

Trend Study 10R-4-05

Study site name: Two Water WMA .

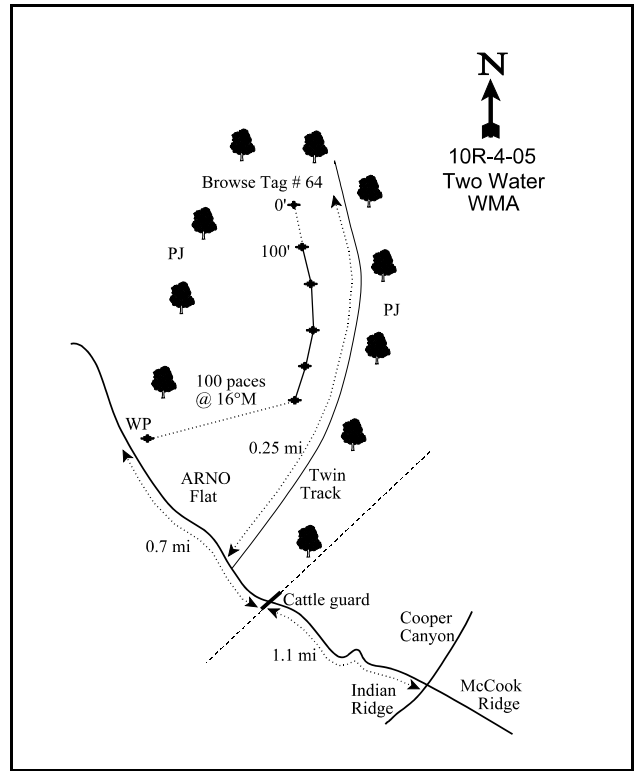
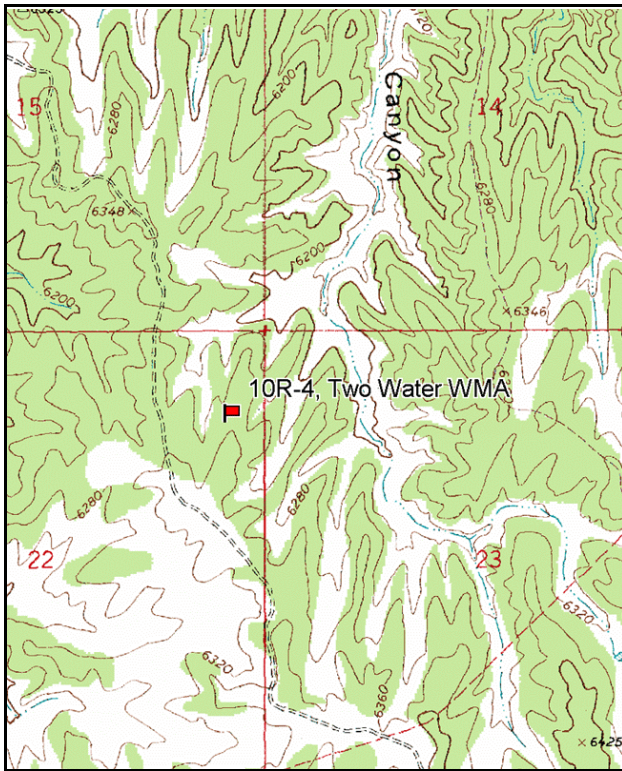
Vegetation Type: Black Sagebrush .

Compass bearing: frequency baseline 162 degrees magnetic. (Line 3 177°M, line 4 180°M, line 5 182°M).

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Belt 2 rebar at 5ft., belt 5 rebar at 10ft.

LOCATION DESCRIPTION

From the intersection of Cooper Canyon, Indian Ridge and McCook Ridge go northwest on McCook Ridge road. Travel 1.1 miles to a cattle guard. Go 0.7 miles past the cattle guard to a sage brush flat on the right and a witness post. The 500-foot stake is 100 paces into the sagebrush flat at an azimuth of 16°M. It is also possible to reach the site by taking the two track road on the east side of the chaining 0.25 miles to the 0-foot stake. The 0-foot stake is marked with browse tag number 64.



Map name: Cooper Canyon .

Diagrammatic Sketch

Township 13S , Range 23E , Section 22

GPS: NAD 27, UTM 12S 4393205 N, 643973 E

## DISCUSSION

### Two Water Wildlife Management Area - Trend Study No. 10R-4

This study is located in a black sagebrush flat in the Two Water Wildlife Management Area. The site is surrounded by pinyon and juniper woodland and located about 1/4 of a mile from a main road. It is on gently sloping (3-5%) terrain with a northerly aspect and elevation of approximately 6,300 feet. Pellet group transect data from 1997 indicated moderate use on this flat with 13 elk, 33 deer, and 1 cow days use/acre (32 elk, 82 deer and 2 cow days use/ha). Pellet group data estimates from 2000 were 5 elk and 60 deer days use/acre (12 edu/ha and 148 ddu/ha). Data from 2005 was estimated at 44 elk, 29 deer, and 2 cow days use/acre (109 deer, 73 elk, and 5 cow days use/ha).

The soil is moderately shallow with an effective rooting depth of almost 15 inches. It has a clay loam texture with a neutral pH. The soil surface is cracked, indicating shrink-swell potential. Rocks are found throughout the soil profile with a high amount of pavement on the surface. Phosphorus is low at 3.6 ppm, as values less than 6 ppm may be limiting to normal plant growth and development (Tiedemann and Lopez 2004). Pedestalizing was noted around the base of black sagebrush plants with cryptogamic crust found mostly under the sagebrush. Erosion appears minimal due to the level terrain and adequate protective ground cover of vegetation and litter. An erosion condition class assessment rated erosion as stable.

The dominant browse on the flat is black sagebrush, which has averaged between 20 and 22% cover from 1997-2005. It is a relatively low growing form, averaging only 6 to 8 inches in height. Density was very high in 2000 at an estimated 21,180 plants/acre. In 2005, sagebrush cover increased slightly, but density dropped to 11,720 plants/acre. The number of young plants decreased and more dead plants were sampled. Apparently, in 2000 there were many small plants that were classified as mature that must have died off during the drought. Decadence increased to 33% in 2005, which is only moderate. Use has been light to moderate on black sagebrush with each reading. Although density declined in 2005, this population appeared to have stabilized.

Winterfat provides some additional preferred forage on the site. It had an estimated density of 4,060 plants/acre in 1997, but declined to 2,960 by 2000. In 2005, density increased 15% to 3,480 plants/acre. Winterfat cover has been 1-2% since 1997. The population is mostly mature with moderate use. It has a low growth form of only 8 to 10 inches in height. Fringed sagebrush density dropped 80% in 2005, probably due to drought. Shadscale are widely scattered on the site and have shown moderate to heavy use. Other browse species sampled include broom snakeweed and cactus.

The herbaceous understory is limited. Cheatgrass was the most dominant species in 1997. Cheatgrass cover in 1997 was 4%, which was 43% of the grass cover. Quadrat frequency was 62%. In 2000, cheatgrass declined significantly in nested frequency and cover from 4% in 1997 to 0.1%. Quadrat frequency declined from 62% to only 8%. In 2005, cheatgrass remained stable and was only sampled in 5% of the quadrats. The most common perennial grasses are needle-and-thread, bottlebrush squirreltail, galleta, blue grama, and Indian ricegrass. Thickspike wheatgrass and bluebunch wheatgrass were also sampled, but only occasionally. Forbs are fairly diverse, but not particularly abundant. Scarlet globemallow is the most common forb. Cover of perennial forbs has only been about 1% with each reading. Annual stickseed was more abundant in 2005. Most of the forbs were found within the protective cover of black sagebrush canopies.

### 1997 APPARENT TREND ASSESSMENT

Erosion on the site does not currently appear to be a problem with the abundant litter and vegetation cover. Percent bare ground cover is moderately high, yet should not be a problem except under extreme conditions. Seedhead formation from last year is abundant on the black sagebrush and percent decadence is low at only 5%. Seedling abundance is low at this time, likely due to a combination of past drought conditions and moderately shallow soils. Herbaceous understory is very limiting with cheatgrass as the dominant species.

Other perennial grasses are present in low numbers that help add stability to the herbaceous understory community. The Desirable Components Index rated this site on the lower potential scale due to the low amount of precipitation in this area. The site was rated as good with good browse cover and healthy browse populations.

winter range condition (DC Index) - good (63) Lower potential scale

#### 2000 TREND ASSESSMENT

Trend for soil is stable. Percent bare ground has increased slightly and sum of nested frequency of grasses and forbs have declined by about 12%. Most of this change is due to a significant decline in the nested frequency and cover of cheatgrass. Perennial grass cover and nested frequency remained fairly stable. Trend for browse is slightly up for the key species black sagebrush. Density has increased, use is mostly moderate, vigor good, and young plants account for 14% of the population. The herbaceous trend is stable due to perennial grasses and forbs and a significant loss of cheatgrass. Needle-and-thread grass and bottlebrush squirreltail remained stable while Indian ricegrass declined significantly. The increase in blue grama and decline in galleta appears to be due to a misidentification of blue grama in 1997. Cheatgrass declined significantly in cover and nested frequency. This was due to the very dry spring and early summer conditions of this season. The most abundant perennial forb, scarlet globemallow, declined slightly in frequency but increased in cover with less competition from cheatgrass. The DCI score was good for this site due to abundant and healthy preferred browse populations.

#### TREND ASSESSMENT

soil - stable (0)

browse - slightly up (+1)

herbaceous understory - stable (0)

winter range condition (DC Index) - good (61) Lower potential scale

#### 2005 TREND ASSESSMENT

The soil trend is stable. The amount of bare ground remained stable. Litter decreased, but pavement increased. An erosion condition class assessment rated erosion as stable. The browse trend is stable. Black sagebrush density decreased, but is still very high. Density was extremely high in 2000 with many small plants that probably died during recent drought years. Black sagebrush cover was still very high in 2005 at 22%. Recruitment was fair at 8% of the population and decadence was only moderate at 33%. Winterfat density increased 15% and percent decadence decreased. Cover increased from 1% to 2%. The herbaceous understory trend is stable. Perennial grasses remain unchanged and cheatgrass did not increase despite the wet spring weather in 2005. The DCI score declined slightly due to higher decadence and lower recruitment of black sagebrush, but was still rated as good.

#### TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - stable (0)

winter range condition (DC Index) - good (54) Lower potential scale

HERBACEOUS TRENDS --  
Management unit 10R, Study no: 4

T y p e	Species	Nested Frequency			Average Cover %		
		'97	'00	'05	'97	'00	'05
G	<i>Agropyron dasystachyum</i>	6	2	4	.06	.03	.00
G	<i>Agropyron spicatum</i>	13	5	13	.36	.30	.37
G	<i>Bouteloua gracilis</i>	<sub>a</sub> -	<sub>b</sub> 25	<sub>c</sub> 40	-	.31	1.02
G	<i>Bromus tectorum</i> (a)	<sub>b</sub> 215	<sub>a</sub> 28	<sub>a</sub> 10	4.02	.11	.03
G	<i>Hilaria jamesii</i>	<sub>b</sub> 75	<sub>a</sub> 46	<sub>a</sub> 43	1.10	.82	.71
G	<i>Oryzopsis hymenoides</i>	<sub>b</sub> 64	<sub>a</sub> 34	<sub>b</sub> 53	.91	.51	.73
G	<i>Sitanion hystrix</i>	<sub>a</sub> 84	<sub>a</sub> 92	<sub>b</sub> 52	.87	1.02	.59
G	<i>Stipa comata</i>	92	90	110	2.01	2.87	2.92
Total for Annual Grasses		215	28	10	4.02	0.11	0.03
Total for Perennial Grasses		334	294	315	5.32	5.89	6.37
Total for Grasses		549	322	325	9.35	6.01	6.40
F	<i>Alyssum alyssoides</i> (a)	6	-	-	.01	-	-
F	<i>Castilleja</i> sp.	4	-	1	.01	-	.00
F	<i>Cryptantha</i> sp.	<sub>b</sub> 10	<sub>a</sub> -	<sub>b</sub> 9	.13	-	.10
F	<i>Descurainia pinnata</i> (a)	<sub>b</sub> 32	<sub>a</sub> 6	<sub>b</sub> 33	.10	.01	.33
F	<i>Draba</i> sp. (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 11	-	-	.02
F	<i>Erigeron</i> sp.	3	-	2	.03	-	.00
F	<i>Lappula occidentalis</i> (a)	<sub>b</sub> 69	<sub>a</sub> 12	<sub>b</sub> 59	.40	.17	1.02
F	<i>Linum lewisii</i>	-	-	1	-	-	.03
F	<i>Machaeranthera grindelioides</i>	-	1	-	-	.03	-
F	<i>Navarretia intertexta</i> (a)	5	-	2	.01	-	.01
F	<i>Penstemon</i> sp.	2	-	-	.03	-	-
F	<i>Schoenocrambe linifolia</i>	4	2	-	.03	.00	-
F	<i>Sphaeralcea coccinea</i>	100	85	77	.57	.82	.84
F	<i>Townsendia incana</i>	-	8	4	-	.04	.04
F	<i>Tragopogon dubius</i>	2	2	-	.00	.00	-
F	Unknown forb-annual (a)	9	-	-	.01	-	-
Total for Annual Forbs		121	18	105	0.53	0.18	1.39
Total for Perennial Forbs		125	98	94	0.82	0.90	1.02
Total for Forbs		246	116	199	1.36	1.08	2.42

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

BROWSE TRENDS --

Management unit 10R, Study no: 4

Type	Species	Strip Frequency			Average Cover %		
		'97	'00	'05	'97	'00	'05
B	Artemisia frigida	28	31	12	.62	1.00	.19
B	Artemisia nova	92	96	96	19.72	21.10	22.46
B	Atriplex confertifolia	34	32	26	.85	.79	.34
B	Ceratoides lanata	71	57	72	2.12	1.41	2.23
B	Gutierrezia sarothrae	12	3	12	-	.01	.19
B	Opuntia sp.	2	3	3	-	-	.03
B	Pediocactus simpsonii	1	1	3	.00	.00	-
Total for Browse		240	223	224	23.32	24.31	25.44

CANOPY COVER, LINE INTERCEPT --

Management unit 10R, Study no: 4

Species	Percent Cover
	'05
Artemisia frigida	.28
Artemisia nova	23.54
Atriplex confertifolia	.20
Ceratoides lanata	1.98
Gutierrezia sarothrae	.10

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10R, Study no: 4

Species	Average leader growth (in)
	'05
Artemisia nova	1.3
Ceratoides lanata	3.8

**BASIC COVER --**

Management unit 10R, Study no: 4

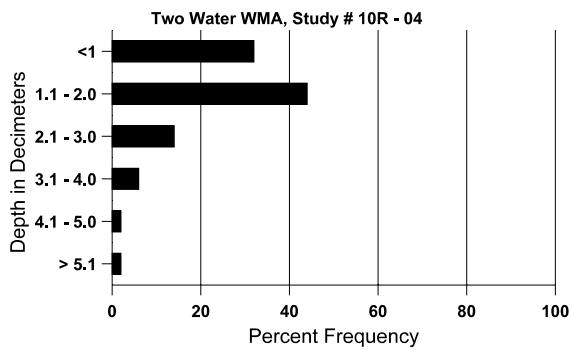
Cover Type	Average Cover %		
	'97	'00	'05
Vegetation	28.09	33.27	30.62
Rock	5.72	5.38	3.32
Pavement	13.89	10.66	24.53
Litter	21.39	21.67	14.10
Cryptogams	6.80	7.54	6.41
Bare Ground	23.37	31.45	29.30

**SOIL ANALYSIS DATA --**

Herd Unit 10R, Study no: 04, Study Name: Two Water WMA

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
14.5	67.2 (14.3)	7.25	25.6	37.8	36.6	2.03	3.63	198.4	0.7

**Stoniness Index**



**PELLET GROUP DATA --**

Management unit 10R, Study no: 4

Type	Quadrat Frequency		
	'97	'00	'05
Rabbit	8	14	55
Elk	11	9	11
Deer	33	32	43
Cattle	-	1	-

Days use per acre (ha)	
'00	'05
-	-
5 (12)	44 (109)
60 (148)	29 (73)
-	2 (5)

BROWSE CHARACTERISTICS --  
Management unit 10R, Study no: 4

		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 frigida</i>												
97	<b>1800</b>	-	260	1540	-	-	0	0	-	-	0	10/10
00	<b>2000</b>	20	460	1540	-	-	2	0	-	-	0	4/7
05	<b>380</b>	100	40	340	-	-	5	0	-	-	0	9/12
<i>Artemisia nova</i>												
97	<b>13260</b>	420	3060	9520	680	560	28	2	5	.30	.30	8/17
00	<b>21180</b>	260	2900	15800	2480	180	51	10	12	3	3	6/15
05	<b>11720</b>	80	960	6920	3840	1380	36	5	33	12	12	8/17
<i>Atriplex confertifolia</i>												
97	<b>880</b>	-	60	600	220	40	16	14	25	16	16	16/16
00	<b>860</b>	-	-	560	300	40	42	0	35	21	21	14/16
05	<b>600</b>	-	-	300	300	-	20	7	50	37	37	17/16
<i>Ceratoides lanata</i>												
97	<b>4060</b>	60	420	3600	40	-	22	3	1	.49	.49	10/10
00	<b>2960</b>	-	-	2420	540	-	35	7	18	11	11	8/8
05	<b>3480</b>	60	60	3380	40	20	32	51	1	.57	.57	9/9
<i>Gutierrezia sarothrae</i>												
97	<b>280</b>	-	20	260	-	-	0	0	-	-	0	8/6
00	<b>100</b>	-	-	100	-	-	0	0	-	-	0	2/3
05	<b>400</b>	-	-	400	-	-	0	0	-	-	0	7/7
<i>Opuntia sp.</i>												
97	<b>60</b>	-	-	60	-	-	0	0	-	-	0	5/9
00	<b>140</b>	-	-	140	-	-	0	0	-	-	0	2/5
05	<b>100</b>	-	-	100	-	-	0	0	-	-	0	4/10
<i>Pediocactus simpsonii</i>												
97	<b>20</b>	-	20	-	-	-	0	0	-	-	0	-/-
00	<b>20</b>	-	-	20	-	-	0	0	-	-	0	-/-
05	<b>60</b>	-	-	60	-	-	0	0	-	-	0	1/2