Trend Study 14-1-04

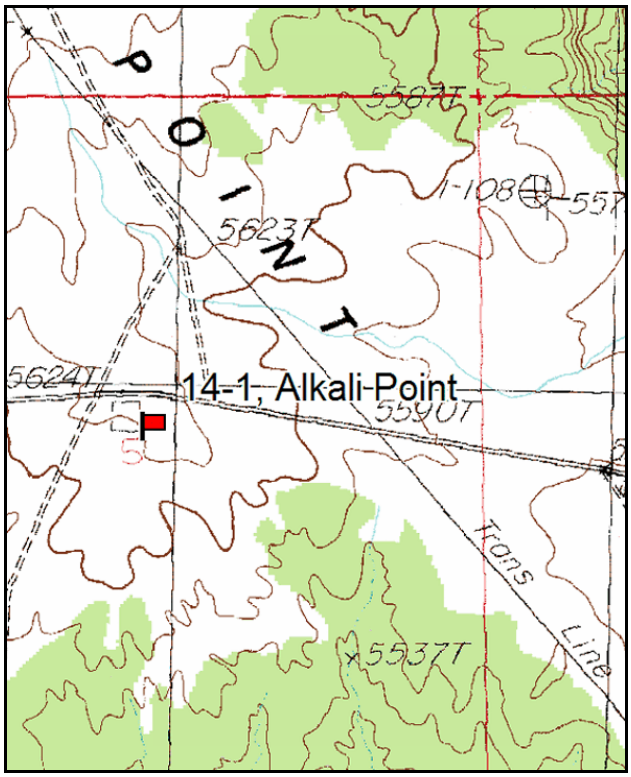
Study site name: Alkali Point . Vegetation type: Wyoming Big Sagebrush .

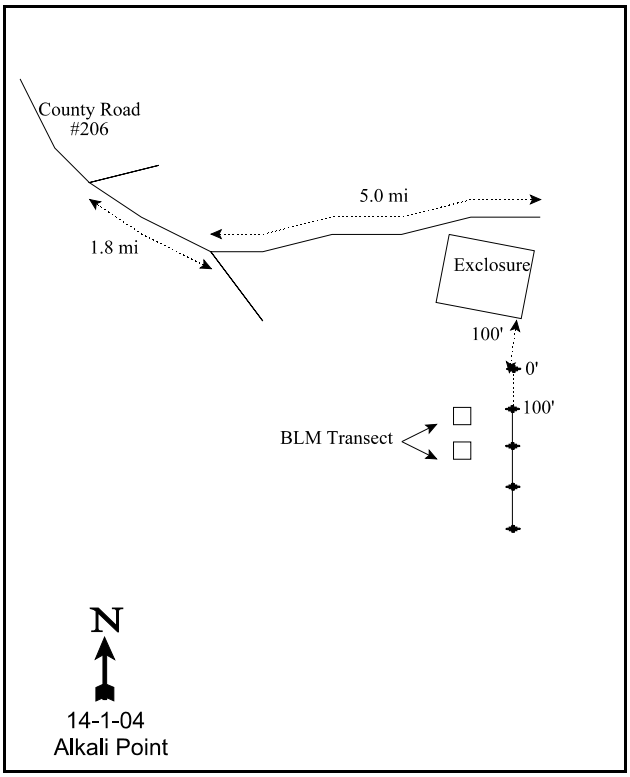
Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

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 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 27, UTM 12S 4152864 N, 649932 E

DISCUSSION

Alkali Point - Trend Study No. 14-1

Alkali Point is 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-juniper woodlands with open Wyoming big sagebrush flats. This study is a Wyoming big sagebrush community that has been invaded by cheatgrass. There is a BLM exclosure and transect 100 feet to the north, but the exclosure is in need of repair and does not exclude livestock. The site drains to the southwest and has a slope of about 5% with an elevation of 5,600 feet. Water is limited on the flat. Past use on the area has included spring cattle grazing. Deer pellet groups are abundant, with an average of 45 deer days use/acre (111 deer days use/ha) from 1986 to 1995. Pellet group data from 1999 estimated 135 deer days use/acre (333 deer days use/ha). In 2004, deer use was still high at 103 deer days use/acre (255 ddu/ha). Cattle use was 4 cow days use/acre (11 cdu/ha). Two elk days use/acre (5 edu/ha) were also estimated. Human activity includes gas and oil exploration, drilling, pipeline and road construction, livestock grazing, and recreational activities.

The soil is moderately deep with an estimated effective rooting depth of nearly 16 inches. Soil texture is a sandy clay loam with a slightly alkaline pH (7.4). Phosphorus and potassium levels are both low at 5.8 ppm and 54.4 ppm respectively. Phosphorus levels below 10 ppm and potassium levels below 70 ppm may limit plant growth and development. Protective ground cover is composed primarily of sagebrush with an understory of annual cheatgrass. Percent bare ground has increased from 42% in 1986 to 53% in 1994, then down to 30% by 1999 as cheatgrass increased. Bare ground increased to 45% in 2004 and the ratio of bare ground to protective cover (vegetation, litter, and cryptogams) decreased from 1:2.8 to 1:2.1.

The dominant browse species is Wyoming big sagebrush which made up 87% of the total browse cover in 1999. The sagebrush stand has become overly mature with no sign of reproduction and high decadence found during all readings. Density of sagebrush was estimated at 4,399 plants/acre (mostly decadent) in 1986, declining to 2,680 in 1994. Much of the difference in density is probably due to the much larger sample used in 1994, but it is apparent that the population has declined. Dead plants, first counted in 1994, totaled 860 plants/acre. As dead plants have increased in 1999 and 2004, density has declined. Data from 1999 estimated 2,160 live plants/acre with 1,300 dead plants. In 2004, density was 2,100 plants/acre with 1,380 dead plants. Percent decadency has continued to increase. In 1994 it was high at 63%, it increased to 80% in 1999, and increased again to 90% in 2004. While decadence has always been high, poor vigor has not always been high. In 1999, only 18% of the population showed poor vigor, but this increased to 85% of the population in 2004. Utilization was extremely heavy in 1986 with 88% of the plants sampled displaying heavy use. The level of use declined in 1994 with only 13% of the sagebrush being heavily browsed. In 1999, utilization was heavy on 46% of the plants sampled. This increased to 64% in 2004. Leader growth (1.3 inches in 2004) and seed production are poor. Drought conditions and competition from winter annuals have prevented sagebrush reproduction.

Broom snakeweed increased in density and cover in 2004. In 1999, it provided 13% of the total browse cover. This increased to 42% of the total browse cover in 2004. There were 6,840 plants/acre estimated in 1994. Density declined in 1999 to 4,660, but increased to 7,960 in 2004. Cover was also at an all time high of 6% in 2004. There are a few Juniper on the flat, but they do not appear to be aggressively increasing and provide very little escape or thermal cover.

The herbaceous understory is poor and dominated by annual grasses, cheatgrass and sixweeks fescue. Annuals were not included in the sample in 1986. In 1994 cheatgrass provided 63% of the grass cover. The only common perennial grass encountered that year was bottlebrush squirreltail. By 1999, cheatgrass increased significantly and provided 92% of the grass cover and 90% of the total herbaceous cover. Cheatgrass declined significantly in 2004. In 1999, cheatgrass was found in 100% of quadrats, but was only found to 80% of the

quadrats in 2004. Cover declined from 23% in 1999 to 14% in 2004. In 1999, spring precipitation was 235% of normal, which led to a very high amount of cheatgrass. In 2004, spring precipitation was 93% of normal. Cheatgrass cover and abundance was still high in 2004, which can lead to destructive wildfires. Sixweeks fescue frequency declined significantly in 2004. Bottlebrush squirreltail declined significantly in 1999 and has not increased since. Annual forbs were common in 2004. Nuttall milkvetch, which is an annual, increased significantly in 2004 and made up 55% of the total forb cover. Other common forbs are storksbill and annual stickseed.

1986 APPARENT TREND ASSESSMENT

There appears to be a downward trend in terms of Wyoming big sagebrush. Use appears heavy with growth and reproduction appearing generally poor. Also, much of the new growth is unavailable due to the hedged and stiff character of the older shrubs. Diversity is very limited, especially for the herbaceous component. Soil trend is down because of poor ground cover and continued soil loss.

1994 TREND ASSESSMENT

Wyoming big sagebrush has not been as heavily used as previously reported. However, the percentage of the plants with poor vigor has nearly doubled from 21% to 49%, while percent decadency has remained similar. In addition, 54% of the decadent plants sampled were classified as dying. Density has declined, although some of the change may be due to the greatly increased sample size used in 1994. Dead plants, first sampled in 1994 number 860 plants/acre which would indicate a population decline. Reproduction is poor with some seedlings sampled but no young. Broom snakeweed has increased from 5,999 plants/acre in 1986 to 6,840 plants/acre in 1994. There were many seedlings encountered in 1994 (2,380 plants/acre), which would indicate a expanding population. As in 1986, herbaceous understory is not very diverse with three grasses and two forbs comprising 86% of the understory cover. Cheatgrass is the most abundant grass followed by six-week fescue, both are annuals. Soil trend is down with an 11% increase in bare ground from 42% in 1986 to 53% in 1994. Litter cover decreased from 46% in 1986 to 24% in 1994. The Desirable Components Index (see methods) rated this site as poor with score of 16 due to high decadence, no young shrubs, and low perennial grass cover.

TREND ASSESSMENT
soil - down (1)
browse - down (1)
herbaceous understory - stable (3)
winter range condition (DC Index) - 16 (poor) Wyoming big sagebrush type

1999 TREND ASSESSMENT

The soil trend is slightly up due to a decline in percent bare ground from 52% to 30% and an increase in litter cover from 24% to 42%. However, these improvements are due primarily to the dramatic increase in cheatgrass. Erosion is not currently a problem. The browse trend is down due to a decline in population density, an increase in heavy utilization, and an increase in percent decadency from 63% to 80%. There is no reproduction, and leader growth and seed production are poor. On the positive side, broom snakeweed has declined in density from 7,240 to 4,660 plants/acre. Trend for the herbaceous understory is also down due to a decline in perennial grasses and forbs and a dramatic increase in cheatgrass. Quadrat frequency of cheatgrass remained similar (99 to 100) but nested frequency increased significantly and cover increased 6 fold from 4% to 23%. The DCI score is -13 which is rated as very poor. Decadence is high, reproduction is low, perennial grasses are rare, and annual grasses are very high which negatively impacts the score.

TREND ASSESSMENT
soil - slightly up (4)
browse - down (1)
herbaceous understory - down (1)
winter range condition (DC Index) - -13 (very poor) Wyoming big sagebrush type

2004 TREND ASSESSMENT

The soil trend is down due to an increase in bare ground and decrease in litter cover, indicating that soil trend based on annual species is not a dependable trend indicator. The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground decreased from 1:2.8 to 1:2.1. The browse trend is once again down. Density and cover only declined slightly, but percent decadency increased from 80 to 90%. Decadent plants classified as dying increased from 18 to 78%. There are no young or seedling plants to replace the decadent and dying population. Heavy use also increased to 64%. Broom snakeweed had a high increase in both density and cover. It now makes up 42% of the total browse cover. The herbaceous understory trend is slightly up, but still in very poor condition. Cheatgrass declined significantly, but is still very abundant (quadrat frequency of 80%) and has over 14% cover. This makes this site susceptible to fire and prevents reproduction of sagebrush. Forbs are comprised of mostly annuals and are more abundant than they were in 1999. The DCI score is still very poor as none of the shrub parameters have improved and the herbaceous understory is made up of mostly cheatgrass.

TREND ASSESSMENT
soil - down (1)
browse - down (1)
herbaceous understory - slightly up (4)
winter range condition (DC Index) - -11 (very poor) Wyoming big sagebrush type

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

Type	Species	Nested Frequency				Average Cover %		
		'86	'94	'99	'04	'94	'99	'04
G	Bromus tectorum (a)	-	a287	b388	a261	3.65	22.55	14.39
G	Hilaria jamesii	5	11	6	6	.12	.16	.07
G	Oryzopsis hymenoides	-	9	6	7	.19	.04	.09
G	Sitanion hystrix	b111	b105	a16	a8	1.42	.20	.10
G	Vulpia octoflora (a)	-	b171	b159	a9	.36	1.65	.02
Total for Annual Grasses		0	458	547	270	4.01	24.21	14.41
Total for Perennial Grasses		116	125	28	21	1.74	0.40	0.26
Total for Grasses		116	583	575	291	5.75	24.62	14.67
F	Astragalus convallarius	13	9	6	14	.02	.01	.05
F	Astragalus mollissimus	4	-	-	-	-	-	-
F	Astragalus nuttallianus (a)	-	a-	a-	b182	-	-	2.12
F	Astragalus spp.	a-	b48	a-	a-	.12	-	-
F	Cordylanthus spp. (a)	a6	b60	a-	a-	.25	-	-

Type	Species	Nested Frequency				Average Cover %		
		'86	'94	'99	'04	'94	'99	'04
F	Cryptantha spp.	$_{a}$-	$_{b}$13	$_{a}$-	$_{a}$-	.06	-	-
F	Cymopterus acaulis	-	2	-	-	.00	-	-
F	Descurainia pinnata (a)	-	-	-	5	-	-	.01
F	Eriogonum cernuum (a)	-	-	-	2	-	-	.03
F	Erodium cicutarium (a)	-	$_{a}$7	$_{b}$49	$_{b}$34	.01	.33	.53
F	Euphorbia fendleri	13	-	-	-	-	-	-
F	Gilia spp. (a)	-	4	-	3	.01	-	.00
F	Lappula occidentalis (a)	-	$_{b}$26	$_{a}$-	$_{c}$44	.05	-	.97
F	Navarretia intertexta (a)	-	$_{a}$-	$_{ab}$7	$_{b}$11	-	.01	.02
F	Phlox longifolia	-	2	-	3	.01	-	.00
F	Plantago patagonica (a)	-	7	2	5	.04	.00	.01
F	Sphaeralcea coccinea	$_{ab}$5	$_{b}$17	$_{a}$-	$_{b}$10	.80	-	.10
Total for Annual Forbs		6	104	58	286	0.35	0.35	3.71
Total for Perennial Forbs		35	91	6	27	1.01	0.01	0.17
Total for Forbs		41	195	64	313	1.37	0.37	3.88

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	'94	'99	'04
B	Artemisia tridentata wyomingensis	65	67	61	11.27	8.68	7.43
B	Chrysothamnus nauseosus	4	0	0	-	-	-
B	Echinocereus spp.	0	1	1	-	.00	.15
B	Gutierrezia sarothrae	74	61	93	2.88	1.33	6.14
B	Juniperus osteosperma	-	-	-	.63	.00	.85
B	Opuntia spp.	5	0	0	.03	-	-
Total for Browse		148	129	155	14.82	10.02	14.58

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

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

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

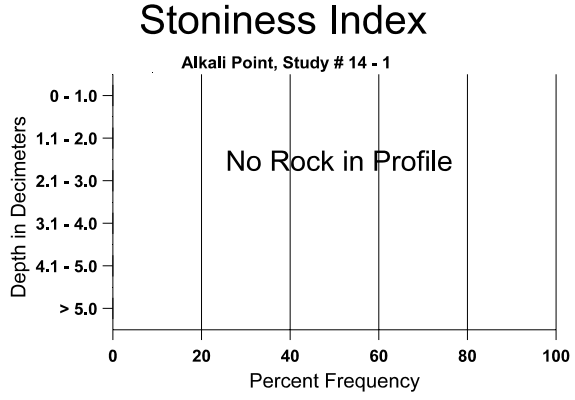
Species	Average leader growth (in)
	'04
Artemisia tridentata wyomingensis	1.3

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

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

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

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
15.8	67.3 (15.5)	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
Rabbit	67	36	4
Elk	6	-	-
Deer	43	37	53
Cattle	-	5	-

Days use per acre (ha)	
'99	'04
-	-
-	2 (5)
135 (333)	103 (255)
2 (5)	4 (11)

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

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis												
86	**4399**	-	-	1533	2866	-	12	88	65	6	21	22/23
94	**2680**	120	-	980	1700	860	26	13	63	34	49	23/35
99	**2160**	-	-	440	1720	1300	52	46	80	18	18	26/33
04	**2100**	20	-	200	1900	1380	35	64	90	78	85	23/32
Chrysothamnus nauseosus												
86	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**100**	40	-	80	20	40	0	0	20	-	0	-/-
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**0**	-	-	-	-	-	0	0	0	-	0	-/-
Echinocereus spp.												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	-	20	-	-	0	0	-	-	0	8/13
04	**20**	-	-	20	-	-	0	0	-	-	0	6/15
Gutierrezia sarothrae												
86	**5999**	200	266	5733	-	-	1	2	0	-	0	8/9
94	**6840**	2380	1600	5020	220	80	0	0	3	2	2	8/9
99	**4660**	80	640	3920	100	160	7	0	2	.42	.85	9/9
04	**7960**	-	1280	6460	220	520	6	0	3	1	28	6/7
Opuntia spp.												
86	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**120**	20	20	80	20	-	0	0	17	-	0	2/4
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**0**	-	-	-	-	-	0	0	0	-	0	4/10