

Trend Study 2-36-06

Study site name: Woodruff Co-op.

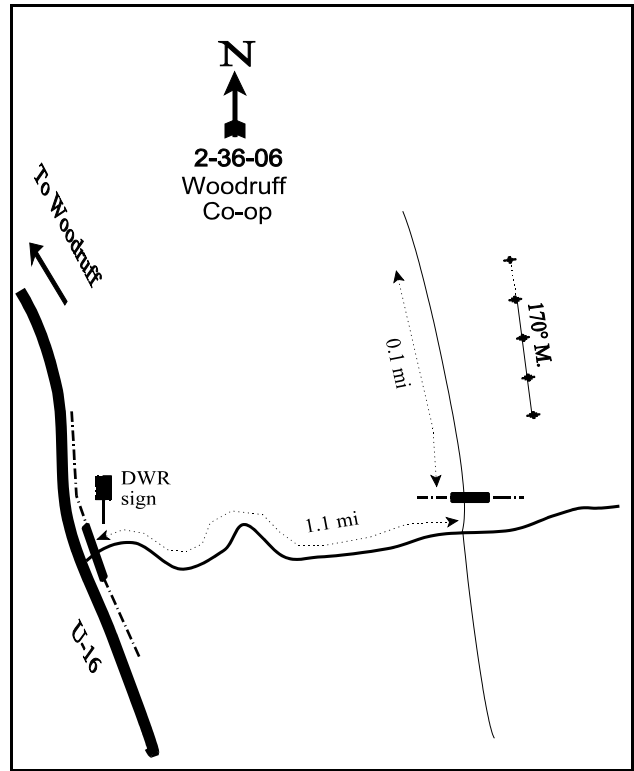
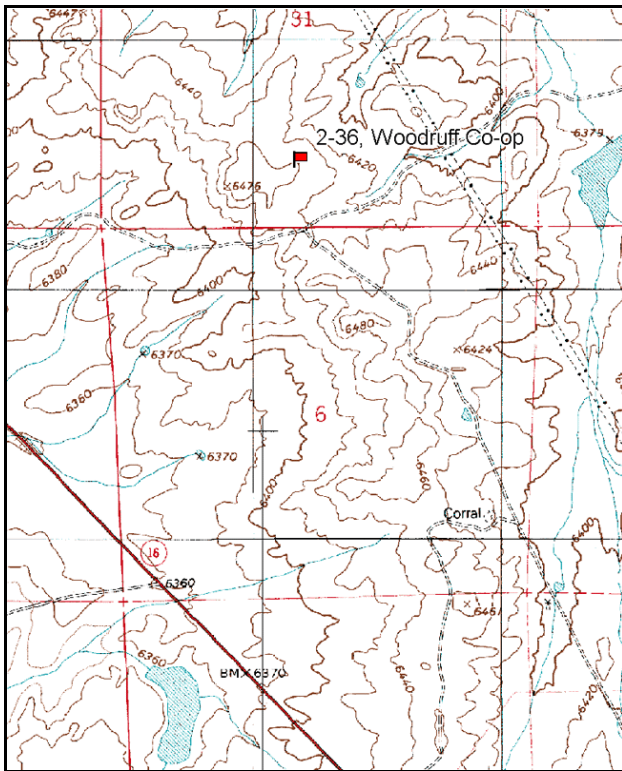
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 170 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). (No Rebar on site).

LOCATION DESCRIPTION

From the junction of U-39 and U-16 in Woodruff, travel south on U-16 5.7 miles to the Woodruff Co-op Livestock Management Area. Turn left (east) through the gate. Drive 1.1 miles to a fork. Turn left and go north through the gate. From the gate, go 0.1 miles. The study is on the east side of the road, approximately 60 paces to the 0-foot baseline stake. The study stakes are short fenceposts. No witness post. The 0-foot baseline stake is marked with browse tag #131. The baseline has a small dogleg from 300 - 400.



Map Name: Neponset Reservoir NE

Diagrammatic Sketch

Township 9N, Range 8E, Section 31

UTM NAD 27, UTM 12T 4590485 N, 493173 E

DISCUSSION

Woodruff Co-op - Trend Study No. 2-36

Study Information

This study was established in 1990 on DWR property to monitor sagebrush reestablishment in an area dominated by introduced perennial grasses (elevation: 6,550 feet, slope: 1-4%, aspect: southeast). In 2003, 173 acres were disked twice and drill seeded in the fall to establish more shrubs and to increase diversity of the community. The seed mix is listed below. Livestock were allowed back onto the allotment in 2005. The allotment continues to be used for spring cattle grazing. Pronghorn use the area year round and deer and elk in the winter. Signs of sage grouse are also common. Pellet group transect data collected in 2001 estimated 3 elk, 7 deer/pronghorn, and 41 cow days use/acre (7 edu/ha, 18 ddu/ha, 102 cdu/ha). Deer pellet groups appear to be from the previous fall and winter, while elk pellet groups appear more recent. Deer and pronghorn pellet groups were combined due to their similarity in appearance. Pellet group data from 2006 was estimated at 7 elk, 13 deer/pronghorn, and 17 cow days use/acre (17 edu/ha, 31 ddu/ha, and 43 cdu/ha). Only one sage grouse pellet group was encountered in 2006.

Soil

The soil is classified in the Woodpass series, which includes very deep, well drained soils that formed in alluvium derived mainly from sandstone and limestone (USDA-NRCS 2006). The effective rooting depth averaged 13 inches in 1996. Soil texture is a sandy clay loam with a neutral soil reaction (pH of 7.2). Pavement and rock cover are limited. The vegetation cover has been moderate due to the dense stand of crested wheatgrass, but there has also been a significant amount of bare soil in all sampling years. Bare ground cover has increased slightly, while the ratio of protective cover (vegetation, litter, and cryptogams) to bare ground decreased from 2.5 to 2.0. Cryptogams are abundant around the base of crested wheatgrass plants. An erosion condition class conducted in 2001 and 2006 both determined soils to be stable. Soil pedestalling provides evidence that some erosion has occurred in the past.

Browse

Wyoming big sagebrush and winterfat are the most important browse species on this study, although a small population of fourwing saltbush was observed for the first time in 2006. The fourwing saltbush had been seeded in the 2003 treatment. Sagebrush density was estimated at nearly 1,000 plants/acre in 1990. The decrease in density between 1990 and 1996 is due to the larger sample used beginning in 1996. The larger sample gives greater accuracy for species that are clumped and/or discontinuous in their distributions. Wyoming big sagebrush density has continually increased from 320 plants/acre in 1996 to 620 plants/acre in 2006, but still averages less than 1% cover. It appears the seeding treatment from 2003 has increased sagebrush density. The majority of sagebrush plants encountered before the treatment showed light to moderate hedging and were relatively small in stature. The use remained light-moderate in 2006 (after the treatment) and the average height and crown of plants were small (7 inches in height and 8 inches in width). Percent decadence had steadily decreased before the treatment and remained low in 2006. Vigor has been good throughout the population all years, including 2006. Annual leader growth does not seem to have been affected by the disking; it averaged about 1 inch in 2001 and 2006.

Winterfat was the most abundant shrub on the study in 2001, averaging 2,500 plants/acre, but was almost completely gone by 2006 at only 20 plants/acre. Winterfat cover was low like sagebrush, averaging less than 1%. Winterfat was greatly affected by the disk treatment. Other browse that are present include: low rabbitbrush, broom snakeweed, gray horsebrush, and pricklypear cactus.

Herbaceous Understory

The herbaceous understory is totally dominated by crested wheatgrass, which has accounted for over 80% of the total vegetation cover since 1996. It was sampled in almost every quadrat and averages around 23% cover. Crested wheatgrass had been moderately utilized in 2001 and 2006. Sandberg bluegrass, needle-and-thread,

and Indian ricegrass have also been sampled. Forbs are limited and provide very little cover or forage. Hoods phlox and longleaf phlox were the most abundant of the perennial forb species in 1996 and 2001, but were not sampled at all in 2006; they apparently did not survive the treatment. Alfalfa, which was seeded in the treatment at a relatively high rate, averaged 1.5% cover in 2006.

1996 TREND ASSESSMENT

Density of Wyoming big sagebrush is still relatively low and does not show signs of increasing. The new, larger sample used in 1996 estimated only 320 plants/acre. No seedlings or young were encountered. The lack of dead plants would suggest that the 1990 population density was overestimated with the smaller sample size. The only positive aspect of the browse trend is an improvement in decadence, which declined from 31% to 6%. Trend for browse is considered stable. Trend for grasses is stable. Sum of nested frequency for crested wheatgrass and all perennial grasses remained similar to 1990. Trend for forbs is down. Sum of nested frequency for perennial forbs declined; the nested frequencies of both phlox and the trifolium species decreased significantly. The Desirable Components Index rated this study as fair due to poor browse cover, but excellent perennial grass cover.

winter range condition (DC Index) - fair (34) Low Potential scale
browse - stable (0) grasses - stable (0) forbs - down (-2)

2001 TREND ASSESSMENT

Trend for browse is stable overall. Wyoming big sagebrush remains limited, but shows a slightly upward trend with an increase in young plants. Decadence decreased from 6% to 0%, and vigor is good on all plants. Winterfat is the most abundant species and has a stable trend. Density estimates are similar to 1996, where young plants outnumber the decadent and dead in the population. Trend for grasses is stable. Sum of nested frequency for crested wheatgrass and all perennial grasses remained similar to 1996. Trend for forbs is slightly up. Sum of nested frequency for perennial forbs increased; however, forbs are rare and produce only 1% total cover. The Desirable Components Index rated this study as fair due to poor browse cover and excellent perennial grass cover.

winter range condition (DC Index) - fair (34) Low Potential scale
browse - stable (0) grasses - stable (0) forbs - slightly up (+1)

2006 TREND ASSESSMENT

Trend for browse is slightly down. Winterfat was the most abundant species and decreased from 2,500 plants/acre to only 20 plants/acre in 2006. Decreases in winterfat are due to the disk treatment. Wyoming big sagebrush increased from 420 plants/acre in 2001 to 620 plants/acre in 2006. Both winterfat and sagebrush combined produce less than 1% cover. Fourwing saltbush was sampled for the first time and it averaged 460 plants/acre. It also produced less than 1% cover. Trend for grasses is down, due to a significant decrease in nested frequency of crested wheatgrass. Crested wheatgrass still remains abundant and averaged 22% cover. The nested frequency of perennial grasses decreased 21%. Trend for forbs is up. Sum of nested frequency for perennial forbs increased, mainly due to an increase in alfalfa and blue flax. The number of valuable forage forb species increased substantially. The Desirable Components Index rated this study as fair due to poor browse cover and excellent perennial grass cover.

winter range condition (DC Index) - fair (35) Low Potential scale
browse - slightly down (-1) grasses - down (-2) forbs - up (+2)

Woodruff Co-op WMA 2003 Seed Mix

Kind of Seed	Pounds in Mix	Bulk lbs/acre
Alfalfa, "Ranger"	250	1.4
Small Burnet, VNS	250	1.4
Cicer Milkvetch	150	0.9
Yellow Sweetclover	50	0.3
Sainfoin, "Remont"	100	0.6
Blue Flax, "Appar"	25	0.1
Russian WR, "Bozoisky"	175	1.0
Orchardgrass, "Paiute"	100	0.6
Great Basin Wildrye "Trailhead"	71	0.4
Great Basin Wildrye "Trailhead"	50	0.3
Indian Ricegrass, "Rimrock"	100	0.6
Bluebunch WG, "Goldar"	100	0.6
Thickspike WG, "Critana"	100	0.6
Sagebrush, Wyoming	35	0.2
Fourwing Saltbush	200	1.2
Bulk LBS. per acre: 10.15	1756	10.2

HERBACEOUS TRENDS --

Management unit 02 , Study no: 36

T y p e	Species	Nested Frequency				Average Cover %		
		'90	'96	'01	'06	'96	'01	'06
G	Agropyron cristatum	c348	bc360	b344	a293	22.46	30.84	22.66
G	Agropyron spicatum	-	-	-	1	-	-	.15
G	Bromus tectorum (a)	-	-	-	5	-	-	.03
G	Dactylis glomerata	a-	a-	a-	b15	-	-	.19
G	Oryzopsis hymenoides	a5	a-	a4	b19	-	.03	.48
G	Poa secunda	b89	b90	b99	a36	1.38	1.44	.35
G	Stipa comata	ab11	a1	b24	ab6	.03	.45	.09
Total for Annual Grasses		0	0	0	5	0	0	0.03
Total for Perennial Grasses		453	451	471	370	23.88	32.77	23.92
Total for Grasses		453	451	471	375	23.88	32.77	23.96
F	Alyssum alyssoides (a)	-	a41	c159	b123	.10	.40	.97
F	Antennaria sp.	-	2	-	-	.00	-	-
F	Astragalus convallarius	-	-	4	-	-	.06	-
F	Astragalus sp.	a-	a-	a-	b9	-	-	.05
F	Astragalus utahensis	7	-	3	2	-	.03	.03
F	Linum lewisii	a-	a-	a-	b33	-	-	.22
F	Medicago sativa	a-	a-	a-	b112	-	-	1.50

Type	Species	Nested Frequency				Average Cover %		
		'90	'96	'01	'06	'96	'01	'06
F	Phlox hoodii	_c 83	_b 43	_b 33	_a -	1.10	.41	-
F	Phlox longifolia	_c 81	_b 37	_c 70	_a -	.08	.24	-
F	Sanguisorba minor	-	-	-	5	-	-	.01
F	Schoenocrambe linifolia	-	3	-	-	.00	-	-
F	Tragopogon dubius	-	3	8	-	.00	.06	-
F	Trifolium sp.	_b 11	_a -	_c 26	_b 8	-	.11	.02
Total for Annual Forbs		0	41	159	123	0.10	0.40	0.97
Total for Perennial Forbs		182	88	144	169	1.19	0.93	1.86
Total for Forbs		182	129	303	292	1.30	1.33	2.83

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

BROWSE TRENDS --

Management unit 02 , Study no: 36

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia tridentata wyomingensis	14	16	22	.28	.96	.24
B	Atriplex canescens	0	0	19	-	-	.52
B	Atriplex gardneri falcata	0	0	0	-	-	-
B	Ceratoides lanata	40	42	1	.59	.53	-
B	Chrysothamnus nauseosus consimilis	0	1	0	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	33	34	2	.26	.75	.06
B	Gutierrezia sarothrae	5	7	0	.03	.33	-
B	Opuntia polyacantha	12	11	4	.18	.34	-
B	Tetradymia canescens	8	3	3	.06	-	.00
Total for Browse		112	114	51	1.41	2.92	0.82

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 36

Species	Percent Cover
	'06
Artemisia tridentata wyomingensis	.16
Atriplex canescens	.58

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 36

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata wyomingensis	1.1	0.9
Atriplex canescens	-	2.2
Ceratoides lanata	5.0	-

BASIC COVER --

Management unit 02 , Study no: 36

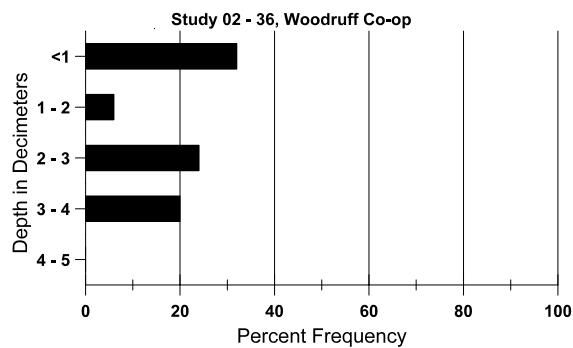
Cover Type	Average Cover %			
	'90	'96	'01	'06
Vegetation	16.75	28.00	39.97	27.23
Rock	1.75	2.09	1.01	2.54
Pavement	1.25	3.02	1.88	1.97
Litter	36.50	34.31	44.11	42.73
Cryptogams	.50	.28	2.07	0
Bare Ground	43.25	26.78	36.09	39.20

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 36, Woodruff Co-op

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy clay loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
13.2	63.0 (14.1)	7.2	56.6	14.1	29.4	2.1	3.9	108.8	0.7

Stoniness Index



PELLET GROUP DATA --

Management unit 02 , Study no: 36

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	10	7	76
Elk	-	-	1
Deer	8	6	9
Cattle	15	19	4
Antelope	6	-	-

Days use per acre (ha)	
'01	'06
-	-
3 (7)	7 (17)
7 (18)	13 (31)
41 (102)	17 (43)
-	-

BROWSE CHARACTERISTICS --

Management unit 02 , Study no: 36

		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>												
90	966	-	100	566	300	-	62	3	31	-	0	10/16
96	320	-	-	300	20	60	31	0	6	-	0	14/24
01	420	20	100	320	-	-	19	0	0	-	0	18/29
06	620	20	260	360	-	-	26	23	0	-	0	7/8
<i>Atriplex canescens</i>												
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	460	20	180	280	-	20	22	9	-	-	0	16/16
<i>Atriplex gardneri falcata</i>												
90	33	-	-	33	-	-	0	0	-	-	0	5/5
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Ceratoides lanata</i>												
90	333	-	100	233	-	-	40	0	0	-	0	7/5
96	2660	-	280	2320	60	20	48	35	2	-	0	7/9
01	2500	-	240	2260	-	-	54	.80	0	-	0	8/9
06	20	-	-	20	-	-	100	0	0	-	0	4/7
<i>Chrysothamnus nauseosus consimilis</i>												
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	40	-	-	40	-	-	100	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)
Chrysothamnus viscidiflorus viscidiflorus												
90	1499	-	366	900	233	-	53	0	16	-	0	4/6
96	880	-	-	800	80	-	0	0	9	7	7	7/11
01	1060	-	-	1040	20	-	0	0	2	-	0	7/11
06	40	-	-	40	-	-	100	0	0	-	0	5/10
Gutierrezia sarothrae												
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	120	-	-	120	-	-	0	0	-	-	0	5/7
01	220	-	-	220	-	-	0	0	-	-	0	7/12
06	0	-	-	-	-	-	0	0	-	-	0	5/10
Opuntia polyacantha												
90	266	-	66	200	-	-	0	0	0	-	13	4/6
96	280	-	20	200	60	140	0	0	21	14	14	4/12
01	420	20	20	400	-	40	0	0	0	-	0	3/9
06	80	-	20	60	-	-	0	0	0	-	0	3/4
Tetradymia canescens												
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	200	-	-	180	20	-	40	10	10	-	0	5/9
01	60	-	-	60	-	-	0	0	0	-	0	5/13
06	80	20	-	80	-	-	25	75	0	-	0	5/10