

Trend Study 2-34-06

Study site name: Otter Creek.

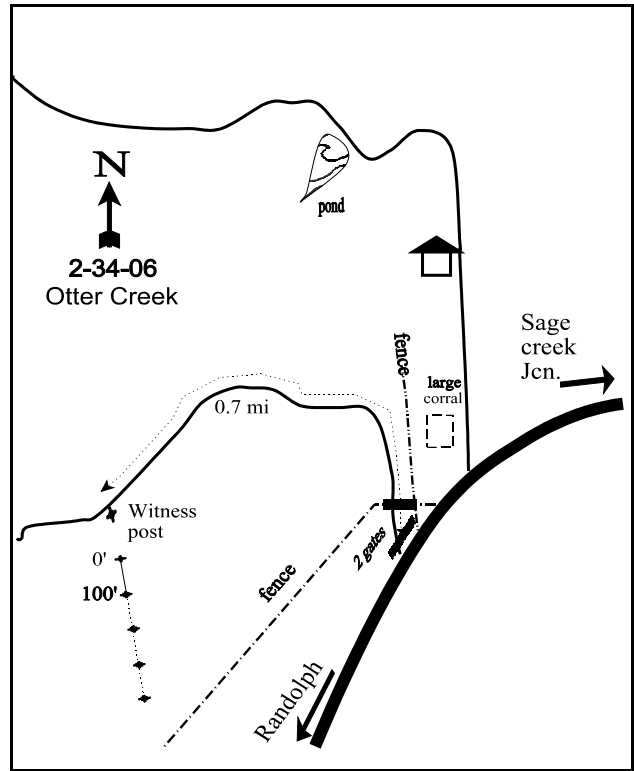
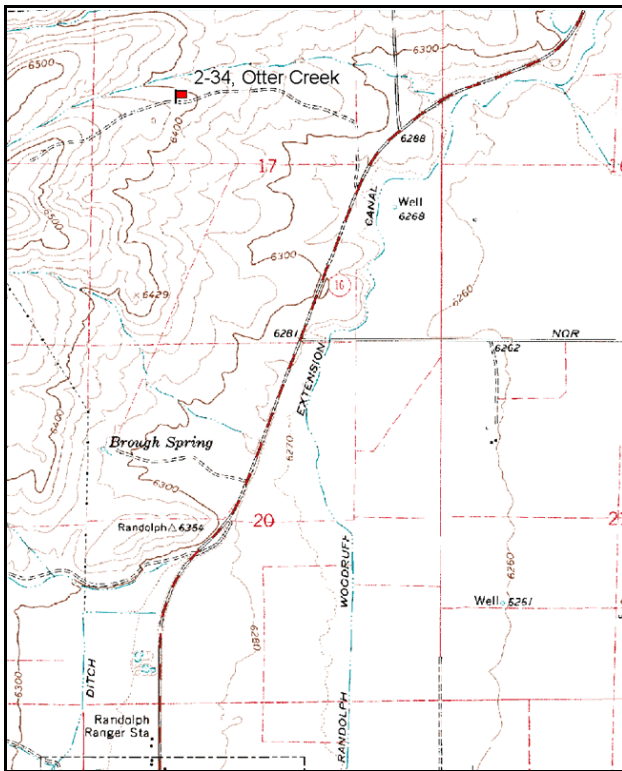
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 146 degrees magnetic.

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

LOCATION DESCRIPTION

Proceed north from Randolph on U-16. Travel 1/2 mile past Nor Gray Lane. Turn left here, and proceed 0.7 miles from the first gate to a witness post on the left hand side of the road. From the witness post walk 15 feet at 160 degrees magnetic to the 0-foot stake of the baseline marked with browse tag #7977.



Map Name: Randolph

Diagrammatic Sketch

Township 11N, Range 7E, Section 17

UTM NAD 27, UTM 12T 4616055 N, 484758 E

DISCUSSION

Otter Creek - Trend Study No. 2-34

Study Information

This study is located approximately 2 miles north of Randolph on the west side of SR 16 on land administered by the BLM (elevation: 6,400 feet, slope: 5%, aspect: east). The study area was treated with herbicides or some kind of mechanical means to control sagebrush prior to 1984. In addition, crested wheatgrass was drill seeded to increase forage production for livestock. By 2001, the area had returned to a climax Wyoming big sagebrush community and 41% of the sagebrush was decadent. In the spring of 2004, 355 acres were treated with a Lawson aerator; a greenstripping design was used, which left some untreated strips of sagebrush. The seed mix included thickspike wheatgrass, crested wheatgrass, slender wheatgrass, Lewis flax, and forage kochia. The pasture just south of the study area remains a thick sagebrush community. Many different animals use the area including cattle, sheep, deer, pronghorn, elk, and sage grouse. Pellet group transect data from 2001 estimated 42 deer/pronghorn and 11 cow days use/acre (103 days use/ha and 27 cdu/ha). Deer and antelope pellet groups were combined due to their similarity in appearance. Sage grouse pellet groups were seen on the study in 2001. Pellet group data from 2006 was estimated at 28 deer/pronghorn and 11 cow days use/acre (69 ddu/ha and 27 cdu/ha).

Soil

Soils are classified in the Pancheri series, which includes deep, well drained soils that formed in loess covered lava plains, which are fertile with agricultural potential. The principal problem is high susceptibility to wind and water erosion. A good plant cover is essential for preventing soil erosion (Campbell and Lacey 1982; USDA-NRCS 2006). The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground remained fair at 2.6:1 in 2006. Soils have a loam texture with a neutral pH of 6.9 and limited organic matter (1.4%). Effective rooting depth is estimated at almost 16 inches. There is little rock on the surface, but a calcareous layer becomes evident at about 10 inches. The study area is not badly eroded even though the amount of exposed bare ground is greater than on nearby undisturbed big sagebrush types. In 2001, an erosion condition class determined soils to be eroding slightly due mostly to pedestalling around sagebrush stems, but were classified as stable in 2006. Bare ground decreased from 40% relative cover in 2001 to 29% in 2006 and both litter and vegetation cover increased. The herbaceous cover provided by crested wheatgrass helps stabilize the soil.

Browse

Browse composition consists almost entirely of Wyoming big sagebrush, which has made up half of the total vegetation cover, except in 2006 (only made up 23%). Sagebrush are small in stature and in 1996 density was estimated at 9,620 plants/acre, which increased in 2001 to 10,440 plants/acre. Decadence was quite high in 2001 at 41% of the population. In 2006, 1,860 dead plants/acre were estimated. The aerator treatment in 2004 decreased the population to 6,760 plants/acre in 2006, but cover remained relatively high at 9% cover. A comparison aerator study on Desert Land and Livestock decreased sagebrush cover from 25% to 2.5% (Summers 2005). The greenstrip method may have accounted for the high cover, because partial areas were left untreated. Recruitment from young plants has been moderate in all sampling years, but was the lowest in 2006 at 7% of the population. Utilization has typically been light to moderate with good vigor except in 1996, when most of the population experienced early leaf drop due to dry conditions. Annual leader growth was very minimal in 2001 and 2006, averaging about 1 inch.

Herbaceous Understory

The herbaceous understory consists exclusively of perennial grasses, with crested wheatgrass dominating the area. It averaged 11-12% cover in 1996 and 2001, then increased to 23% in 2006. Crested wheatgrass averaged 62% of the total vegetation cover in 2006. It was seeded before the study was established in 1984 and again in 2004 with the aerator treatment. Sandberg bluegrass is the only other common perennial grass found and cover has averaged 3-5%. Grasses showed a moderate level of grazing use in 1984, but in 2006

grazing was light. Forbs occur rarely and produced about 1% cover in 1996 and 2001. In 2006, cover increased to 4% due to an increase in Hood's phlox and the newly seeded Lewis flax.

1990 TREND ASSESSMENT

The seeded Wyoming big sagebrush shows an upward trend and is still recovering. Young plants still make up a significant portion of the population, although the percentage of decadent plants has increased. The overall density decreased from 9,566 plants/acre to 7,665 plants/acre, but over a 1,000 plants were added to the mature population. Canopy cover is estimated at 14%. Sagebrush has been moderately hedged and has normal vigor. Trend for grasses is stable. Crested wheatgrass nested frequency decreased significantly, while Sandberg bluegrass increased significantly. Trend for forbs is slightly up. Forbs are a minimal component of the herbaceous understory and most are low growing and unpalatable.

browse - up (+2)

grasses - stable (0)

forbs - slightly up (+1)

1996 TREND ASSESSMENT

Trend for Wyoming big sagebrush is stable. Utilization is light to moderate and percent decadence is low. Recruitment is good with abundant seedlings and young. The poor vigor found on the majority of the population appears to be a temporary condition brought on by prolonged drought conditions. Current cover for sagebrush is 16%. Trend for grasses is stable. Sum of nested frequency for perennial grasses has increased slightly, while frequency of forbs has declined slightly. Nested frequency for the native Sandberg bluegrass has increased significantly. Trend for forbs is stable. Forbs are a minimal component of the herbaceous understory and most are low growing and unpalatable. The Desirable Components Index rated this study as excellent due to good browse cover, low decadence, and good perennial grass cover.

winter range condition (DC Index) - excellent (76) Low Potential scale

browse - stable (0)

grasses - stable (0)

forbs - stable (0)

2001 TREND ASSESSMENT

Trend for browse is stable. Wyoming big sagebrush density remains stable, and recruitment from young plants is adequate to replace the decadent plants classified as dying in the population. Vigor is generally good, although percent decadence increased from 9% to 41%. Increased decadence is likely due to drought and should improve with normal precipitation in the future. Use remains light to moderate. Trend for grasses is stable. Crested wheatgrass, the dominant herbaceous species, remains at a stable frequency. Trend for forbs is stable. Sum of nested frequency of perennial forbs remained similar to 1996. The Desirable Components Index decreased to good due to decreased browse cover and moderate decadence, but perennial grass cover is still good.

winter range condition (DC Index) - good (54) Low Potential scale

browse - stable (0)

grasses - stable (0)

forbs - stable (0)

2006 TREND ASSESSMENT

Trend for key browse, Wyoming big sagebrush, is down. Mature and decadent plants combined decreased by 32%, from 9,180 plants/acre to 6,280 plants/acre. Drought conditions in 2001 and 2002 most likely stressed the sagebrush, but the aerator treatment caused the decrease in density. Decadence was quite high in 2001 at 41% of the population and in 2006 dead plants were estimated at 1,860 plants/acre. Young recruitment remains fair at 7%. Trend for grasses is stable. Perennial grass sum of nested frequency remained similar to 2001. Trend for forbs is up. Perennial forb sum of nested frequency increased by 82%, mainly due to a significant increase in Lewis flax. The Desirable Components Index rated this study as good-excellent due to moderate browse cover, moderate decadence, and increased perennial grass cover.

winter range condition (DC Index) - good-excellent (44) Low Potential scale
 browse - down (-2) grasses - stable (0) forbs - up (+2)

HERBACEOUS TRENDS --
 Management unit 02 , Study no: 34

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron cristatum	_b 341	_a 309	_{ab} 310	_a 300	_a 317	11.62	10.64	23.34
G	Carex sp.	-	4	-	4	5	-	.01	.18
G	Oryzopsis hymenoides	-	-	-	3	-	-	.00	-
G	Poa secunda	_a 147	_b 208	_c 265	_{bc} 227	_b 190	5.29	2.48	3.41
G	Stipa comata	-	3	2	3	-	.01	.03	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		488	524	577	537	512	16.93	13.17	26.93
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F	Alyssum alyssoides (a)	-	-	-	20	52	-	.04	.09
F	Arabis sp.	-	-	-	1	1	-	.00	.00
F	Arenaria sp.	-	-	-	-	1	-	-	.03
F	Astragalus utahensis	_{ab} 2	_b 6	_{ab} 5	_{ab} 3	_a -	.03	.00	.00
F	Calochortus nuttallii	-	-	-	2	-	-	.00	-
F	Cordylanthus ramosus (a)	-	-	-	2	-	-	.01	-
F	Erigeron pumilus	-	-	-	1	1	-	.00	.00
F	Linum lewisii	_a -	_a -	_a -	_a -	_b 79	-	-	.87
F	Lomatium sp.	-	1	-	9	-	-	.02	-
F	Phlox hoodii	_a 38	_b 81	_{ab} 75	_{ab} 58	_b 85	1.16	.54	2.77
F	Phlox longifolia	_a -	_b 50	_b 31	_b 25	_b 50	.15	.10	.30
F	Tragopogon dubius	-	-	-	4	-	-	.03	-
F	Trifolium sp.	_c 29	_a 4	_a -	_{bc} 18	_{ab} 7	-	.05	.02
F	Unknown forb-perennial	1	-	-	-	-	-	-	-
F	Zigadenus paniculatus	-	-	-	4	3	-	.03	.07
Total for Annual Forbs		0	0	0	22	52	0	0.04	0.08
Total for Perennial Forbs		70	142	111	125	227	1.35	0.80	4.09
Total for Forbs		70	142	111	147	279	1.35	0.85	4.18

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

BROWSE TRENDS --

Management unit 02 , Study no: 34

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia tridentata wyomingensis	98	94	89	16.12	11.36	9.11
B	Atriplex gardneri falcata	8	9	7	.06	.18	.03
B	Chrysothamnus viscidiflorus stenophyllus	10	5	10	.60	.03	.18
B	Eriogonum microthecum	1	1	0	.15	.03	-
B	Opuntia sp.	2	1	1	-	-	-
Total for Browse		119	110	107	16.93	11.60	9.32

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 34

Species	Percent Cover '06
Artemisia tridentata wyomingensis	7.81
Atriplex gardneri falcata	.16
Chrysothamnus viscidiflorus stenophyllus	.20

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 34

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata wyomingensis	0.8	1.0

BASIC COVER --

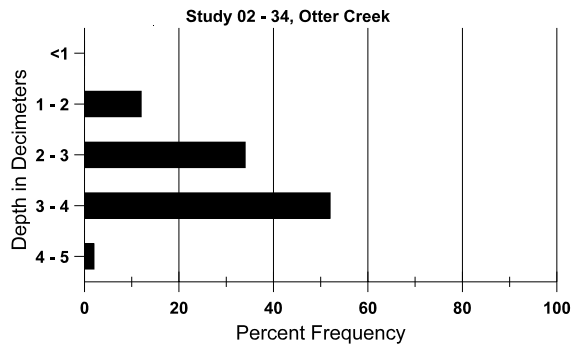
Management unit 02 , Study no: 34

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	13.50	5.00	36.29	28.72	38.15
Rock	0	0	.03	.01	.04
Pavement	0	0	.22	.10	.04
Litter	40.25	40.50	29.26	35.75	43.18
Cryptogams	0	.50	3.84	4.25	1.48
Bare Ground	46.25	54.00	42.42	46.36	33.09

SOIL ANALYSIS DATA --
Herd Unit 02, Study no: 34, Otter Creek

Effective rooting depth (in)	Temp °F (depth)	PH	Loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
15.6	62.0 (13.6)	6.9	40.6	35.1	24.4	1.4	15.2	108.8	0.6

Stoniness Index



PELLET GROUP DATA --
Management unit 02 , Study no: 34

Type	Quadrat Frequency		
	'96	'01	'06
Sheep	3	4	-
Rabbit	1	-	2
Elk	7	-	1
Deer	14	23	20
Cattle	5	6	3

Days use per acre (ha)	
'01	'06
3 (8)	-
-	-
-	-
42 (103)	28 (69)
11 (27)	11 (27)

BROWSE CHARACTERISTICS --
Management unit 02 , Study no: 34

		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>												
84	9566	700	5233	3433	900	-	51	8	9	-	0	17/28
90	7665	166	2133	2866	2666	-	42	0	35	6	10	15/14
96	9620	400	1500	7300	820	340	31	3	9	2	87	16/23
01	10440	-	1260	4920	4260	860	32	0	41	2	2	15/22
06	6760	340	480	4860	1420	1860	20	14	21	14	14	12/18

		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>Atriplex gardneri falcata</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	33	-	33	-	-	-	0	0	-	-	0	-/-
96	180	-	-	180	-	-	0	0	-	-	0	4/10
01	240	-	-	240	-	-	0	0	-	-	0	2/7
06	160	-	20	140	-	-	0	0	-	-	0	4/10
<i>Chrysothamnus viscidiflorus stenophyllus</i>												
84	332	-	166	166	-	-	10	0	0	-	0	11/25
90	699	-	-	33	666	-	0	0	95	52	86	8/15
96	340	-	-	320	20	-	0	0	6	-	88	9/15
01	140	-	-	80	60	-	0	0	43	-	0	7/14
06	320	-	-	280	40	-	0	0	13	6	19	10/17
<i>Eriogonum microthecum</i>												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	20	-	-	20	-	-	0	0	0	-	0	6/11
01	20	-	-	-	20	-	0	0	100	-	0	6/9
06	0	-	-	-	-	-	0	0	0	-	0	-/-
<i>Leptodactylon pungens</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	33/44
06	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Opuntia sp.</i>												
84	33	-	-	33	-	-	0	0	-	-	0	7/17
90	33	-	-	33	-	-	0	0	-	-	0	6/17
96	60	-	20	40	-	-	0	0	-	-	0	4/7
01	20	-	-	20	-	-	0	0	-	-	0	4/11
06	20	-	-	20	-	-	0	0	-	-	0	6/16