

Trend Study 4-14-06

Study site name: Chapman Canal .

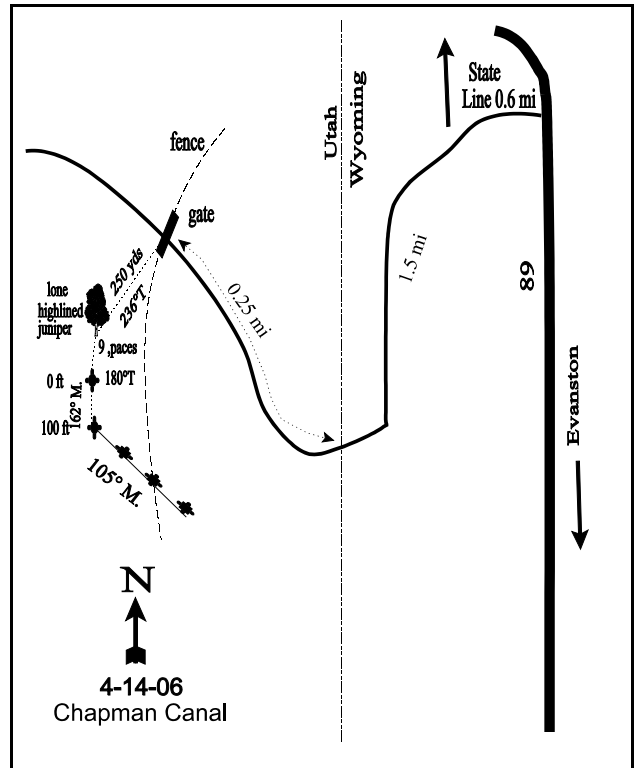
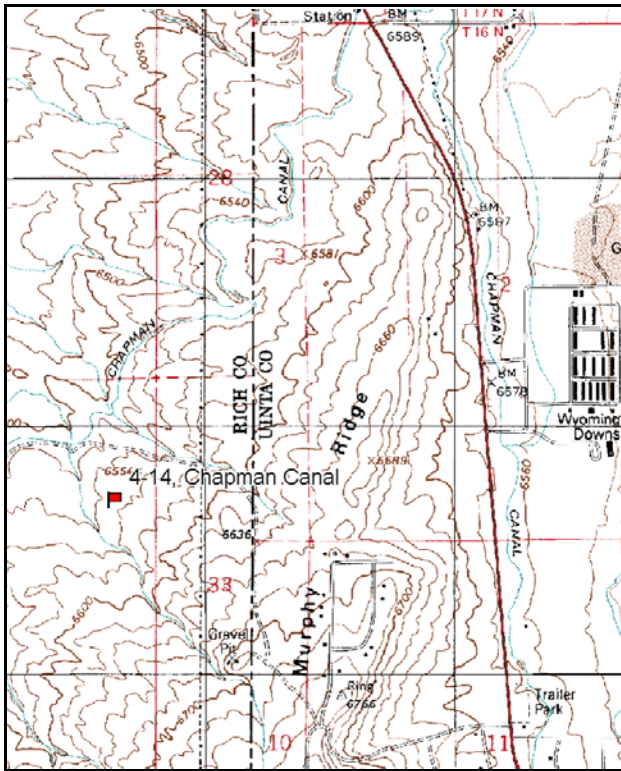
Vegetation type: Big Sagebrush-Grass .

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 state line southbound on Highway 16/89, proceed 0.6 miles towards Evanston and turn right (west). Proceed 1.5 miles, crossing Chapman Canal, to a gate (DL&L). Go through the gate and travel 0.25 miles to a fence/gate. From the gate walk approximately 130 paces at 218 degrees magnetic to a lone high lined juniper. This is the only juniper present in the area. From the tree walk 9 paces at 165 degrees magnetic to the 0-foot stake of the baseline, marked with browse tag #7939. The baseline doglegs after 100 feet and runs 105 degrees magnetic.



Map Name: Neponset Reservoir NE

Diagrammatic Sketch

Township 8N, Range 8E, Section 32

UTM NAD 27, UTM 12T 4581670 N 495612 E

DISCUSSION

Chapman Canal - Trend Study No. 4-14

Study Information

This study is located 3 miles east of Neponset Reservoir near the Utah-Wyoming state line (elevation: 6,550 feet, slope: 8%, aspect: west). This area of rolling hills is dominated by an extensive big sagebrush-grass type that extends for miles before any cover from trees or terrain is discernible. This section of land was owned by the School and Institutional Trust Lands Administration (SITLA) until 2006, when it was purchased by Deseret Land and Livestock. Deer, elk, antelope, sage grouse, horses, and cattle all utilize the area. A brood of Hungarian partridge and five winter killed deer carcasses were also observed at the time of study establishment in 1984. Deer/antelope use was moderately heavy in 1996 with a pellet group quadrat frequency of 24%. Pellet group frequency was 25% in 2001 and 53% in 2006. A few elk pellet groups have also been identified. The pellet group transect in 2001 estimated 30 deer/antelope, 5 elk, and 5 cow days use/acre (74 ddu/ha, 13 edu/ha and 13 cdu/ha). All deer/antelope pellet groups appeared to be from winter use. About half of the elk pellet groups appeared to be from winter use, while the other half were from spring or early summer use. The pellet group data in 2006 was estimated at 126 deer/antelope, 15 elk, and 3 cow says use/acre (311 ddu/ha, 38 edu/ha, and 7 cdu/ha). Deer pellets were from fall or winter and elk were from late winter. An antelope carcass was identified in the area.

Soil

The soil is in the Duckree Gravelly Loam series, a category typified by very deep, well drained, moderately permeable soils, formed in alluvium and colluvium from quartzite, chert, and sandstone (USDA-NRCS 2006). It is strongly calcareous and alkaline at all depths. Available water capacity is low and the erosion hazard is moderate (Campbell and Lacey 1982). The effective rooting depth is nearly 11 inches. Soil texture is a clay loam with a moderately alkaline soil reaction (pH of 8.0). Phosphorus could be a limiting factor at only 5.5 ppm because values of less than 6 ppm may limit plant growth and development (Tiedemann and Lopez 2004). Organic matter is also relatively low at only 1.9%. Ground cover is poor and comes primarily from the shrub crowns. Most shrub interspaces are barren and soil compaction from trampling is evident. Relative bare ground cover was 37% in 1996, 26% in 2001, and 29% in 2006. Sheet and gully erosion is noticeable throughout the area, but is not excessive. The soil erosion condition class was determined as slight in 2001 and stable in 2006.

Browse

The key browse species is Wyoming big sagebrush, which contributes the most browse cover. Sagebrush individuals were generally low in stature and heavily browsed in 1984. Vigor was poor on 18% of the population; although there was noticeable decadence among larger plants, there appeared to be adequate reproduction. In 1990, the population had changed little, other than a more moderate and improved vigor. The 1996 population density was 3,700 plants/acre, which was a 46% decline from 1990. This is primarily due to the reduction of young from 2,133 to 60 plants/acre and a larger sample size measured in 1996, which gives a better estimate of browse populations. Density was estimated at 4,040 plants/acre in 2001. Utilization of the sagebrush was light to moderate, vigor good on most plants, and percent decadence dropped slightly. No seedlings were sampled and young plants were still lacking. In 2006, sagebrush density decreased to 3,500 plants/acre, decadent individuals made up 89% of the population, plants classified with poor vigor made up 93% of the population and plants classified as dying made up 64% of the population. The sagebrush defoliator moth (*Aroga websterii*) had definitely infested 29% of the population and was likely the cause of the decadent/dying appearance of most sagebrush individuals. The study was sampled late in the summer, after the moth had defoliated many of the sagebrush individuals.

Narrowleaf low rabbitbrush is abundant and its population has remained fairly stable since 1984 at about 4,200 plants/acre. Mature plants are small, mostly unutilized, and in good vigor. Winterfat has been sampled in low densities since 1996.

Herbaceous Understory

The herbaceous understory is characterized by an adequate diversity of grasses, but few quality forbs. The most abundant grasses are Sandberg bluegrass and western wheatgrass. Cheatgrass was sampled in 2001, but it only occurred in small numbers and was not sampled again in 2006. The most abundant forbs include Hoods phlox and longleaf phlox, two low value perennial forbs for big game.

1990 TREND ASSESSMENT

The Wyoming big sagebrush population is dynamic in terms of age class structure, but fairly stable in total density. The sagebrush has a moderate to heavily hedged growth form. Sagebrush canopy cover averaged about 15%. Western wheatgrass and Sandberg bluegrass are very abundant and lightly used. Even with the fair understory, shrub interspaces are bare with 41% bare soil.

browse - stable (0)

grass - stable (0)

forb - stable (0)

1996 TREND ASSESSMENT

Trend for browse is stable. The density of sagebrush has decreased 46%. These large changes in density are likely due to the larger sample size used beginning in 1992, which better estimates shrub populations with clumped and/or discontinuous distributions. The grass trend is stable. The nested frequency of perennial grasses increased 12%, which is due mainly to a significant increase in the nested frequency of Sandberg bluegrass. These increases are also likely a product of the increased sample area used this year. The forb trend is stable. The nested frequency of perennial forbs increased, but this is due to the increased sample area. The Desirable Components Index score is good due to good browse cover, moderate percent browse decadence, moderate perennial grass cover, no annual grass cover, and good perennial forb cover.

winter range condition (DC Index) - good (51) Lower potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2001 TREND ASSESSMENT

Trend for Wyoming big sagebrush is stable with a similar density to 1996. Utilization continues to be light to moderate, vigor good on most plants, and decadence has declined slightly from 31% to 26%. Recruitment is poor with no seedlings encountered and young plants accounting for only 1% of the population. Without an improvement in reproduction, this population will likely decline slightly in the future (since 3% plants were classified as dying). The grass trend is stable. The nested frequency of perennial grasses changed little. Unfortunately, cheatgrass was sampled for the first time. The forb trend is stable. The nested frequency of perennial forbs decreased 11%, but none of the beneficial perennial forb species showed significant decreases. The DCI score remained good.

winter range condition (DC Index) - good (62) Lower potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2006 TREND ASSESSMENT

The browse trend is slightly down. The Wyoming big sagebrush density decreased 13%, most of the population (89%) was decadent, and 64% of the population was classified as dying. The high decadence and dying classifications were likely due to the infestation of the defoliator moth, but at this time it is difficult to determine which plants were dead and which plants were temporarily defoliated and will return to normal vigor. The grass trend is slightly up. The nested frequency of perennial grasses increased 14% and the nested frequency of cheatgrass decreased significantly. The forb trend is slightly up. The nested frequency of perennial forbs increased 42%, most of which is due to significant increases in longleaf phlox and rose pussytoes. Longleaf phlox increased significantly, which is beneficial for sage grouse hens previous to egg laying (Barnett and Crawford 1994). There are few species which provide significant forage for big game. The DCI score decreased to fair to good due to a large decrease in browse cover, large increase in decadence,

but an increase in perennial grass cover.

winter range condition (DC Index) - fair to good (44) Lower potential scale
browse - slightly down (-1) grass - slightly up (+1) forb - slightly up(+1)

HERBACEOUS TRENDS --
 Management unit 04 , Study no: 14

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron cristatum	-	-	-	2	1	.00	.15	.15
G	Agropyron smithii	_a 206	_a 220	_a 202	_{ab} 215	_b 256	1.81	2.99	9.06
G	Agropyron spicatum	_c 30	_b 13	_a -	_{ab} 1	_{ab} 6	-	.00	.33
G	Bromus tectorum (a)	-	-	_a -	_b 16	_a -	-	.04	-
G	Oryzopsis hymenoides	_a 4	_{ab} 11	_b 27	_{ab} 19	_b 24	.21	.21	1.24
G	Poa fendleriana	-	-	-	7	-	-	.06	-
G	Poa secunda	_{ab} 205	_a 178	_b 234	_b 231	_b 244	4.33	7.26	7.30
G	Sitanion hystrix	_b 15	_{ab} 1	_{ab} 13	_a -	_{ab} 8	.07	-	.33
G	Stipa comata	-	3	-	6	9	-	.18	.09
Total for Annual Grasses		0	0	0	16	0	0	0.04	0
Total for Perennial Grasses		460	426	476	481	548	6.43	10.87	18.53
Total for Grasses		460	426	476	497	548	6.43	10.92	18.53
F	Alyssum alyssoides (a)	-	-	_a 19	_b 164	_c 212	.04	.44	.87
F	Antennaria rosea	_c 38	_{bc} 38	_{ab} 9	_a 4	_c 32	.24	.18	.73
F	Arabis drummondii	-	-	2	-	1	.01	-	.00
F	Arenaria sp.	3	-	-	-	-	-	-	-
F	Astragalus convallarius	-	5	-	1	2	-	.01	.03
F	Astragalus sp.	7	7	3	8	6	.00	.12	.01
F	Astragalus utahensis	-	1	-	-	-	-	-	-
F	Cordylanthus ramosus (a)	-	-	-	2	-	-	.03	-
F	Cryptantha sp.	_b 11	_b 14	_{ab} 4	_a -	_{ab} 5	.06	-	.06
F	Cymopterus sp.	_a -	_a -	_{ab} 3	_{ab} 5	_b 11	.01	.04	.02
F	Descurainia pinnata (a)	-	-	-	7	3	-	.02	.01
F	Draba sp. (a)	-	-	-	1	-	-	.00	-
F	Erigeron pumilus	_a -	_{ab} 5	_{ab} 7	_b 11	_{ab} 4	.01	.12	.01
F	Haplopappus acaulis	1	4	3	1	1	.03	.03	.15
F	Lappula occidentalis (a)	-	-	-	5	-	-	.01	-
F	Microsteris gracilis (a)	-	-	-	6	-	-	.01	-
F	Phlox hoodii	_a 71	_{ab} 108	_c 145	_{bc} 110	_{bc} 124	3.79	1.88	2.45
F	Phlox longifolia	_a 16	_a 6	_b 56	_b 64	_c 104	.28	.24	.62
F	Ranunculus testiculatus (a)	-	-	_a 8	_a 17	_b 39	.02	.03	.08

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Senecio integerrimus</i>	-	-	-	1	-	-	.00	-
F	<i>Senecio multilobatus</i>	-	-	-	-	2	-	-	.03
F	<i>Trifolium</i> sp.	5	7	-	1	-	-	.00	-
F	Unknown forb-perennial	-	2	-	-	-	-	-	-
Total for Annual Forbs		0	0	27	202	254	0.07	0.55	0.96
Total for Perennial Forbs		152	197	232	206	292	4.44	2.65	4.12
Total for Forbs		152	197	259	408	546	4.51	3.20	5.08

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

BROWSE TRENDS --

Management unit 04 , Study no: 14

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Artemisia tridentata wyomingensis</i>	88	84	84	14.79	18.32	10.03
B	<i>Atriplex gardneri falcata</i>	7	14	13	.53	.09	.37
B	<i>Ceratoides lanata</i>	8	8	8	.21	-	.30
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	82	83	83	5.54	4.51	5.53
B	<i>Opuntia</i> sp.	13	4	9	.21	.53	.53
B	<i>Tetradymia canescens</i>	1	2	2	-	.15	.15
Total for Browse		199	195	199	21.29	23.60	16.92

CANOPY COVER, LINE INTERCEPT --

Management unit 04 , Study no: 14

Species	Percent Cover '06
<i>Artemisia tridentata wyomingensis</i>	10.73
<i>Atriplex gardneri falcata</i>	.15
<i>Ceratoides lanata</i>	.11
<i>Chrysothamnus viscidiflorus stenophyllus</i>	5.40
<i>Opuntia</i> sp.	-
<i>Tetradymia canescens</i>	.08

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 04 , Study no: 14

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata wyomingensis	1.1	-

BASIC COVER --

Management unit 04 , Study no: 14

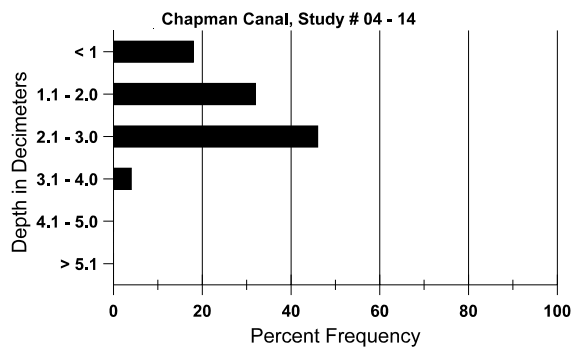
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	2.00	8.50	28.93	38.24	40.44
Rock	0	.25	.07	.06	.00
Pavement	0	.75	.63	1.22	.79
Litter	43.25	31.00	27.83	31.87	25.71
Cryptogams	10.00	18.25	12.77	21.15	12.23
Bare Ground	44.75	41.25	40.43	31.89	32.98

SOIL ANALYSIS DATA --

Herd Unit 04, Study no: 14, Chapman Canal

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%OM	PPM P	PPM K	dS/m
			% sand	% silt	% clay				
10.7	61.0 (9.4)	8.0	44.8	26.0	29.3	1.9	5.5	67.2	0.7

Stoniness Index



PELLET GROUP DATA --
 Management unit 04 , Study no: 14

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	9	28	38
Grouse	-	-	1
Elk	5	2	7
Deer	24	25	53
Cattle	1	-	2
Antelope	-	-	3

Days use per acre (ha)	
'01	'06
-	-
-	8.7 groups/acre
5 (13)	15 (38)
30 (74)	126 (311)
5 (13)	3 (7)
-	-

BROWSE CHARACTERISTICS --
 Management unit 04 , Study no: 14

		Age class distribution (plants per acre)					Utilization					
Y	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	6799	933	1466	2133	3200	-	29	60	47	.88	18	13/19
90	6866	-	2133	1800	2933	-	50	16	43	1	4	15/18
96	3700	20	60	2480	1160	760	32	2	31	9	9	18/34
01	4040	-	60	2940	1040	760	43	3	26	3	3	19/33
06	3500	140	60	340	3100	740	3	.57	89	64	93	16/29
<i>Atriplex canescens</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	22/36
06	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Atriplex gardneri falcata</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	600	-	-	600	-	-	0	0	-	-	0	4/9
01	840	-	440	400	-	-	2	0	-	-	0	3/7
06	840	-	340	500	-	-	10	0	-	-	0	3/7

		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)
Ceratoides lanata												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	300	60	80	220	-	-	13	0	-	-	0	5/7
01	240	-	20	220	-	-	17	17	-	-	0	6/10
06	240	-	-	240	-	-	33	67	-	-	0	5/8
Chrysothamnus viscidiflorus stenophyllus												
84	4199	-	733	3133	333	-	6	0	8	-	0	10/11
90	4599	-	866	2533	1200	-	43	4	26	-	3	5/7
96	4260	-	60	3200	1000	40	.93	0	23	2	4	10/17
01	4240	-	20	3100	1120	20	.94	0	26	4	4	8/15
06	4180	-	180	3360	640	-	3	1	15	1	11	9/14
Opuntia sp.												
84	266	-	-	266	-	-	0	0	0	-	0	4/9
90	466	-	333	133	-	-	0	0	0	-	29	5/3
96	480	-	-	440	40	-	0	0	8	-	0	4/15
01	80	-	-	60	20	-	0	0	25	-	0	3/11
06	200	-	40	140	20	-	0	0	10	-	0	4/9
Tetradymia canescens												
84	133	-	-	133	-	-	100	0	0	-	0	7/14
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	20	-	-	-	20	-	0	0	100	100	100	8/7
01	40	-	-	40	-	-	0	0	0	-	0	7/10
06	40	-	-	40	-	-	0	50	0	-	50	8/21