

Trend Study 2-23-06

Study site name: Flat Bottom Canyon .

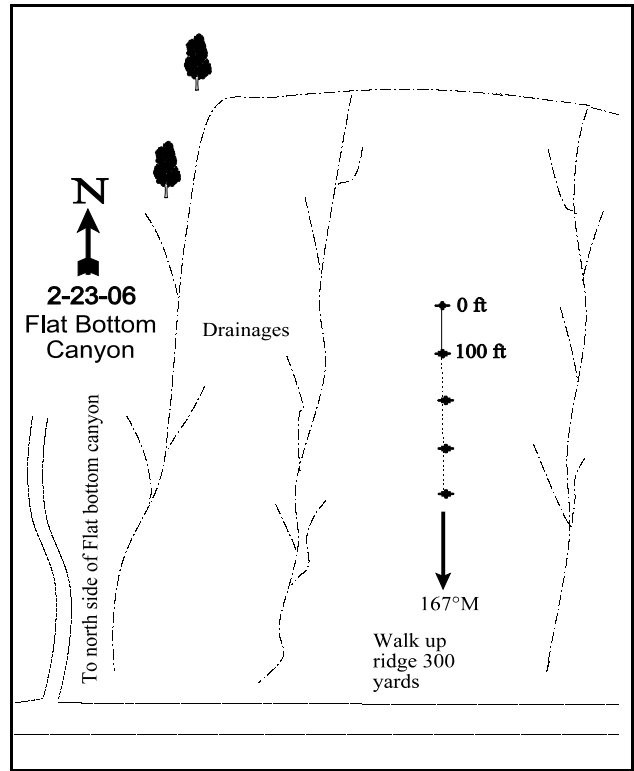
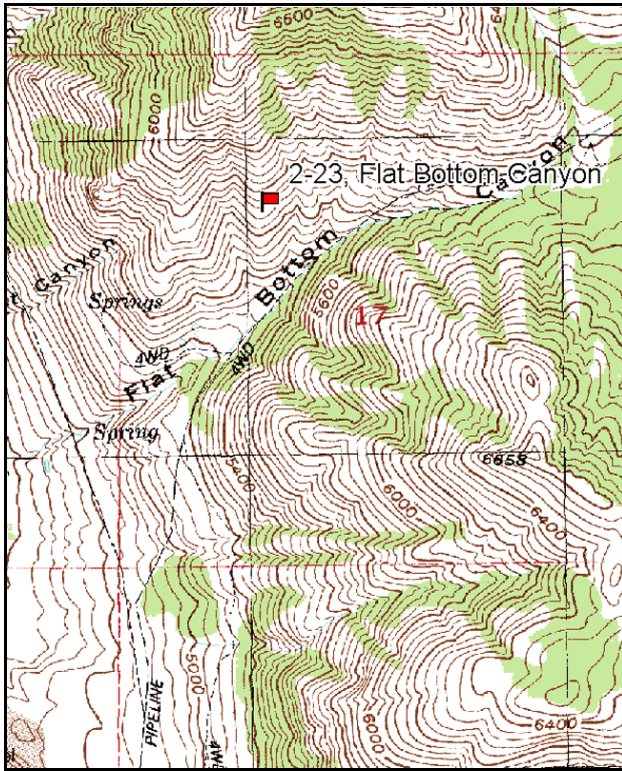
Vegetation type: Big Sagebrush .

Compass bearing: frequency baseline 167 degrees magnetic.

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

LOCATION DESCRIPTION

Ask for permission and directions to the mouth of the canyon at the Bingham sand and gravel pit. Four-wheel drive is needed. From mouth of canyon proceed to the ridge on north side of canyon where the site is located. Walk up the ridge about 300 yards to the 400-foot stake. The 0-foot baseline stake is further up the ridge. The 0-foot stake is marked with browse tag #7919. This site can be reached by following aqueduct road in Box Elder Canyon and around the bench to Flat Bottom Canyon.



Map Name: Mount Pisgah

Diagrammatic Sketch

Township 9N, Range 1W, Section 17

UTM NAD 27, UTM 12T 4596766 N, 418054 E

DISCUSSION

Flat Bottom Canyon - Trend Study No. 2-23

Study Information

This study is located in Flat Bottom Canyon, which is just east of the Brigham City gravel pit (elevation: 5,600 feet, slope: 50%, aspect: south). Utilized by deer in winter, the study area produces relatively little browse forage. A very shallow soil almost certainly limits plant growth and plant densities on the steep south slopes of the canyon. A pellet group transect read in 2001 estimated 25 deer use days/acre (63 ddu/ha). Most of the pellet groups appeared to be from late spring use. There were more pellet groups near the bottom of the slope where the density of sagebrush was higher. Pellet group data from 2006 was estimated at 15 deer days use/acre (36 ddu/ha).

Soil

Soil is classified in the Foxol series, which have shallow, well drained soils with moderate permeability. The soils formed in residuum from quartzite (USDA-NRCS 2006). The soil is very rocky with a loam texture and a soil reaction that is moderately acidic (pH of 5.9). Effective rooting depth was estimated at only 7 inches in 1996. The potential for severe soil erosion and gully formation on the steep face is inevitable, but is not serious due to the abundance of rock and herbaceous cover. The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground was fair at 3.5:1 in 2006. The erosion condition class was classified as stable in 2001 and slight in 2006.

Browse

This study is dominated by annual grasses and weedy forbs. Browse is a minor component and consists of a low-growing population of mountain big sagebrush. Density has steadily decreased since 1984 at 2,232 plants/acre (half were young plants) to 20 plants/acre in 2006. Utilization was moderate to heavy in 1984 and has displayed moderate use since. Mature plants are short and may be stunted due to the poor site conditions combined with continual use by deer and dry growing conditions. The upper south slopes of the canyon are all depleted of sagebrush. More sagebrush is found near the bottom of the canyon where the soil is deeper.

The only abundant browse species has been broom snakeweed. Snakeweed density steadily increased from 1,065 plants/acre in 1984 to 4,760 by 2001. The population disappeared in 2006 when no plants were sampled.

Herbaceous Understory

Annual grasses and weedy forbs are very abundant, especially lower on the slope. Cheatgrass, rattlesnake brome, and rattail fescue dominated the herbaceous understory in 1996 and 2001 by producing 19% and 13% cover, respectively. In 2006, annual grass cover decreased by 35% and nested frequency decreased 47%. Rattail fescue was very common in 2001, but was not sampled in 2006. Bluebunch wheatgrass, red three-awn, and Sandberg bluegrass are moderately abundant. Bulbous bluegrass was a minor component until 2006, when cover increased from less than 1% in 2001 to 8% in 2006 and quadrat frequency increased from 21% in 2001 to 74% in 2006. Forbs are dominated by pale alyssum, ragweed, and storksbill. Dyer's woad, a noxious weed in the state of Utah, has been on the study since 1984. It decreased significantly from 1996 to 2006 and was only sampled in a single quadrat in 2006.

1990 TREND ASSESSMENT

The many heavily hedged sagebrush encountered in 1984 are now mostly dead. Mature and decadent plants decreased from 1,166 plants/acre in 1984 to 466 plants/acre in 1990. The small remaining sagebrush are vigorous, showing light to moderate use. The low amount of forage produced combined with heavy ant and aphid infestation and aggressive invaders, there appears little chance for reversal of the downward trends. Trend for grasses is up. Perennial grass sum of nested frequency increased by 28%, mostly due to a significant increase in Sandberg bluegrass and purple three-awn. Trend for forbs is stable. Nested frequency for ragweed and Louisiana wormwood both significantly decreased. Both species are native, but ragweed is generally

unpalatable and weedy. Spring parsley was not observed in 1984, but was fairly common in 1990.

browse - down (-2)

grasses - up (+2)

forbs - stable (0)

1996 TREND ASSESSMENT

The browse trend is down due to a 65% decline in the density of mountain big sagebrush. Currently, there are only 200 sagebrush plants/acre. Mature plants numbered only 60 plants/acre. Drought combined with the low water holding capacity of the rocky soil, high surface temperatures, and competition with winter annuals are eliminating sagebrush from the area. Trend for grasses is down. Perennial grass sum of nested frequency decreased by 44%, mainly due to a significant decrease in Sandberg bluegrass. Annual grasses were included in the sample for the first time and cheatgrass was extremely abundant at 17% cover. Trend for forbs is slightly down. Ragweed was the only species that significantly increased and it is considered weedy and generally unpalatable. The Desirable Components Index rated this study as very poor due to low browse cover, but with fair perennial grass and forb cover. Annual grass cover was very high at 19%.

winter range condition (DC Index) - very poor (9) Mid-level potential scale

browse - down (-2)

grasses - down (-2)

forbs - slightly down (-1)

2001 TREND ASSESSMENT

Trend for browse is stable. Density of mountain big sagebrush has remained similar at 160 plants/acre, but the population is very small. Utilization is moderate and vigor is normal. Density of rubber rabbitbrush has increased, but the population is small and are mostly unutilized. Density of broom snakeweed increased from 3,240 plants/acre in 1996 to 4,760 plants/acre in 2001, which can be an indicator of disturbance. Trend for grasses is slightly up. Sandberg bluegrass and red three-awn both significantly increased. Bulbous bluegrass significantly increased, but is not abundant. Cheatgrass significantly declined from 17% to 7% cover, while rattail fescue increased from less than 1% to 6% cover. Trend for forbs is slightly down. Ragweed nested frequency significantly declined. Unfortunately, annual forb nested frequency also increased substantially with pale alyssum, storksbill, and *Holosteum umbellatum*. The composition of the herbaceous understory is still poor and will most likely not improve. The Desirable Components Index rated this study as very poor due to low browse cover, but with fair perennial grass and forb cover. Annual grass cover is common, but decreased since 1996.

winter range condition (DC Index) - very poor (18) Mid-level potential scale

browse - stable (0)

grasses - slightly up (+1)

forbs - slightly down (-1)

2006 TREND ASSESSMENT

Trend for key browse, mountain big sagebrush, is down. Mountain big sagebrush is nearly absent from the study area at only 20 plants/acre. Young recruitment has not been observed in since 1996. Broom snakeweed was very common in 2001 at 4,760 plants/acre, but not a single plant was sampled in 2006. Trend for grasses is stable. Perennial grass sum of nested frequency without bulbous bluegrass has remained similar to 2001. Bulbous bluegrass has significantly increased with each reading and cover increased from less than 1% in 2001 to 8% in 2006. Cheatgrass cover and nested frequency have remained similar to the 2001 reading. Rattail fescue decreased from 6% cover in 2001 to 0% in 2006. Trend for forbs is stable. Annual forbs changed very little and once again ragweed nested frequency significantly increased. Yellow salsify decreased significantly and was not sampled at all in 2006. Dyer's woad was only sampled in a single quadrat in 2006. The Desirable Components Index rated this study as very poor due to low browse cover, but with fair perennial grass and forb cover. Annual grass cover is common and has remained similar to 2001.

winter range condition (DC Index) - very poor (28) Mid-level potential scale

browse - down (-2)

grasses - stable (0)

forbs - stable (0)

HERBACEOUS TRENDS --
Management unit 02 , Study no: 23

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron spicatum	c ₁₈₄	bc ₁₈₂	ab ₁₂₆	a ₁₁₇	a ₁₂₅	4.07	4.67	7.17
G	Aristida purpurea	a ₉	b ₃₈	b ₄₈	c ₈₆	c ₈₅	1.17	2.61	3.64
G	Bromus brizaeformis (a)	-	-	c ₁₅₂	b ₇₀	a ₁₇	1.00	.20	.04
G	Bromus japonicus (a)	-	-	-	4	-	-	.01	-
G	Bromus tectorum (a)	-	-	b ₃₈₇	a ₃₃₀	a ₃₄₂	16.60	7.41	8.67
G	Festuca myuros (a)	-	-	b ₈₇	c ₂₇₈	a ₋	.91	5.73	-
G	Poa bulbosa	-	-	a ₁₀	b ₄₆	c ₂₁₃	.02	.75	7.60
G	Poa secunda	b ₁₆₂	c ₂₃₄	a ₇₀	b ₁₈₄	b ₁₄₇	1.00	4.06	1.51
Total for Annual Grasses		0	0	626	682	359	18.51	13.36	8.71
Total for Perennial Grasses		355	454	254	433	570	6.28	12.11	19.94
Total for Grasses		355	454	880	1115	929	24.79	25.48	28.66
F	Achillea millefolium	-	-	2	11	2	.03	.19	.03
F	Agoseris glauca	-	6	10	-	1	.05	-	.00
F	Alyssum alyssoides (a)	-	-	a ₁₂₇	c ₂₉₆	b ₂₀₀	.38	1.07	.52
F	Allium sp.	a ₋	a ₋	a ₋	a ₋	b ₈	-	.00	.01
F	Ambrosia psilostachya	b ₈₃	a ₁₃	c ₁₅₂	b ₇₅	c ₁₂₃	4.23	1.82	4.83
F	Artemisia ludoviciana	b ₃₉	a ₁₀	a ₉	a ₅	a ₁₀	.22	.06	.07
F	Astragalus convallarius	-	-	-	2	-	-	.00	-
F	Astragalus utahensis	a ₂	a ₁	b ₂₁	ab ₁₂	a ₁	.49	.07	.03
F	Balsamorhiza hookeri	-	4	-	-	-	-	-	-
F	Cymopterus sp.	a ₋	c ₃₃	bc ₂₄	bc ₂₁	b ₁₄	.08	.14	.06
F	Draba sp. (a)	-	-	a ₋	b ₃₇	c ₁₆₅	-	.20	.35
F	Epilobium brachycarpum (a)	-	-	6	-	2	.02	-	.00
F	Erodium cicutarium (a)	-	-	a ₁₄₀	b ₂₁₇	a ₁₅₁	1.21	4.96	2.81
F	Erigeron sp.	-	-	2	-	-	.15	-	-
F	Eriogonum umbellatum	-	-	4	2	5	.09	.03	.21
F	Hackelia patens	-	-	-	3	-	-	.00	-
F	Helianthus annuus (a)	-	2	-	-	-	-	-	-
F	Holosteum umbellatum (a)	-	-	a ₂₁	b ₂₁₂	b ₂₆₁	.04	.86	.89
F	Isatis tinctoria	ab ₁₃	ab ₁₆	b ₂₅	ab ₁₄	a ₁	.13	.20	.00
F	Lactuca serriola	-	-	3	-	-	.00	-	-
F	Tragopogon dubius	b ₃₀	b ₁₈	b ₃₃	b ₂₅	a ₋	.36	.26	-
F	Unknown forb-perennial	1	-	-	-	-	-	-	-
F	Veronica biloba (a)	-	-	-	-	3	-	-	.00
Total for Annual Forbs		0	2	294	762	782	1.66	7.10	4.59

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
	Total for Perennial Forbs	168	101	285	170	165	5.86	2.81	5.26
	Total for Forbs	168	103	579	932	947	7.53	9.91	9.85

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

BROWSE TRENDS --

Management unit 02 , Study no: 23

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Artemisia tridentata vaseyana</i>	7	5	1	.18	.03	.03
B	<i>Chrysothamnus nauseosus hololeucus</i>	3	5	0	.53	1.39	-
B	<i>Gutierrezia sarothrae</i>	54	69	0	1.46	4.40	-
B	<i>Opuntia sp.</i>	1	6	2	-	.01	-
	Total for Browse	65	85	3	2.17	5.83	0.03

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 23

Species	Percent Cover
	'06
<i>Artemisia tridentata vaseyana</i>	.36

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 21

Species	Average leader growth (in)	
	'01	'06
<i>Artemisia tridentata vaseyana</i>	2.6	-

BASIC COVER --

Management unit 02 , Study no: 23

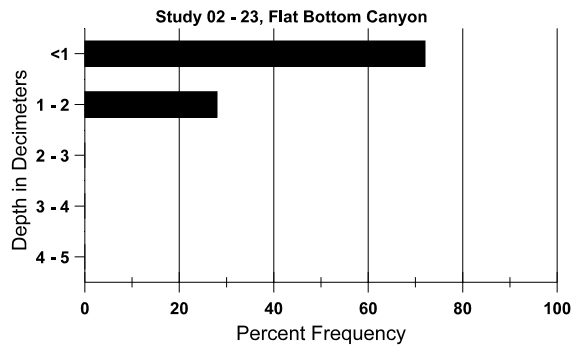
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	2.25	9.50	42.44	47.72	43.59
Rock	16.50	18.00	18.50	17.84	22.36
Pavement	18.25	33.25	10.93	19.59	21.03
Litter	40.00	22.50	41.72	19.67	11.59
Cryptogams	6.00	4.25	1.90	2.01	4.81
Bare Ground	17.00	12.50	1.45	6.20	8.23

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 23, Flat Bottom Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	Loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
7.1	69.2 (9.0)	5.9	48.2	29.4	22.4	1.8	10.7	140.8	0.3

Stoniness Index



PELLET GROUP DATA --

Management unit 02 , Study no: 23

Type	Quadrat Frequency		
	'96	'01	'06
Deer	7	5	8

Days use per acre (ha)	
'01	'06
25 (63)	15 (36)

BROWSE CHARACTERISTICS --
Management unit 02 , Study no: 23

		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)
Amelanchier alnifolia												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	43/56
06	0	-	-	-	-	-	0	0	-	-	0	-/-
Artemisia tridentata vaseyana												
84	2232	33	1066	700	466	-	24	33	21	-	4	6/6
90	566	-	100	333	133	-	29	12	23	-	0	8/10
96	200	-	140	60	-	40	0	0	0	-	0	13/22
01	160	-	-	140	20	40	63	0	13	-	0	13/27
06	20	-	-	20	-	40	100	0	0	-	0	14/22
Chrysothamnus nauseosus hololeucus												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	60	-	40	20	-	-	0	0	0	-	0	32/54
01	120	-	20	80	20	-	0	0	17	-	0	31/51
06	0	-	-	-	-	-	0	0	0	-	0	24/31
Gutierrezia sarothrae												
84	1065	166	66	866	133	-	0	0	12	-	0	9/12
90	2432	233	633	1766	33	-	1	0	1	-	1	7/8
96	3240	80	960	2020	260	-	0	0	8	-	0	9/13
01	4760	-	40	4420	300	80	0	0	6	5	5	8/16
06	0	-	-	-	-	-	0	0	0	-	0	10/15
Opuntia sp.												
84	66	-	-	66	-	-	0	0	0	-	0	7/11
90	99	66	66	-	33	-	0	0	33	-	0	-/-
96	20	-	-	20	-	-	0	0	0	-	0	3/10
01	160	-	40	100	20	-	0	0	13	-	0	2/8
06	40	-	-	40	-	-	0	0	0	-	0	4/10