

Trend Study 2-32-06

Study site name: Wood Pass .

Vegetation type: Juniper .

Compass bearing: frequency baseline 165 degrees magnetic.

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

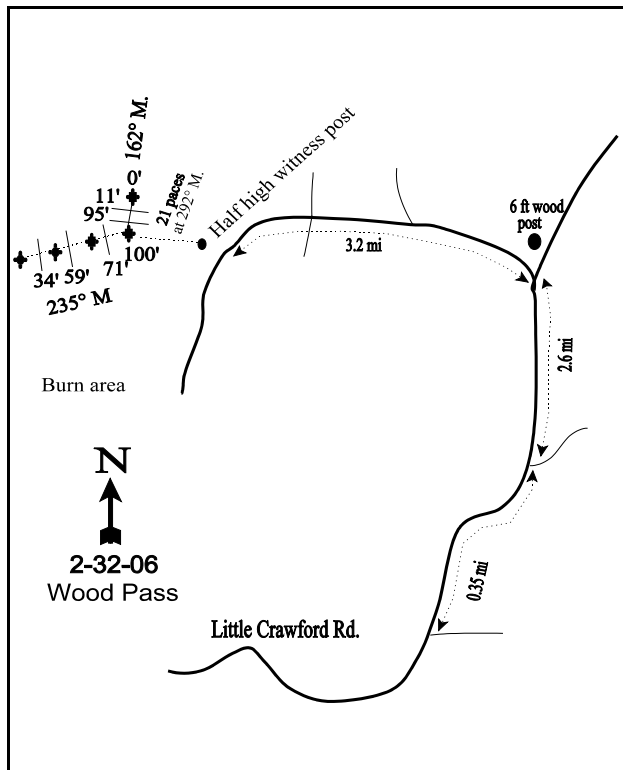
LOCATION DESCRIPTION

From the intersection of Wilson Lane and Little Crawford Road east of Woodruff proceed northeast for 1.35 miles to a fork. Turn left and travel 0.35 mile to another fork. Turn left and proceed 2.6 miles to a third fork marked by a six-foot tall wooden post. Turn left and proceed 3.2 miles staying on the main road, to a witness post just off the right side of road. From the witness post walk 21 paces at 292 degrees magnetic to the 100-foot baseline stake. Walk 100 feet at 342 degrees magnetic from the 100-foot stake to the 0-foot baseline stake. The 0-foot stake is marked by browse tag #7942. The baseline doglegs at 100 feet and runs 235 degrees magnetic.



Map Name: Woodruff Narrows

Township 10N, Range 7E, Section 13



Diagrammatic Sketch

UTM NAD 27, UTM 12T 4605849 N, 491564 E

DISCUSSION

Wood Pass - Trend Study No. 2-32

Study Information

This study is located on the east side of the Crawford Mountains approximately a half mile south of Wood Pass on land administered by the BLM (elevation: 6,800 feet, slope: 3-5%, aspect: southeast). The vegetation type is an open juniper woodland with an abundant association of low-growing black sagebrush and Wyoming big sagebrush. Animal use includes cattle in spring and summer, and deer and elk in winter. Pronghorn and sage grouse use the area continuously. Depending on the winter, snow depth could limit mid-winter utilization of the sagebrush. A pellet group transect read in 2001 estimated 19 deer/pronghorn and 9 cow days use/acre (46 ddu/ha and 23 cdu/ha). Deer and pronghorn pellet groups were combined due to their similarity in appearance. Pellet group data from 2006 was estimated at 21 deer/pronghorn, 33 elk, and 17 cow days use/acre (51 ddu/ha, 81 edu/ha, and 43 cdu/ha).

Soil

The soil is classified in the Solak series, a shallow, excessively drained soil that formed in residuum and colluvium weathered from conglomerate composed of sandstone, quartzite, and limestone. Total soil depth does not usually exceed 20 inches. Permeability to water is moderate, but available water capacity is low and erosion hazard is high. This soil, although occupied by Utah juniper, has a very low site productivity index or capability for producing juniper (Campbell and Lacey 1982; USDA-NRCS 2006). Soils have a clay loam texture with a soil reaction that is slightly alkaline (pH of 7.4). Effective rooting depth is variable, ranging from 10 inches to nearly 14 inches along the baseline. Black sagebrush is found in the more shallow soil, while Wyoming big sagebrush occupies the deeper soil. The soil is rocky throughout the profile with a calcareous layer at about 10 to 12 inches. Phosphorus could be a limiting factor at only 4.5 ppm. Values less than 6 ppm may limit normal plant growth and development (Tiedemann and Lopez 2004). Relative bare ground cover averaged 23% until 2001. In 2001, bare ground cover increased to 30% and then decreased to 24% in 2006. The ratio of protective cover (vegetation, litter, and cryptograms) to bare ground was fair at 3.1:1 in 2006. There is some localized erosion and a small gully is starting just north of the 0' stake. The erosion condition class was determined as stable in 2001 and slight in 2006 due to the formation of an active gully and soil movement.

Browse

The important browse species include black sagebrush and Wyoming big sagebrush. Black sagebrush has averaged 7% cover since 1996 with about 3,700 plants/acre. Plants classified as decadent have ranged from 50-65% of the population between 1984 and 1990. In 1996, decadence dropped to 25% in 1996 and slightly increased to 37% in 2006. Along with the moderately high number of decadent plants, 27% of the population was classified as dying in 2006, which was up from 6% in 2001. Utilization was moderate in 1984 and 1990, but has been light since 1996. Young recruitment has been low at only 1-3% of population during each reading since 1996.

There is most likely some hybridization between the black sagebrush and the Wyoming big sagebrush. Wyoming big sagebrush averaged 6% cover in 1996 and 2001, but decreased slightly to 4% in 2006. Density remained stable at about 4,600 plants/acre between 1984 and 1990. The baseline was extended in 1996 to increase the sample size and get a more accurate measurement of density. Density in 1996 averaged about 2,440 plants/acre, but decreased to 2,000 plants/acre in 2001 and 2006. Plants classified as decadent were estimated at 30% in 1996, decreased in 2001 to 21%, but increased to 42% of population in 2006. Young recruitment has been good during each year read, but in 2006 only 8% of population were young and 33% were classified as dying. It appears that the population may decline unless some of the dying plants recover or young recruitment increases. Seedlings were very abundant in 2006, which may contribute to the young population if they survive. Utilization has been light to moderate, except in 1984 and 1990 when it was moderate.

Point-center quarter data in 1996 estimated 235 junipers/acre with an average diameter of just over 5 inches. The density has increased in 2006 to 309 junipers/acre with average diameter of 5 inches. Plants ranged from about 4-8 feet in height on average. Canopy cover in 2001 averaged 13% and increased to 18% in 2006. A few of the more mature trees are highlined.

Herbaceous Understory

The herbaceous understory is diverse but not abundant. Eight perennial grasses produced less than 6% total cover in 1996 and 8% in 2001 and 2006. Sandberg bluegrass is the most abundant species. Forbs are also diverse yet few occur more than occasionally. Hoods phlox is the only common species and it accounted for over half of the forb cover.

1990 TREND ASSESSMENT

Density data indicates a slight increase in juniper on this open site. The trees are highlined. Sagebrush is common on the density plots where a large number of young sagebrush were classified. The sagebrush currently display a moderately hedged growth form. Rabbits have heavily browsed the low rabbitbrush. Trend for grasses is slightly up. Sandberg bluegrass, the most abundant grasses, increased significantly in nested frequency. Trend for forbs is slightly down. Forbs are rare, but cryptantha, lobeleaf groundsel, and a clover species all decreased significantly in nested frequency.

browse - stable (0)

grasses - slightly up (+1)

forbs - slightly down (-1)

1996 TREND ASSESSMENT

The browse trend is slightly up for black sagebrush and Wyoming big sagebrush. Black sagebrush shows improved vigor and a decline in percent decadence from 65% to 25%. Wyoming big sagebrush is less heavily utilized, and displays improved vigor and a decline in percent decadence. Seedlings and young plants are sufficient to maintain the population. Total density has declined, but the number of mature plants is similar to 1990 estimates. Some of the change in density of black sagebrush and Wyoming big sagebrush are due to the larger sample used in 1996. Trend for grasses is up. Perennial grass sum of nested frequency increased by 27%, mainly due to a significant increase in western wheatgrass. Trend for forbs is stable. Not much change from 1990, except a significant decrease in low penstemon nested frequency. Forbs are few and not abundant. The Desirable Components Index rated this study as good due to good browse cover, moderate decadence, and fair perennial grass cover.

winter range condition (DC Index) - good (43) Low Potential scale

browse - slightly up (+1)

grasses - up (+2)

forbs - stable (0)

2001 TREND ASSESSMENT

Trend for black and Wyoming big sagebrush is slightly down. Black sagebrush has remained at a similar density compared to 1996. Utilization is mostly light, vigor normal, and decadence similar (25% to 31%). Recruitment is currently poor and the population could decline slightly if drought conditions continue. Wyoming big sagebrush density declined 18%, but displays mostly light use and good vigor. Decadence has also declined from 30% to 21%. Recruitment is good with 16% of the population consisting of young plants. Trend for grasses is stable. Perennial grass sum of nested frequency remained unchanged, while cover increased from 6% to 8%. Cheatgrass is present, but not abundant (less than 1% cover). Trend for forbs is up. Perennial forb sum of nested frequency increased by 50% mainly due to a significant increase in cryptantha, low penstemon, and a clover species. The Desirable Components Index rated this study as good due to good browse cover, moderate decadence, and fair perennial grass cover.

winter range condition (DC Index) - good (57) Low Potential scale

browse - slightly down (-1)

grasses - stable (0)

forbs - up (+2)

2006 TREND ASSESSMENT

Trend for key browse, Wyoming big sagebrush and black sagebrush, is stable. Density of both species remained similar to 2001 estimates. Decadence of Wyoming big sagebrush increased from 21% in 2001 to 42% in 2006. Also 33% of the population was classified as dying. Young recruitment was moderate, but is not enough to replace the population if all 33% die. Black sagebrush also increased in the number of plants classified as dying and young recruitment is not quite as good. Both species may decrease with high densities of dying plants. Trend for grasses is slightly up. Perennial grass sum of nested frequency increased by 18% even though cover remained at 8%. Trend for forbs is stable. Perennial forbs sum of nested frequency remained similar to 2001. The Desirable Components Index rated this study as fair-good due to good browse cover, moderate decadence, decreased young recruitment, and fair perennial grass cover.

winter range condition (DC Index) - fair-good (47) Low Potential scale
browse - stable (0) grasses - slightly up (+1) forbs - stable (0)

HERBACEOUS TRENDS --
 Management unit 02 , Study no: 32

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron smithii	b ₃₁	a ₋	b ₈₈	b ₅₈	c ₉₈	.97	.49	.89
G	Agropyron spicatum	b ₄₇	c ₇₉	ab ₃₄	bc ₆₄	a ₈	.65	2.08	.10
G	Bromus tectorum (a)	-	-	ab ₂₅	b ₃₀	a ₄	.10	.45	.01
G	Carex sp.	-	-	-	-	6	-	-	.06
G	Oryzopsis hymenoides	a ₈	ab ₁₇	bc ₃₂	ab ₁₉	c ₄₇	.52	.63	.86
G	Poa fendleriana	a ₋	a ₋	b ₁₃	b ₁₀	b ₂₁	.07	.10	.21
G	Poa secunda	a ₁₄₅	b ₂₀₆	b ₁₉₁	b ₁₉₈	b ₂₃₃	3.28	3.77	4.71
G	Sitanion hystrix	b ₃₆	a ₉	ab ₂₆	ab ₁₆	a ₉	.11	.57	.06
G	Stipa comata	abc ₇	ab ₅	a ₁₇	c ₂₅	bc ₂₈	.21	.78	.53
G	Stipa lettermani	a ₋	a ₋	a ₋	a ₋	b ₁₁	-	-	.15
Total for Annual Grasses		0	0	25	30	4	0.10	0.45	0.00
Total for Perennial Grasses		274	316	401	390	461	5.84	8.43	7.60
Total for Grasses		274	316	426	420	465	5.94	8.89	7.61
F	Agoseris glauca	a ₋	a ₋	a ₃	a ₃	b ₁₁	.00	.03	.05
F	Alyssum alyssoides (a)	-	-	-	6	5	-	.01	.01
F	Antennaria rosea	a ₋	ab ₄	ab ₈	b ₁₅	b ₁₂	.31	.25	.36
F	Arabis sp.	a ₋	a ₋	b ₁₀	ab ₁	a ₋	.02	.00	-
F	Arenaria sp.	1	-	-	-	-	-	-	-
F	Astragalus convallarius	a ₈	a ₋	a ₁₀	a ₇	b ₂₂	.02	.10	.20
F	Astragalus utahensis	29	14	21	14	20	.12	.11	.13
F	Camelina microcarpa (a)	-	-	-	-	2	-	-	.00
F	Calochortus nuttallii	4	-	-	-	-	-	-	-
F	Chaenactis douglasii	7	-	-	-	-	-	-	-

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Cirsium undulatum</i>	-	-	-	3	-	-	.00	-
F	<i>Collomia linearis</i> (a)	-	-	-	3	-	-	.03	-
F	<i>Comandra pallida</i>	6	5	-	-	3	-	-	.00
F	<i>Collinsia parviflora</i> (a)	-	-	-	-	11	-	-	.02
F	<i>Cordylanthus ramosus</i> (a)	-	-	_a 15	_{ab} 36	_b 51	.10	.18	.88
F	<i>Crepis acuminata</i>	_b 11	_{ab} 2	_{ab} 3	_a 1	_{ab} 5	.06	.00	.01
F	<i>Cryptantha</i> sp.	_b 25	_a -	_{ab} 8	_c 47	_b 11	.09	.58	.10
F	<i>Cymopterus</i> sp.	-	-	-	2	1	-	.03	.00
F	<i>Cynoglossum officinale</i>	-	-	-	3	-	-	.00	-
F	<i>Descurainia pinnata</i> (a)	-	-	_{ab} 6	_b 8	_a -	.01	.03	.00
F	<i>Draba</i> sp. (a)	-	-	-	1	-	-	.00	-
F	<i>Erigeron pumilus</i>	-	-	-	-	8	-	-	.02
F	<i>Eriogonum umbellatum</i>	-	-	-	-	1	-	-	.00
F	<i>Haplopappus acaulis</i>	-	4	-	-	-	-	-	-
F	<i>Ipomopsis aggregata</i>	5	-	-	-	-	-	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	_a 3	_b 9	_{ab} 3	.00	.02	.01
F	<i>Microsteris gracilis</i> (a)	-	-	-	2	-	-	.01	-
F	<i>Penstemon humilis</i>	_b 49	_b 36	_a 3	_b 24	_b 25	.01	.22	.51
F	<i>Phlox hoodii</i>	115	133	104	111	100	2.30	2.45	2.47
F	<i>Phlox longifolia</i>	_{ab} 11	_a 6	_{ab} 13	_a 5	_b 22	.03	.04	.13
F	<i>Senecio multilobatus</i>	_b 21	_a -	_a 3	_a 4	_a 5	.00	.03	.01
F	<i>Trifolium</i> sp.	_b 45	_a 6	_a 3	_b 43	_b 66	.00	.27	.39
Total for Annual Forbs		0	0	24	65	72	0.12	0.29	0.93
Total for Perennial Forbs		337	210	189	283	312	3.00	4.16	4.43
Total for Forbs		337	210	213	348	384	3.12	4.45	5.36

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

BROWSE TRENDS --

Management unit 02 , Study no: 32

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia nova	55	52	54	6.93	7.48	7.47
B	Artemisia tridentata wyomingensis	50	41	40	6.50	6.23	4.05
B	Atriplex canescens	0	0	0	-	.00	-
B	Chrysothamnus nauseosus consimilis	0	2	0	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	13	11	10	.10	.53	.31
B	Eriogonum microthecum	1	2	2	.03	.15	.03
B	Juniperus osteosperma	23	20	20	7.63	11.09	12.79
B	Leptodactylon pungens	0	1	1	-	.03	.03
B	Opuntia sp.	1	0	0	-	-	-
B	Tetradymia canescens	0	1	1	-	-	.03
Total for Browse		143	130	128	21.20	25.53	24.72

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 32

Species	Percent Cover	
	'01	'06
Artemisia nova	-	8.93
Artemisia tridentata wyomingensis	-	5.11
Chrysothamnus viscidiflorus stenophyllus	-	.40
Juniperus osteosperma	12.60	18.11

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 32

Species	Average leader growth (in)	
	'01	'06
Artemisia nova	0.5	0.6
Artemisia tridentata wyomingensis	0.9	0.8

POINT-QUARTER TREE DATA --
 Management unit 02 , Study no: 32

Species	Trees per Acre		Average diameter (in)	
	'01	'06	'01	'06
Juniperus osteosperma	216	309	6.0	5.0

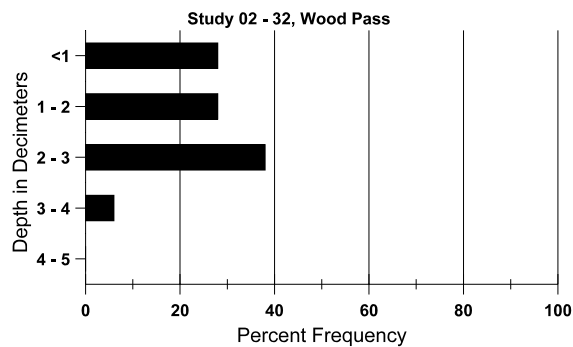
BASIC COVER --
 Management unit 02 , Study no: 32

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	1.75	6.00	29.52	36.61	33.29
Rock	2.00	3.25	1.21	1.04	2.42
Pavement	14.75	18.00	4.10	3.92	11.23
Litter	55.50	41.00	39.92	40.78	40.39
Cryptogams	3.00	8.75	4.83	3.94	3.76
Bare Ground	23.00	23.00	21.77	37.10	28.82

SOIL ANALYSIS DATA --
 Herd Unit 02, Study no: 32, Wood Pass

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
9.7	60.6 (12.7)	7.4	32.9	36.7	30.4	3.3	4.5	70.4	0.7

Stoniness Index



PELLET GROUP DATA --
 Management unit 02 , Study no: 32

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	15	20	21
Elk	2	-	4
Deer	38	17	29
Cattle	1	4	6

Days use per acre (ha)	
'01	'06
-	-
-	33 (81)
19 (46)	21 (51)
9 (23)	17 (43)

BROWSE CHARACTERISTICS --
 Management unit 02 , Study no: 32

		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 nova</i>												
84	1199	-	133	466	600	-	78	0	50	-	0	9/16
90	1533	66	133	400	1000	-	39	0	65	5	26	10/13
96	3800	-	100	2760	940	460	20	2	25	2	2	11/21
01	3760	-	20	2560	1180	580	4	0	31	6	6	12/22
06	3560	2060	60	2200	1300	620	.56	.56	37	27	30	12/19
<i>Artemisia tridentata wyomingensis</i>												
84	4666	200	666	1400	2600	-	71	6	56	-	14	18/24
90	4532	-	1733	933	1866	-	53	15	41	1	15	18/20
96	2440	100	640	1080	720	600	28	2	30	-	0	17/31
01	2000	-	320	1260	420	620	12	0	21	7	7	16/28
06	1940	1360	160	960	820	380	27	8	42	33	69	15/23
<i>Atriplex canescens</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	6/10
06	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Chrysothamnus nauseosus consimilis</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	24/28
01	40	-	-	40	-	-	0	0	-	-	0	31/45
06	0	-	-	-	-	-	0	0	-	-	0	29/40

		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 stenophyllus												
84	466	-	-	333	133	-	0	0	29	-	0	10/12
90	1400	-	400	1000	-	-	38	24	0	-	0	7/11
96	500	-	80	160	260	20	12	0	52	36	36	8/11
01	380	-	80	300	-	40	0	0	0	-	0	9/17
06	360	60	-	160	200	-	0	0	56	11	17	10/16
Eriogonum microthecum												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	20	-	-	20	-	-	0	0	-	-	0	6/9
01	60	-	-	60	-	-	0	0	-	-	0	5/10
06	40	-	-	40	-	-	0	0	-	-	0	5/11
Juniperus osteosperma												
84	266	-	133	133	-	-	0	0	0	-	0	69/43
90	399	-	133	266	-	-	33	33	0	-	0	84/49
96	500	-	140	360	-	20	0	0	0	-	0	-/-
01	460	20	120	320	20	20	4	0	4	-	0	-/-
06	460	60	100	320	40	-	0	0	9	9	9	16/17
Leptodactylon pungens												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	66	266	-	66	-	-	0	0	-	-	0	2/3
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	20	-	-	20	-	-	0	0	-	-	0	-/-
06	20	-	-	20	-	-	0	0	-	-	0	6/11
Opuntia sp.												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	66	-	-	66	-	-	0	0	-	-	0	3/9
96	60	-	-	60	-	-	0	0	-	-	0	4/8
01	0	-	-	-	-	-	0	0	-	-	0	4/8
06	0	-	-	-	-	-	0	0	-	-	0	5/21
Symphoricarpos oreophilus												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	14/27
01	0	-	-	-	-	-	0	0	-	-	0	15/29
06	0	-	-	-	-	-	0	0	-	-	0	10/23

		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)
Tetradymia canescens												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	132	-	66	-	66	-	50	50	50	-	0	-/-
96	0	-	-	-	-	-	0	0	0	-	0	6/8
01	20	-	-	20	-	-	0	0	0	-	0	11/19
06	40	-	-	40	-	-	0	0	0	-	0	11/21