

LOWER WESTWATER-DOLORES - TREND STUDY NO. 13B-1-10

Vegetation Type: Basin Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Not Available

Land Ownership: BLM

Elevation: 4600 ft. (1402 m)

Aspect: Northwest

Slope: 4%-6%

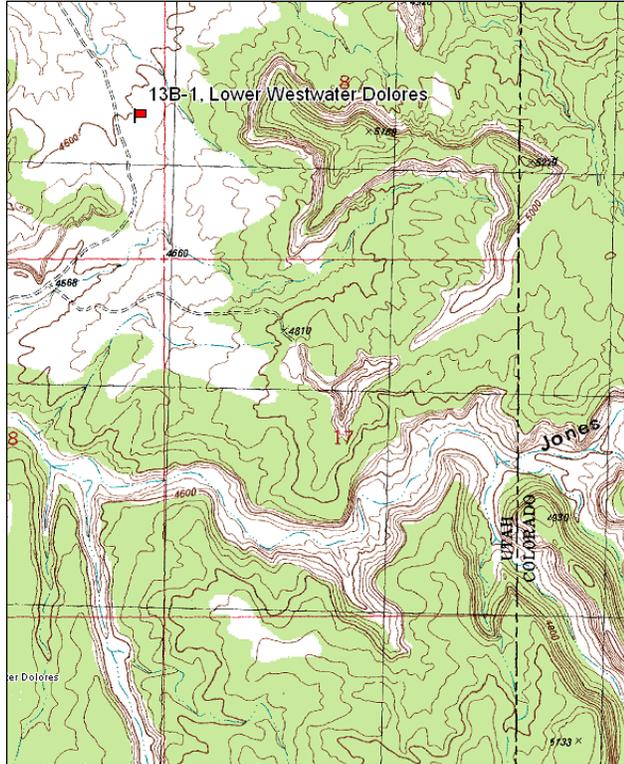
Transect bearing: 165° magnetic

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

Directions:

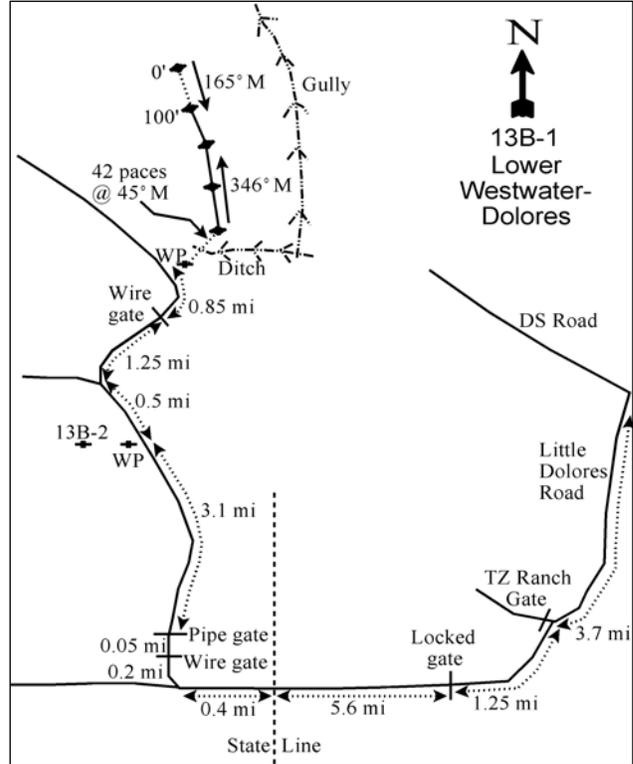
From the intersection of the DS Road and Little Dolores Road west of Glade Park, Colorado, go down Little Dolores Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles along the fence to another gate (permission and key necessary to get through gates). Continue 5.6 miles to the state line. Go another 0.4 miles to a cabin. Turn right along the edge of a field and go 0.2 miles to a wire gate and another 0.05 miles to a pipe gate. Go 3.1 miles to transect 13B-2. Continue 0.5 miles to a fork near a sheep corral. Keep right. Continue 1.25 miles to a wire gate, then another 0.85 miles to the witness post, a 2 ½ foot tall fencepost off the right side of the road on top of the road cut. From the witness post, walk 42 paces at 45°M to the 400-foot baseline stake.

Map Name: Westwater



Township: 20S Range: 26E Section: 7

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 666761 E 4327390 N

LOWER WESTWATER DOLORES - TREND STUDY NO. 13B-1

Site Information

Site Description: The study site is in an open valley surrounded by slick rock cliffs and domes of sandstone about 2 miles from the Colorado River. At the outset of the study the area was dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) with a dense cheatgrass (*Bromus tectorum*) understory. The area is now dominated by cheatgrass with few sagebrush plants sampled. The land is administered by the Bureau of Land Management (BLM) out of the Grand Junction office in Colorado as part of the Mountain Island allotment. The pellet group data indicated heavy deer use in 2000, but more moderate use in 2005 and 2010. Estimated elk use has been light and cattle use has been moderate since 2000 (Table - Pellet Group Data).

Browse: The key browse species on this site is basin big sagebrush with some apparent Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) hybrids. At the outset of the study the stand exhibited a distinctly clumped dispersion pattern, but most plants sampled now are dead. There was a large decrease in cover (Table - Browse Trends) and density of sagebrush between the 2000 and 2005 sample years without new recruitment of young plants. This has resulted in live sagebrush plants now being rare on the site. Decadence and poor vigor of sagebrush steadily increased since 1986, with all plants considered decadent and in poor vigor in 2010. Recruitment of young sagebrush plants has been poor over the length of the study. Utilization of sagebrush in most sample years was moderate to heavy, but there was no use noted in 2010 (Table - Browse Characteristics). The decline in sagebrush is likely due to the combination of extended drought and competition with annual species. It was noted in 2010 that more live sagebrush plants were growing around the washes that are on, and surrounding, the study site.

Other browse species include broom snakeweed (*Gutierrezia sarothrae*) and spiny hopsage (*Grayia spinosa*), which are found in very low densities (Table - Browse Characteristics). Spiny hopsage has had good leader growth since 2005 (Table - Key Browse Annual Leader Growth) and it was noted in 2010 that there had been heavy browsing of the species in the past. Green ephedra (*Ephedra viridis*) was present in low numbers and was heavily hedged in 1986, but has not been sampled since. On the opposing slope, there is a vigorous stand of sand sagebrush (*Artemisia filifolia*), a few spiny hopsage, and a few scattered Utah juniper trees (*Juniperus osteosperma*).

Herbaceous Understory: The site is almost entirely dominated by annual grasses and forbs. Cheatgrass is the dominant species providing the majority of vegetation cover on the site. There was a large increase in the cover of cheatgrass between the 2000 and 2005 sample years. The most common perennial grass species are galleta (*Hilaria jamesii*) and sand dropseed (*Sporobolus cryptandrus*), but neither is overly abundant. Forbs consist primarily of annual species with storksbill (*Erodium cicutarium*) and Russian thistle (*Salsola iberica*) providing the majority of the forb cover. The perennial species small flower globemallow (*Sphaeralcea parvifolia*) has steadily increased in cover since 2000 and is the only common perennial forb on the site (Table - Herbaceous Trends).

Soil: The soil is classified as a sandy loam with a moderately alkaline pH. Phosphorus has limited availability for plant growth and development at 3.9 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). The soil is protected fairly well by the combination of vegetation and litter. No rock or pavement was encountered on the surface or in the profile (Table - Basic Cover). There are no current erosion problems; however, pedestalling around the sagebrush is about 5 to 7 inches. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1986 to 1995 - slightly down (-1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of basin big sagebrush increased from 12% to 32% and plants displaying poor vigor increased from 0% to 26%. Recruitment of young plants was low in both years.
- **1995 to 2000 - slightly down (-1):** There was a 16% decrease in the density of basin big sagebrush from 1,480 plants/acre to 1,240 plants/acre. Also, decadence increased to 53% and recruitment of young plants remained low. The cover of sagebrush increased slightly.
- **2000 to 2005 - down (-2):** There was a large die-off in sagebrush as density decreased 95% to just 60 plants/acre. Cover of sagebrush also decreased substantially. Decadence and plants displaying poor vigor both increased to 67%. There was no new recruitment of young plants.
- **2005 to 2010 - stable (0):** There was little change in the density of sagebrush, but all of the plants that were sampled were decadent and displayed poor vigor.

Grass:

- **1986 to 1995 - down (-2):** The sum of nested frequency of perennial grasses decreased by 47% with a significant decrease in the nested frequency of galleta. Annual grasses were not included in the sample in 1986.
- **1995 to 2000 - slightly down (-1):** There was a 13% decrease in the sum of nested frequency of perennial grasses, though cover remained similar. The nested frequency of cheatgrass decreased significantly, but cover remained similar.
- **2000 to 2005 - down (-2):** The sum of nested frequency of perennial grasses decreased by 27% and cover decreased from 3% to 1%. There was a significant increase in the annual grass six weeks fescue (*Vulpia octoflora*) nested frequency and cover increased from less than 1% to 4%. There was little change in the nested frequency of cheatgrass, but cover increased from 12% to 24%.
- **2005 to 2010 - slightly up (+1):** Perennial grass sum of nested frequency increased by 33%, though neither of the two perennial species sampled increased significantly. Both galleta and sand dropseed increased substantially in cover. The nested frequency of six weeks fescue decreased two degrees of significance, and cover decreased to a negligible amount. Cheatgrass variables remained similar, but high.

Forb:

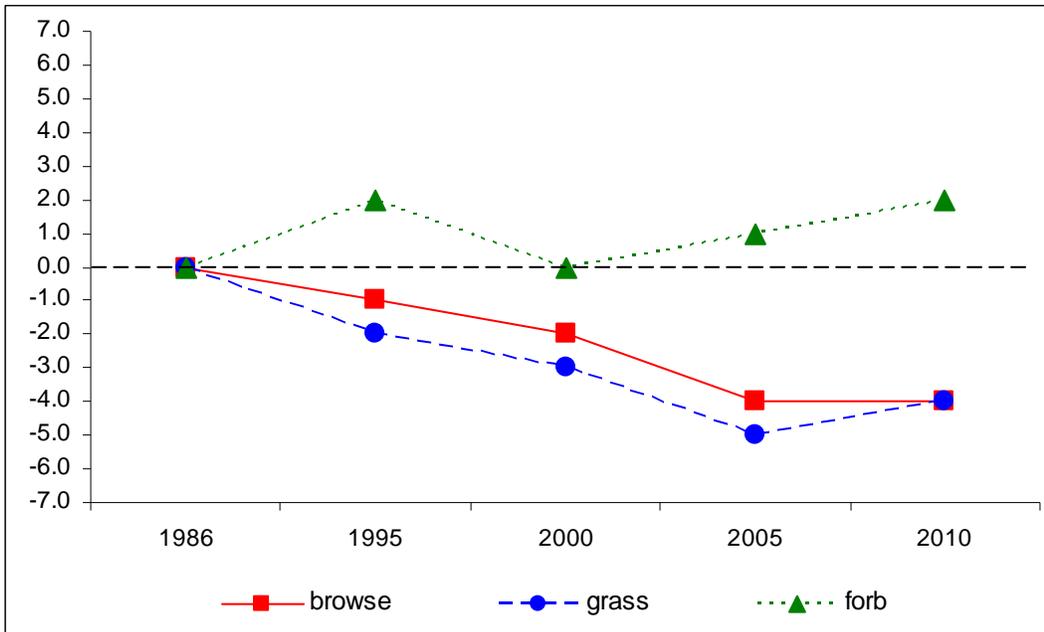
- **1986 to 1995 - up (+2):** Perennial forb sum of nested frequency increased two-fold, primarily due to a significant increase in the nested frequency of heath aster (*Leucelene ericoides*). Weedy annual species dominated the forb component on the site in 1995. Annual species were not included in the sample in 1986.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 74% and cover decreased to a negligible amount. Heath aster decreased significantly in nested frequency.
- **2000 to 2005 - slightly up (+1):** There was an 81% increase in the sum of nested frequency of perennial forbs, but perennial forbs are so rare that any change reflects a large percentage change. Cover of perennial forbs increased to near 1%. There was a significant increase in the nested frequency of small flower globemallow.
- **2005 to 2010 - up (+1):** The sum of nested frequency of perennial forbs increased nearly four-fold due to a significant increase in the nested frequency of hoary aster (*Machaeranthera canescens*) and a *Cryptantha spp.*, though neither increased substantially in cover. The cover of small flower globemallow increased from 1% to 2%, however.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
 Management unit 13B, study no: 1

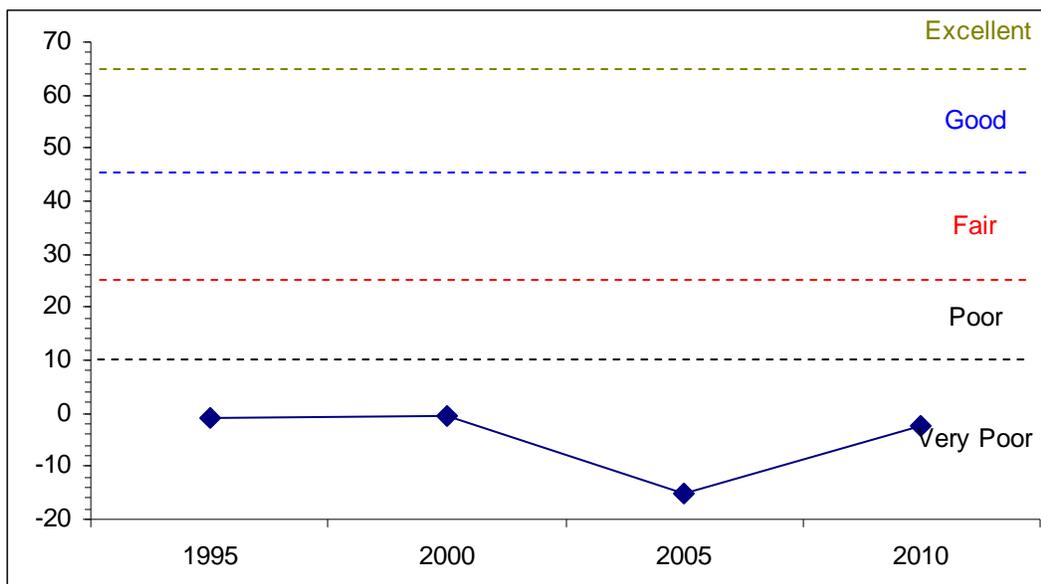
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	2.1	0.0	0.0	4.0	-9.4	2.4	0.0	-0.9	Very Poor
00	3.0	0.0	0.0	5.5	-9.4	0.3	0.0	-0.6	Very Poor
05	0.2	0.0	0.0	2.8	-20.0	1.7	0.0	-15.3	Very Poor
10	0.2	0.0	0.0	9.0	-17.6	5.8	0.0	-2.5	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 13B, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 13B, Study no: 1



HERBACEOUS TRENDS--
 Management unit 13B, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'86	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Bromus tectorum</i> (a)	-	b384	a334	a345	a355	12.39	12.20	23.82	23.43
G	<i>Hilaria jamesii</i>	c206	b114	ab75	a47	a58	1.99	1.83	.93	2.64
G	<i>Oryzopsis hymenoides</i>	-	-	1	-	-	-	.15	-	-
G	<i>Sitanion hystrix</i>	9	-	-	-	-	-	-	-	-
G	<i>Sporobolus cryptandrus</i>	a1	a-	ab23	b25	b38	-	.77	.47	1.86
G	<i>Vulpia octoflora</i> (a)	-	ab46	b48	c124	a17	.09	.27	4.28	.03
Total for Annual Grasses		0	430	382	469	372	12.48	12.47	28.11	23.47
Total for Perennial Grasses		216	114	99	72	96	1.99	2.75	1.40	4.51
Total for Grasses		216	544	481	541	468	14.47	15.23	29.52	27.98
F	<i>Astragalus</i> sp.	b12	ab4	a-	ab1	ab3	.01	-	.00	.38
F	<i>Chaenactis stevioides</i>	-	3	-	2	-	.00	-	.01	-
F	<i>Chenopodium fremontii</i> (a)	-	a-	b39	a9	c88	-	.14	.02	.27
F	<i>Cryptantha</i> sp.	a-	b12	a-	a-	b27	.03	-	-	.17
F	<i>Draba nemorosa</i> (a)	-	a3	b14	a1	a-	.00	.03	.00	-
F	<i>Erodium cicutarium</i> (a)	-	a35	b75	c251	c239	.45	1.25	10.16	3.76
F	<i>Gilia</i> sp. (a)	-	-	-	2	7	-	-	.00	.01
F	<i>Lappula occidentalis</i> (a)	-	a1	ab6	b12	c36	.00	.04	.03	.07
F	<i>Lepidium densiflorum</i> (a)	-	c120	a25	c108	b62	.79	.18	.82	.19
F	<i>Leucelene ericoides</i>	a26	b56	a15	a4	a8	1.12	.13	.01	.33
F	<i>Machaeranthera canescens</i>	a-	a-	a1	a7	b90	-	.00	.07	.49
F	<i>Navarretia intertexta</i> (a)	-	c61	b18	ab6	a-	.13	.07	.01	-
F	<i>Oenothera albicaulis</i> (a)	-	ab9	a-	a3	b14	.02	-	.00	.04
F	<i>Plantago patagonica</i> (a)	-	c191	a10	c149	b70	.61	.06	.55	.20
F	<i>Salsola iberica</i> (a)	-	a-	a-	b68	c247	-	-	.24	5.15

Type	Species	Nested Frequency					Average Cover %			
		'86	'95	'00	'05	'10	'95	'00	'05	'10
F	<i>Sisymbrium altissimum</i> (a)	-	_b 156	_a 24	_a 22	_a 23	.93	.24	.54	.29
F	<i>Sphaeralcea parvifolia</i>	_a -	_{bc} 7	_{ab} 5	_c 24	_{bc} 18	.02	.01	.76	1.54
Total for Annual Forbs		0	576	211	631	786	2.95	2.05	12.41	10.02
Total for Perennial Forbs		38	82	21	38	146	1.20	0.14	0.86	2.92
Total for Forbs		38	658	232	669	932	4.16	2.20	13.28	12.94

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

BROWSE TRENDS--

Management unit 13B, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	<i>Artemisia tridentata tridentata</i>	41	29	3	2	1.69	2.39	.18	.18
B	<i>Gutierrezia sarothrae</i>	2	1	0	1	-	-	-	.03
B	<i>Opuntia</i> sp.	0	0	0	0	-	-	-	-
Total for Browse		43	30	3	3	1.69	2.39	0.17	0.20

CANOPY COVER, LINE INTERCEPT--

Management unit 13B, Study no: 1

Species	Percent Cover	
	'05	'10
<i>Artemisia tridentata tridentata</i>	.01	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 13B, Study no: 1

Species	Average leader growth (in)	
	'05	'10
<i>Artemisia tridentata tridentata</i>	.01	7.4
<i>Grayia spinosa</i>	-	38.9

BASIC COVER--

Management unit 13B, Study no: 1

Cover Type	Average Cover %				
	'86	'95	'00	'05	'10
Vegetation	11.50	29.78	22.89	42.96	46.90
Rock	0	0	0	0	0
Pavement	.25	0	0	0	0
Litter	50.50	51.34	34.70	31.29	39.79
Cryptogams	18.50	2.17	12.19	1.14	.91
Bare Ground	19.25	17.96	38.54	31.76	30.19

SOIL ANALYSIS DATA --

Management unit 13B, Study no: 1, Study Name: Lower Westwater Dolores

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
19.0	8.2	71.0	16.4	12.6	0.0	3.9	118.4	0.1

PELLET GROUP DATA--

Management unit 13B, Study no: 1

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	12	10	14	17	-	-	-
Elk	-	-	3	1	12 (30)	1 (2)	2 (5)
Deer	31	39	33	12	79 (195)	29 (73)	34 (84)
Cattle	3	4	11	4	27 (68)	26 (65)	22 (54)

BROWSE CHARACTERISTICS--

Management unit 13B, Study no: 1

		Age class distribution					Utilization		
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia tridentata tridentata									
86	5132	0	88	12	-	60	5	0	6/5
95	1480	1	66	32	-	15	3	26	24/30
00	1240	2	45	53	-	52	24	26	19/26
05	60	0	33	67	-	0	100	67	15/27
10	40	0	0	100	-	0	0	100	20/26
Atriplex canescens									
86	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	23/13
10	0	0	0	-	-	0	0	0	32/55
Grayia spinosa									
86	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	17/26
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	24/44
10	0	0	0	-	-	0	0	0	25/44
Gutierrezia sarothrae									
86	0	0	0	-	-	0	0	0	-/-
95	40	50	50	-	-	0	0	0	12/12
00	20	0	100	-	-	0	0	0	5/-
05	0	0	0	-	-	0	0	0	12/14
10	20	0	100	-	-	0	0	0	10/21

		Age class distribution			Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Opuntia sp.									
86	66	0	100	-	-	0	0	0	6/7
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	7/-
05	0	0	0	-	-	0	0	0	7/33
10	0	0	0	-	-	0	0	0	6/9