

AIRPORT - TREND STUDY NO. 11B-3-10

Vegetation Type: Chained, Seeded Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Semidesert Gravelly Loam (Wyoming Big Sagebrush), R034XY205UT

Land Ownership: BLM

Elevation: 5960 ft. (1817 m)

Aspect: West

Slope: 2%

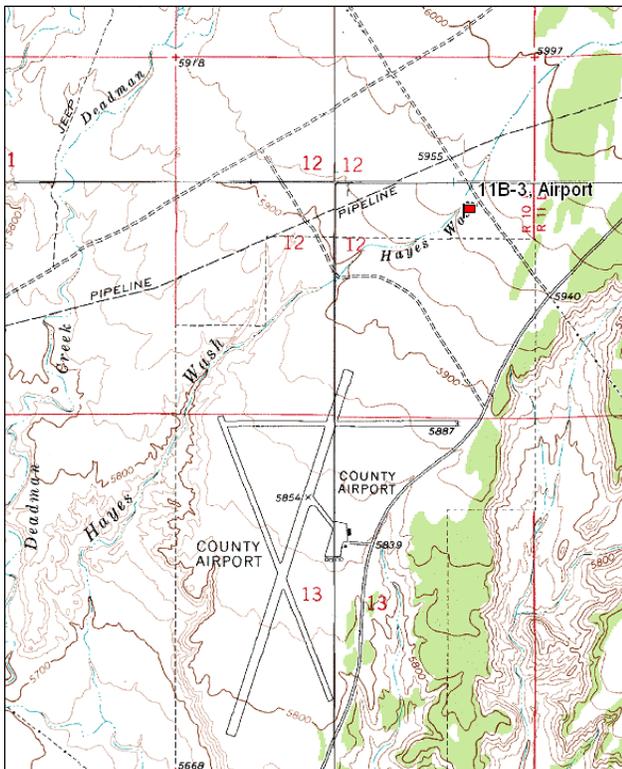
Transect bearing: 165° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (51ft), line 4 (71ft).

Directions:

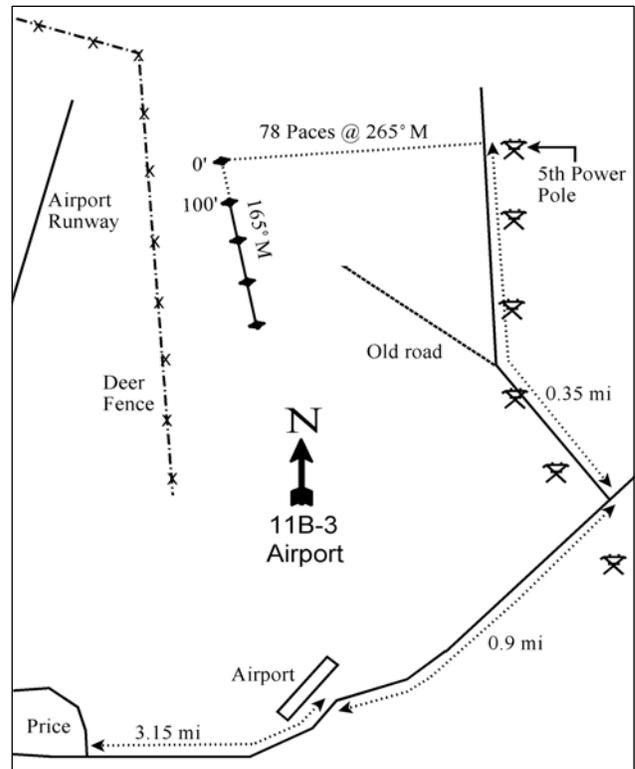
From the intersection of Main Street and the Airport Road in Price, go 3.15 miles to the airport. Continue on the paved road 0.9 miles past the Carbon County Airport to a point where two power lines cross the road and there is a dirt road turning off to the left. Turn on this road and follow the power line 0.35 miles to a witness post on the left (west) side of the road. From the witness post, walk west 78 paces @ 265°M to the 0-foot stake, a rebar tagged #7891.

Map Name: Wellington



Township: 14S Range: 10E Section: 12

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 522100 E 4386096 N

AIRPORT - TREND STUDY NO. 11B-3

Site Information

Site Description: This study is located on a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat one mile north and slightly east of the Carbon County Airport. The large flat extends several miles north to the higher benches and mesas of the West Tavaputs Plateau. Mature Utah juniper (*Juniperus osteosperma*) stands border the east side. This area was chained and drill seeded with crested wheatgrass (*Agropyron cristatum*) in 1965-66 by the Bureau of Land Management (BLM). Now the area supports a moderately low density of Wyoming big sagebrush with a crested wheatgrass understory. Sometime after the 1994 reading, the Carbon County Airport was expanded with a longer runway. A large deer fence now encloses the airport and is only about 300 feet west of the study site, which may concentrate more deer use on the site shown by increased quadrat frequency of deer pellets from 1994 to 2000. Pellet group transect data has estimated moderately light use by deer since 2000 with light use by elk. Deer remains were found on the site in 2005. Grazing in the area is managed by the BLM as part of the Hayes Wash allotment. Estimated cattle use has been light since 2000. Quadrat frequency also indicates heavy use by rabbits on the site (Table - Pellet Group Data).

Browse: The site supports a moderate dense stand of Wyoming big sagebrush which provides the majority of browse cover on the site. Wyoming big sagebrush cover (Table - Browse Trends) and density have increased substantially since 1994, with the highest levels in 2005. Some of the sagebrush on this site display characteristics of black sagebrush (*Artemisia nova*) and mountain big sagebrush (*A. tridentata* ssp. *vaseyana*). There is obviously some hybridizing occurring between the sagebrush subspecies, but all sagebrush were classified as Wyoming big sagebrush in the study. The sagebrush population is a mixture of mature and young plants with mostly light use, though heavy use was noted in 1986. Sagebrush plants with the heaviest use appeared to have more characteristics of mountain big sagebrush, which is the most palatable of the sagebrush subspecies. Decadence of sagebrush was high at the outset of the study in 1986, but has been low in every other sample year. The only other preferred browse on the site consists of a few scattered fourwing saltbush (*Atriplex canescens*) and green ephedra (*Ephedra viridis*). Both species have had heavy browsing. Broom snakeweed (*Gutierrezia sarothrae*) is the only other common browse species on the site with a fluctuating density over the sample years (Table - Browse Characteristics).

Herbaceous Understory: At the outset of the study, grasses were dominated by the seeded species crested wheatgrass, but there was a large decrease in crested wheatgrass in 2005 and grasses have been rare on the site since. Perennial grass species are now uncommon, though a number of species including galleta (*Hillaria jamesii*), Indian ricegrass (*Oryzopsis hymenoides*) and sand dropseed (*Sporobolus cryptandrus*), were sampled for the first time in 2010. Forbs are limited and dominated by annual species. The most common perennial forb species is scarlet globemallow (*Sphaeralcea coccinea*) (Table - Herbaceous Trends).

Soil: The soil has a sandy clay loam texture with a slightly alkaline soil reaction (pH 7.8). Organic matter is low at only 1%, which is the lowest reading on the entire unit (Table - Soil Analysis Data). Bare ground cover is high and increased with the decrease in vegetation cover provided by crested wheatgrass. There is a high amount of pavement cover that provides some protective ground cover (Table - Basic Cover). Rows of seeded crested wheatgrass are contoured to the slight slope which limits erosion and also helps the buildup of litter. Windrowed piles of juniper and sagebrush are remnants of the pre-treatment of the flat. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1986 to 1994 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1994; therefore, trend was determined using other parameters. Decadence of sagebrush decreased

from 47% to 14%. There was a slight decrease in the recruitment of young sagebrush plants, but recruitment remained good.

- **1994 to 2000 - up (+2):** There was a two-fold increase in the density of Wyoming big sagebrush from 1,120 plants/acre to 2,280 plants/acre, and cover increased slightly from 4% to 5%. Recruitment of young sagebrush plants increased from 16% to 32% and decadence decreased to 11%.
- **2000 to 2005 - up (+2):** The density of sagebrush increased by two-fold to 4,580 plants/acre and cover increased to 9%. Decadence of sagebrush decreased to 5% and recruitment of young sagebrush increased to 72% of the population. There was a very large number of sagebrush seedlings also sampled.
- **2005 to 2010 - stable (0):** Density of sagebrush increased slightly to 4,900 plants/acre and cover remained similar. Many of the young plants that were sampled in 2005 have established on the site with an increase in mature plants. Recruitment of young sagebrush plants decreased, but young plants still comprised nearly half the population.

Grass:

- **1986 to 1994 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1994 to 2000 - stable (0):** The perennial grass sum of nested frequency changed little, though cover increased slightly from 15% to 16%.
- **2000 to 2005 - down (-2):** There was a 78% decrease in the sum of nested frequency of perennial grasses and cover decreased to less than 1%. There was a significant decrease in the nested frequency of crested wheatgrass. Grasses became rare on the site.
- **2005 to 2010 - slightly up (+1):** The perennial grass sum of nested frequency increased slightly and cover increased to 2%. A number of perennial species were sampled for the first time, though grasses remain rare on the site.

Forb:

- **1986 to 1994 - slightly up (+1):** The perennial forb sum of nested frequency increased, but perennial forbs remain fairly rare on the site.
- **1994 to 2000 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover increased slightly from less than 1% to 2%.
- **2000 to 2005 - up (+2):** The sum of nested frequency of perennial forbs increased by 62% and cover increased to 5%.
- **2005 to 2010 - stable (0):** The perennial forb sum of nested frequency increased slightly, but cover decreased to 3%.

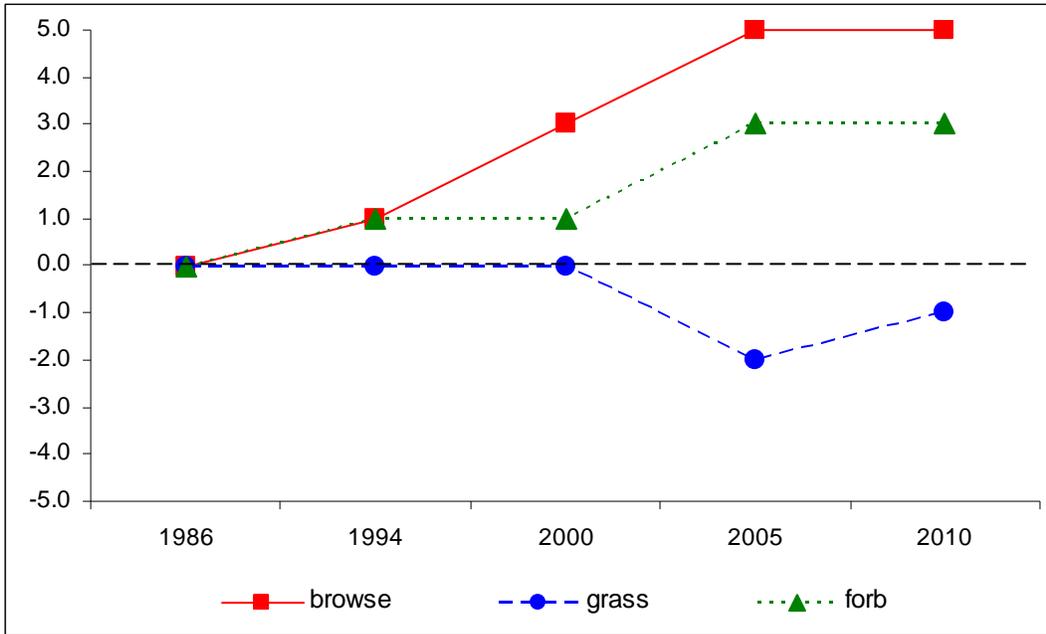
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 11B, study no: 3

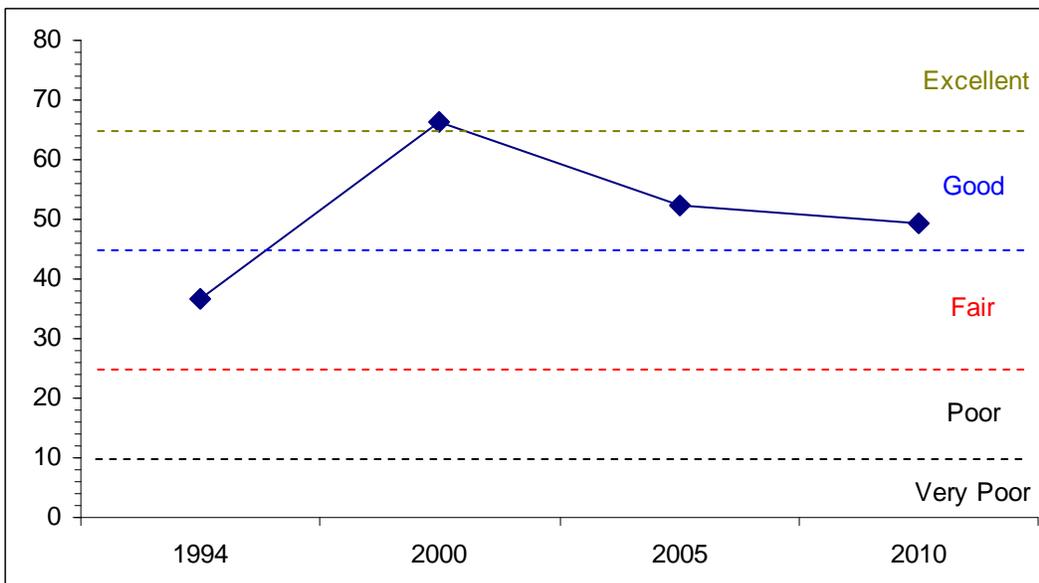
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
94	5.8	0.0	0.0	30.0	0.0	1.0	0.0	36.8	Fair
00	6.6	11.4	15.0	30.0	0.0	3.3	0.0	66.2	Good-Excellent
05	12.1	13.6	15.0	1.7	0.0	10.0	0.0	52.4	Good
10	11.1	13.5	15.0	4.0	0.0	5.9	0.0	49.4	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 11B, Study no: 3



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 11B, Study no: 3



HERBACEOUS TRENDS--
Management unit 11B, Study no: 3

T y P e	Species	Nested Frequency					Average Cover %			
		'86	'94	'00	'05	'10	'94	'00	'05	'10
G	Agropyron cristatum	_b 298	_b 289	_b 301	_a 59	_a 26	15.34	16.43	.81	1.05
G	Agropyron dasystachyum	7	-	3	1	-	-	.01	.03	-
G	Agropyron trachycaulum	5	-	-	-	-	-	-	-	-
G	Bouteloua gracilis	-	-	-	7	3	-	-	.01	.03
G	Bromus tectorum (a)	-	_a -	_a -	_a -	_b 26	-	-	-	.04
G	Hilaria jamesii	_a -	_a -	_a -	_a -	_b 37	-	-	-	.88
G	Oryzopsis hymenoides	1	-	-	-	4	-	-	-	.04
G	Poa secunda	-	1	-	-	-	.00	-	-	-
G	Sporobolus cryptandrus	-	-	-	-	7	-	-	-	.01
Total for Annual Grasses		0	0	0	0	26	0	0	0	0.04
Total for Perennial Grasses		311	290	304	67	77	15.34	16.44	0.85	2.02
Total for Grasses		311	290	304	67	103	15.34	16.44	0.85	2.07
F	Astragalus convallarius	_{ab} 1	_a -	_{ab} 5	_{ab} 6	_b 11	-	.23	.18	.28
F	Chaenactis douglasii	-	-	-	1	-	-	-	.00	-
F	Chenopodium fremontii (a)	-	_a -	_a -	_b 24	_b 27	-	-	.06	.08
F	Cirsium sp.	-	-	-	3	-	-	-	.00	-
F	Cryptantha fulvocanescens	-	-	-	9	-	-	-	.04	-
F	Descurainia pinnata (a)	-	_a -	_a -	_b 145	_a 4	-	-	2.97	.01
F	Eriogonum cernuum (a)	-	_a -	_a -	_b 163	_b 160	-	-	.78	2.04
F	Eriogonum ovalifolium	-	1	-	-	-	.00	-	-	-
F	Halogeton glomeratus (a)	-	-	-	2	-	-	-	.00	-
F	Lappula occidentalis (a)	-	_a -	_a -	_c 174	_b 52	-	-	3.40	.35
F	Lepidium sp. (a)	-	_a -	_a -	_b 27	_a 9	-	-	.23	.35
F	Leucelene ericoides	-	-	3	3	9	-	.00	.38	.10
F	Navarretia intertexta (a)	-	-	-	-	2	-	-	-	.00
F	Orobanche fasciculata	-	-	1	-	-	-	.00	-	-
F	Salsola iberica (a)	-	_a -	_a -	_b 17	_c 48	-	-	.03	.15
F	Sphaeralcea coccinea	_a 50	_{ab} 79	_a 69	_b 104	_{ab} 92	.50	1.38	4.48	1.99
F	Sphaeralcea grossulariifolia	_a -	_a -	_a -	_a -	_b 31	-	-	-	.55
Total for Annual Forbs		0	0	0	552	302	0	0	7.49	3.01
Total for Perennial Forbs		51	80	78	126	143	0.50	1.63	5.10	2.93
Total for Forbs		51	80	78	678	445	0.50	1.63	12.59	5.94

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

BROWSE TRENDS--

Management unit 11B, Study no: 3

Type	Species	Strip Frequency				Average Cover %			
		'94	'00	'05	'10	'94	'00	'05	'10
B	Artemisia tridentata wyomingensis	32	49	65	76	4.21	5.21	9.35	8.81
B	Atriplex canescens	1	1	1	0	.03	.03	.20	-
B	Chrysothamnus viscidiflorus stenophyllus	4	0	0	18	.15	-	-	.25
B	Ephedra viridis	1	1	3	2	.38	.03	.15	.03
B	Gutierrezia sarothrae	11	54	35	29	.52	2.72	2.67	1.85
B	Opuntia polyacantha	10	8	5	2	.00	.03	-	.00
Total for Browse		59	113	109	127	5.30	8.03	12.38	10.95

CANOPY COVER, LINE INTERCEPT--

Management unit 11B, Study no: 3

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	7.48	11.63
Chrysothamnus viscidiflorus stenophyllus	-	.08
Ephedra viridis	.05	-
Gutierrezia sarothrae	2.31	1.93
Opuntia polyacantha	-	.08

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 11B, Study no: 3

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.5	1.5
Atriplex canescens	2.2	-

POINT-QUARTER TREE DATA--

Management unit 11B, Study no: 3

Species	Trees per Acre	Average diameter (in)
	'10	
Juniperus osteosperma	20	3.4

BASIC COVER--

Management unit 11B, Study no: 3

Cover Type	Average Cover %				
	'86	'94	'00	'05	'10
Vegetation	3.25	21.21	27.20	24.29	16.96
Rock	.50	5.38	.18	.32	.45
Pavement	18.00	5.61	9.19	12.31	10.81
Litter	50.75	15.90	14.14	18.38	24.85
Cryptogams	0	.11	1.45	.32	.48
Bare Ground	27.50	31.23	47.47	53.56	55.41

SOIL ANALYSIS DATA --

Management unit 11B, Study no: 3, Study Name: Airport

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.2	7.8	59.6	19.8	20.6	1.0	7.5	291.2	0.6

PELLET GROUP DATA--

Management unit 11B, Study no: 3

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'00	'05	'10	'00	'05	'10
Rabbit	50	73	81	70	-	-	-
Elk	1	1	1	4	-	-	17 (43)
Deer	8	22	18	10	24 (58)	27 (68)	24 (60)
Cattle	4	10	2	-	2 (4)	10 (25)	2 (4)

BROWSE CHARACTERISTICS--

Management unit 11B, Study no: 3

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Artemisia tridentata wyomingensis										
86	1065	22	31	47	133	6	88	0	18/22	
94	1120	16	70	14	520	0	2	4	22/34	
00	2280	32	57	11	240	28	4	4	18/23	
05	4580	72	23	5	394200	6	3	3	20/29	
10	4900	47	48	5	160	13	1	3	18/27	
Atriplex canescens										
86	0	0	0	0	-	0	0	0	-/-	
94	20	0	100	0	-	0	0	0	44/63	
00	20	0	0	100	20	100	0	0	44/56	
05	20	100	0	0	580	0	100	0	38/64	
10	0	0	0	0	-	0	0	0	40/49	

		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>Chrysothamnus viscidiflorus stenophyllus</i>										
86	99	0	0	100	-	0	100	0	-/-	
94	100	0	100	0	-	0	0	0	6/12	
00	0	0	0	0	-	0	0	0	-/-	
05	0	0	0	0	-	0	0	0	-/-	
10	900	2	93	4	-	0	0	4	6/8	
<i>Ephedra viridis</i>										
86	132	25	75	0	-	25	25	0	17/6	
94	220	0	100	0	-	0	0	0	24/31	
00	20	0	0	100	-	0	100	0	-/-	
05	60	33	67	0	-	0	67	0	22/37	
10	40	0	100	0	-	0	50	0	16/32	
<i>Gutierrezia sarothrae</i>										
86	265	12	12	75	-	0	0	0	6/4	
94	420	0	100	0	20	0	0	0	9/11	
00	8940	2	82	16	120	0	.44	13	7/12	
05	1920	4	95	1	3000	0	0	0	8/12	
10	1200	0	87	13	-	0	0	3	6/8	
<i>Opuntia polyacantha</i>										
86	432	8	54	38	-	0	0	38	4/6	
94	260	0	92	8	-	0	0	8	3/15	
00	240	0	92	8	20	0	0	0	3/6	
05	100	0	100	0	-	0	0	0	5/15	
10	40	0	100	0	-	0	0	0	4/18	