

Trend Study 19B-5-07

Study site name: West Government Creek .

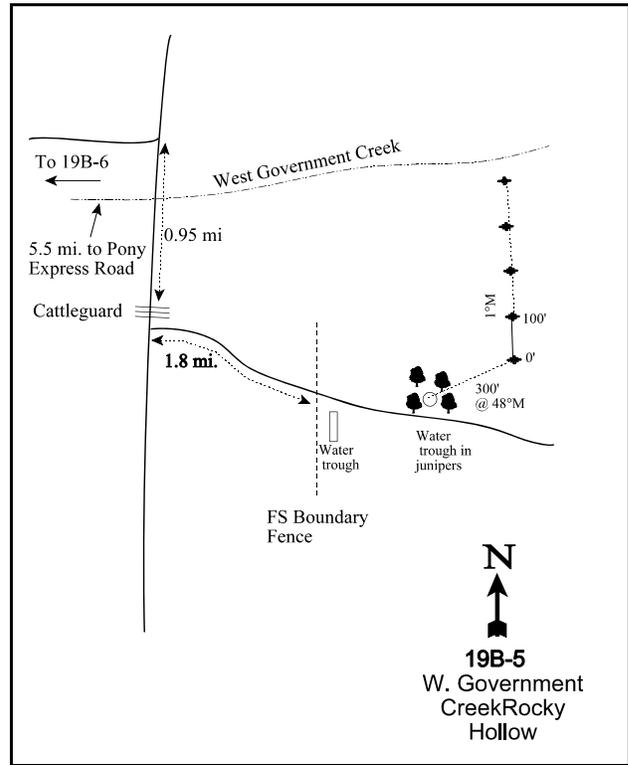
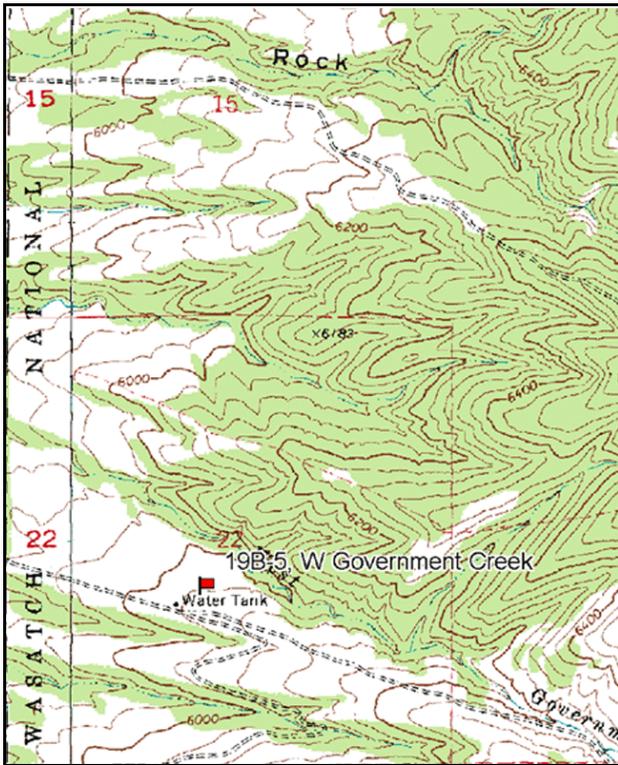
Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 357 degrees magnetic.

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

LOCATION DESCRIPTION

Turn south off the Pony Express Road onto the Erickson Pass Road. Go 4.6 miles to the turnoff to study 19B-6. Continue 0.95 miles to a cattleguard. Turn left 60 yards past the cattleguard. Go 1.8 miles to a water trough. From the northeast side of the circular trough, the 0-foot baseline stake is 300 feet away at an azimuth of 48 degrees. This stake is marked by browse tag #3975.



Map Name: Lookout Pass

Diagrammatic Sketch

Township 9S, Range 7W, Section 22

GPS: NAD 83, UTM 12S 361722 E 4430996 N

DISCUSSION

West Government Creek - Trend Study No. 19B-5

Study Information

This study samples deer winter range on Forest Service-administered land [elevation: 6,060 feet (1,847 m), slope: 7%-10%, aspect: west-northwest]. This area was formerly occupied by juniper-pinyon woodland. In the late 1960s, the trees were chained and windrowed. The area was then seeded using a rangeland drill. In 1983, it was noted that heavy cattle use was depressing grass vigor. Past intense cattle grazing has partly contributed to the high shrub canopy cover. There is a steel water trough 300 feet (91 m) to the southwest, which may explain the localized, intense grazing. The trough had no water in 2007. Use of the site by big game is very light. From the pellet group transect, there were an estimated 14 deer days use/acre (35 ddu/ha) in 2002 and 25 deer days use/acre (63 ddu/ha) in 2007. Elk pellets were only present in the transect in 2007 and use was estimated at 1 elk day use/acre (3 edu/ha). Cattle use was estimated at 33 days use/acre (82 cdu/ha) in 2002 and 3 days use/acre (7 cdu/ha) in 2007. Rabbit pellet groups were also moderately abundant in 2007, quadrat frequency was 52%.

Soil

The study lies within the Abela soil series, which generally consists of very deep, well-drained soils that formed in alluvium or lacustrine deposits. Soils in this series are derived mainly from limestone, sandstone, and quartzite and are found on fan remnants with 2%-25% slopes (USDA-NRCS 2007). Specifically at the study, the soil texture is a gravelly loam with a slightly alkaline reactivity (pH of 7.6). Surface soil movement and pedestalling around plants has been apparent. Relative bare ground cover was very high in 1983 at 51%. It declined to 26% in 1989 and 15% in 1997, but increased to 34% with drought in 2002. In 2007, relative bare ground cover decreased to 23%. The erosion condition was classified as slight in 2002 and 2007.

Browse

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominates the overstory, and canopy cover has averaged 30% since 2002. The density has oscillated between increasing and decreasing with alternate sample years. The lowest density was estimated at 2,300 plants/acre (5,693 plants/ha) in 1997, and the highest density was estimated at 5,298 plants/acre (13,114 plants/ha) in 1989. In 2007, the density was estimated at 2,320 plants/acre (5,743 plants/ha). In 1983, there were 1,166 seedlings/acre (2,886 seedlings/ha), but there have been few or no seedlings sampled since. The young age class has steadily decreased from 31% in 1983 to 1% of the population in 2007. Sagebrush decadence was low from 1983 through 1997 (1%-9%) and increased dramatically in both 2002 (24%) and 2007 (39%). In 2007, 19% of the population was dying, but few dying plants had been sampled previously. Annual leader growth averaged 1.2 inches (3 cm) in 2002 and 2007. Browse use been predominantly light-moderate in all sample years.

Antelope bitterbrush (*Purshia tridentata*) provides additional, but limited, forage. Although there has been a small amount of variability, the estimated density has averaged 100 plants/acre (248 plants/ha) since 1983. These plants have a prostrate growth form due to heavy browsing over the years. Height and crown measurements have increased each sample year. Even with heavy use, bitterbrush plants have had normal vigor, and no decadent plants have been sampled since 1997.

Scattered pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees are present, and the re-establishment of the tree canopy has occurred at a slow rate. Juniper density estimates, using the point-centered quarter method were only 30 trees/acre in 2002 and in 2007. Pinyon density has been too low to measure.

Herbaceous Understory

Perennial grasses dominate the understory. Perennial grass cover was 16% in 1997, 12% in 2002, and 21% in

2007. Although cover has been variable, the sum of nested frequency for perennial grasses has remained similar between sample years. The grass component is composed primarily of crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Agropyron intermedium*), and Sandberg bluegrass (*Poa secunda*). Crested wheatgrass has been the most abundant grass, providing nearly one-half of the grass cover in 1997 and 2002. Intermediate wheatgrass is more common in depressions. Cheatgrass (*Bromus tectorum*) is present but has been sampled in only a few quadrats.

Forb diversity and abundance has been fair. Perennial forb cover was 5% in 1997, less than 1% in 2002, and 3% in 2007. Between three and 20 perennial species have been sampled, and the most abundant species include silky milkvetch (*Astragalus cibarius*), tapertip hawkbeard (*Crepis acuminata*), alfalfa (*Medicago sativa*), American vetch (*Vicia americana*), and longleaf phlox (*Phlox longifolia*). In 2002, forbs were only sampled in 12% of the quadrats, and the only forb species sampled were pale agoseris (*Agoseris glauca*), rock goldenrod (*Petradoria pumila*), and American vetch. Common annual species include pale alyssum (*Alyssum alyssoides*) and bur buttercup (*Ranunculus testiculatus*), which is an allelopathic plant (Buchanan et al. 1978).

1989 TREND ASSESSMENT

The browse trend is up. Wyoming big sagebrush density increased 71%. Young plants decreased from 31% to 26%, and decadence increased from 1% of the population to 9%. The average crown width decreased 12 inches (30 cm). Browse use improved from light-moderate to light. The grass trend is stable. The sum of nested frequency of perennial grasses increased 6%. Bottlebrush squirreltail (*Sitanion hystrix*) and Indian ricegrass (*Oryzopsis hymenoides*) were each sampled in one quadrat in 1983, but were not sampled at all in 1989. The forb trend is up. The sum of nested frequency of perennial forbs increased 67%, including significant increases in the nested frequencies of silky milkvetch, longstalk springparsely (*Cymopterus longipes*), and alfalfa.

browse - up (+2)

grass - stable (0)

forb - up (+2)

1997 TREND ASSESSMENT

The browse trend is stable. The density of Wyoming big sagebrush decreased 57%. Most of the decrease in density was attributed to the larger sample area that was measured beginning in 1997. If there had been a large number of dead sagebrush plants measured, then the decrease in density may have been attributed to shrub die-off. Thus, trend was determined from other parameters. Young plants decreased to 16% of the population, but decadence remained constant at 9%. The proportion of plants exhibiting poor vigor was stable, and browse use shifted from light to light-moderate. The grass trend is stable. The sum of nested frequency of perennial grasses increased 7%. There was a significant decrease in the nested frequency of intermediate wheatgrass and a significant increase in that of Sandberg bluegrass, however, Sandberg bluegrass offers less forage than intermediate wheatgrass. The forb trend is stable. The sum of nested frequency for perennial forbs decreased 4%, including significant decreases in the nested frequencies of four species. The Desirable Components Index (DCI) score was excellent due to the high browse cover, low browse decadence, and high perennial grass and forb cover.

winter range condition (DCI) - excellent (84) Low potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2002 TREND ASSESSMENT

The browse trend is up. Wyoming big sagebrush density increased 37%. The change in density was attributed to increases in both the mature and decadent age classes. Decadency increased to 24% of the population, while young plants decreased from 16% to 3%. The increase in decadency was likely the result of the region-wide drought (Utah Climate Summaries 2007). The proportion of plants exhibiting poor vigor remained constant. Browse use remained light-moderate. The grass trend is stable. The sum of nested frequency for perennial grasses decreased 8%. The forb trend is down. The sum of nested frequency of perennial forbs

decreased 92%, and the number of measured species decreased from 24 to three. No annual forbs were sampled. Crickets and competition from sagebrush were also suspected to have suppressed the forb species. The DCI score decreased to good due to the decrease in recruitment, perennial grass cover and perennial forb cover.

winter range condition (DCI) - good (61) Low potential scale
browse - up (+2) grass - stable (0) forb - down (-2)

2007 TREND ASSESSMENT

The browse trend is down. Wyoming big sagebrush density decreased 27%. No sagebrush seedlings were sampled, and the young component of the population decreased to 1%. The decadent age class increased to 39% of the population, and 19% of the population was classified as dying. Because of the high number of dying plants, vigor also declined. Many of the sagebrush looked drought-stressed. Browse use remained predominantly light-moderate, though heavily browsed plants increased from 3% of the population to 21%. The grass trend is stable. The sum of nested frequency of perennial grasses increased 7%, including a significant increase in the nested frequency of Sandberg bluegrass. Although the increase in nested frequency was small, perennial grass cover increased from 12% to 21%. Grasses had good seed production, but had not been grazed at the time of sampling. The forb trend is up. The sum of nested frequency of perennial forbs increased nine-fold, and the number of species increased from three to 19. Annual forbs had a higher abundance, but lower cover, than perennial forbs. The DCI score remained good.

winter range condition (DCI) - good (61) Low potential scale
browse - down (-2) grass - stable (0) forb - up (+2)

**HERBACEOUS TRENDS --
Management unit 19B, Study no: 5**

Type	Species	Nested Frequency					Average Cover %		
		'83	'89	'97	'02	'07	'97	'02	'07
G	Agropyron cristatum	c ₂₇₉	bc ₂₆₃	ab ₂₃₁	a ₁₇₆	a ₁₉₆	8.53	5.74	8.01
G	Agropyron intermedium	ab ₁₅₄	a ₁₉₂	bc ₁₃₆	c ₁₃₂	bc ₁₀₉	3.59	3.02	3.58
G	Agropyron spicatum	-	-	a ₇	a ₉	a ₁₂	.18	.39	.51
G	Bromus tectorum (a)	-	-	a ₁₂	a ₃	a ₁₀	.02	.00	.05
G	Oryzopsis hymenoides	1	-	-	-	-	-	-	-
G	Poa secunda	a ₃₉	a ₅₀	b ₁₆₈	b ₁₇₆	c ₂₁₆	3.95	2.73	9.18
G	Sitanion hystrix	a ₃	-	-	a ₄	-	-	.03	-
Total for Annual Grasses		0	0	12	3	10	0.02	0.00	0.05
Total for Perennial Grasses		476	505	542	497	533	16.26	11.93	21.29
Total for Grasses		476	505	554	500	543	16.29	11.93	21.35
F	Agoseris glauca	-	-	a ₂	a ₃	a ₄	.00	.00	.06
F	Alyssum alyssoides (a)	-	-	b ₂₄₉	-	a ₇₆	.63	-	.20
F	Antennaria rosea	-	a ₈	a ₃	-	-	.00	-	-
F	Arabis sp.	-	-	6	-	-	.01	-	-
F	Astragalus ciliaris	a ₂₅	b ₇₄	a ₂₅	-	b ₄₇	1.14	-	1.69

Type	Species	Nested Frequency					Average Cover %		
		'83	'89	'97	'02	'07	'97	'02	'07
F	<i>Astragalus convallarius</i>	_a 3	_a 6	_a 3	-	_a 2	.04	-	.03
F	<i>Castilleja chromosa</i>	-	_a 2	_a 1	-	-	.03	-	-
F	<i>Calochortus nuttallii</i>	_a 1	-	_a 1	-	_a 6	.00	-	.01
F	<i>Chaenactis douglasii</i>	_a 16	_a 9	_a 3	-	-	.00	-	-
F	<i>Cirsium neomexicanum</i>	_a 1	_a 6	_a 2	-	-	.03	-	-
F	<i>Comandra pallida</i>	-	-	_a 3	-	_a 2	.03	-	.00
F	<i>Collinsia parviflora</i> (a)	-	-	_a 45	-	_a 65	.11	-	.20
F	<i>Crepis acuminata</i>	_a 14	_a 26	_a 15	-	_a 15	.16	-	.14
F	<i>Cymopterus longipes</i>	_a 11	_b 31	_a 10	-	_a 3	.04	-	.01
F	<i>Draba</i> sp. (a)	-	-	-	-	4	-	-	.00
F	<i>Eriogonum</i> sp.	-	-	1	-	-	.03	-	-
F	<i>Erigeron pumilus</i>	_a 16	_a 16	_a 9	-	-	.02	-	-
F	<i>Galium boreale</i>	-	-	_a 4	-	_a 5	.18	-	.01
F	<i>Holosteum umbellatum</i> (a)	-	-	-	-	5	-	-	.01
F	<i>Lathyrus brachycalyx</i>	-	-	34	-	-	.37	-	-
F	<i>Medicago sativa</i>	_a 18	_b 38	_a 13	-	-	1.72	-	-
F	<i>Microsteris gracilis</i> (a)	-	-	_a 23	-	_a 10	.04	-	.02
F	<i>Petroradia pumila</i>	_{bc} 30	_c 37	_{ab} 18	_a 12	_a 10	.34	.28	.22
F	<i>Phlox longifolia</i>	_a 55	_a 69	_a 68	-	_a 53	.66	-	.35
F	<i>Ranunculus testiculatus</i> (a)	-	-	_b 200	-	_a 158	1.00	-	.56
F	<i>Tragopogon dubius</i>	-	_a 2	-	-	_a 2	-	-	.01
F	<i>Vicia americana</i>	_a 4	-	_b 89	_a 10	_b 75	.57	.04	.42
F	<i>Zigadenus paniculatus</i>	-	-	-	-	1	-	-	.01
Total for Annual Forbs		0	0	517	0	318	1.78	0	0.99
Total for Perennial Forbs		194	324	310	25	225	5.43	0.33	2.99
Total for Forbs		194	324	827	25	543	7.21	0.33	3.99

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

BROWSE TRENDS --

Management unit 19B, Study no: 5

Type	Species	Strip Frequency			Average Cover %		
		'97	'02	'07	'97	'02	'07
B	Artemisia tridentata wyomingensis	73	76	74	17.67	20.67	16.40
B	Atriplex canescens	0	0	0	-	.38	-
B	Gutierrezia sarothrae	10	10	5	.03	.12	.03
B	Juniperus osteosperma	1	3	2	.85	1.37	1.50
B	Purshia tridentata	5	4	4	.71	.38	.33
Total for Browse		89	93	85	19.27	22.94	18.28

CANOPY COVER, LINE INTERCEPT --

Management unit 19B, Study no: 5

Species	Percent Cover	
	'02	'07
Artemisia tridentata wyomingensis	31.35	28.64
Gutierrezia sarothrae	.06	-
Juniperus osteosperma	2.21	3.23
Purshia tridentata	.05	.25

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 19B, Study no: 5

Species	Average leader growth (in)	
	'02	'07
Artemisia tridentata wyomingensis	1.2	1.2

POINT-QUARTER TREE DATA --

Management unit 19B, Study no: 5

Species	Trees per Acre		Average diameter (in)	
	'02	'07	'02	'07
Juniperus osteosperma	30	20	4.1	3.9

BASIC COVER --

Management unit 19B, Study no: 5

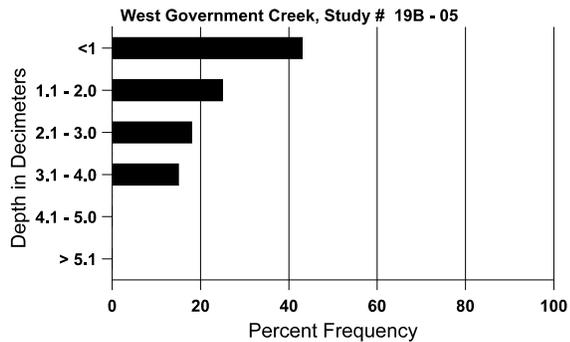
Cover Type	Average Cover %				
	'83	'89	'97	'02	'07
Vegetation	5.25	10.00	42.08	35.67	42.98
Rock	2.75	2.75	.76	1.08	.40
Pavement	8.75	22.50	6.08	5.15	5.71
Litter	32.25	38.75	42.22	37.11	39.62
Cryptogams	0	0	4.57	1.06	.53
Bare Ground	51.00	26.00	16.29	40.34	26.13

SOIL ANALYSIS DATA --

Herd Unit 19B, Study no: 5, West Government Creek

Effective rooting depth (in)	Temp °F (depth)	pH	Loam			%OM	ppm P	ppm K	dS/m
			%sand	%silt	%clay				
12.2	58.5 (14.0)	7.6	40.4	35.1	24.6	3.4	23.8	336.0	.2

Stoniness Index



PELLET GROUP DATA --

Management unit 19B, Study no: 5

Type	Quadrat Frequency		
	'97	'02	'07
Rabbit	21	12	54
Elk	-	-	1
Deer	3	3	8
Cattle	10	10	6

Days use per acre (ha)	
'02	'07
-	-
-	1 (3)
14 (35)	25 (63)
33 (82)	3 (7)

BROWSE CHARACTERISTICS --
Management unit 19B, Study no: 5

		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>												
83	3099	1166	966	2100	33	-	55	0	1	-	1	25/36
89	5298	33	1366	3466	466	-	17	0	9	1	7	21/24
97	2300	20	360	1740	200	-	40	0	9	2	6	31/51
02	3160	-	100	2300	760	20	30	3	24	6	6	30/47
07	2320	-	20	1400	900	60	30	21	39	19	21	31/49
<i>Gutierrezia sarothrae</i>												
83	0	-	-	-	-	-	0	0	0	-	0	-/-
89	33	-	-	33	-	-	0	0	0	-	0	7/4
97	240	20	60	180	-	-	0	0	0	-	0	12/11
02	440	-	20	400	20	-	0	0	5	-	0	7/9
07	140	-	-	80	60	20	0	0	43	43	43	6/7
<i>Juniperus osteosperma</i>												
83	0	-	-	-	-	-	0	0	-	-	0	-/-
89	0	-	-	-	-	-	0	0	-	-	0	-/-
97	20	-	20	-	-	-	0	0	-	-	0	-/-
02	60	-	20	40	-	-	0	0	-	-	0	-/-
07	40	-	-	40	-	-	0	0	-	-	0	-/-
<i>Purshia tridentata</i>												
83	66	-	-	66	-	-	0	100	0	-	0	9/28
89	132	-	-	66	66	-	25	75	50	-	0	12/22
97	100	-	20	80	-	-	20	40	0	-	0	15/38
02	120	-	20	100	-	-	0	83	0	-	0	17/51
07	80	-	-	80	-	-	0	75	0	-	0	23/59