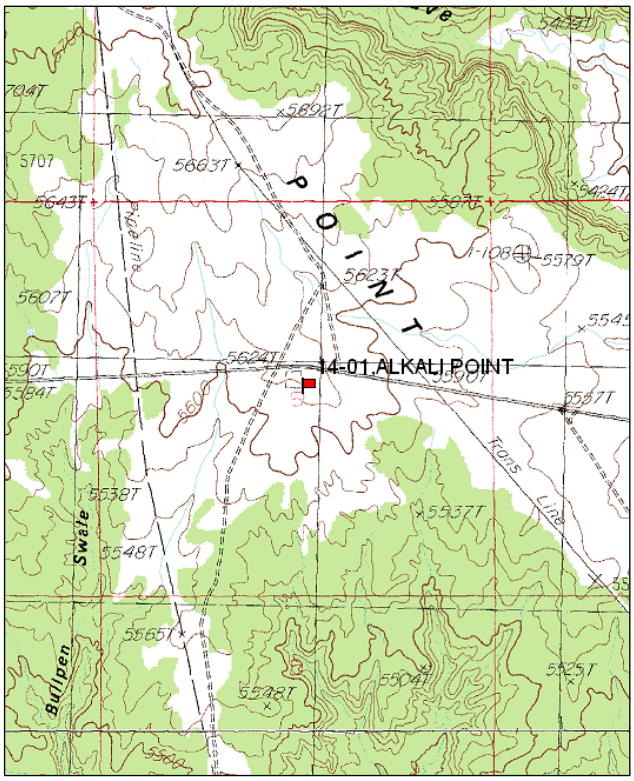
ALKALI POINT - TREND STUDY NO. 14-1-09

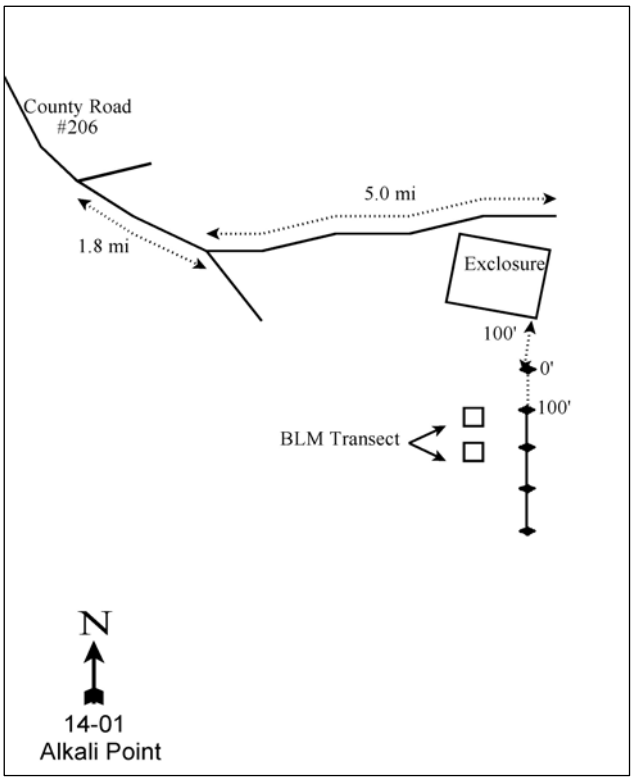
Vegetation Type: Wyoming Big Sagebrush
Range Type: Crucial Deer Winter
NRCS Ecological Site Description: Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT
Land Ownership: BLM
Elevation: 5,600 ft (1,707 m)
Aspect: West
Slope: 5%
Transect bearing: 180 degrees magnetic.
Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

Directions:
Turn east by A & M Propane 0.2 miles south of the UDOT shed on the south end of Blanding on SR-l91. Go 1.15 miles. Turn right (south) on county road #206 and travel along the main gravel road 7.0 miles to a fork. Stay right (passing the turnoff to "mustang", county road #207) and proceed 1.8 miles to another fork. Stay left and go 5 miles. Stop at the northeast corner of the exclosure. The transect starts 100 feet off the southeast corner (in line with the east boundary fence) and runs south from there. The 0-foot baseline stake is a fence post marked with a browse tag.

Map Name: Bradford Canyon



Diagrammatic Sketch:



Township: 38S, Range: 24E, Section: 5

GPS: NAD 83, UTM 12S 649869 E 4153067 N

ALKALI POINT - TREND STUDY NO. 14-1

Site Information

Site Description: The study samples an area that is an important wintering area for deer moving southwest off the Abajo Mountains. The long and flat tablelands are cut by intermittent-flow canyons which support pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands with open Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flats. This study is in a Wyoming big sagebrush community that has been invaded by cheatgrass. Water is limited on the flat. Pellet group data indicates very heavy use by deer and light to minimal use by elk and cattle since 1999 (Table - Pellet Group Data). Human activity in the area includes gas and oil exploration, drilling, pipeline and road construction, livestock grazing, and recreational activities.

Browse: The dominant browse species is Wyoming big sagebrush which provides the majority of the browse cover, but has been declining since 1994 (Table - Browse Trends). The density of Wyoming big sagebrush has also been declining since 1994. The sagebrush stand is overly mature with no sign of reproduction and high decadence found during all readings. The proportion of sagebrush plants displaying poor vigor has been very high since 2004. Sagebrush plants have displayed mostly heavy use over the sample years. Broom snakeweed (*Gutierrezia sarothrae*) has comprised a significant component of the community in many sample years, but was not sampled in 2009 (Table - Browse Characteristics). There are a few mature juniper trees on the flat, but they do not appear to be aggressively increasing and provide very little escape or thermal cover.

Herbaceous Understory: The herbaceous understory is poor and dominated by annual grasses, primarily cheatgrass (*Bromus tectorum*), which is the dominant species on the site. Cheatgrass provides nearly all of the grass cover on the site. Bottlebrush squirreltail (*Sitanion hystrix*) was common at the outset of the study, but declined significantly in 1999 and has not increased since. Forbs are lacking on the site with many annual species present (Table - Herbaceous Trends).

Soil: The soil is a sandy clay loam with a slightly alkaline pH and a moderately deep effective rooting depth. Phosphorus and potassium levels are both limiting to plant growth and development at 5.8 ppm and 54.4 ppm, respectively (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Protective ground cover is composed primarily of sagebrush with an understory of annual cheatgrass. Bare ground cover has fluctuated, but has been mostly moderately high since 1994 (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1986 to 1994 - slightly down (-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 remained high and the proportion of plants displaying poor vigor increased from 21% to 49%. There has been no new recruitment of young sagebrush plants.
- **1994 to 1999 - down (-2):** Density of sagebrush decreased by 19% from 2,680 plants/acre to 2,160 plants/acre, and cover decreased from 11% to 9%. Decadence of sagebrush increased from 63% to 80%, but poor vigor decreased to 18%.
- **1999 to 2004 - slightly down (-1):** There was little change in the density of sagebrush, but cover decreased to 7%. Decadence increased to 80% and poor vigor increased to 85% of the population. There is still no new recruitment of young sagebrush plants.
- **2004 to 2009 - down (-2):** The density of sagebrush decreased by 21% to 1,660 plants/acre, and cover decreased to 4%. Decadence and poor vigor both decreased slightly, but remained very high at 82% and 75%, respectively. No young sagebrush plants were sampled.

Grass:

- **1986 to 1994 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1994 to 1999 - down (-2):** The sum of nested frequency of perennial grasses decreased by 78% and cover decreased from 2% o less than 0.5%. There was a significant decrease in the nested frequency of bottlebrush squirreltail and a significant increase in the nested frequency of cheatgrass. Cheatgrass cover increased from 4% to 23%.
- **1999 to 2004 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses. The nested frequency of cheatgrass and sixweeks fescue both decreased significantly.
- **2004 to 2009 - stable (0):** The site is still dominated by cheatgrass with little change in the sum of nested frequency of perennial grasses.

Forb:

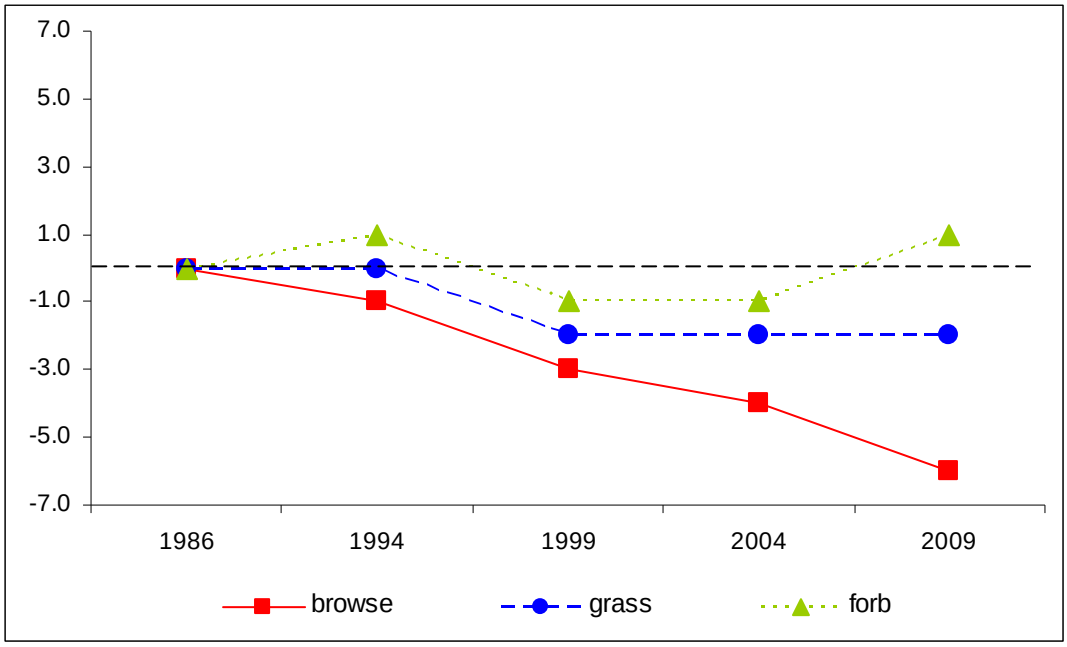
- **1986 to 1994 - slightly up (+1):** The sum of nested frequency of perennial forbs increased, but cover is still only 1%.
- **1994 to 1999 - down (-2):** The sum of nested frequency of perennial forbs decreased markedly. Perennial forbs were almost nonexistent on the site with almost no cover.
- **1999 to 2004 - stable (0):** The sum of nested frequency of perennial forbs increased slightly, but the sum of nested frequency of annual forbs increased substantially. Almost all of the forb cover was provided by annual forbs.
- **2004 to 2009 - up (+2):** There was a substantial increase in the sum of nested frequency and cover of perennial forbs. The increase was almost entirely due to an increase in Fendler euphorbia (*Euphorbia fendleri*).

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 14, study no: 1

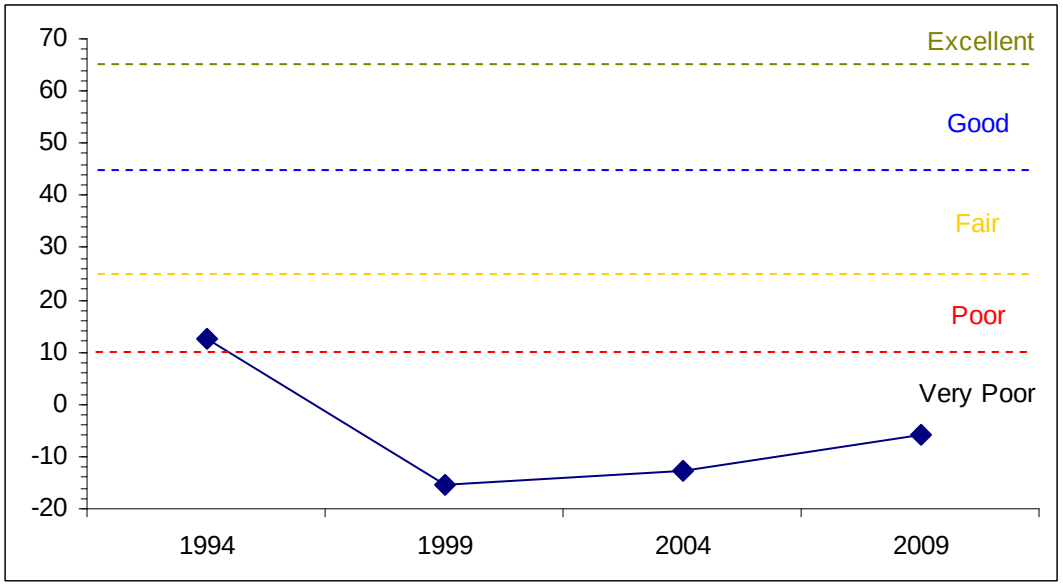
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
94	14.1	-3.9	0.0	3.5	-3.0	2.0	0.0	**12.7**	Poor
99	10.9	-9.0	0.0	0.8	-18.2	0.0	0.0	**-15.5**	Very Poor
04	9.3	-12.0	0.0	0.5	-10.8	0.3	0.0	**-12.7**	Very Poor
09	4.8	0.0	0.0	0.6	-14.1	2.8	0.0	**-5.9**	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 14, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE
Management unit 14, Study no: 1



HERBACEOUS TRENDS--
Management unit 14, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'86	'94	'99	'04	'09	'94	'99	'04	'09
G	Bromus tectorum (a)	-	a287	b388	a261	a273	3.65	22.55	14.39	18.83
G	Hilaria jamesii	5	11	6	6	11	.12	.16	.07	.21
G	Oryzopsis hymenoides	-	9	6	7	3	.19	.04	.09	.03
G	Sitanion hystrix	b111	b105	a16	a8	a9	1.42	.20	.10	.07
G	Vulpia octoflora (a)	-	b171	b159	a9	a8	.36	1.65	.02	.01
Total for Annual Grasses		0	458	547	270	281	4.01	24.21	14.41	18.85
Total for Perennial Grasses		116	125	28	21	23	1.74	0.40	0.26	0.31
Total for Grasses		116	583	575	291	304	5.75	24.62	14.67	19.16
F	Astragalus convallarius	13	9	6	14	5	.02	.01	.05	.01
F	Astragalus mollissimus	4	-	-	-	-	-	-	-	-
F	Astragalus nuttallianus (a)	-	a-	a-	b182	a-	-	-	2.12	-
F	Astragalus sp.	a-	b48	a-	a-	a-	.12	-	-	-
F	Cordylanthus sp. (a)	a6	b60	a-	a-	a3	.25	-	-	.15
F	Cryptantha sp.	-	13	-	-	-	.06	-	-	-
F	Cymopterus acaulis	-	2	-	-	-	.00	-	-	-
F	Descurainia pinnata (a)	-	-	-	5	-	-	-	.01	-
F	Eriogonum cernuum (a)	-	-	-	2	-	-	-	.03	-
F	Erodium cicutarium (a)	-	a7	b49	b34	b59	.01	.33	.53	.87
F	Euphorbia fendleri	a13	a-	a-	a-	b162	-	-	-	1.09
F	Gilia sp. (a)	-	4	-	3	-	.01	-	.00	-
F	Lappula occidentalis (a)	-	b26	a-	c44	a4	.05	-	.97	.03
F	Navarretia intertexta (a)	-	-	7	11	-	-	.01	.02	-
F	Phlox longifolia	-	2	-	3	3	.01	-	.00	.00
F	Plantago patagonica (a)	-	7	2	5	4	.04	.00	.01	.03
F	Sphaeralcea coccinea	a5	b17	a-	b10	b16	.80	-	.10	.30
Total for Annual Forbs		6	104	58	286	70	0.35	0.35	3.71	1.10
Total for Perennial Forbs		35	91	6	27	186	1.01	0.01	0.17	1.41
Total for Forbs		41	195	64	313	256	1.37	0.37	3.88	2.52

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

BROWSE TRENDS--
Management unit 14, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'94	'99	'04	'09	'94	'99	'04	'09
B	Artemisia tridentata wyomingensis	65	67	61	55	11.27	8.68	7.43	3.81
B	Chrysothamnus nauseosus	4	0	0	0	.00	-	-	-
B	Echinocereus sp.	0	1	1	1	-	.00	.15	.03
B	Gutierrezia sarothrae	74	61	93	0	2.88	1.33	6.14	.00
B	Juniperus osteosperma	0	0	0	0	.63	.00	.85	.85
B	Opuntia sp.	5	0	0	0	.03	-	-	-
Total for Browse		148	129	155	56	14.82	10.02	14.58	4.70

CANOPY COVER, LINE INTERCEPT--
Management unit 14, Study no: 1

Species	Percent Cover		
	'99	'04	'09
Artemisia tridentata wyomingensis	-	5.51	4.71
Gutierrezia sarothrae	-	5.91	-
Juniperus osteosperma	.60	1.00	1.56

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 14, Study no: 1

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata wyomingensis	1.3	1.3

BASIC COVER--
Management unit 14, Study no: 1

Cover Type	Average Cover %				
	'86	'94	'99	'04	'09
Vegetation	3.00	22.54	32.62	33.73	24.41
Rock	1.00	.03	.68	.24	.45
Pavement	.25	.20	.02	.01	.01
Litter	45.75	24.08	41.93	30.83	52.59
Cryptogams	8.00	1.78	1.97	.80	1.29
Bare Ground	42.00	52.84	30.11	45.40	36.15

SOIL ANALYSIS DATA --
Management unit 14, Study no: 1, Study Name: Alkali Point

Effective rooting depth (in)	pH	sandy clay loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.8	7.4	62.9	14.6	22.6	1.7	5.8	54.4	0.4

PELLET GROUP DATA--
Management unit 14, Study no: 1

Type	Quadrat Frequency			
	'94	'99	'04	'09
Rabbit	67	36	4	23
Elk	6	-	-	1
Deer	43	37	53	48
Cattle	-	5	-	3

Days use per acre (ha)		
'99	'04	'09
-	-	-
-	2 (5)	-
135 (333)	103 (255)	119 (294)
2 (5)	4 (11)	12 (29)

BROWSE CHARACTERISTICS--
Management unit 14, Study no: 1

		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	**4399**	0	35	65	-	12	88	21	22/23
94	**2680**	0	37	63	120	26	13	49	23/35
99	**2160**	0	20	80	-	52	46	18	26/33
04	**2100**	0	10	90	20	35	64	85	23/32
09	**1660**	0	18	82	20	40	52	75	26/37
Chrysothamnus nauseosus									
86	**0**	0	0	0	-	0	0	0	-/-
94	**100**	0	80	20	40	0	0	0	-/-
99	**0**	0	0	0	-	0	0	0	-/-
04	**0**	0	0	0	-	0	0	0	-/-
09	**0**	0	0	0	-	0	0	0	-/-
Echinocereus sp.									
86	**0**	0	0	-	-	0	0	0	-/-
94	**0**	0	0	-	-	0	0	0	-/-
99	**20**	0	100	-	-	0	0	0	8/13
04	**20**	0	100	-	-	0	0	0	6/15
09	**20**	0	100	-	-	0	0	0	7/20
Gutierrezia sarothrae									
86	**5999**	4	96	0	199	1	2	0	8/9
94	**6840**	23	73	3	2380	0	0	2	8/9
99	**4660**	14	84	2	80	7	0	.85	9/9
04	**31760**	14	86	1	-	8	0	31	6/7
09	**0**	0	0	0	-	0	0	0	-/-
Opuntia sp.									
86	**0**	0	0	0	-	0	0	0	-/-
94	**120**	17	67	17	20	0	0	0	2/4
99	**0**	0	0	0	-	0	0	0	-/-
04	**0**	0	0	0	-	0	0	0	4/10
09	**0**	0	0	0	-	0	0	0	4/14