

Trend Study 10-10-05

Study site name: Sunday School .

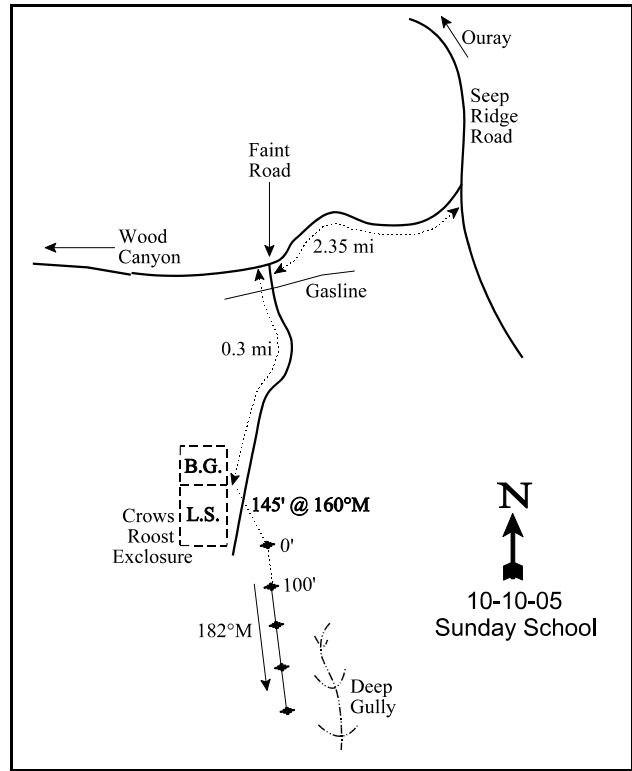
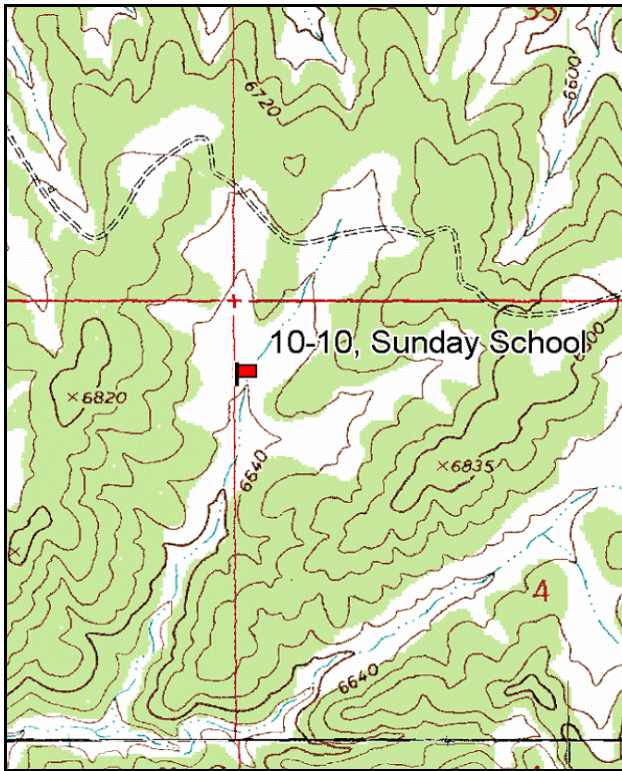
Vegetation type: Fourwing Saltbush .

Compass bearing: frequency base line 182 degrees magnetic.

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

LOCATION DESCRIPTION

From the Seep Ridge Road, turn onto the Wood Canyon/Willow Creek road and proceed west 2.35 miles. Turn left onto a jeep trail and go 0.3 miles to the Crows Roost Exclosure. The study site is on the east side of the exclosure. The 0-foot baseline stake is 29 paces from the SE corner of the big game exclosure, at a bearing of 160°. The frequency baseline runs south from there, parallel to the livestock exclosure fence. The study is marked by 2-foot tall green metal fenceposts.



Map Name: Bates Knolls

Diagrammatic Sketch

Township 14S , Range 22E , Section 5

GPS: NAD 27, UTM 12S 4388018 N, 631434 E

DISCUSSION

Sunday School - Trend Study No. 10-10

The Sunday School trend study is located in a draw adjacent to the Crows Roost Exclosure on BLM land. The study site is at an elevation of 6,650 feet with a southeast aspect. The wide draw drains to the south, although the bottom of the draw is relatively flat. The dominant vegetation type is fourwing saltbush and big sagebrush. The Sunday School Canyon allotment is used by cattle each winter with a rotational deferred system of grazing from November 1 through April 30. Few deer and elk pellet groups were encountered in 1988 and no pellet groups were found in 1995. Pellet group transect data from 2000 indicated light use by wildlife with an estimated 3 deer days use/acre (8 ddu/ha) and 20 elk days use/acre (49 edu/ha). Livestock use was estimated at 19 cow days use/acre (47 cdu/ha). In 2005, use was light at 10 deer days use/acre (25 ddu/ha), 15 elk days use/acre (38 edu/ha), and 14 cow days use/acre (34 cdu/ha). Rabbit sign was very high in 2005 with an 86% quadrat frequency.

The clay loam soil on the site is moderately deep and well-drained. Soil reaction is slightly alkaline (pH of 7.7). Effective rooting depth is estimated at almost 18 inches. A stoniness profile estimated from penetrometer readings shows the majority of rock to occur 12 inches or deeper in the profile. There is an active gully in the middle of the draw. It was reported to be 10 feet deep in 1988 with steep banks. In 1995, it was only about 4 feet deep with vegetation growing in the bottom. In 2000 and 2005 the gully appeared to be actively head cutting the erodible soil and had steep bank 15-20 feet deep. An erosion condition class rated this area as critical in 2005 due to the gully, pedestaling, and soil movement. Ground cover characteristics have been trending downward as bare ground increased in 2000 and in 2005. Vegetation and litter cover decreased in this period.

Fourwing saltbush, Wyoming big sagebrush, basin big sagebrush, winterfat, and fringed sagebrush are all abundant browse species on this site. The majority of the big sagebrush on the site is Wyoming big sagebrush. Basin big sagebrush is found near the bottom of the draw where soil is deeper. The larger sample size implemented in 1995 began sampling basin big sagebrush. In 1988, only 200 young sagebrush plants were sampled. In 1995, Wyoming big sagebrush density was 1,940 plants/acre. This declined to 1,120 plants/acre in 2000, and to 980 plants/acre in 2005. Young plants were very abundant in 1995 as they made up 39% of the population. Only 4% of the population were young in 2000 and this increased to 10% in 2005. Decadence increased from about 3% in both 1995 and 2000 to 45% in 2005. Thirty-one percent of the population was classified as dying in 2005. Use increased from light in earlier years to moderate in 2005. Basin big sagebrush has remained stable since 1995 at about 740 plants/acre, but decadence increased to 41% in 2005. No young plants were sampled in 2005.

Fourwing saltbush density was 1,860 plants/acre in 1995. This increased to 2,200 plants/acre in 2000. In 2005, 1,740 plant/acre were sampled. Cover was about 3% in 1995, this increased to 5% in 2000, and was 2% in 2005. The stand appeared to be moving to an increasingly decadent condition in 1995 when 80% of the population was classified as decadent with 47% of the population classified as dying. However in 2000, the condition of fourwing improved as decadence decreased to 27% and no plants were classified as dying. The high amount of decadence in 1995 could be explained by the fact that fourwing saltbush is susceptible to winter injury and there was an extremely harsh winter during 1992-93. Decadence was 32% in 2005, while 18% of the population was classified as dying. Utilization was light to moderate in 2000 and increased to moderate to heavy in 2005. Young plants have not been very abundant during any sampling year. Photos from 1988 show fourwing to be abundant and very vigorous, while in 2005 plants show poor vigor and very little usable forage.

Winterfat and fringed sagebrush are very abundant on this site. Winterfat density has declined from 9,399 plants/acre in 1988 to 4,720 plants/acre in 2005. Young plants were very abundant in 2005 with 20% of the population classified as young. Winterfat cover has remained stable at about 3% from 1995-2005. Fringed sagebrush density has been variable, but cover has been 2-4% from 1995-2005.

The herbaceous understory was dominated by annual species in 1995 as cheatgrass and tansy mustard made up 88% of the herbaceous cover and 64% of the total vegetation cover. Due to the unusually wet spring of 1995, tansy mustard was 2 to 3 feet tall and cheatgrass cover was nearly 11%. Cheatgrass decreased significantly in 2000 and again in 2005. Cover was less than 1% in 2000 and 2005. Tansy mustard was not sampled in 2000 and was insignificant in 2005. This drastic decrease in annuals is due to the drought conditions and timing of moisture events. Annual stickseed increased from less than 1% cover in 1995 and 2000 to nearly 8% cover in 2005. Thickspike wheatgrass and blue grama are the most abundant perennial grasses. Scarlet globemallow is the only abundant perennial forb. Thickspike significantly increased in 2000 as did globemallow. Perennial grasses and forbs significantly increased in sum of nested frequency in 2000 and remained stable in 2005.

1988 APPARENT TREND ASSESSMENT

Basal vegetation cover is relatively high for this type of site at 7%. Litter cover is also fairly high at 55% and found mostly under the shrubs. The site is dominated by annual species with percent bare ground moderately high at 28%. Rock fragments are exposed as pavement (9.5%), although they are not concentrated. The key browse, big sagebrush, fourwing saltbush, and winterfat have low decadency rates, light utilization, and good vigor. The herbaceous understory consists mostly of annuals, but thickspike wheatgrass, blue grama, and Sandberg bluegrass are moderately abundant. Perennial forbs are lacking and consist primarily of one species, scarlet globemallow.

1995 TREND ASSESSMENT

Soil trend appears stable. Percent bare ground has declined from 28% to 21%. Litter cover also declined, but this has been the general trend with the drought. Due to the abundant herbaceous cover (mostly annuals), erosion is minimal. Overall, the browse trend is considered stable. Fourwing saltbush has a high percentage of decadent plants (80%) and nearly half of the population displays poor vigor (47%). In the nearby Crow's Roost Enclosure, decadent fourwing were also noted in both the total and livestock enclosure. This increased decadence is not related to use, as only 13% of the mature plants show moderate to heavy use. Fourwing saltbush can be damaged by severe drought in association with a severe winter (cold with heavy snow) which took place in 1992-93. It should also be noted that even under ideal conditions fourwing saltbush has a fairly short life span of 20 to 30 years. The replacement of the older plants with younger ones is almost impossible when they are competing against a very dense population of winter annuals. Trend for winterfat appears stable, with only a small increase in moderate to heavy use than was reported in 1988 (0% vs 8%). Winterfat within the enclosure were larger and more vigorous than those sampled outside. Big sagebrush now provides 37% of the browse cover with good vigor, good reproductive potential, and a robust percentage of young plants. The great change in density for fringed sagebrush is most likely a reflection of the much larger, better distributed sample used in 1995. The herbaceous understory trend is down and in poor condition. The fairly numerous perennial grasses, thickspike wheatgrass and blue grama, have sum of nested frequency values that have declined significantly. The most numerous perennial forb, scarlet globemallow, has also decreased significantly. Sum of nested frequency of perennial grasses declined 59%, while frequency of perennial forbs decreased 42%. Cheatgrass and annual forbs dominate the understory by providing 91% of the total herbaceous cover. Due to the wet spring, tansy mustard was very robust and abundant even within the enclosure. The Desirable Components Index (see methods) rated this site as fair. The high amount of cheatgrass and the potential for fire lowers the score.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - down (-2)

winter range condition (DC Index) - fair (32) Lower potential scale

2000 TREND ASSESSMENT

Trend for soil is down. Percent cover for bare ground increased from 21% to almost 36% in 2000. Percent cover of vegetation also decreased while litter cover remained nearly stable. Although the increase in bare ground and decrease in vegetation cover is due to the drastic decrease in annuals, cheatgrass is fairly good at holding soils and is better than having bare soil. Gully erosion is also a problem. Trend for browse is stable overall. Fourwing saltbush shows increased use, but greatly improved vigor. Percent decadency decreased from a high of 80% in 1995 to a moderate level in 2000 at 27%. Recruitment (young plants) remains low at 6%. Big sagebrush was split into basin big sagebrush and Wyoming big sagebrush in 2000. Use on both subspecies is mostly light with low decadency. However, poor vigor occurred in 33% of the basin big sagebrush population and 12% of the Wyoming big sagebrush population. Trend for the herbaceous understory is up. Annual species decreased in 2000 due to drought, with sum of nested frequency for perennial species increasing. The DCI score increased to excellent as cheatgrass decreased, perennial grass increased, and browse increased.

TREND ASSESSMENT

soil - down (-2)

browse - stable (0)

herbaceous understory - up (+2)

winter range condition (DC Index) - excellent (71) Lower potential scale

2005 TREND ASSESSMENT

The soil trend is down. Bare ground increased from 36% in 2000 to 50% in 2005. Litter cover decreased from 42% to 23% and vegetation cover decreased from 37% to 29%. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) decreased further. The bottom of the draw is currently eroding into a gully and head cutting up the draw. Erosion is a problem in this area. The browse trend is slightly down. The number of decadent and dying sagebrush plants increased, while few young plants were found to replace those that are dying. Fourwing saltbush vigor is poor, but density has only decreased very slightly. Utilization increased in 2005. Winterfat density declined, but young plants were abundant and strip frequency was higher in 2005. The herbaceous understory is stable. Sum of nested frequency for perennial grasses and forbs remained stable and cheatgrass declined. Thickspike wheatgrass, blue grama, and scarlet globe mallow are all stable. The DCI score decreased to good as perennial grass cover decreased, shrub recruitment decreased, and browse cover decreased slightly.

TREND ASSESSMENT

soil - down (-2)

browse - slightly down (-1)

herbaceous understory - stable (0)

winter range condition (DC Index) - good (53) Lower potential scale

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

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	<i>Agropyron dasystachyum</i>	_b 208	_a 119	_b 247	_b 245	1.43	10.67	5.08
G	<i>Agropyron spicatum</i>	-	9	-	2	.09	-	.00
G	<i>Bouteloua gracilis</i>	_c 177	_a 22	_b 97	_b 129	.18	1.68	3.79
G	<i>Bromus tectorum</i> (a)	-	_c 252	_b 82	_a 43	10.79	.53	.19
G	<i>Oryzopsis hymenoides</i>	-	-	-	1	-	-	.00
G	<i>Poa secunda</i>	20	16	26	24	.10	.21	.64
G	<i>Sitanion hystrix</i>	-	-	-	3	-	-	.00
Total for Annual Grasses		0	252	82	43	10.79	0.53	0.19
Total for Perennial Grasses		405	166	370	404	1.81	12.57	9.53
Total for Grasses		405	418	452	447	12.61	13.10	9.73
F	<i>Chenopodium fremontii</i> (a)	-	-	-	5	-	-	.01
F	<i>Delphinium</i> sp.	-	1	-	-	.00	-	-
F	<i>Descurainia pinnata</i> (a)	-	_b 302	_a -	_a 6	19.10	-	.04
F	<i>Erigeron eatonii</i>	_a 1	_b 18	_a -	_a -	.54	-	-
F	<i>Lappula occidentalis</i> (a)	-	_b 88	_a 44	_c 245	.39	.16	7.76
F	<i>Machaeranthera canescens</i>	_b 9	_a -	_a -	_a -	-	-	-
F	<i>Phlox longifolia</i>	15	28	13	16	.11	.10	.04
F	<i>Ranunculus testiculatus</i> (a)	-	_b 84	_a 21	_a 23	.70	.10	.08
F	<i>Schoenocrambe linifolia</i>	-	-	-	-	-	-	.00
F	<i>Sphaeralcea coccinea</i>	_c 202	_a 84	_b 142	_{ab} 107	.63	3.08	1.75
Total for Annual Forbs		0	474	65	279	20.20	0.27	7.90
Total for Perennial Forbs		227	131	155	123	1.28	3.18	1.80
Total for Forbs		227	605	220	402	21.48	3.45	9.71

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

BROWSE TRENDS --

Management unit 10 , Study no: 10

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Artemisia frigida	44	79	79	1.78	3.60	3.02
B	Artemisia tridentata tridentata	11	15	11	.71	2.84	3.12
B	Artemisia tridentata wyomingensis	36	27	27	3.84	5.17	4.18
B	Atriplex canescens	55	53	49	2.83	5.23	2.46
B	Ceratoides lanata	55	61	68	3.23	2.85	3.28
Total for Browse		201	235	234	12.39	19.71	16.09

CANOPY COVER, LINE INTERCEPT --

Management unit 10 , Study no: 10

Species	Percent Cover
	'05
Artemisia frigida	1.38
Artemisia tridentata tridentata	2.73
Artemisia tridentata wyomingensis	3.36
Atriplex canescens	1.86
Ceratoides lanata	3.16

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10 , Study no: 10

Species	Average leader growth (in)
	'05
Artemisia tridentata wyomingensis	1.9
Ceratoides lanata	4.2

BASIC COVER --

Management unit 10 , Study no: 10

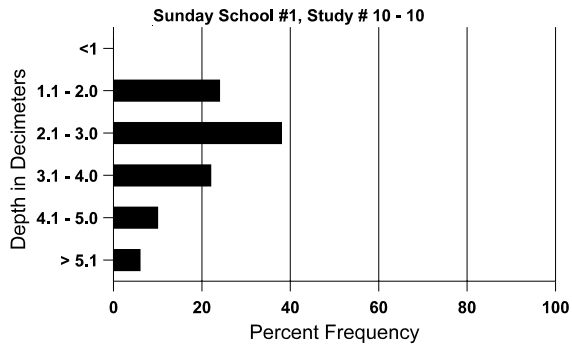
Cover Type	Average Cover %			
	'88	'95	'00	'05
Vegetation	7.00	49.70	36.77	29.32
Rock	.25	.27	.06	.62
Pavement	9.50	2.63	3.00	7.91
Litter	55.00	40.40	42.09	22.85
Cryptogams	.50	.03	.36	.06
Bare Ground	27.75	21.33	35.75	49.85

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 10, Study Name: Sunday School #1

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
17.8	58.4 (18.1)	7.7	28.0	39.4	32.6	2.4	10.1	409.6	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 10 , Study no: 10

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	3	38	86
Elk	-	11	22
Deer	-	6	10
Cattle	3	6	10

Days use per acre (ha)	
'00	'05
-	-
20 (50)	15 (38)
3 (9)	10 (25)
19 (47)	14 (34)

BROWSE CHARACTERISTICS --
Management unit 10 , Study no: 10

		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 frigida												
88	94599	132333	62666	31933	-	-	0	0	0	-	0	7/5
95	2040	8880	680	1340	20	-	0	0	1	.98	.98	7/5
00	9660	340	1340	8300	20	-	0	0	0	.20	.20	5/8
05	5700	160	820	4880	-	-	24	5	0	-	0	5/7
Artemisia tridentata tridentata												
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	760	160	400	360	-	-	11	0	0	-	0	24/33
00	660	-	120	520	20	20	3	0	3	-	27	72/65
05	740	-	-	440	300	60	32	24	41	22	22	34/41
Artemisia tridentata wyomingensis												
88	200	1733	200	-	-	-	0	0	0	-	0	-/-
95	1940	260	760	1120	60	-	11	5	3	1	1	19/24
00	1120	60	40	1040	40	80	7	0	4	2	9	24/30
05	980	-	100	440	440	280	39	31	45	31	31	21/29
Atriplex canescens												
88	1333	-	133	1200	-	-	0	0	0	-	0	31/28
95	1860	-	60	320	1480	20	5	8	80	47	47	18/26
00	2200	-	140	1460	600	40	43	5	27	-	0	18/24
05	1740	-	120	1060	560	120	20	60	32	18	18	11/16
Ceratoides lanata												
88	9399	66	2866	6533	-	-	0	0	0	-	0	9/3
95	8320	40	580	7140	600	-	3	4	7	-	0	10/10
00	7380	120	420	6920	40	-	18	1	1	-	0	7/8
05	4720	20	940	3720	60	-	10	73	1	1	1	7/7
Gutierrezia sarothrae												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	6/8
Opuntia sp.												
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	1/3
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-