

Trend Study 2-30-06

Study site name: State Line.

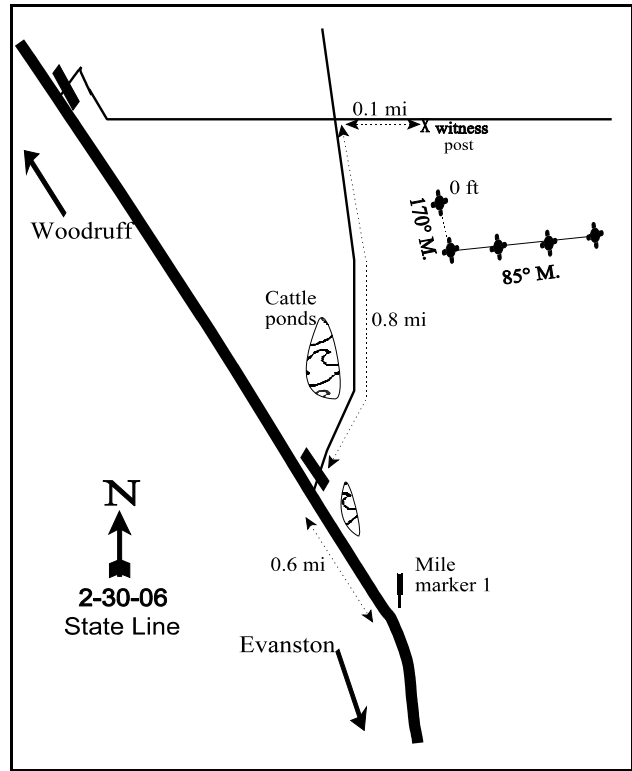
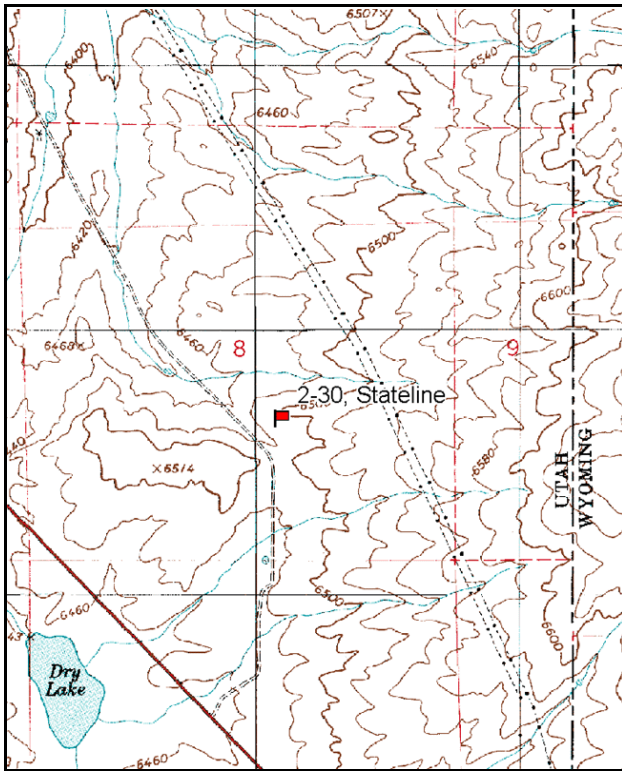
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 170 degrees magnetic.

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

LOCATION DESCRIPTION

From the Utah/Wyoming border, proceed north on Highway 16 for 0.6 miles past mile marker 1. Turn right proceeding through gate, and travel 0.8 miles north to an intersection in a wash. Turn right, and drive 0.1 miles east to a witness post. Walk ten paces at a bearing of 170 degrees magnetic. From 0' to 100' 170 degrees magnetic from 100' to 400' 85 degrees magnetic. The 0-foot stake is wired with a browse tag # 7991



Map Name: Neponset Reservoir NE

Diagrammatic Sketch

Township 8N, Range 8E, Section 8

UTM NAD 27, UTM 12T 4587628 N, 495083 E

DISCUSSION

State Line - Trend Study No. 2-30

Study Information

This study is located near the Utah-Wyoming border southeast of Woodruff on land administered by the BLM (elevation: 6,500 feet, slope: 3%, aspect: nearly level). This area is dominated by Wyoming big sagebrush and has very few species in the herbaceous understory. The area is used by deer and pronghorn. Quadrat frequency of deer pellet groups was moderately high at 26% in 1996, declined to 13% in 2001, and slightly increased to 20% in 2006. A pellet group transect read in 2001 estimated 31 deer/pronghorn, 7 elk, and 12 cow days use/acre (76 ddu/ha, 17 edu/ha, and 29 cdu/ha). Deer and pronghorn pellet groups were combined due to their similarity in appearance. Pellet group data from 2006 was estimated at 25 deer/pronghorn, 5 elk, and 14 cow days use/acre (63 ddu/ha, 12 edu/ha, and 34 cdu/ha). Cattle were in the area during the spring and early summer of 2001 and 2006. Sage grouse also use the area, and some sage grouse droppings were encountered in 2001.

Soil

Soil is classified in the Neponset series, a moderately deep, well drained soil residually formed from sandstone and siltstone. Total soil depth ranges from 20 to 40 inches and is calcareous throughout. Neponset soil is moderately permeable to water and has low available water capacity. It is moderately susceptible to water erosion and highly susceptible to wind erosion and dune formation (Campbell and Lacey 1982; USDA-NRCS 2006). The soil has a clay loam texture and a soil reaction that is slightly alkaline (7.8 pH). Effective rooting depth is slightly more than 10 inches. The surface is nearly free of rock cover with a calcareous layer at about 10 inches below the surface. Moderately high amounts of bare ground are exposed, but terrain is nearly level so water erosion is not excessive. Soil pedestalling is evident around plants and the soil is held in place by the abundance of cryptogamic crusts under sagebrush crowns. The presence of flow patterns, rills, and soil movement indicate continual erosion is occurring. The ratio of protective cover (vegetation, litter, and cryptograms) to bare ground remained fair at 2.9:1 in 2006. The erosion condition class was determined to be slight in 2001 and 2006.

Browse

The landscape is dominated by Wyoming big sagebrush, which has averaged between 22-25% cover since 1996. Density declined from 8,066 plants/acre in 1990 to 6,500 in 1996. The decline in density is largely the result of changes in the number of young plants and the larger sample size collected in 1996. The density has changed very little since 1996. Due to drought, seedlings and young were scarce in 1996 and 2001, but seedlings were very abundant in 2006 with above average precipitation, especially in the spring (Monsen and Meyer 1990; Utah Climate Summaries 2006). Annual leader growth was relatively poor in 2001 at 1.0 inch and only 0.5 inches in 2006. Utilization of sagebrush has been consistently moderate to heavy since 1990, except in 2006 when it was only considered light. Vigor has remained normal on most plants and decadence steadily declined from 39% in 1990 to 21% in 2001, but increased to 30% in 2006.

Other fairly common browse species include Gardner saltbush and stickyleaf low rabbitbrush. Gardner saltbush is a very small, low-growing saltbush that is strongly rhizomatous and sprouts profusely. It is an important browse, especially on disturbed sites where it seems to perform exceptionally well (Carlson et al. 1984). The density plot data from 1984 and 1990 almost certainly present a biased picture of this species importance with 3,866 and 5,532 plants/acre estimated respectively. The larger sample used beginning in 1996 gives a better picture of the species true density, which was estimated at 1,840 plants/acre in 1996 and 1,100 plants/acre in 2001 and 2006. Stickyleaf low rabbitbrush has a mostly mature population of around 2,000 plants/acre.

Herbaceous Understory

Herbaceous composition produces little forage and lacks diversity. Grass production is poor and many acres

are required to support a single AUM. Total grass cover has only averaged between 5-6% since 1996. The only common grass is Sandberg bluegrass, which accounts for at least 75% of the grass cover during all readings. Not a single annual grass has been found on this study since 1984. Forbs are even less productive and few species have any significant value. The only fairly common species include hoods phlox and stemless goldenweed.

1990 TREND ASSESSMENT

Wyoming big sagebrush displays a stable trend. It is moderately to heavily hedged with fair vigor and a well-balanced age class structure. Decadence is moderately high at 38%. Trend for grasses is slightly down. Perennial grass sum of nested frequency decreased by 14% due mainly to a significant decrease in western wheatgrass and needle-and-thread. Trend for forbs is stable. Forbs are minimal and have not changed from 1984.

browse - stable (0) grasses - slightly down (-1) forbs - stable (0)

1996 TREND ASSESSMENT

Trend for Wyoming big sagebrush is stable although it could decline in the near future without an improvement in reproduction. The number of seedlings and young plants have declined since 1990, but the number of mature and decadent sagebrush have remained similar. Total density has declined from 8,066 plants/acre in 1990 to 6,500 plants/acre in 1996. Some of the difference in density is due to the larger sample used in 1996. Dead sagebrush, first included in 1996, number 800 plants/acre. Considering the large population, this would not suggest a major die-off. It is indicative that the larger sample used in 1996 gives a more accurate estimate of the actual Wyoming big sagebrush density. There is less heavy use of the sagebrush, vigor has improved, and percent decadence has declined slightly (38% to 32%). However, 8% population was classified at dying (>50% crown death). If reproduction does not improve, the population will likely decline slightly. Trend for grasses is slightly down. Perennial grass sum of nested frequency decreased by 13%. Trend for forbs is slightly down. Perennial forb sum of nested frequency decreased by 16% due mainly to a decrease in stemless goldenweed. The Desirable Components Index rated this study as good due to excellent browse cover, moderate decadence, and low perennial grass cover.

winter range condition (DC Index) - good (52) Low Potential scale
browse - stable (0) grasses - slightly down (-1) forbs - slightly down (-1)

2001 TREND ASSESSMENT

Trend for Wyoming big sagebrush is stable. Density has remained similar to 1996. Utilization is moderate, vigor is normal on most plants, and percent decadence has declined to 21%. Seed production is good this year, while annual leader growth appeared to be poor averaging only 1 inch. Reproduction is poor with few seedlings and young plants encountered. The population will eventually decline if reproduction does not improve. Trend for grasses is slightly up. The sum of the nested frequency of perennial grasses increased 12%. Trend for forbs is down. Perennial forb sum of nested frequency declined by 27% and has continually declined since 1984. Hoods phlox was the main species that decreased significantly. The Desirable Components Index rated this study as good due to excellent browse cover, moderate decadence, and low perennial grass cover.

winter range condition (DC Index) - good (57) Low Potential scale
browse - stable (0) grasses - slightly up (+1) forbs - down (-2)

2006 TREND ASSESSMENT

Trend for key browse, Wyoming big sagebrush, is stable. Density has not changed from previous years, but the number of decadent plants increased to 30% and 15% of the population was classified as dying. Seedlings were very abundant and may contribute to the population if they survive. Trend for grasses is stable. Very little change in sum of nested frequency for perennial grasses. Trend for forbs is up. Perennial forb cover still

remains minimal, but sum of nested frequency increased by 37%, mainly due to significant increase in longleaf phlox. The Desirable Components Index rated this study as good due to excellent browse cover, moderate decadence, and low perennial grass cover.

winter range condition (DC Index) - good (53) Low Potential scale
 browse - stable (0) grasses - stable (0) forbs - up (+2)

HERBACEOUS TRENDS --
 Management unit 02 , Study no: 30

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron smithii	c140	ab94	a51	ab96	bc108	.36	.87	1.23
G	Oryzopsis hymenoides	5	9	8	10	12	.19	.51	.08
G	Poa secunda	235	248	232	245	212	4.11	4.94	3.68
G	Sitanion hystrix	a-	ab9	b23	a-	b17	.07	-	.07
G	Stipa comata	b39	a-	a-	a-	a-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		419	360	314	351	349	4.73	6.32	5.07
Total for Grasses		419	360	314	351	349	4.73	6.32	5.07
F	Alyssum alyssoides (a)	-	-	a2	c211	b147	.00	.69	.57
F	Antennaria rosea	6	9	2	1	3	.15	.00	.00
F	Arabis sp.	b19	a-	a-	a3	a1	-	.00	.00
F	Astragalus convallarius	b20	a6	a2	ab9	a-	.00	.07	-
F	Astragalus utahensis	-	2	1	1	-	.00	.00	-
F	Cymopterus sp.	a-	a-	a-	a3	b15	-	.00	.05
F	Draba sp. (a)	-	-	3	3	-	.00	.03	-
F	Eriogonum caespitosum	-	2	-	-	-	-	-	-
F	Eriogonum cernuum (a)	-	-	-	1	-	-	.00	-
F	Erigeron pumilus	3	5	-	-	-	-	-	-
F	Haplopappus acaulis	b69	b64	a30	a15	a16	.74	.54	.42
F	Phlox hoodii	ab125	ab128	b133	a89	ab102	2.08	1.88	1.34
F	Phlox longifolia	a3	ab25	b39	ab29	c70	.11	.12	.32
F	Ranunculus testiculatus (a)	-	-	-	-	4	-	-	.00
F	Trifolium sp.	7	4	-	2	1	-	.00	.00
F	Unknown forb-perennial	1	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	5	215	151	0.00	0.73	0.57
Total for Perennial Forbs		253	245	207	152	208	3.09	2.64	2.16
Total for Forbs		253	245	212	367	359	3.10	3.37	2.74

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

BROWSE TRENDS --

Management unit 02 , Study no: 30

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Artemisia tridentata wyomingensis</i>	98	96	94	23.38	25.17	21.96
B	<i>Atriplex gardneri falcata</i>	14	15	14	.56	.27	.28
B	<i>Chrysothamnus depressus</i>	0	0	0	-	-	.00
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	56	51	47	1.41	1.91	1.71
B	<i>Leptodactylon pungens</i>	0	3	4	-	.53	.30
B	<i>Opuntia sp.</i>	9	12	17	.21	.21	.16
B	<i>Tetradymia canescens</i>	6	4	5	.01	.00	.01
Total for Browse		183	181	181	25.57	28.10	24.44

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 30

Species	Percent Cover
	'06
<i>Artemisia tridentata wyomingensis</i>	24.26
<i>Atriplex gardneri falcata</i>	.21
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	1.58
<i>Leptodactylon pungens</i>	.25
<i>Opuntia sp.</i>	.28
<i>Tetradymia canescens</i>	.08

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 30

Species	Average leader growth (in)	
	'01	'06
<i>Artemisia tridentata wyomingensis</i>	1.0	0.5

BASIC COVER --

Management unit 02 , Study no: 30

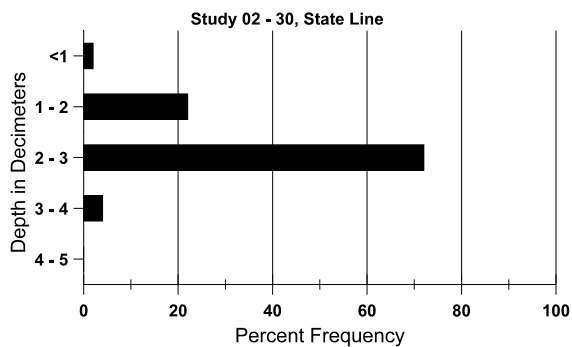
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	6.25	12.00	31.88	39.17	31.01
Rock	.75	.25	.33	.11	.41
Pavement	7.00	7.00	1.16	1.01	.74
Litter	42.75	24.00	26.83	28.42	31.02
Cryptogams	5.50	14.00	8.70	12.45	11.36
Bare Ground	37.75	42.75	39.54	42.63	43.56

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 30, State Line

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
10.4	54.8 (9.3)	7.8	41.9	28.1	30.0	2.0	8.4	99.2	0.8

Stoniness Index



PELLET GROUP DATA --

Management unit 02 , Study no: 30

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	4	1	27
Grouse	-	5	-
Elk	-	-	4
Deer	26	13	20
Cattle	-	1	2
Antelope	1	1	1

Days use per acre (ha)	
'01	'06
-	-
-	-
7 (17)	5 (12)
31 (76)	25 (63)
12 (29)	14 (34)
-	-

BROWSE CHARACTERISTICS --
Management unit 02 , Study no: 30

		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)
<i>Artemisia tridentata wyomingensis</i>												
84	7532	1533	1133	3466	2933	-	45	27	39	-	3	14/19
90	8066	66	1400	3600	3066	-	42	37	38	2	19	15/16
96	6500	40	100	4320	2080	800	46	11	32	8	8	15/31
01	6700	40	20	5260	1420	700	58	15	21	8	8	18/30
06	6600	17180	240	4360	2000	920	14	0	30	15	19	16/28
<i>Atriplex gardneri falcata</i>												
84	3866	5400	2200	1666	-	-	38	0	0	-	0	7/11
90	5532	3600	4466	1066	-	-	5	5	0	-	0	5/7
96	1840	-	-	1800	40	-	0	0	2	-	0	3/7
01	1060	-	60	1000	-	-	23	38	0	-	0	4/7
06	1100	40	320	740	40	-	2	0	4	-	2	4/7
<i>Ceratoides lanata</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	5/11
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
84	1732	66	66	1600	66	-	0	0	4	-	4	11/14
90	2065	-	133	1066	866	-	39	3	42	-	6	6/10
96	2020	-	-	1660	360	20	0	0	18	10	10	8/13
01	2000	-	20	1840	140	40	0	0	7	4	4	8/12
06	1880	200	60	1200	620	60	11	0	33	10	24	7/12
<i>Eriogonum microthecum</i>												
84	66	-	-	66	-	-	0	0	-	-	0	1/2
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	-/-

		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)
Leptodactylon pungens												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	220	-	20	200	-	-	0	0	-	-	0	4/9
06	180	-	-	180	-	-	0	0	-	-	0	5/12
Opuntia sp.												
84	600	-	-	600	-	-	0	0	0	-	0	5/13
90	932	133	533	133	266	-	0	0	29	2	14	4/6
96	500	-	100	340	60	20	0	0	12	4	4	3/11
01	440	20	20	340	80	-	0	0	18	5	5	3/7
06	540	60	80	440	20	20	0	0	4	-	0	3/10
Tetradymia canescens												
84	66	-	-	66	-	-	100	0	0	-	0	4/5
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	360	-	-	200	160	-	0	17	44	11	11	4/9
01	80	-	-	80	-	-	25	0	0	-	0	7/12
06	120	-	20	40	60	-	17	0	50	33	33	6/10