

Trend Study 9-7-05

Study site name: Warren Draw .

Vegetation type: Mountain Big Sagebrush .

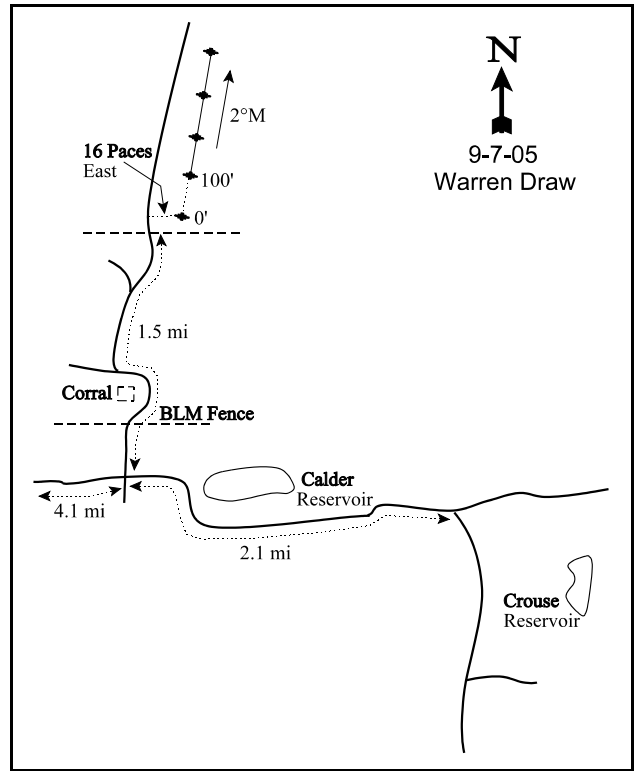
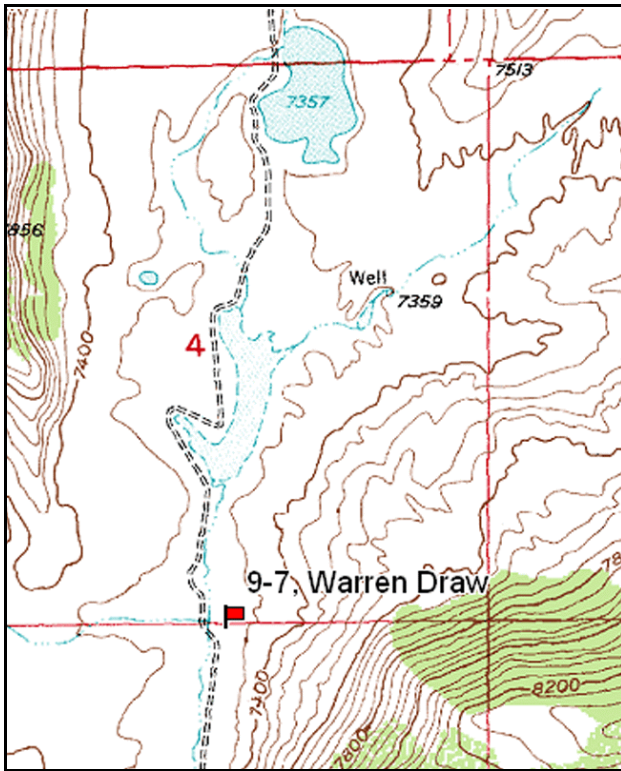
Compass bearing: frequency baseline 2 degrees magnetic.

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

LOCATION DESCRIPTION

From the junction between Crouse and Calder reservoirs proceed west 2.1 miles to an intersection. Turn right (north) and go 1.5 miles, past a fence and 2 forks. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces east to the 0-foot baseline stake. The frequency baseline is marked with green steel fenceposts approximately 18 inches in height.

Alternative route: From the Diamond Mountain turnoff off US 191 travel east to an intersection just south of Matt Warner reservoir. Turn right towards Calder reservoir and proceed 4.1 miles to a fork. Turn left (north) at this fork and travel 1.5 miles passing through one fence and coming to another. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces east to the 0-foot baseline stake. The frequency baseline is marked with green steel fenceposts approximately 18 inches in height.



Map Name: Warren Draw

Diagrammatic Sketch

Township 1S, Range 24E, Section 4

GPS: NAD 27, UTM 12T 4513015 N, 649639 E

DISCUSSION

Warren Draw - Trend Study No. 9-7

The Warren Draw trend study is located just north of the DWR boundary fence in Warren Draw. The site is on a gentle (10%) west-facing slope at an elevation of approximately 7,350 feet. The area is used year-round by deer and elk. Sage grouse also appear to be in abundance. Water is readily available in most years with several stock ponds within a mile. In 1995, pellet group quadrat frequency data suggested moderately low use by elk and deer. Pellet group data from 2000 estimated 22 deer, 8 elk, and 1 cow days use/acre (54 ddu/ha, 20 edu/ha, and 2 cdu/ha). Pellet group data from 2005 estimated 78 deer, 13 elk and 1 cow days use/acre (193 ddu/ha, 31 edu/ha, and 2 cdu/ha).

Soil conditions are good with abundant protective ground cover (vegetation, litter, and cryptogams) and low amounts of bare soil. Soil texture is a sandy clay loam with a neutral pH of 6.6. Soil depth is moderate with an estimated effective rooting depth of nearly 13 inches. Some areas close to the site contain black sagebrush, which indicates localized rooting depth restrictions. Rock and pavement are scarce both on the surface and within the profile. Penetrometer readings used to estimate a profile stoniness index are more indicative of soil compaction in the profile than the presence of rocks. The erosion condition class determined soil movement as stable in 2005. Some pedestaling was observed around mature sagebrush plants.

The key browse species is mountain big sagebrush. The sagebrush stand has had an average cover of 20%. Population density was estimated at 7,320 plants/acre in 1995, 8,940 in 2000, and 8,220 in 2005. Percent decadence has been fairly high over all sampling years, except in 1982. In 1982, decadency was low at 7%, but increased to 51% by 1988 and has remained between 20% and 42% since then. The portion of the population classified as dying increased from 1% in 1995 to 11% in 2000. It reached a high of 20% in 2005. In 2000, several sagebrush plants were covered with ants. Young recruitment has been fairly good over the years at 12-13%, but decreased in 2005 to 5%. Seedlings were fairly abundant in 2005. Use has been light to moderate. Annual leader growth was fairly good in 2000, about 4 inches, but decreased to only 1.6 inches in 2005.

The only other browse species sampled was slenderbush eriogonum and fringed sagebrush. Snowberry is also scattered around the area in lower numbers.

Even with a high density and cover of sagebrush, the herbaceous understory is abundant. Grasses combined to produce nearly 15% cover in 1995 and 2000, then increased to 24% in 2005. Forbs averaged 24% cover in 1995 and 16% in 2000 and 2005. Eleven perennial grasses were sampled in 2005; Sandberg bluegrass, mutton bluegrass, and pinewoods needlegrass were the most abundant. These 3 species combined to produce 79% of the grass cover in 2005. Other species include: bottlebrush squirreltail, needle-and-thread, prairie junegrass, thickspike wheatgrass, Kentucky bluegrass, and a sedge species. Perennial grasses slightly decreased in sum of nested frequency in 2000 due to drought, but partially recovered by 2005. Forbs are diverse and abundant with 22 perennial species encountered in 1995, 18 in 2000, and 20 in 2005. Forbs decreased in cover from 24% in 1995 to 16% in 2000 and 2005. The dominant species are mainly mat forming and include: rose pussytoes, desert phlox, and owllover. Species with forage value included Silver lupine, penstemon, dandelion, and bluebells.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable to improving. All nine categories on the apparent trend evaluation form had favorable ratings. Vegetative trend appears stable but is perhaps more precarious at least with respect to the key browse species. Mountain big sagebrush appears to be sustaining itself at the present time, but age, form and vigor class distributions tend to be borderline. Reproduction may be a problem. All of these will be important parameters to monitor in the future.

1988 TREND ASSESSMENT

Soil conditions have improved in some areas but declined in others. Basal vegetative cover has increased from 18% to 23%. Percent litter cover declined slightly while percent bare ground increased. The site is in good condition and the soil trend is considered stable. The key browse species, mountain big sagebrush, displays a slightly improving trend. Even though population density increased dramatically, the proportion of decadent plants also dramatically increased from 7% to 51%. Biotic potential (number of seedlings) is currently high at 28% and the proportion of young plants is good at 13%. The number of mature plants has also increased slightly. The current population could decline in the future if drought conditions persist and cause the high number of decadent sagebrush to die-off. The herbaceous trend is up due to a large increase in the quadrat frequency of grasses and forbs since 1982.

TREND ASSESSMENT

soil - stable (0)

browse - slightly up (+1)

herbaceous understory - up (+2)

1995 TREND ASSESSMENT

Ground cover characteristics have improved in most categories since 1988. Currently, 53% of the ground surface is covered by vegetation, 65% of which is covered by herbaceous plants. Percent litter has declined due to the prolonged drought, but cryptogamic cover has increased and percent bare ground has declined from 16% to 14%. Trend for soil is stable. The browse trend is slightly up for mountain big sagebrush. The number of mature plants increased, while the number of decadent shrubs declined from 51% to 20%. The only negative aspect of the browse trend is the moderate and heavy use of the sagebrush. Thirty-four percent of the plants were heavily hedged, up from 9% in 1988. Trend for the herbaceous understory is slightly up due to an increase in the sum of nested frequency of grasses and forbs. Three species sampled in 1988 increased significantly in nested frequency while three others declined significantly. The main difference in composition is the appearance of thickspike wheatgrass. If identification was accurate in the past, it appears that thickspike is coming into the site and squirreltail is going out. The Desirable Components Index rated this site as excellent with a score of 85 due to good browse cover, moderate decadence, excellent percent cover for perennial grass and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - slightly up (+1)

herbaceous understory - slightly up (+1)

winter range condition (DC Index) - Excellent (85) Mid-level Potential scale

2000 TREND ASSESSMENT

Trend for soil is stable. Vegetation and litter cover are abundant with the proportion of bare ground remaining about the same. Erosion is minimal as a result. Trend for browse is stable. Mountain big sagebrush shows increases in poor vigor and decadency, but these increases can be attributed to drought and should improve with normal precipitation in the future. Recruitment remains good at 12% and the number of young plants is adequate to replace the dying individuals in the population, if any should be lost to die-off. Use also decreased to a more moderate level compared to that in 1995. Trend for the herbaceous understory is down due to drought. Sum of nested frequency decreased for perennial grasses, and moderately decreased for perennial forbs. The Desirable Components Index rated this site as good with a score of 78 due to good browse cover, high decadence, excellent percent cover for perennial grass and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - down (-2)

winter range condition (DC Index) - Good (78) Mid-level Potential scale

2005 TREND ASSESSMENT

Trend for soil is stable. Protective ground cover (vegetation, litter, and cryptogams) to bare soil has remained similar to previous years and provides good protection from erosion. Trend for key browse, mountain big sagebrush, is slightly down. The population density dropped from 8,940 plants/acre in 2000 to 8,220 in 2005. This is not a large drop, but percent decadence and percent dying have both increased. Plants classified as dying increased from 11% in 2000 to 20% in 2005. Young recruitment is also slightly down with only 5% of population classified as young. Trend for the herbaceous understory is slightly up. Sum of nested frequency for perennial grasses slightly increased, while perennial forbs increased by 16%. Annual forbs increased dramatically, but most are low growing and poor in forage value. The Desirable Components Index rated this site as good with a score of 75 due to good browse cover, high decadence, excellent percent cover for perennial grass and forbs.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - slightly up (+1)

winter range condition (DC Index) - Good (75) Mid-level Potential scale

HERBACEOUS TRENDS --

Management unit 09 , Study no: 7

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron dasystachyum	a-	c265	c279	b207	2.48	3.87	1.67
G	Agropyron intermedium	-	-	4	-	-	.15	-
G	Bouteloua gracilis	-	-	-	3	-	-	.03
G	Carex sp.	26	29	18	8	.14	.30	.02
G	Festuca ovina	b20	b30	a-	a1	.29	-	.00
G	Koeleria cristata	c51	ab9	b11	a-	.04	.05	-
G	Poa fendleriana	a41	a79	b153	b121	1.52	5.07	4.39
G	Poa pratensis	a-	bc27	ab10	c36	.43	.21	1.07
G	Poa secunda	a89	a108	a79	b222	1.08	.98	11.01
G	Sitanion hystrix	c278	b52	a13	b42	2.23	.25	.45
G	Stipa comata	ab57	b65	a34	ab52	1.72	.67	1.85
G	Stipa pinetorum	b188	b177	b136	a86	4.61	3.60	3.06
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		750	841	737	778	14.58	15.18	23.57
Total for Grasses		750	841	737	778	14.58	15.18	23.57

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
F	<i>Achillea millefolium</i>	34	33	42	26	.34	.71	.46
F	<i>Agoseris glauca</i>	a-	a-	a ⁵	b ²⁹	-	.01	.14
F	<i>Allium</i> sp.	-	2	2	-	.01	.03	-
F	<i>Antennaria rosea</i>	ab ¹⁹¹	ab ¹⁸⁹	b ¹⁹⁶	a ¹⁵⁵	5.49	6.70	3.07
F	<i>Androsace septentrionalis</i> (a)	-	b ³⁶	a ¹⁸	a ⁸	.09	.04	.02
F	<i>Arabis drummondii</i>	24	7	4	4	.03	.01	.03
F	<i>Artemisia ludoviciana</i>	1	-	-	-	-	-	-
F	<i>Astragalus aretioides</i>	1	1	-	-	.00	-	-
F	<i>Aster</i> sp.	15	24	23	34	.09	.17	.51
F	<i>Chenopodium leptophyllum</i> (a)	-	6	-	3	.01	-	.00
F	<i>Collinsia parviflora</i> (a)	-	b ⁴³	a ⁷	c ¹⁰⁶	.26	.01	.34
F	<i>Cryptantha</i> sp.	-	1	-	-	.00	-	-
F	<i>Delphinium nuttallianum</i>	-	6	-	-	.03	-	.00
F	<i>Descurainia pinnata</i> (a)	1	1	-	-	.00	-	-
F	<i>Draba</i> sp. (a)	-	-	3	-	-	.01	-
F	<i>Erigeron eatonii</i>	b ¹³⁶	b ¹⁵⁷	a ⁶⁵	a ⁶⁶	.62	.37	.62
F	<i>Erigeron flagellaris</i>	a-	a-	b ¹¹	a ⁶	-	.11	.03
F	<i>Gayophytum ramosissimum</i> (a)	-	b ¹⁸	a-	b ²³	.09	-	.07
F	<i>Heterotheca villosa</i>	-	2	-	-	.00	-	-
F	<i>Hymenoxys richardsonii</i>	3	3	3	-	.03	.03	-
F	<i>Lupinus argenteus</i>	a ²⁴	b ⁴⁴	a ¹⁷	ab ²⁸	1.44	.56	1.62
F	<i>Lychnis drummondii</i>	-	5	-	-	.06	-	-
F	<i>Mertensia</i> sp.	a-	a-	a-	b ⁸	-	-	.12
F	<i>Microsteris gracilis</i> (a)	-	6	2	1	.02	.00	.00
F	<i>Navarretia</i> sp.	-	b ¹⁴	a-	b ²³	.08	-	.18
F	<i>Oenothera</i> sp.	-	-	-	3	-	-	.15
F	<i>Orthocarpus luteus</i> (a)	-	b ¹⁰⁹	a ³⁰	b ¹⁰⁶	3.04	.16	1.74
F	<i>Orobanche</i> sp.	-	2	-	-	.00	-	-
F	<i>Penstemon</i> sp.	13	1	6	10	.00	.09	.18
F	<i>Phlox hoodii</i>	c ²³⁴	b ¹⁷²	ab ¹⁶¹	a ¹²⁷	10.77	5.90	5.26
F	<i>Phlox longifolia</i>	a ⁵²	b ⁸¹	a ³⁹	a ⁴³	.34	.07	.12
F	<i>Polygonum douglasii</i> (a)	-	b ¹⁶¹	a ¹²	a ²⁰	.59	.03	.05
F	<i>Potentilla gracilis</i>	-	2	6	8	.03	.01	.01
F	<i>Schoenocrambe linifolia</i>	-	-	-	3	-	-	.00
F	<i>Taraxacum officinale</i>	a ¹⁸	ab ³⁸	a ¹⁶	b ⁴⁸	.13	.21	.66
F	<i>Tragopogon dubius</i>	-	-	3	2	-	.01	.03

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
F	Trifolium gymnocarpon	_a -	_c 113	_b 41	_d 139	.27	.23	.85
F	Unknown forb-annual (a)	-	3	-	-	.00	-	-
F	Unknown forb-perennial	11	-	-	-	-	-	-
F	Zigadenus elegans	-	3	12	-	.00	.12	-
Total for Annual Forbs		1	383	72	267	4.12	0.26	2.24
Total for Perennial Forbs		757	900	652	762	19.82	15.39	14.11
Total for Forbs		758	1283	724	1029	23.94	15.65	16.35

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

BROWSE TRENDS --

Management unit 09 , Study no: 7

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Artemisia frigida	0	1	1	-	-	-
B	Artemisia tridentata vaseyana	99	97	97	20.41	18.76	20.37
B	Eriogonum microthecum	3	3	3	.03	.01	.15
Total for Browse		102	101	101	20.45	18.77	20.53

CANOPY COVER, LINE INTERCEPT --

Management unit 09 , Study no: 7

Species	Percent Cover
	'05
Artemisia tridentata vaseyana	25.14

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 09 , Study no: 7

Species	Average leader growth (in)
	'05
Artemisia tridentata vaseyana	1.6

BASIC COVER --

Management unit 09 , Study no: 7

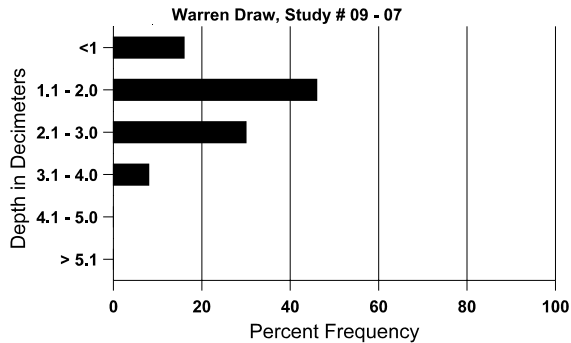
Cover Type	Average Cover %				
	'82	'88	'95	'00	'05
Vegetation	18.25	23.00	53.39	57.93	51.55
Rock	1.25	1.50	.16	.08	.67
Pavement	0	0	.07	.09	.10
Litter	65.50	59.00	50.50	66.19	45.95
Cryptogams	.25	.50	1.31	1.22	.84
Bare Ground	14.75	16.00	13.86	13.88	16.30

SOIL ANALYSIS DATA --

Herd Unit 09, Study # 7, Study Name: Warren Draw

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
12.9	60.0 (13.5)	6.6	63.4	16.7	19.9	2.1	20.4	265.6	0.8

Stoniness Index



PELLET GROUP DATA --

Management unit 09 , Study no: 7

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	3	13	67
Elk	14	21	15
Deer	10	24	39
Cattle	2	1	2

Days use per acre (ha)	
'00	'05
-	-
8 (20)	13 (31)
22 (55)	78 (193)
1 (2)	1 (2)

BROWSE CHARACTERISTICS --
Management unit 09 , Study no: 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)
Artemisia frigida												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	20	-	-	20	-	-	0	0	-	-	0	4/5
05	20	-	-	20	-	-	0	100	-	-	0	1/2
Artemisia tridentata vaseyana												
82	3799	-	-	3533	266	-	30	26	7	-	7	18/31
88	10732	3000	1400	3866	5466	-	63	9	51	.74	9	21/25
95	7320	140	940	4940	1440	840	30	34	20	1	1	16/29
00	8940	80	1060	4580	3300	1120	25	5	37	11	11	17/29
05	8220	440	420	4380	3420	1920	31	24	42	20	20	17/24
Chrysothamnus viscidiflorus viscidiflorus												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	6/9
Eriogonum microthecum												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	100	-	-	100	-	-	0	0	-	-	0	4/15
00	60	-	-	60	-	-	0	0	-	-	67	6/9
05	120	-	-	120	-	-	0	0	-	-	0	5/9
Symphoricarpos oreophilus												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	13/11
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-

		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>Tetradymia canescens</i>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	13/36