

Trend Study 16B-24-04

Study site name: Wiregrass Bench.

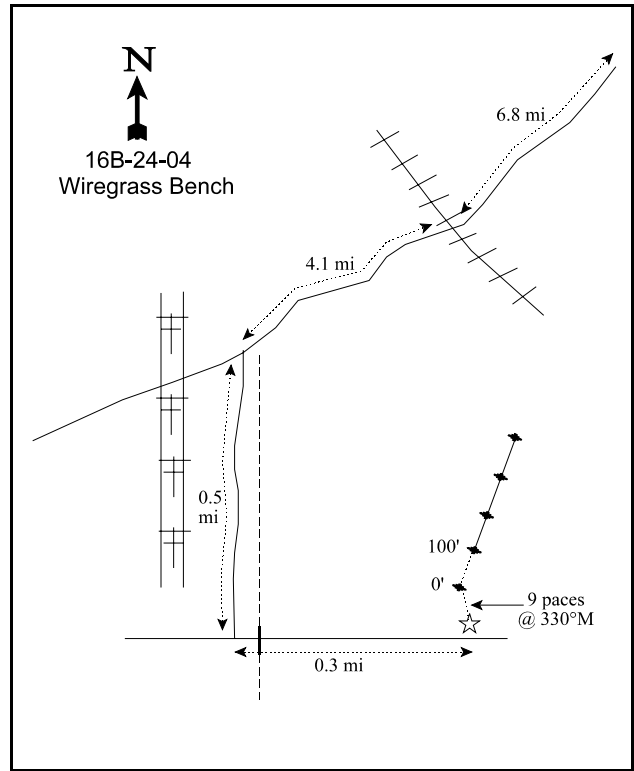
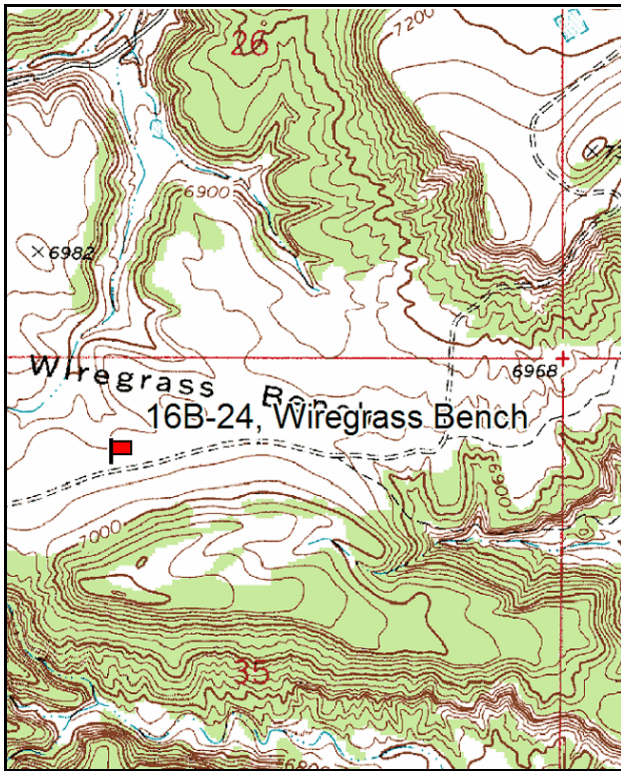
Vegetation type: Wyoming Big Sagebrush.

Compass bearing: frequency baseline 0 degrees magnetic.

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

LOCATION DESCRIPTION

Take exit 240 on highway 6 in Price just past the hospital. Turn right at the stop sign, continue to another stop sign and turn right again. Stay on this road until you go over a canal, then turn right at the first road on the right. Proceed 6.8 miles to a railroad crossing. From the railroad tracks, travel 4.1 miles. Just before reaching the power lines turn left and travel 0.5 miles along the fence to a "T" in the road. Turn left through a gate and travel 0.3 miles to the witness post on the left. The 0' stake is 9 paces at 330°M. The baseline runs in the direction of 0°M.



Map Name: Pinnacle Peak

Diagrammatic Sketch

Township 14S, Range 8E, Section 35

GPS: NAD 27, UTM 12S 4379741 N, 500290 E

## DISCUSSION

### Wiregrass Bench - Trend Study No. 16B-24

Wiregrass Bench is located about 10 miles west of Price. This study was established in 1994 to monitor possible sagebrush die-off on important winter range. The site has a northwest aspect and a gentle slope of 5-10%. Elevation is 6,900 feet. The site is on the Haley allotment which is grazed from May 16 to October 31 by cattle and is managed by the BLM. Pellet group frequency data from 1994 indicated high deer use on the site as well as some elk use. Pellet group transect data taken in 1999 estimated moderate use by wildlife with 38 deer days use/acre (93 ddu/ha), 23 elk days use/acre (56 edu/ha), and 15 cow days use/acre (38 cdu/ha). Deer use was higher in 2004 at 69 days use/acre (93 ddu/ha). Elk and cattle use remained about the same with 12 elk days use/acre (31 edu/ha) and 12 cow days use/acre (30 cdu/ha).

Soil depth is quite deep with an estimated effective rooting depth of over 20 inches. The soil is slightly alkaline pH (7.6). Rock is fairly uniformly distributed throughout the profile as evidenced by the stoniness index data. Phosphorus is low at 6.8 ppm. Percent bare ground was fairly low for a Wyoming big sagebrush site at 32% in both 1994 and 1999. This increased to 47% in 2004. Cryptogam cover also fell from 13% in 1999 to less than 2% in 2004. Ratio of bare ground to protective cover (vegetation, litter, and cryptogams) decreased from 1:3.1 in 1999 to 1:2.2 in 2004. An erosion class rating in 2004 rated erosion on this site as slight, with signs of erosion from rills, gullies, and pedestaling.

The key browse species on this site is Wyoming big sagebrush which had a population density of 1,860 plants/acre in 1994. Density increased to 2,380 plants/acre in 1999 and then decreased by 18% to 1,940 plants/acre in 2004. While density has remained relatively stable, cover and decadence has been reflective of precipitation patterns. Annual precipitation was low in 1993 and 1994 at about 80% of normal each year and was even lower from 2001-2003 at about 56% of normal. Percent cover was 6% in 1994, 10% in 1999, and decreased to 5% in 2004. Percent decadence was 49% in 1994 and 63% in 2004, while it was 29% in 1999 when precipitation was better. Seventy percent of the decadent plants showed signs of poor vigor in 2004. Recruitment has been good in this population. Young plants made up 18% of the population in 1999 and 13% were classified as young in 2004. Seedlings were very abundant in 2004 estimating 30,460 plants/acre. Utilization has increased with each reading. In 2004, 40% were showing moderate use and 45% showed heavy use. Some of the mature and decadent plants sampled in 1999 showed evidence of insect infestation.

The most numerous shrub on the site is the increaser low rabbitbrush. This species had a 41% increase in density in 1999, but declined by 15% in 2004. Cover has remained stable at about 3% for each reading. Broom snakeweed is present at the site and estimated 3,260 plants/acre and 3,480 plants/acre in 1994 and 1999 respectively. This decreased to only 460 plants/acre in 2004. Utah serviceberry is present in low numbers. In 1999, only 33% showed signs of moderate use. This increased to 100% heavy use in 2004.

The herbaceous understory is very abundant and diverse. Grasses provide 66%, 50%, and 60% of the total vegetation cover in 1994, 1999, and 2004 respectively. Blue grama and Salina wildrye account for the majority of the cover. Blue grama is a warm season grass which provides little forage and increases under excessive spring livestock grazing. This species decreased significantly in sum of nested frequency in 1999. It increased slightly in 2004 and was closer to its highest level in 1994. Salina wildrye provides poor to fair forage for livestock and big game. This species has remained relatively stable through the three readings. Other perennial species include: western wheatgrass, mutton bluegrass, Indian ricegrass, needle-and-thread, and bottlebrush squirreltail. Forbs are diverse but not abundant. Perennial forbs nearly doubled in sum of nested frequency in 1999, but decreased in 2004. A few important perennial species include: narrowleaf paintbrush, redroot eriogonum and scarlet globemallow occur on the site.

## 1994 APPARENT TREND ASSESSMENT

Ground cover characteristics show adequate cover to control soil erosion. Herbaceous ground cover is high at 25% and litter cover is also high for a Wyoming big sagebrush site at 23%. The apparent browse trend is declining somewhat for Wyoming big sagebrush. Reproductive potential is low and the majority of the population is decadent. This is likely caused by a combination of drought and competition from the abundant herbaceous understory and increaser shrubs rabbitbrush and broom snakeweed. The herbaceous understory is abundant and diverse but the composition of grasses is dominated by blue grama and Salina wildrye, both of which offer only fair forage value. The Desirable Components Index (see methods) rating is fair to good at 48. Decadence is higher than desired, but recruitment is fair and the herbaceous understory is abundant.

winter range condition (DC Index) - 48 (good) Wyoming big sagebrush type

## 1999 TREND ASSESSMENT

Trend for soil is slightly up. Relative percent cover for bare ground decreased from 42% down to 31%. There was a notable increase in cryptogamic cover also. Erosion is not a problem at the site, and herbaceous sum of nested frequency increased in 1999. Trend for the key browse Wyoming big sagebrush is slightly up. Decadency decreased from 49% to 29%, the proportion of decadent plants classified as dying decreased from 26% to 12%, and plants showing poor vigor decreased from 14% to 4%. Biotic potential and recruitment both increased in 1999 as well. Improved precipitation patterns in last few years has helped restore vigor and increase the number of seedlings and young. The only negative aspect for this population of Wyoming big sagebrush is that use has increased. Currently, 50% of the population is classified as moderately browsed, up from 16% in 1994. An additional 10% show heavy use. Trend for the herbaceous understory is slightly up. Perennial species dominate the understory. Sum of nested frequency for perennial grasses and forbs increased in 1999. The DCI score improved to good to excellent as sagebrush was more abundant, less decadent, and had more young plants in the population.

### TREND ASSESSMENT

soil - slightly up (4)

browse - slightly up (4)

herbaceous understory - up slightly (4)

winter range condition (DC Index) - 66 (good to excellent) Wyoming big sagebrush type

## 2004 TREND ASSESSMENT

Soil trend is slightly down. Cryptogam cover decreased from 13% to 2%. Relative percent bare ground is higher, from 31% to 42%. A few signs of erosion were noted in 2004. Browse trend is slightly down. Density has remained relatively stable, but cover decreased and decadency has increased to 63%. Forty-four percent of the population is now classified as dying, from only 3% in 1999. Use has increased with each reading and now 85% of the population show signs of moderate or heavy use. Recruitment is good at 13% and seedlings are very abundant. Return to normal precipitation pattern should help this population. Trend for herbaceous understory is stable. Cover of perennial grasses was higher by 3% in 2004. No cheatgrass was sampled in 2004. Cover increased for the two dominant species blue grama and Salina wildrye. Sum of nested frequency declined for perennial forbs, but increased for annual forbs. Cover remained stable for perennial forbs. The DCI score declined to fair to good, due to decreased sagebrush cover and increased decadence.

TREND ASSESSMENT

soil - down slightly (2)

browse - down slightly (2)

herbaceous understory - stable (3)

winter range condition (DC Index) - 47 (fair to good) Wyoming big sagebrush type

HERBACEOUS TRENDS --

Management unit 16B, Study no: 24

Type	Species	Nested Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
G	Agropyron smithii	a-	a-	b42	-	-	.32
G	Agropyron spicatum	10	2	12	.53	.01	.05
G	Bouteloua gracilis	b274	a230	ab254	10.33	4.77	6.64
G	Bromus tectorum (a)	ab5	b20	a-	.01	.20	-
G	Elymus salina	ab263	b294	a265	9.56	8.72	10.01
G	Oryzopsis hymenoides	b25	b19	a-	.38	.20	-
G	Poa fendleriana	56	98	71	.51	1.27	.66
G	Poa secunda	a-	a-	b59	-	-	.61
G	Sitanion hystrix	c95	b53	a15	1.06	1.19	.07
G	Sporobolus cryptandrus	-	-	5	-	-	.00
G	Stipa comata	a17	a4	b70	.32	.00	.93
G	Vulpia octoflora (a)	-	-	2	-	-	.01
Total for Annual Grasses		5	20	2	0.00	0.20	0.00
Total for Perennial Grasses		740	700	793	22.71	16.18	19.34
Total for Grasses		745	720	795	22.72	16.38	19.35
F	Agoseris glauca	a-	c55	b10	-	.24	.05
F	Arabis spp.	-	-	2	-	-	.00
F	Astragalus convallarius	a42	ab38	b57	.41	.14	1.11
F	Astragalus spp.	ab7	b13	a-	.30	.21	-
F	Castilleja linariaefolia	a14	b51	a7	.05	.38	.05
F	Calochortus nuttallii	a3	b31	b37	.00	.07	.14
F	Castilleja spp.	-	-	6	-	-	.03
F	Chenopodium spp. (a)	-	-	2	-	-	.01
F	Comandra pallida	a35	b69	b59	.36	.19	.45
F	Collinsia parviflora (a)	b21	b27	a3	.05	.06	.00
F	Crepis acuminata	-	3	-	-	.03	-
F	Cryptantha spp.	2	-	-	.01	-	-
F	Cymopterus spp.	-	7	-	-	.04	-
F	Delphinium nuttallianum	-	5	-	-	.00	-
F	Descurainia pinnata (a)	1	-	3	.00	-	.01

Type	Species	Nested Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
F	<i>Eriogonum alatum</i>	<sub>a</sub> 4	<sub>b</sub> 33	<sub>a</sub> 3	.03	.16	.03
F	<i>Eriogonum racemosum</i>	44	45	31	.39	.32	.27
F	<i>Eriogonum umbellatum</i>	3	1	3	.03	.00	.03
F	<i>Gayophytum ramosissimum</i> (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 24	-	-	.10
F	<i>Hedysarum boreale</i>	-	-	5	-	-	.12
F	<i>Hymenoxys acaulis</i>	1	-	-	.00	-	-
F	<i>Lappula occidentalis</i> (a)	<sub>a</sub> -	<sub>a</sub> 3	<sub>b</sub> 25	-	.00	.10
F	<i>Lepidium densiflorum</i> (a)	18	15	9	.04	.02	.02
F	<i>Lesquerella</i> spp.	1	-	1	.00	-	.00
F	<i>Machaeranthera grindelioides</i>	<sub>a</sub> 8	<sub>b</sub> 11	<sub>a</sub> -	.06	.10	-
F	<i>Penstemon caespitosus</i>	5	20	8	.05	.09	.05
F	<i>Penstemon carnosus</i>	-	-	3	-	-	.01
F	<i>Penstemon palmeri</i>	3	-	-	.01	-	-
F	<i>Phlox longifolia</i>	<sub>a</sub> 43	<sub>b</sub> 74	<sub>b</sub> 80	.08	.56	.35
F	<i>Plantago patagonica</i> (a)	<sub>a</sub> 42	<sub>a</sub> 37	<sub>b</sub> 78	.12	.08	.19
F	<i>Polygonum douglasii</i> (a)	<sub>a</sub> 21	<sub>a</sub> 6	<sub>b</sub> 146	.04	.01	.31
F	<i>Ranunculus testiculatus</i> (a)	-	-	4	-	-	.01
F	<i>Schoenocrambe linifolia</i>	14	12	19	.03	.02	.27
F	<i>Sphaeralcea coccinea</i>	52	48	37	.18	.48	.72
F	<i>Taraxacum officinale</i>	7	12	2	.01	.02	.00
F	<i>Zigadenus paniculatus</i>	<sub>a</sub> -	<sub>b</sub> 24	<sub>a</sub> -	-	.06	.00
Total for Annual Forbs		103	88	294	0.26	0.19	0.77
Total for Perennial Forbs		288	552	370	2.05	3.16	3.74
Total for Forbs		391	640	664	2.31	3.35	4.51

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

BROWSE TRENDS --

Management unit 16B, Study no: 24

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	2	2	3	-	-	.38
B	Artemisia tridentata wyomingensis	58	66	56	5.51	9.74	4.90
B	Chrysothamnus viscidiflorus viscidiflorus	72	76	86	2.94	2.96	2.96
B	Echinocereus spp.	0	4	0	-	-	-
B	Gutierrezia sarothrae	63	34	13	.61	.18	.00
B	Opuntia spp.	9	3	2	.01	-	-
B	Pediocactus simpsonii	0	0	2	-	-	-
B	Pinus edulis	0	1	0	.38	.15	-
Total for Browse		204	186	162	9.46	13.05	8.25

CANOPY COVER, LINE INTERCEPT --

Management unit 16B, Study no: 24

Species	Percent Cover '04
Amelanchier utahensis	.16
Artemisia tridentata wyomingensis	5.13
Chrysothamnus viscidiflorus viscidiflorus	2.71
Gutierrezia sarothrae	.25
Opuntia spp.	.23

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 16B, Study no: 24

Species	Average leader growth (in) '04
Amelanchier utahensis	2.6
Artemisia tridentata wyomingensis	2.5

**BASIC COVER --**

Management unit 16B, Study no: 24

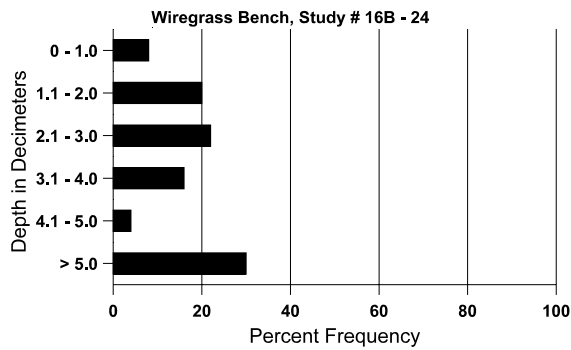
Cover Type	Average Cover %		
	'94	'99	'04
Vegetation	34.32	32.04	34.01
Rock	1.33	.57	.25
Pavement	.41	.33	3.89
Litter	23.33	24.23	26.12
Cryptogams	3.75	13.03	1.58
Bare Ground	31.76	32.17	47.34

**SOIL ANALYSIS DATA --**

Management unit 16B, Study no: 24, Study Name: Wiregrass Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
20.2	55.5 (16.1)	7.6	34.7	41.4	23.8	1.7	6.8	121.6	0.6

**Stoniness Index**



**PELLET GROUP DATA --**

Management unit 16B, Study no: 24

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	33	56	25
Elk	12	5	6
Deer	36	53	50
Cattle	6	7	4

Days use per acre (ha)	
'99	'04
-	-
23 (56)	13 (31)
38 (93)	69 (170)
15 (38)	12 (30)

BROWSE CHARACTERISTICS --  
Management unit 16B, Study no: 24

		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)
<b>Amelanchier utahensis</b>												
94	<b>40</b>	-	-	40	-	-	50	0	-	-	0	17/20
99	<b>60</b>	-	40	20	-	-	33	0	-	-	0	37/42
04	<b>60</b>	-	-	60	-	-	0	100	-	-	0	24/22
<b>Artemisia tridentata wyomingensis</b>												
94	<b>1880</b>	20	180	780	920	580	16	1	49	13	14	22/33
99	<b>2380</b>	260	420	1280	680	760	50	10	29	3	4	23/34
04	<b>1940</b>	30460	260	460	1220	1060	40	45	63	44	44	23/33
<b>Chrysothamnus viscidiflorus viscidiflorus</b>												
94	<b>4400</b>	-	40	4360	-	20	0	0	0	-	0	21/25
99	<b>7480</b>	200	1280	6200	-	20	4	.26	0	-	0	4/8
04	<b>6360</b>	480	800	5340	220	80	17	3	3	3	3	5/9
<b>Echinocereus spp.</b>												
94	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
99	<b>80</b>	-	-	80	-	-	0	0	-	-	0	1/2
04	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<b>Gutierrezia sarothrae</b>												
94	<b>3260</b>	-	40	3180	40	40	0	0	1	.61	.61	31/6
99	<b>3480</b>	-	540	2920	20	100	0	0	1	-	0	3/4
04	<b>460</b>	-	60	400	-	-	0	0	0	-	0	4/5
<b>Opuntia spp.</b>												
94	<b>260</b>	-	-	260	-	-	0	0	-	-	0	3/7
99	<b>80</b>	-	-	80	-	-	0	0	-	-	0	2/5
04	<b>40</b>	-	-	40	-	-	0	0	-	-	0	3/16
<b>Pediocactus simpsonii</b>												
94	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
99	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
04	<b>60</b>	-	20	40	-	-	0	0	-	-	0	1/2
<b>Pinus edulis</b>												
94	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
99	<b>20</b>	-	20	-	-	-	0	0	-	-	0	-/-
04	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-