Trend Study 4-15-06

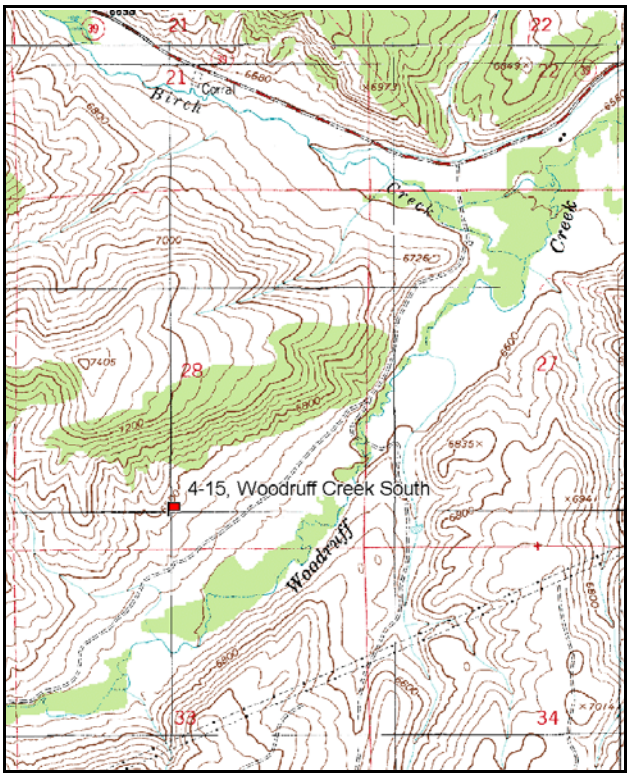
Study site name: Woodruff Creek South . Vegetation type: Big Sagebrush .

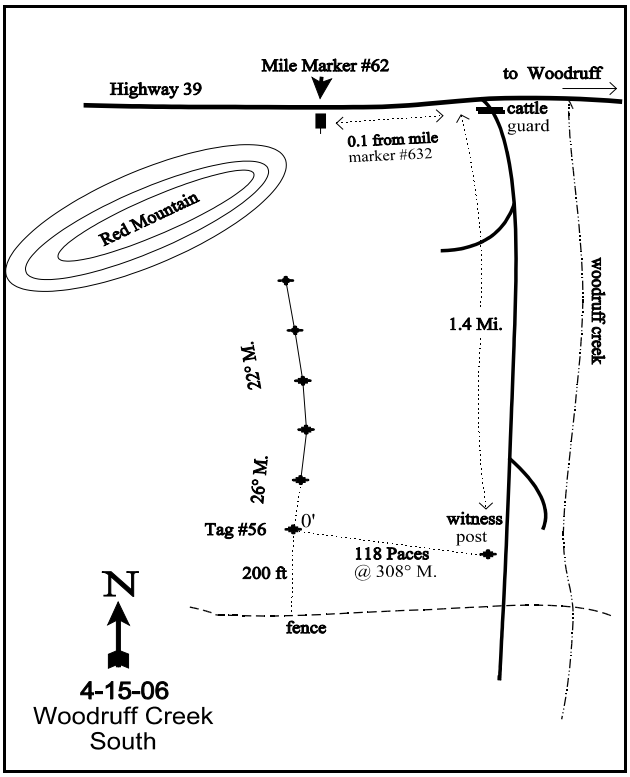
Compass bearing: frequency baseline 26 degrees magnetic.

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

LOCATION DESCRIPTION

Travel east on highway 39 and turn right (south) 0.1 miles past mile marker #62. Travel west for 1.4 miles to a witness post on the right hand side of the road. From the witness post, walk 118 paces at 308 degrees magnetic to the 0-foot baseline stake. The 0-foot baseline stake is marked with a browse tag #56. There is a fence 200 feet to the west from the 0-foot baseline stake. The baseline runs in a direction of 26 degrees magnetic. The baseline doglegs at the 300-foot baseline stake and runs in a direction of 22 degrees magnetic.





Map Name: Meachum Ridge

Diagrammatic Sketch

Township 9N , Range 6E , Section 28

UTM NAD 27, UTM 12T 4591981 N 476988 E

DISCUSSION

Woodruff Creek South - Trend Study No. 4-15

Study Information

This study was established in 1996 downstream from Woodruff Reservoir and about one-third of a mile north of Woodruff Creek. It samples a Wyoming big sagebrush site with a juniper overstory (elevation: 6,800 feet, slope: 16%, aspect: east). The area is typically heavily used in winter by deer. Five winter killed deer were found in 1996. Deer pellet groups were fairly abundant in 1996, with a quadrat frequency of 28%. Cattle had utilized the site prior to the 1996 reading. Deer pellet group quadrat frequency was also moderately high in 2001, at 34%. The pellet group transect in 2001 estimated 31 deer days use/acre (76 ddu/ha) and 34 cow days use/acre (84 cdu/ha). All deer pellet groups appeared to be from winter use while cattle pats were from the previous fall. The 2006 pellet group quadrat frequency was 4% for deer. The pellet group transect estimate in 2006 was 18 deer and 36 cow days use/acre (45 ddu/ha and 88 cdu/ha).

Soil

The soil is in the Cutoff series, which is moderately deep, well drained, moderately permeable, and formed in residuum and colluvium derived from sandstone and conglomerate (USDA-NRCS 2006). The effective rooting depth is estimated at a little over 12 inches and the soil texture is a sandy clay loam with a neutral soil reaction (pH of 6.8). At about 6 inches in depth, a layer of larger gravel can be detected. The soil doesn't have much structure and was dry down to about 18 inches in 1996. Unprotected bare ground is not abundant due to the adequate herbaceous ground cover. Unfortunately, most of that cover comes from cheatgrass. Some erosion is occurring in the form of flow patterns, rills, pedestalling, and an active gully near the end of the baseline, but has not been excessive. The soil erosion condition class was determined as slight in 2001 and 2006.

Browse

The Wyoming big sagebrush is moderately abundant with an estimated density of 3,300 plants/acre in 1996, 5,480 plants/acre in 2001, and 4,700 plants/acre in 2006. Most of the sagebrush sampled in 1996 was losing its leaves due the excessively dry conditions. Data from the Woodruff weather station indicates that only 62% of the normal precipitation was collected from April-Sept of 1996 (Utah climate summaries 2006). Seed production appeared good with mostly light utilization. Seedlings were abundant and 18% of the population was classified as young. Decadent plants accounted for 33% of the population. In 2001, utilization was still light to moderate, vigor good, and percent decadence declined from 33% to 23%. Young plants were numerous and accounted for 29% of the population. In 2006, decadence decreased to 19%, use was light, and plants classified as dying increased to 11% of the population. The decrease in density was due to a loss in young; the combined densities of mature and decadent plants only decreased 2% from 2001 to 2006.

Other shrubs include narrowleaf low rabbitbrush, prickly pear, and gray horsebrush. A few snowberry and winterfat plants were also observed, but not sampled. Juniper trees are scattered through the area and most of the mature trees are highlined. There are quite a few young trees in the 3 to 4 foot class. Point-quarter data estimated 85 juniper trees/acre with an average diameter of 4 inches in 1996. During the 2001 reading, 94 trees/acre were estimated with an average diameter of 7 inches. In 2006, 117 trees/acre were estimated with an average diameter of 5 inches. Overhead canopy cover averaged 11% in 1996 and 2001, but increased to 16% in 2006.

Herbaceous Understory

The herbaceous understory consists of patches of thick cheatgrass. In other areas where cheatgrass is not as abundant, Sandberg bluegrass, western and bluebunch wheatgrass are common. Indian ricegrass is also fairly abundant. Several other perennial grasses are found in small numbers. Cheatgrass provided 16% cover in 1996, only 2% in 2001, and 8% in 2006. The decrease in cheatgrass was due to the dry conditions of 2000 and 2001 and rebounded some with the improved precipitation in 2004 and 2005 (Utah climate summaries 2006).

Sandberg bluegrass, western wheatgrass, and bluebunch wheatgrass have provided 8-9% combined cover since 1996. Forbs are very sparse, and have produced less than 1% cover since 1996.

2001 TREND ASSESSMENT

Trend for Wyoming big sagebrush is up. Density has increased 40%, utilization continues to be light to moderate, vigor is good, and percent decadence has declined to 23%. Reproduction is also excellent with abundant seedlings and young. The only other common shrub is stickyleaf low rabbitbrush, which has remained relatively stable in density. The grass trend is slightly up. The nested frequency of perennial grasses increased 18%. The nested frequencies of western wheatgrass and needle-and-thread grass increased significantly, but the nested freqeuncies of bluebunch wheatgrass, mutton bluegrass, and Indian ricegrass decreased significantly. These changes in grass abundance are likely caused by overgrazing in late spring. The nested frequency of cheatgrass decreased significantly. The forb trend is stable. The nested frequency and composition of forbs changed little. The Desirable Compents Index score was fair in 1996 due to moderate browse cover, moderate perennial grass cover, and moderate annual grass cover. In 2001, the DCI score improved to good due to an improved young density, increased in perennial grass cover, and decreased annual grass cover.

1996 winter range condition (DC Index) - fair (38) Lower potential scale
2001 winter range condition (DC Index) - good (61) Lower potential scale
browse - up (+2) grass - slightly up (+1) forb - stable(0)

2006 TREND ASSESSMENT

The browse trend is stable. The total density of Wyoming big sagebrush decreased 14% due to a 700 plants/acre decrease in young. The density of mature and decadent individuals did not change. The population continues to have a large density of young (19% of the population) and seedlings. Use was light and decadence decreased to 19% of the population. However, plants with poor vigor increased to 19% of the population and plants classified as dying increased to 11% of the population. The grass trend is slightly down. The nested frequency of perennial grasses decreased 13%; due mainly to a significant decrease in the nested frequency of Sandberg bluegrass. The forb trend is stable. The nested frequency of perennial forbs changed little and did not improve much in composition. The DCI score remained good.

winter range condition (DC Index) - good (51) Lower potential scale
browse - stable (0) grass - slightly down (-1) forb - stable (0)

HERBACEOUS TRENDS --
Management unit 04 , Study no: 15

Type	Species	Nested Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
G	Agropyron smithii	$_{a}$37	$_{b}$123	$_{b}$105	.29	2.29	2.81
G	Agropyron spicatum	$_{b}$52	$_{a}$2	$_{a}$13	1.37	.01	.34
G	Bromus tectorum (a)	$_{b}$354	$_{a}$232	$_{a}$253	15.76	1.60	7.67
G	Elymus cinereus	4	-	-	.06	-	-
G	Koeleria cristata	2	-	-	.00	-	-
G	Oryzopsis hymenoides	$_{b}$36	$_{a}$22	$_{a}$21	.81	.49	.50
G	Poa fendleriana	$_{b}$9	$_{a}$-	$_{a}$-	.22	-	-
G	Poa pratensis	1	-	2	.03	-	.03

Type	Species	Nested Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
G	Poa secunda	$_{ab}$257	$_{b}$309	$_{a}$241	6.25	7.15	4.35
G	Sitanion hystrix	22	13	24	.23	.04	.31
G	Stipa comata	$_{a}$2	$_{b}$31	$_{b}$31	.03	1.09	.50
Total for Annual Grasses		354	232	253	15.76	1.60	7.67
Total for Perennial Grasses		422	500	437	9.30	11.10	8.85
Total for Grasses		776	732	690	25.07	12.71	16.53
F	Agoseris glauca	-	-	2	-	-	.00
F	Alyssum alyssoides (a)	-	-	2	-	-	.00
F	Antennaria rosea	-	5	4	-	.01	.18
F	Arabis drummondi	$_{b}$12	$_{a}$-	$_{a}$-	.03	.03	-
F	Astragalus beckwithii	2	-	3	.03	-	.03
F	Astragalus convallarius	$_{a}$2	$_{b}$15	$_{ab}$8	.01	.16	.10
F	Astragalus utahensis	5	5	-	.03	.06	-
F	Chenopodium album (a)	-	-	7	-	-	.04
F	Chaenactis douglasii	1	3	1	.00	.00	.03
F	Cryptantha sp.	$_{a}$-	$_{a}$-	$_{b}$13	.03	-	.22
F	Descurainia pinnata (a)	6	2	6	.04	.00	.07
F	Erigeron pumilus	-	1	4	-	.00	.03
F	Gilia sp. (a)	$_{a}$-	$_{a}$-	$_{b}$12	-	-	.05
F	Holosteum umbellatum (a)	-	-	1	-	-	.00
F	Lappula occidentalis (a)	-	7	5	-	.04	.03
F	Orobanche sp.	5	-	-	.01	-	-
F	Phlox hoodii	6	6	1	.04	.04	.03
F	Phlox longifolia	$_{a}$3	$_{a}$4	$_{b}$17	.00	.01	.14
F	Ranunculus testiculatus (a)	$_{a}$-	$_{a}$-	$_{b}$17	-	-	.05
F	Sisymbrium altissimum (a)	-	-	-	-	-	.00
F	Tragopogon dubius	-	3	-	-	.01	-
Total for Annual Forbs		6	9	50	0.04	0.04	0.25
Total for Perennial Forbs		36	42	53	0.20	0.32	0.78
Total for Forbs		42	51	103	0.24	0.37	1.04

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

BROWSE TRENDS --
Management unit 04 , Study no: 15

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia tridentata wyomingensis	83	86	85	10.83	11.01	12.12
B	Atriplex canescens	0	0	0	-	.03	-
B	Chrysothamnus viscidiflorus viscidiflorus	58	54	52	2.68	1.89	.91
B	Gutierrezia sarothrae	0	0	1	-	-	-
B	Juniperus osteosperma	7	8	8	6.98	8.26	10.63
B	Opuntia sp.	13	6	4	.16	.00	-
B	Tetradymia canescens	3	3	5	.01	-	-
Total for Browse		164	157	155	20.67	21.20	23.67

CANOPY COVER, LINE INTERCEPT --
Management unit 04 , Study no: 15

Species	Percent Cover	
	'01	'06
Artemisia tridentata wyomingensis	-	13.43
Chrysothamnus viscidiflorus viscidiflorus	-	2.38
Juniperus osteosperma	11.19	15.63
Opuntia sp.	-	.26

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 04 , Study no: 15

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata wyomingensis	1.2	1.3

POINT-QUARTER TREE DATA --
Management unit 04 , Study no: 15

Species	Trees per Acre	
	'01	'06
Juniperus osteosperma	93	117

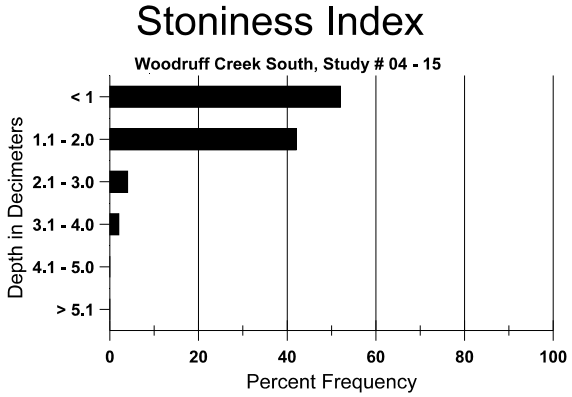
Average diameter (in)	
'01	'06
7.4	5.3

BASIC COVER --
Management unit 04 , Study no: 15

Cover Type	Average Cover %		
	'96	'01	'06
Vegetation	44.31	37.37	41.52
Rock	3.07	1.93	2.13
Pavement	10.89	13.43	17.09
Litter	46.23	47.56	42.37
Cryptogams	2.21	4.95	4.09
Bare Ground	7.96	14.96	13.99

SOIL ANALYSIS DATA --
Herd Unit 04, Study no: 15, Woodruff Creek South

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
12.3	61.0 (12.4)	6.8	53.7	19.3	27.0	2.8	20.9	204.8	0.7



PELLET GROUP DATA --
Management unit 04 , Study no: 15

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	13	25	32
Horse	1	-	-
Elk	7	1	2
Deer	28	34	4
Cattle	6	12	18

Days use per acre (ha)	
'01	'06
-	-
1 (3)	-
-	-
31 (76)	18 (45)
34 (84)	36 (88)

BROWSE CHARACTERISTICS --
Management unit 04 , Study no: 15

		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 tridentata wyomingensis												
96	**3300**	1100	600	1600	1100	840	19	.60	33	5	5	18/36
01	**5480**	360	1580	2660	1240	720	21	.72	23	.36	.36	17/28
06	**4700**	7760	880	2940	880	760	5	.42	19	11	19	18/27
Atriplex canescens												
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	14/27
06	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Ceratoides lanata												
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	-/-
06	**0**	-	-	-	-	-	0	0	-	-	0	9/16
Chrysothamnus viscidiflorus viscidiflorus												
96	**2540**	80	180	2220	140	20	0	0	6	2	2	13/20
01	**2340**	-	60	2020	260	-	0	0	11	3	3	10/15
06	**2180**	20	320	1800	60	-	2	0	3	-	0	10/16
Gutierrezia sarothrae												
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	5/8
06	**20**	-	-	20	-	-	0	0	-	-	0	6/7
Juniperus osteosperma												
96	**140**	-	-	140	-	-	0	0	0	-	0	-/-
01	**180**	-	20	160	-	-	0	0	0	-	0	-/-
06	**180**	20	20	140	20	-	0	0	11	11	11	-/-
Opuntia sp.												
96	**420**	-	120	280	20	-	0	0	5	-	0	4/15
01	**300**	-	140	100	60	20	0	0	20	20	20	3/10
06	**120**	-	40	80	-	-	0	0	0	-	0	3/12
Purshia tridentata												
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	-/-
06	**0**	-	-	-	-	-	0	0	-	-	0	9/29

		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)
Symphoricarpos oreophilus												
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	-/-
06	**0**	-	-	-	-	-	0	0	-	-	0	19/18
Tetradymia canescens												
96	**80**	-	-	80	-	-	0	0	-	-	0	12/23
01	**80**	-	-	80	-	-	0	0	-	-	0	8/20
06	**140**	-	20	120	-	-	14	14	-	-	0	7/13