

Trend Study 28-6-08

Study site name: Cottonwood .

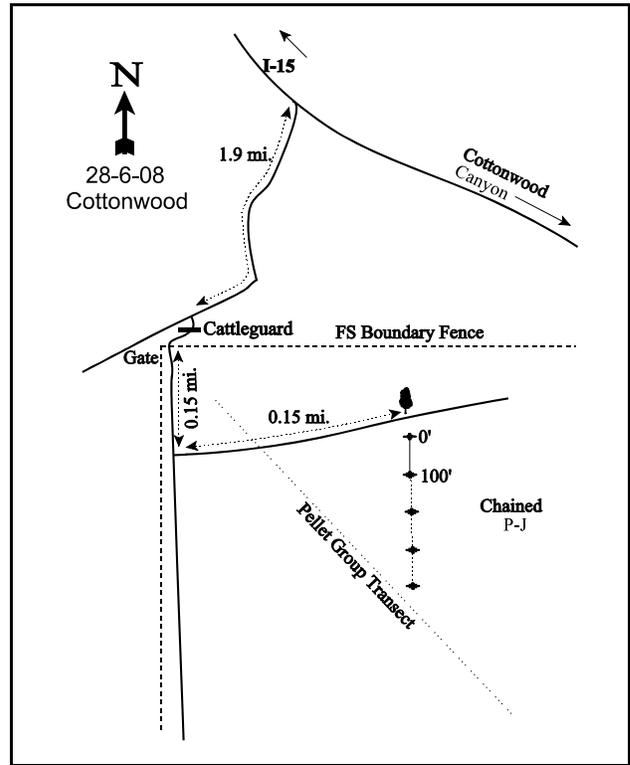
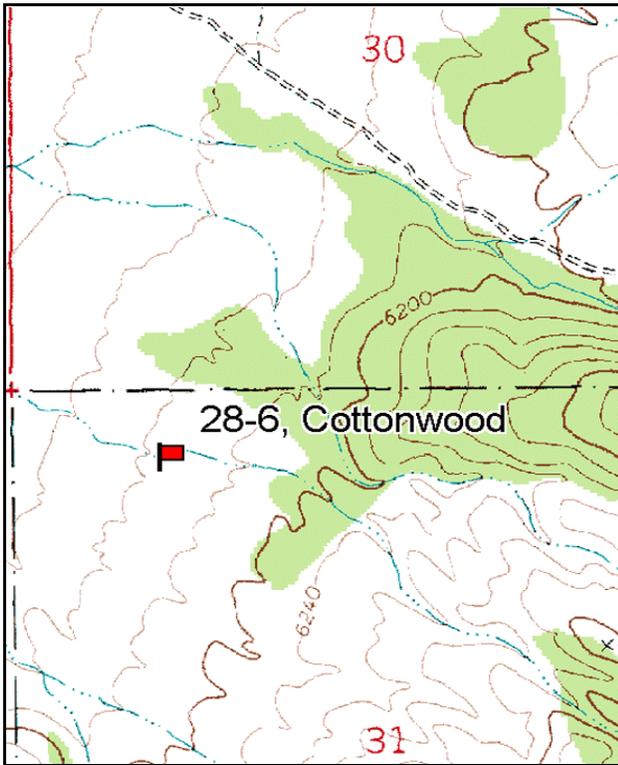
Vegetation type: Chained, Seeded P-J .

Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

From the intersection of SR 20 and the frontage road along the east side of I-15, travel south down the frontage road 6.6 miles to a gate on the left. Go through the gate and travel east for 1.9 miles to a cattleguard on the right. From the cattleguard, go 0.15 miles south along the fence. Turn left on an old road going up into the chaining. Continue 0.15 miles to the study site on the south side of the road. Stop next to a large pinyon. From large pinyon, walk 75 feet at 130 degrees magnetic. The 0-foot baseline stake is 20 feet south of the road. This 2 foot tall fencepost is marked with a browse tag #9006.



Map Name: Cottonwood Mountain

Diagrammatic Sketch

Township 32S, Range 7W, Section 31

GPS: NAD 83, UTM 12S 351003 E, 4205316 N

DISCUSSION

Cottonwood - Trend Study No. 28-6

Study Information

This trend study is located on critical deer winter range west of the Hurricane Cliffs and samples a sagebrush area at the mouth of Cottonwood Canyon [elevation: 6,100 feet (1,859 m), slope: 2%-3%, aspect: west]. The site is just above the Forest Service boundary fence. The area is part of a large chaining project completed in 1970. The site is now dominated by a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass type with few pinyon pine (*Pinus edulis*) or Utah juniper (*Juniperus osteosperma*) trees being present. In 1992, deer sign was abundant including antler drops, pellet groups, and a carcass. A pellet group transect read on site in 1998 estimated 41 deer, 7 elk, and 2 cow days use/acre (101 ddu/ha, 17 edu/ha, and 5 cdu/ha). Pellet group transect data collected in 2003 estimated 60 deer, 3 elk, and 5 cow days use/acre (149 ddu/ha, 7 edu/ha, and 13 cdu/ha) on the site. Pellet group data for 2008 estimated 121 deer, 1 elk, and 4 cow days use/acre (299 ddu/ha, 2 edu/ha, and 11 cdu/ha).

Soils

The soil is a sandy loam with a slightly alkaline pH (7.5). Several gullies are found crossing the site, but do not appear to be very active. Relative combined average vegetation and litter cover has been 45%-64%, and relative combined average pavement and rock cover has been 18%-32% since 1992. Relative average bare ground cover has been moderate at 15%-23% since 1992. An erosion condition class assessment rated erosion as slight in 2003 due to surface litter movement, pedestaling, flow patterns, and rill formation. The erosion condition class assessment was rated as stable in 2008.

Browse

Wyoming big sagebrush is the only preferred browse species found in any frequency on the site. The sagebrush density has been similar since 1992 averaging about 1,600 plants/acre. Decadence in the sagebrush population increased steadily from 1987 to a high of 49% in 2003 before lowering slightly in 2008. Sagebrush plants displaying poor vigor have steadily increased from 1987, as well, with a high of 20% in 2008. Recruitment of young sagebrush plants showed a decline from 1987 with young plants comprising only 1% and 5% of the population in 2003 and 2008, respectively. Utilization of sagebrush has been moderate to heavy with very high use in 1987 when 89% of the sagebrush sampled displayed heavy hedging (>60% of twigs browsed). The only other browse encountered on the site include a few prickly phlox (*Leptodactylon pungens*) and prickly pear cactus (*Opuntia* sp.). Mature stands of pinyon and juniper to the north provide thermal cover. On the site itself, there are only scattered mature pinyon and juniper trees and a few young ones.

Herbaceous Understory

For a chained and seeded site, perennial herbaceous vegetation is limited. Common perennial grasses include crested wheatgrass (*Agropyron cristatum*), purple three-awn (*Aristida purpurea*), bottlebrush squirreltail (*Sitanion hystrix*), and needle-and-thread (*Stipa comata*). The average total cover of perennial grasses has been low at around 5% since 1992. Although annual species were not sampled in 1987, photographs from that year show that cheatgrass (*Bromus tectorum*) was moderately abundant. Cheatgrass has been the dominant grass on the site comprising 72% and 71% of the grass cover in 1998 and 2008, respectively. With drought conditions in 2003, cheatgrass had a drastic decline in frequency and cover, but quickly recovered in 2008. The forb component has poor composition and diversity. The only common perennial forb is scarlet globemallow (*Sphaeralcea coccinea*) which is a desirable species that has maintained a good population.

1992 TREND ASSESSMENT

Trend for browse is slightly down. Differences in density of browse species may be related to the larger sample area used in 1992, therefore, trends for browse were determined using other parameters. Decadence of Wyoming big sagebrush increased from 1987 to 16%, and plants displaying poor vigor increased to 14%.

Recruitment of young plants declined with only 6% of the population comprised of young plants. Trend for grasses is up. Sum of nested frequencies for perennial grasses increased by 80% from 1987, with a significant increase in the nested frequency of bottlebrush squirreltail. Trend for forbs is slightly down. The sum of nested frequency of perennial forbs declined by 29% from 1987, with a significant decrease in the nested frequency of fendler spurge (*Euphorbia fendleri*). Annual grasses and forbs dominate the herbaceous understory. Cheatgrass accounts for 45% of the herbaceous understory cover.

winter range condition (DCI) - fair (35) Low potential scale
browse - slightly down (-1) grass - up (+2) forb - slightly down (-1)

1998 TREND ASSESSMENT

The browse trend is slightly down. Density of Wyoming big sagebrush has decreased by 19% since 1992 to 1,560 plants/acre and decadence has increased to 29% of the population. Sagebrush plants displaying poor vigor has remained fairly low at 13%. Recruitment of young plants is still low with only 6% of the population being categorized as young. The trend for grasses is slightly down. The sum of nested frequency of perennial grasses increased, but the nested frequency of cheatgrass increased significantly as well. The wet spring of 1998 produced high cheatgrass cover and cheatgrass was the dominant species comprising 72% of the grass cover, 66% of the herbaceous cover, and 52% of the vegetation cover. Trend for forbs is stable. The sum of nested frequency of perennial forbs and cover of perennial forbs had little change from 1992.

winter range condition (DCI) - poor-fair (24) Low potential scale
browse - slightly down (-1) grass - slightly down (-1) forb - stable (0)

2003 TREND ASSESSMENT

Trend for browse is slightly down. Density of Wyoming big sagebrush remained similar to 1998 at 1,620 plants/acre. The sagebrush population increased in decadence to 49%, and the proportion of plants displaying poor vigor increased to 17%. Recruitment of young sagebrush declined to just 1% of the population. Trend for grasses is stable. Although the sum of nested frequency of perennial grasses has declined since 1998, cheatgrass significantly declined in cover and frequency which is a positive sign. Cool season grasses show declines in frequency while purple three-awn, a warm season species, remained stable. Trend for forbs is stable. Perennial forbs are stable in frequency, and cover of perennial forbs doubled since 1998 to 4%.

winter range condition (DCI) - fair (32) Low potential scale
browse - slightly down (-1) grass - stable (0) forb - stable (0)

2008 TREND ASSESSMENT

The browse trend is stable. Density of Wyoming big sagebrush remained similar to 2003. Decadence of sagebrush declined slightly, but was still fairly high at 39%. The proportion of sagebrush plants displaying poor vigor increased slightly to 20%. Recruitment of young sagebrush plants increased slightly, but is still low with young plants comprising only 5% of the population. Trend for grasses is down. The sum of nested frequency of perennial grasses declined by 20% since 2003, and the nested frequency of cheatgrass increased significantly. Cheatgrass dominated the grasses and comprised 71% of the grass cover. Trend for forbs is up. The sum of nested frequency of perennial forbs increased by 74% due to a significant increase in the nested frequency of scarlet globemallow. Globemallow is the only common perennial forb and provided 84% of the forb cover.

winter range condition (DCI) - poor-fair (28) Low potential scale
browse - stable (0) grass - down (-2) forb - up (+2)

HERBACEOUS TRENDS --
Management unit 28 , Study no: 6

T y p e	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
G	<i>Agropyron cristatum</i>	c ₃₅	ab ₂₂	ab ₂₅	a ₁₈	a ₁₄	.88	.97	.61	.45
G	<i>Aristida purpurea</i>	a ₈	bc ₅₃	cd ₇₅	d ₇₄	ab ₂₇	3.02	4.52	2.42	2.17
G	<i>Bouteloua gracilis</i>	3	-	-	-	-	-	-	-	-
G	<i>Bromus tectorum</i> (a)	-	d ₃₀₂	b ₃₆₇	a ₄₄	c ₃₄₂	8.19	17.91	.33	12.06
G	<i>Oryzopsis hymenoides</i>	8	6	8	2	7	.07	.10	.03	.40
G	<i>Poa secunda</i>	-	-	1	1	3	-	.03	.00	.01
G	<i>Sitanion hystrix</i>	a ₁₁	b ₄₆	b ₄₄	a ₁₆	ab ₂₈	.93	.86	.19	.68
G	<i>Sporobolus cryptandrus</i>	3	-	3	-	-	-	.00	.00	-
G	<i>Stipa comata</i>	6	6	19	12	20	.21	.43	.19	1.13
Total for Annual Grasses		0	302	367	44	342	8.19	17.91	0.33	12.06
Total for Perennial Grasses		74	133	175	123	99	5.12	6.92	3.46	4.86
Total for Grasses		74	435	542	167	441	13.32	24.84	3.80	16.93
F	<i>Ambrosia</i> sp.	-	5	-	-	-	.01	-	-	-
F	<i>Astragalus panguicensis</i>	2	-	-	-	-	-	-	-	-
F	<i>Calochortus flexuosus</i>	-	-	a ⁻	a ⁻	b ₁₁	-	-	-	.02
F	<i>Chaenactis douglasii</i>	-	-	1	-	3	-	.00	-	.01
F	<i>Chenopodium fremontii</i> (a)	-	3	-	1	-	.00	-	.00	-
F	<i>Crepis acuminata</i>	-	-	-	-	8	-	-	-	.02
F	<i>Cryptantha</i> sp.(a)	-	-	a ⁻	a ⁻	b ₁₉	-	-	-	.05
F	<i>Descurainia pinnata</i> (a)	-	b ₄₂	a ⁻	a ₁	a ₁	1.47	-	.00	.00
F	<i>Eriogonum cernuum</i> (a)	-	6	-	-	7	.04	-	-	.01
F	<i>Erigeron</i> sp.	-	-	2	-	-	-	.01	-	.00
F	<i>Euphorbia fendleri</i>	b ₉₀	a ⁻	a ⁻	a ⁻	a ⁻	-	-	-	-
F	<i>Gayophytum ramosissimum</i> (a)	-	-	a ⁻	a ⁻	b ₃₆	-	-	-	.11
F	<i>Gilia</i> sp. (a)	-	c ₁₁₂	a ⁻	b ₂₇	b ₄₀	.66	-	.47	.23
F	<i>Ipomopsis aggregata</i>	-	3	-	-	-	.00	-	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	-	-	7	-	-	-	.16
F	<i>Lygodesmia</i> sp.	-	-	-	-	1	-	-	-	.00
F	<i>Mentzelia albicaulis</i> (a)	-	-	a ⁻	a ⁻	b ₄₇	-	-	-	.62
F	<i>Phlox longifolia</i>	a ⁻	a ⁻	a ⁻	a ₆	b ₁₉	-	-	.15	.13
F	<i>Polygonum</i> sp.	-	3	-	-	5	.01	-	-	.01
F	<i>Ranunculus testiculatus</i> (a)	-	-	a ⁻	a ⁻	b ₃₁	-	-	-	.08
F	<i>Senecio multilobatus</i>	-	2	-	-	-	.00	-	-	-
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	-	-	-	-	-	.00

Type	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
F	<i>Sphaeralcea coccinea</i>	_a 71	_{ab} 103	_b 125	_b 130	_c 188	2.59	2.29	4.25	7.80
F	<i>Streptanthus cordatus</i>	-	-	-	-	1	-	-	-	.00
Total for Annual Forbs		0	163	0	29	188	2.18	0	0.48	1.29
Total for Perennial Forbs		163	116	128	136	236	2.62	2.31	4.40	8.02
Total for Forbs		163	279	128	165	424	4.81	2.31	4.89	9.32

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

BROWSE TRENDS --

Management unit 28 , Study no: 6

Type	Species	Strip Frequency				Average Cover %			
		'92	'98	'03	'08	'92	'98	'03	'08
B	<i>Artemisia tridentata wyomingensis</i>	50	46	44	47	9.88	7.56	12.17	8.91
B	<i>Leptodactylon pungens</i>	3	1	1	1	.15	.03	.00	.00
B	<i>Opuntia sp.</i>	2	1	1	1	.00	.00	.00	.00
Total for Browse		55	48	46	49	10.03	7.59	12.17	8.91

CANOPY COVER, LINE INTERCEPT --

Management unit 28 , Study no: 6

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata wyomingensis</i>	8.21	8.64

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 28 , Study no: 6

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata wyomingensis</i>	1.6	1.5

BASIC COVER --

Management unit 28 , Study no: 6

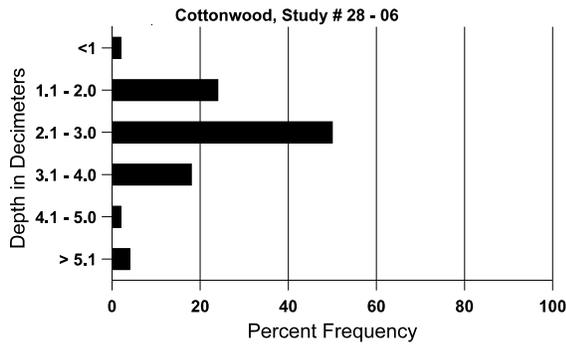
Cover Type	Average Cover %				
	'87	'92	'98	'03	'08
Vegetation	3.25	24.97	34.35	22.39	33.70
Rock	12.75	5.65	4.45	5.30	3.54
Pavement	10.50	24.90	16.75	30.56	20.37
Litter	64.25	25.82	38.24	28.77	40.47
Cryptogams	0	.01	.24	.10	.10
Bare Ground	9.25	21.09	23.68	26.27	17.06

SOIL ANALYSIS DATA --

Management unit 28, Study no: 6, Study Name: Cottonwood

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
14.8	68.8 (15.0)	7.5	61.4	20.4	18.2	1.3	7.8	147.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 28 , Study no: 6

Type	Quadrat Frequency			
	'92	'98	'03	'08
Rabbit	61	38	35	88
Elk	-	1	-	1
Deer	57	47	28	65
Cattle	2	-	2	2

Days use per acre (ha)		
'98	'03	'08
-	-	-
7 (17)	3 (7)	1 (2)
41 (101)	60 (149)	121 (299)
2 (5)	5 (13)	4 (11)

BROWSE CHARACTERISTICS --
Management unit 28 , Study no: 6

		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>												
87	2464	-	466	1799	199	-	11	89	8	.81	3	23/29
92	1920	-	120	1500	300	-	57	14	16	6	14	-/-
98	1560	140	100	1000	460	340	64	6	29	6	13	26/37
03	1620	-	20	800	800	280	37	42	49	14	17	27/35
08	1580	120	80	880	620	560	10	42	39	20	20	22/33
<i>Cowania mexicana stansburiana</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	26/50
<i>Juniperus osteosperma</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	20	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Leptodactylon pungens</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	60	-	-	60	-	-	0	0	-	-	0	-/-
98	20	-	-	20	-	-	0	0	-	-	0	3/10
03	20	-	-	20	-	-	0	0	-	-	0	6/5
08	20	-	-	20	-	-	0	0	-	-	0	4/8
<i>Opuntia sp.</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	40	20	20	20	-	-	0	0	-	-	0	-/-
98	20	-	-	20	-	-	0	0	-	-	0	5/9
03	20	-	20	-	-	-	0	0	-	-	0	-/-
08	20	-	-	20	-	-	0	0	-	-	0	6/14