

Trend Study 2-2-06

Study site name: Mouth of Blacksmith Fork.

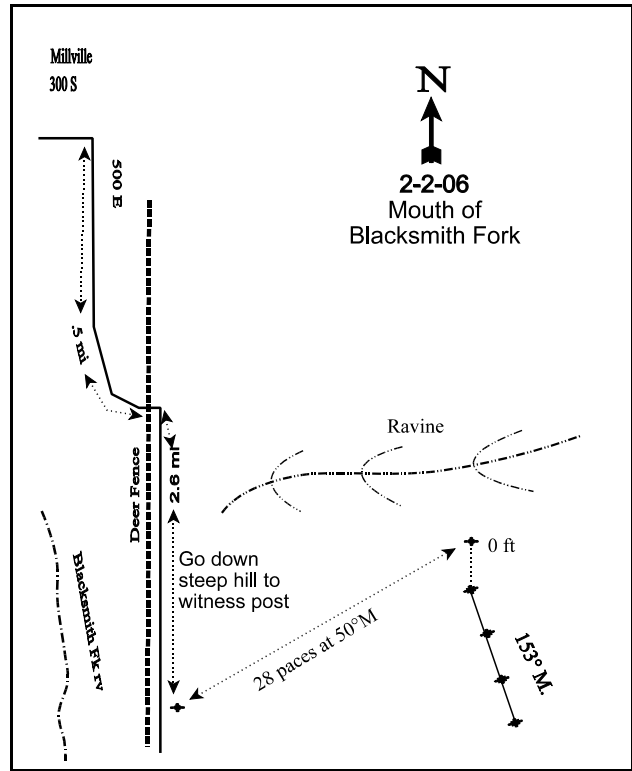
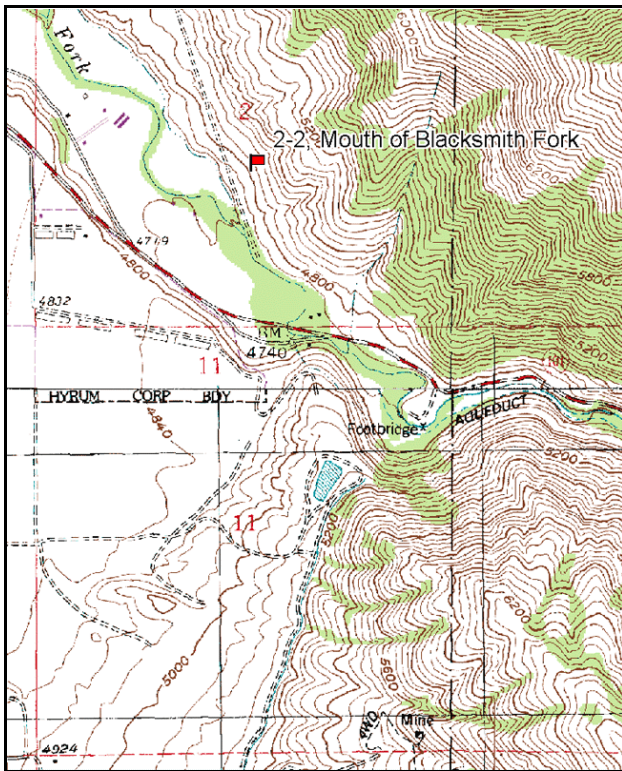
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 159 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 4 on 5 ft.

LOCATION DESCRIPTION

Proceed south 0.5 miles from the intersection of 300 South and 500 East in Millville. At the intersection just east of the deer fence, proceed south for 2.6 miles and stop at a witness post, which is at the top of the hill. From the witness post, walk 100 feet at 50 degrees magnetic to the 0-foot stake of the baseline marked by browse tag #90. The baseline runs at a bearing of 159 degrees magnetic. The baseline doglegs after 100 feet and runs 151 degrees magnetic.



Map Name: Logan

Diagrammatic Sketch

Township 10N, Range 1E, Section 2

UTM NAD 27, UTM 12T 4609060 N , 433136 E

DISCUSSION

Mouth of Blacksmith Fork - Trend Study No. 2-2

Study Information

This study is located slightly north of where the Blacksmith Fork river enters the Cache Valley (elevation: 4,800 feet, slope: 30%, aspect: southwest). The study sits on a narrow bench about 200 feet above a big game fence which runs along the east edge of the valley. The vegetation type is basin big sagebrush with a remnant stand of perennial grass and an overabundance of annual grasses, annual forbs, and perennial weeds. The area has been heavily utilized in the past. A pellet group transect read in 2001 estimated only 2 deer days use/acre (5 ddu/ha). Pellet group data in 2006 was estimated at 1 elk, 32 deer, and 1 cow days use/acre (2 edu/ha, 79 ddu/ha, and 2 cdu/ha). In 2006, multiple bedding areas and 4 deer carcasses were observed.

Soil

Soil is classified in the Sterling soil series (USDA-NRCS 2006), a category with moderately rapid permeability. Rooting depth can reach 60 inches, but more often is restricted to the upper 16 inches of the soil profile. Effective rooting depth was estimated at 16 inches. The soil is moderately alkaline (pH 7.9) and calcareous in the upper horizons, but becomes strongly so in the subsoil. Soils have a loam texture with rocks common on the surface and throughout the profile. Erosion potential is medium to high (Erickson and Mortensen 1974). There is some evidence of soil movement, but ground cover percentages indicate no meaningful changes in the soil condition. The erosion condition class was determined to be stable in 2001 and 2006 due to the abundance of herbaceous vegetation and litter cover.

Browse

The key browse species is basin big sagebrush. Some mountain big sagebrush grows on the nearby slopes, but the majority of the sagebrush along the bench is the more deeply rooted basin big sagebrush. The population was extremely decadent (92%), heavily browsed (100%), and generally in poor vigor during the 1984 reading. Since then, browsing has been light to moderate with good vigor. Density has increased from 799 plants/acre in 1984 to 1,860 plants/acre in 2001. A 23% decrease was observed in 2006, dropping to 1,440 plants/acre. Cover in 1996 and 2001 was estimated at 10-11%, but actually increased in 2006 to 16% despite the decrease in density. Starting in 1996, a larger sample size was taken, which gives better estimates of density in clumped and discontinuous distributions. Recruitment from young plants was abundant in 1990 and 1996, but very little recruitment was observed in 2001 or 2006. The abundant herbaceous understory dominated by annuals may be suppressing big sagebrush and bitterbrush seedling from establishing (Hall et al. 1999). Decadence has increased from 8% in 1996 to 17% in 2006, although this is still within expected levels. Shrubs such as antelope bitterbrush and Utah juniper occur occasionally, but were not sampled even with the larger sample. Broom snakeweed is minimal at less than 1% cover.

Herbaceous Understory

The herbaceous composition is dominated by annual grasses and biennial/perennial weeds. Among the grasses, the annuals cheatgrass and jointed goatgrass are especially prevalent. Cheatgrass cover has fluctuated from 15% in 2001 to 5% in 2006. Jointed goatgrass has steadily increased from 8% in 1996 to a high of 26% in 2006. It appears that cheatgrass is being outcompeted by jointed goatgrass and bulbous bluegrass. The abundance of these annual grasses leaves the area susceptible to a devastating fire which would eliminate the sagebrush. Less abundant are bluebunch wheatgrass, Sandberg bluegrass, prairie Junegrass, and red three-awn, a warm season increaser. The poor value bulbous bluegrass is also abundant and has remained similar to 2001 observation.

The forb component consists largely of annual mustards, ragweed, storksbill, and yellow salsify. Ragweed alone made up 58% of the forb cover in 1996. Apart from the low frequency and cover values of white sweet clover and alfalfa, the forb composition is nearly valueless and indicative of very poor range condition.

1990 TREND ASSESSMENT

Basin big sagebrush has shown a slight increase in density (17%) since 1984. Decadence has gone from 92% down to 31%, while the young class currently makes up 31% of the population. This population remains a moderately hedged, low density sagebrush community. The grass trend is down. Bluebrunch wheatgrass decreased significantly in nested frequency, while jointed goatgrass increased significantly. Trend for forbs is down. Dyers woad increased significantly in nested frequency, while yellow salsify decreased. Actually, only 6 out of 20 forbs increased in nested and quadrat frequency and 4 of those were weedy increasers.

browse - slightly up (+1)

grasses - down (-2)

forbs - down (-2)

1996 TREND ASSESSMENT

Trend for browse is slightly up with a 43% increase in density of basin big sagebrush. Some of the increase is due to the larger sample size used in 1996. However, utilization is light, vigor is good, and decadence is low at 8%. Much of the dead sagebrush within the population appear to be the result of the harsh winters of the early 1980's (heavy use and winter injury) combined with drought. Trend for grasses is down. The herbaceous composition is extremely poor, with 74% of the herbaceous cover made up of annual weeds. The grass composition is totally dominated by undesirable species which include jointed goatgrass, rattlesnake brome, Japanese brome, cheatgrass, annual rye, and bulbous bluegrass. Preferred perennial grasses averaged only 2% cover. Trend for forbs is slightly down. The forb composition is also poor and dominated by weedy annual, biennial, and perennial species. Common ragweed is the most abundant species. It accounts for 58% of the forb cover, and showed a notable increase in its nested frequency since 1990. Conversely, dyers woad declined significantly in nested frequency, while that of white sweetclover increased. With the high amounts of fine fuel (weedy species), one wildfire could remove all of the critical winter browse (basin big sagebrush) from the area. The Desirable Components Index rated this study as very poor due to high cover of annual grasses.

winter range condition (DC Index) - very poor (30) Mid-level potential scale

browse - up (+2)

grasses - down (-2)

forbs - slightly down (-1)

2001 TREND ASSESSMENT

Trend for basin big sagebrush is slightly up with an increase in density. Use is mostly light with normal vigor and percent decadence is low at 13%. The only downward trend parameter is the decline in young and seedling sagebrush. Trend for grasses is down. Sum of nested frequency of perennial grasses increased slightly since 1996. However, the majority of the rise is the result of a significant increase in the poor value bulbous bluegrass. Jointed goatgrass and cheatgrass also increased significantly. These three species account for 89% of the grass cover and 74% of the total herbaceous cover. Trend for forbs is down. Sum of nested frequency of perennial forbs declined in frequency. The most abundant forbs consist of pale alyssum, ragweed, and storksbill. The only positive aspects of the forb composition is the significant decline in the nested frequency of dyer's woad and the stable frequency of alfalfa. The Desirable Components Index rated this study as very poor due to the continuous increase in the cover and nested frequency of annual grasses.

winter range condition (DC Index) - very poor (17) Mid-level potential scale

browse - slightly up (+1)

grasses - down (-2)

forbs - down (-2)

2006 TREND ASSESSMENT

Trend for basin big sagebrush is slightly down. Density has decreased by 23% since 2001, although cover increased from 11% to 16%. Plants are continuing to get larger, but recruitment from young plants has been minimal the last two readings. The dense understory of annual grasses is most likely preventing seedling and young recruitment. Trend for grasses is stable. Cheatgrass nested frequency actually decreased significantly, while jointed goatgrass remained similar to 2001. However, jointed goatgrass increased in cover from 15% in 2001 to 26% in 2006. Annual rye nested frequency increased significantly and bulbous bluegrass cover

increased from 8% in 2001 to 11% in 2006. Trend for forbs is stable. Sum of nested frequency of perennial forbs changed very little in 2006. Annual forbs sum of nested frequency decreased. The Desirable Components Index rated this study as very poor due to the high cover and nested frequency of annual grasses.

winter range condition (DC Index) - very poor (22) Mid-level potential scale
browse - slightly down (-1) grasses - stable (0) forbs - stable (0)

HERBACEOUS TRENDS --
 Management unit 02 , Study no: 2

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	<i>Aegilops cylindrica</i> (a)	a ³	b ⁸¹	c ¹⁴⁸	d ²²⁹	d ²⁷⁴	7.88	15.26	26.07
G	<i>Agropyron spicatum</i>	b ⁴⁶	a ¹⁵	a ²¹	a ¹⁷	a ¹⁷	.73	.28	.16
G	<i>Aristida purpurea</i>	3	-	-	-	-	-	-	-
G	<i>Bromus brizaeformis</i> (a)	-	-	b ⁴⁸	b ⁴⁵	a ¹¹	.19	.18	.04
G	<i>Bromus japonicus</i> (a)	-	-	c ³³⁸	b ⁷³	a ¹²	16.71	.32	.02
G	<i>Bromus tectorum</i> (a)	-	-	b ²⁶²	c ³¹³	a ¹⁸³	8.07	14.82	4.94
G	<i>Carex</i> sp.	-	-	-	4	-	-	.38	-
G	<i>Elymus cinereus</i>	-	-	-	8	3	-	.27	.03
G	<i>Koeleria cristata</i>	5	-	-	-	-	-	-	-
G	<i>Poa bulbosa</i>	a ⁻	a ⁻	b ⁵⁸	c ¹⁷¹	c ¹⁹³	1.49	7.62	10.55
G	<i>Poa pratensis</i>	-	-	-	3	-	-	.03	-
G	<i>Poa secunda</i>	a ¹²	ab ³⁴	a ¹⁴	b ⁶²	b ⁵⁰	.03	.78	1.10
G	<i>Secale cereale</i> (a)	-	a ⁸	bc ¹¹⁴	b ⁸⁹	c ¹³⁵	2.77	2.48	5.12
Total for Annual Grasses		3	89	910	749	615	35.64	33.08	36.20
Total for Perennial Grasses		66	49	93	265	263	2.25	9.36	11.84
Total for Grasses		69	138	1003	1014	878	37.90	42.44	48.05
F	<i>Agoseris glauca</i>	1	5	3	-	4	.00	-	.01
F	<i>Allium acuminatum</i>	b ²²	a ⁻	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Alyssum alyssoides</i> (a)	-	-	a ⁴⁷	b ¹⁰⁶	a ²¹	.21	.33	.04
F	<i>Ambrosia psilostachya</i>	d ²⁶¹	bc ⁹⁴	c ¹¹⁴	ab ⁵⁷	a ⁴⁴	3.92	2.25	1.77
F	<i>Artemisia ludoviciana</i>	1	3	-	-	-	-	-	-
F	<i>Asclepias asperula</i>	a ⁻	b ⁸	ab ⁵	b ¹¹	ab ⁶	.54	.23	.98
F	<i>Astragalus utahensis</i>	ab ⁶	b ⁸	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Balsamorhiza sagittata</i>	1	-	-	-	-	-	-	-
F	<i>Calochortus nuttallii</i>	1	-	3	3	8	.01	.03	.02
F	<i>Cirsium undulatum</i>	b ²²	a ¹	a ¹	a ²	a ⁻	.00	.15	-
F	<i>Comandra pallida</i>	3	-	-	-	-	-	-	-
F	<i>Collinsia parviflora</i> (a)	-	-	-	-	4	-	-	.01
F	<i>Crepis acuminata</i>	5	7	-	2	1	-	.00	.03

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Cryptantha sp.	-	-	-	-	2	-	-	.03
F	Epilobium brachycarpum (a)	-	-	_b 70	_a 6	_a -	.29	.01	-
F	Erodium cicutarium (a)	-	-	_a 8	_b 141	_a 19	.07	4.19	.43
F	Gilia sp. (a)	-	-	3	8	-	.00	.01	-
F	Grindelia squarrosa	-	-	3	-	-	.03	-	-
F	Holosteum umbellatum (a)	-	-	_a -	_c 101	_b 60	-	.29	.14
F	Isatis tinctoria	_a 1	_c 46	_b 27	_{ab} 6	_{ab} 6	.19	.01	.09
F	Lactuca serriola	-	6	2	6	2	.00	.02	.03
F	Linum lewisii	1	-	-	-	-	-	-	-
F	Lithospermum ruderales	_a -	_b 6	_a -	_a -	_a -	.03	-	-
F	Lomatium grayi	5	-	-	-	-	-	-	-
F	Melilotus alba	_a 9	_a 1	_b 28	_a -	_a -	.30	-	-
F	Medicago sativa	15	19	16	22	26	.45	.74	.96
F	Petroradia pumila	2	-	-	-	-	-	-	-
F	Phlox longifolia	-	-	5	-	-	.01	-	-
F	Ranunculus testiculatus (a)	-	-	-	6	6	-	.01	.01
F	Tragopogon dubius	_c 191	_{ab} 35	_b 60	_a 8	_a 15	.71	.16	.06
F	Unknown forb-perennial	-	-	-	-	3	-	-	.15
F	Veronica biloba (a)	-	-	-	-	6	-	-	.01
F	Zigadenus paniculatus	-	-	-	4	-	-	.00	-
Total for Annual Forbs		0	0	128	368	116	0.57	4.86	0.65
Total for Perennial Forbs		547	239	267	121	117	6.22	3.63	4.16
Total for Forbs		547	239	395	489	233	6.80	8.50	4.82

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

BROWSE TRENDS --

Management unit 02 , Study no: 2

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia tridentata tridentata	50	52	46	9.85	10.98	15.73
B	Gutierrezia sarothrae	7	9	6	.03	.69	.03
Total for Browse		57	61	52	9.89	11.67	15.76

CANOPY COVER, LINE INTERCEPT --
Management unit 02 , Study no: 2

Species	Percent Cover
	'06
Artemisia tridentata tridentata	17.25
Gutierrezia sarothrae	.55

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 02 , Study no: 2

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata tridentata	2.1	2.0

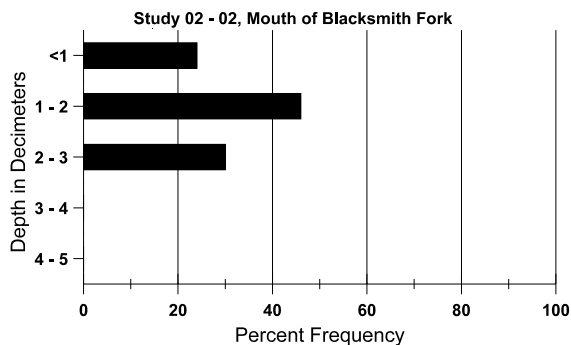
BASIC COVER --
Management unit 02 , Study no: 2

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	2.00	11.00	59.50	69.97	64.77
Rock	16.00	20.75	6.88	3.52	4.32
Pavement	14.00	3.50	2.87	4.34	5.37
Litter	58.00	51.75	71.15	55.77	45.77
Cryptogams	1.00	0	0	0	0
Bare Ground	9.00	13.00	.41	.26	.55

SOIL ANALYSIS DATA --
Herd Unit 02, Study no: 02, Mouth of Blacksmith Fork

Effective rooting depth (in)	Temp °F (depth)	PH	Loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
15.9	75.6 (16.5)	7.9	33.3	40.7	26.0	2.7	7.3	188.8	0.8

Stoniness Index



PELLET GROUP DATA --

Management unit 02 , Study no: 2

Type	Quadrat Frequency		
	'96	'01	'06
Elk	1	-	1
Deer	1	2	16
Cattle	1	1	-

Days use per acre (ha)	
'01	'06
-	1 (2)
2 (5)	32 (79)
2 (4)	1 (2)

BROWSE CHARACTERISTICS --

Management unit 02 , Study no: 2

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata tridentata</i>												
84	799	-	-	66	733	-	0	100	92	-	13	32/40
90	966	-	300	366	300	-	24	3	31	2	24	25/27
96	1680	220	440	1100	140	520	6	0	8	1	1	32/52
01	1860	-	20	1600	240	280	16	0	13	4	5	31/41
06	1440	-	-	1200	240	220	36	10	17	3	3	34/51
<i>Gutierrezia sarothrae</i>												
84	99	-	-	66	33	-	67	0	33	-	0	19/22
90	899	-	66	833	-	-	0	0	0	-	0	18/16
96	620	-	280	340	-	-	0	0	0	-	0	14/19
01	560	-	-	560	-	-	4	0	0	-	0	12/18
06	140	-	-	140	-	-	0	0	0	-	0	13/17
<i>Opuntia sp.</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	33	-	-	33	-	-	0	0	-	-	0	6/8
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	-/-