Good

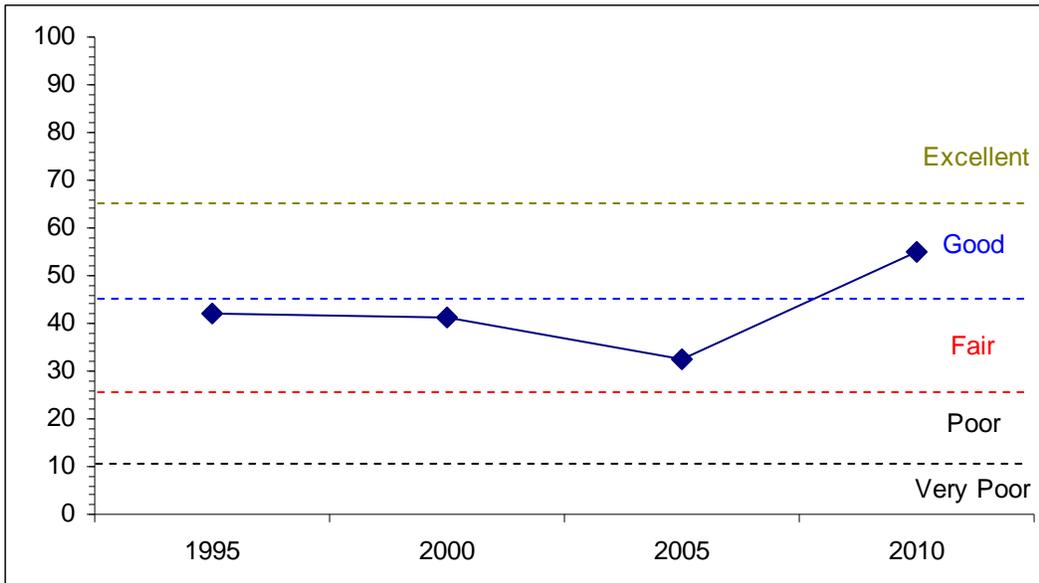
**Trend Summary**

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 10, Study no: 12



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--  
 Management unit 10, Study no: 12



HERBACEOUS TRENDS--  
 Management unit 10, Study no: 12

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	c59	b35	a1	a-	a-	.22	.00	-	-
G	Agropyron spicatum	a-	a-	a-	b26	b10	-	-	.08	.03
G	Bromus tectorum (a)	-	3	-	-	-	.01	-	-	-
G	Oryzopsis hymenoides	3	2	5	6	-	.03	.06	.02	-
G	Poa fendleriana	a1	a3	b51	a4	a2	.00	.66	.01	.06
G	Sitanion hystrix	ab24	bc52	c76	ab30	a8	.18	1.35	.08	.05
Total for Annual Grasses		0	3	0	0	0	0.00	0	0	0
Total for Perennial Grasses		87	92	133	66	20	0.43	2.08	0.19	0.14
Total for Grasses		87	95	133	66	20	0.44	2.08	0.19	0.14
F	Chenopodium fremontii (a)	-	a-	a-	b20	a-	-	-	.36	-
F	Chenopodium leptophyllum(a)	-	b84	a-	b76	a-	.34	-	.22	-
F	Cryptantha sp.	1	2	-	-	-	.00	-	-	-
F	Descurainia pinnata (a)	-	c148	a3	b56	a3	1.46	.00	.77	.00
F	Lappula occidentalis (a)	-	ab11	a-	b14	ab9	.07	-	.06	.01
F	Schoenrambe linifolia	a-	a-	a-	b8	b22	-	-	.06	.27
F	Unknown forb-annual (a)	-	4	-	-	-	.01	-	-	-
Total for Annual Forbs		0	247	3	166	12	1.88	0.00	1.42	0.01
Total for Perennial Forbs		1	2	0	8	22	0.00	0	0.06	0.27
Total for Forbs		1	249	3	174	34	1.89	0.00	1.49	0.29

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

BROWSE TRENDS--

Management unit 10, Study no: 12

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia frigida	36	46	33	42	1.85	3.03	.22	1.29
B	Artemisia tridentata wyomingensis	97	98	97	98	32.26	32.55	26.90	24.24
B	Atriplex canescens	1	0	2	0	-	-	-	-
B	Atriplex confertifolia	16	18	8	1	1.69	.97	.03	-
B	Gutierrezia sarothrae	2	14	3	3	.01	.07	-	.00
B	Juniperus osteosperma	0	7	8	4	.15	.18	.38	-
B	Opuntia sp.	4	3	1	0	-	.03	-	-
B	Pinus edulis	0	0	1	0	-	-	-	-
B	Sarcobatus vermiculatus	17	19	17	17	2.62	5.28	3.64	3.32
Total for Browse		173	205	170	165	38.59	42.13	31.18	28.87

CANOPY COVER, LINE INTERCEPT--

Management unit 10, Study no: 12

Species	Percent Cover	
	'05	'10
Artemisia frigida	.11	.90
Artemisia tridentata wyomingensis	32.84	25.88
Atriplex confertifolia	.03	-
Gutierrezia sarothrae	-	.10
Juniperus osteosperma	.75	-
Sarcobatus vermiculatus	3.43	3.75

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10, Study no: 12

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.0	1.2

BASIC COVER--

Management unit 10, Study no: 12

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	5.75	43.86	41.80	31.92	28.45
Rock	.75	.74	.02	.02	.00
Pavement	32.25	19.73	15.25	18.66	9.26
Litter	49.50	43.14	45.29	40.06	43.25
Cryptogams	5.00	6.84	9.23	9.01	3.48
Bare Ground	6.75	8.53	19.11	16.12	33.35

SOIL ANALYSIS DATA --

Management unit 10, Study no: 12, Study Name: Wolf Den

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
26.1	8.0	46.0	33.4	20.6	1.8	3.5	115.2	0.6

PELLET GROUP DATA--

Management unit 10, Study no: 12

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	7	6	70	5	-	-	-
Elk	3	4	8	1	3 (9)	-	2 (5)
Deer	52	47	77	39	116 (287)	261 (645)	212 (524)

BROWSE CHARACTERISTICS--

Management unit 10, Study no: 12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia frigida</i>									
88	<b>4532</b>	15	82	3	866	4	10	0	7/5
95	<b>2040</b>	20	80	0	600	0	0	0	11/11
00	<b>3700</b>	15	85	0	40	1	0	0	5/9
05	<b>1300</b>	31	57	12	840	8	0	11	5/5
10	<b>3120</b>	21	79	0	20	13	3	0	6/7
<i>Artemisia tridentata wyomingensis</i>									
88	<b>18131</b>	8	65	26	1066	25	6	10	21/16
95	<b>7580</b>	3	78	19	240	65	20	3	27/32
00	<b>7260</b>	6	53	42	60	38	18	13	26/33
05	<b>7740</b>	1	54	45	4100	54	22	9	29/34
10	<b>9280</b>	36	43	21	3080	41	9	17	25/29
<i>Atriplex canescens</i>									
88	<b>0</b>	0	0	0	-	0	0	0	-/-
95	<b>20</b>	0	0	100	-	100	0	0	43/22
00	<b>0</b>	0	0	0	-	0	0	0	-/-
05	<b>40</b>	0	0	100	-	50	0	50	-/-
10	<b>0</b>	0	0	0	-	0	0	0	-/-
<i>Atriplex confertifolia</i>									
88	<b>465</b>	29	57	14	-	0	0	0	22/18
95	<b>380</b>	11	74	16	160	0	0	0	20/23
00	<b>520</b>	19	62	19	-	12	8	15	19/26
05	<b>160</b>	13	38	50	20	25	38	50	26/20
10	<b>20</b>	100	0	0	-	0	0	0	13/12

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>Gutierrezia sarothrae</i>									
88	<b>865</b>	31	69	-	133	0	0	0	7/6
95	<b>60</b>	0	100	-	180	0	0	0	12/8
00	<b>900</b>	20	80	-	-	0	0	0	5/6
05	<b>60</b>	33	67	-	140	0	33	0	3/2
10	<b>200</b>	10	90	-	-	0	0	0	5/5
<i>Juniperus osteosperma</i>									
88	<b>0</b>	0	0	0	-	0	0	0	-/-
95	<b>0</b>	0	0	0	-	0	0	0	-/-
00	<b>140</b>	43	57	0	20	0	0	0	-/-
05	<b>160</b>	50	0	50	-	13	0	50	-/-
10	<b>80</b>	75	25	0	-	25	0	25	-/-
<i>Opuntia sp.</i>									
88	<b>66</b>	100	0	-	-	0	0	0	-/-
95	<b>80</b>	0	100	-	-	0	0	0	3/4
00	<b>60</b>	0	100	-	-	0	0	0	5/9
05	<b>20</b>	0	100	-	-	0	0	0	2/4
10	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Pinus edulis</i>									
88	<b>0</b>	0	0	-	66	0	0	0	-/-
95	<b>0</b>	0	0	-	-	0	0	0	-/-
00	<b>0</b>	0	0	-	-	0	0	0	-/-
05	<b>20</b>	100	0	-	-	0	0	0	-/-
10	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Sarcobatus vermiculatus</i>									
88	<b>266</b>	0	100	0	-	0	0	0	33/26
95	<b>3860</b>	0	89	11	-	0	0	0	37/50
00	<b>800</b>	8	63	30	-	15	10	13	40/54
05	<b>940</b>	2	64	34	20	72	28	9	35/49
10	<b>780</b>	44	46	10	-	10	0	10	35/43