

RED MOUNTAIN ALLOTMENT - TREND STUDY NO. 9-1-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Sand (Fourwing Saltbush), R034XY214UT

Land Ownership: BLM

Elevation: 6070 ft. (1851 m)

Aspect: Northwest

Slope: 2%-4%

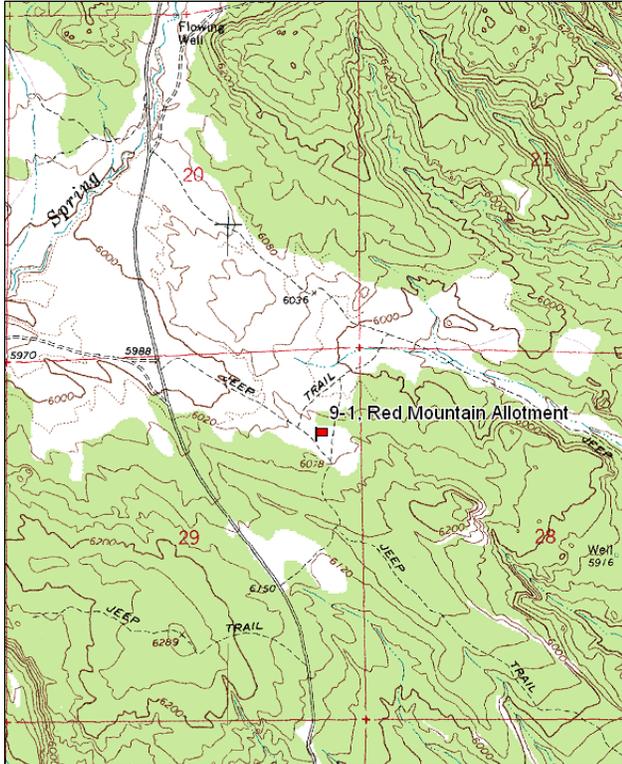
Transect bearing: frequency baseline 0'-100' is 9° magnetic, 100'-500' is 105° magnetic

Belt placement: line 1 (4ft), line 2 (28ft), line 3 (45ft), line 4 (77ft), line 5 (89ft).

Directions:

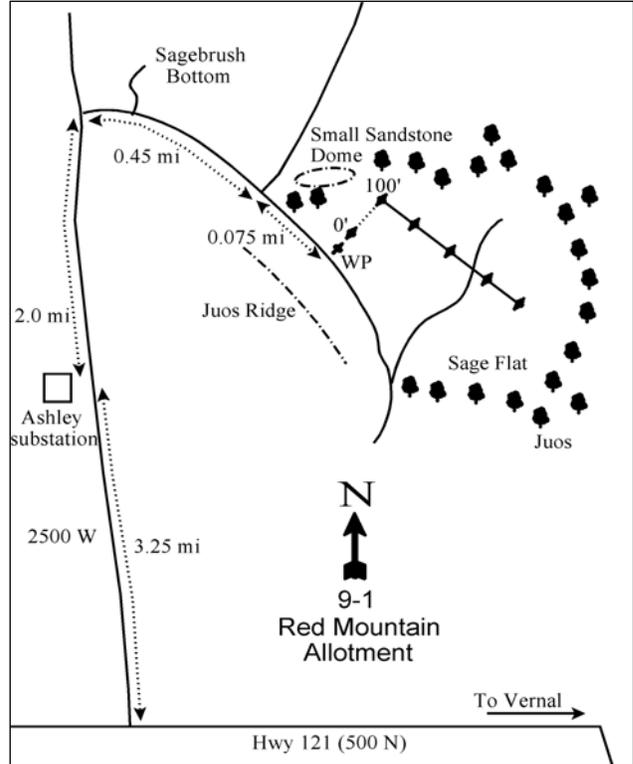
From Highway 121 (500 N) west of Vernal in Maeser, go north on 2500 West for 3.25 miles to the Ashley substation. From there, continue 2.0 miles to a dirt road to the right in the sagebrush bottom. Turn and go east for 0.45 miles to a fork. Stay right and proceed less than 0.1 miles to the witness post on the left. The 0-foot stake should be visible in the sagebrush along the left side of the road. The study can also be located by walking 75 paces bearing 167°M from the east end of the sandstone dome to the 0-foot baseline stake.

Map Name: Steinaker Reservoir



Township: 3S Range: 21E Section: 29

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 620329 E 4487869 N

RED MOUNTAIN ALLOTMENT - TREND STUDY NO. 9-1

Site Information

Site Description: The study is located on big game winter range above Vernal that supports a nearly pure stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) covered rocky ridges. The area was treated by with a lop and scatter in the fall of 2005 as part of the Steinaker Draw PJ Project ([WRI Project #28](#)) to remove encroaching juniper trees. This study is in the Red Mountain cattle allotment managed by the Bureau of Land Management. Pellet group transect data has estimated heavy use by deer and light use by elk and cattle since 2000 (Table - Pellet Group Data).

Browse: Wyoming big sagebrush is the dominant browse species and provides nearly all of the browse cover on the site (Table - Browse Trends). The sagebrush stand is fairly dense, but density has decreased substantially since 2000. The population is comprised of large, mature plants with high decadence and mostly light to moderate use. Heavy use of sagebrush was noted in 1982 and 2005. Recruitment of young sagebrush plants has been mostly poor over the course of the study. All other browse species present are found infrequently which include stickleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), prickly pear cactus (*Opuntia* sp.), Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*) and prickly phlox (*Leptodactylon pungens*) (Table - Browse Characteristics).

Herbaceous Understory: Herbaceous vegetation occurs mainly under the canopy of sagebrush, leaving bare interspaces between individual shrubs. The annual grass cheatgrass (*Bromus tectorum*) dominates the site and provides nearly all of the herbaceous cover. The annual grass species six weeks fescue (*Vulpia octoflora*) has also been prevalent at times. Perennial grasses are rare on the site, providing little cover. Forbs have been sparse during all sampling periods. Annual forbs comprise the majority of the forb component with perennial forbs being extremely rare (Table - Herbaceous Trends).

Soil: The soil texture is a sandy loam and has a moderately alkaline reaction (pH 7.9) and is low in organic matter (Table - Soil Analysis Data). Bare ground cover is relatively low, but much of the protective vegetation cover is provided by cheatgrass (Table - Basic Cover). Limited soil movement is apparent in the form of soil pedestals around plants, although runoff is low and the terrain is relatively flat. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly down (-1):** The density of the primary browse species, Wyoming big sagebrush, increased substantially from 5,131 plants/acre to 9,665 plants/acre, but decadence increased from 8% to 53% and poor vigor increased from 5% to 19%. Recruitment of young plants remained poor at 3% of the population.
- **1988 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of sagebrush decreased to 15% and poor vigor decreased to 6% of the population. Recruitment of young sagebrush plants increased, but was still poor at 8%.
- **1995 to 2000 - slightly down (-1):** The density of sagebrush increased by 25% from 4,360 plants/acre to 5,440 plants/acre, though cover remained similar. Decadence of sagebrush increased to 65% and poor vigor increased to 25% of the population. Recruitment of young sagebrush plants decreased to just 1%.
- **2000 to 2005 - down (-2):** There was a 20% decrease in the density of Wyoming big sagebrush to 4,360 plants/acre and cover decreased to from 20% to 15%. Decadence remained high at 62% and poor vigor increased slightly to 30%. However, recruitment of young sagebrush plants increased to 11%, the highest value of any sample year.

- **2005 to 2010 - down (-2):** The Wyoming big sagebrush density decreased by 29% to 3,080 plants/acre, though cover increased slightly to 16%. Decadence decreased, but remained high at 32% and poor vigor was high at 28%. Recruitment of young sagebrush plants decreased to 3% of the population.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The perennial grass sum of nested frequency decreased by 37%.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial grasses decreased by 24% and cover decreased from 2% to 1%.
- **2000 to 2005 - down (-2):** There was a 42% decrease in the sum of nested frequency of perennial grasses and cover decreased to less than 1%. Cheatgrass and six weeks fescue increased significantly in nested frequency and annual grass cover increased from 7% to 22%.
- **2005 to 2010 - slightly up (+1):** The sum of nested frequency of perennial grasses increased by 20% and cover increased to 2%. Cheatgrass still dominated the site, but decreased significantly in nested frequency. Six weeks fescue was not sampled.

Forb:

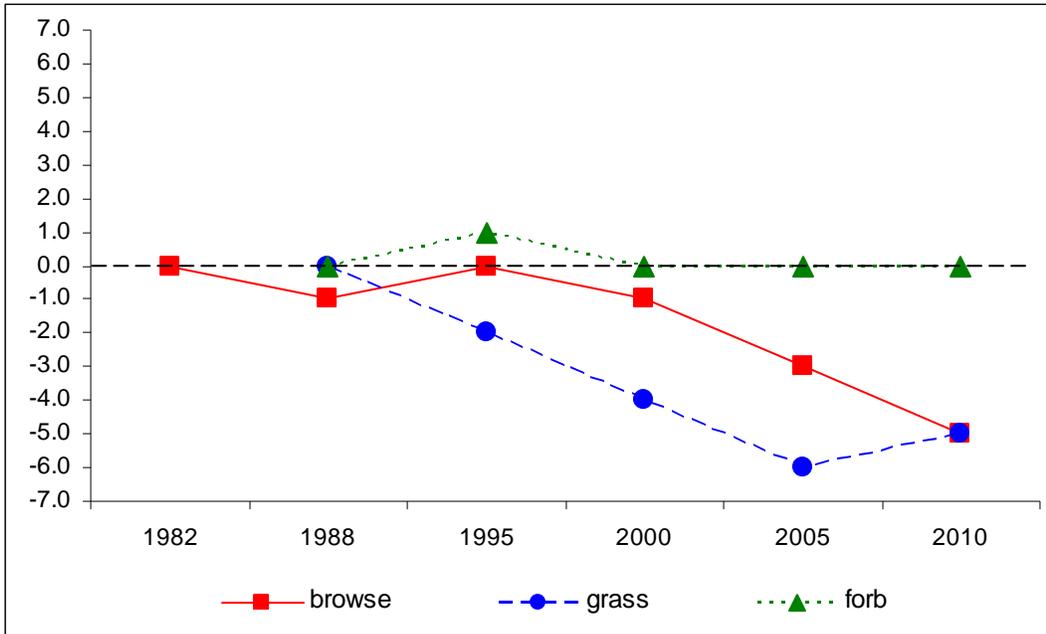
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased two-fold, but remained very rare on the site. Annual forbs were abundant on the site.
- **1995 to 2000 - slightly down (-1):** There was a substantial decrease in the sum of nested frequency of perennial forbs and they provide almost no cover. Annual forbs also decreased and forbs were extremely rare on the site.
- **2000 to 2005 - stable (0):** Forbs were extremely rare on the site.
- **2005 to 2010 - stable (0):** Forbs were extremely rare on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 9, study no: 1

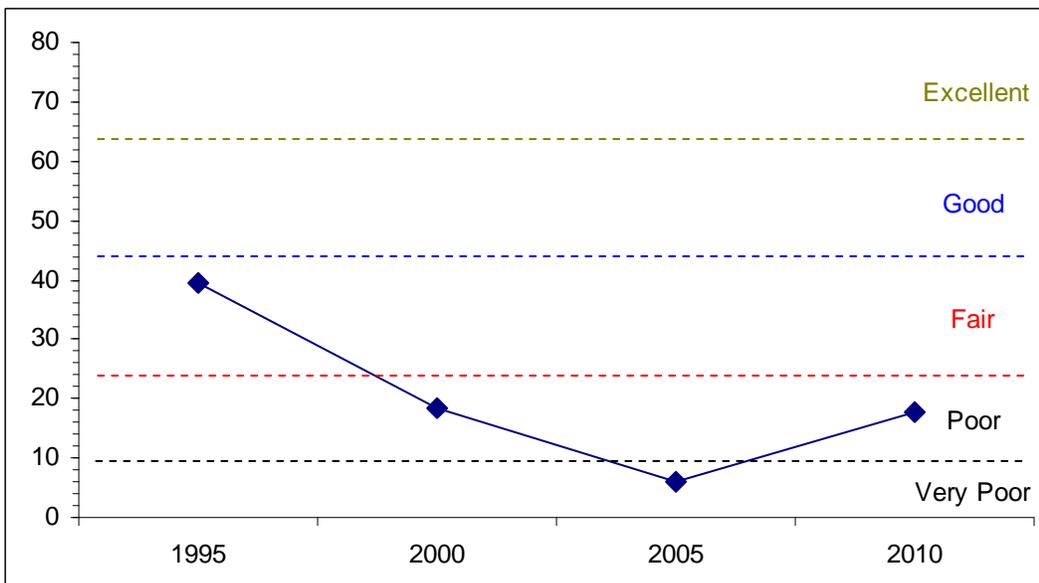
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	26.7	10.5	4.0	3.4	-5.6	0.7	0.0	39.6	Fair
00	25.3	-4.5	0.5	2.3	-5.2	0.2	0.0	18.5	Poor
05	18.6	-3.6	5.5	1.7	-16.2	0.1	0.0	6.1	Very Poor
10	20.6	5.4	1.5	3.1	-13.3	0.4	0.0	17.7	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 9, Study no: 1



HERBACEOUS TRENDS--
Management unit 09, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron dasystachyum	b71	b53	a15	a14	a4	.33	.12	.06	.03
G	Bromus tectorum (a)	-	a251	a290	c380	b332	5.64	6.90	19.26	17.72
G	Oryzopsis hymenoides	2	-	-	-	4	-	-	-	.03
G	Poa fendleriana	c111	b51	b45	ab23	a7	.66	.35	.52	.24
G	Poa secunda	a-	b17	c47	b15	c52	.40	.61	.15	1.20
G	Sitanion hystrix	c50	b25	a4	a9	a2	.23	.03	.07	.00
G	Stipa comata	3	3	2	5	10	.06	.03	.03	.05
G	Vulpia octoflora (a)	a-	c252	b31	c251	a-	1.82	.09	2.31	-
Total for Annual Grasses		0	503	321	631	332	7.47	6.99	21.57	17.72
Total for Perennial Grasses		237	149	113	66	79	1.69	1.15	0.84	1.57
Total for Grasses		237	652	434	697	411	9.17	8.14	22.42	19.30
F	Allium sp.	b12	b11	a-	a-	a-	.02	-	-	-
F	Androsace septentrionalis (a)	-	4	-	-	-	.01	-	-	-
F	Astragalus sp.	-	-	-	2	-	-	-	.00	-
F	Calochortus nuttallii	1	2	-	2	-	.01	-	.01	-
F	Chaenactis sp.	-	2	-	-	-	.00	-	-	-
F	Chenopodium leptophyllum(a)	-	b16	a-	a-	a-	.04	-	-	-
F	Collinsia parviflora (a)	-	3	-	7	-	.00	-	.01	-
F	Cryptantha sp.	a2	b18	a-	ab7	a1	.07	-	.04	.15
F	Descurainia pinnata (a)	-	c92	a-	b11	ab4	.25	-	.07	.03
F	Erigeron pumilus	-	8	2	2	-	.02	.00	.00	-
F	Eriogonum cernuum (a)	-	2	-	-	-	.00	-	-	-
F	Gilia sp. (a)	-	b16	ab7	a-	a2	.03	.01	-	.00
F	Lappula occidentalis (a)	-	a3	ab3	b22	c87	.00	.03	.05	1.18
F	Lepidium montanum	b12	b13	b12	a-	ab10	.06	.07	-	.01
F	Machaeranthera canescens	a6	b16	a-	a-	a-	.04	-	-	-
F	Oenothera pallida	-	1	-	-	-	.00	-	-	-
F	Orobancha sp.	3	-	-	-	-	-	-	-	-
F	Phlox longifolia	ab3	b11	a-	ab1	ab5	.05	-	.00	.01
F	Plantago patagonica (a)	-	c207	a94	b142	a69	1.23	.27	.62	.32
F	Polygonum douglasii (a)	-	2	-	-	-	.00	-	-	-
F	Salsola iberica (a)	-	-	-	-	1	-	-	-	.00
F	Schoenrambe linifolia	-	5	6	-	3	.04	.01	-	.01
F	Senecio multilobatus	-	-	-	-	-	-	.00	-	-
F	Sisymbrium altissimum (a)	-	-	-	-	1	-	-	-	.00
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	345	104	182	164	1.59	0.32	0.76	1.55
Total for Perennial Forbs		40	87	20	14	19	0.33	0.09	0.06	0.18
Total for Forbs		40	432	124	196	183	1.93	0.41	0.83	1.74

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

BROWSE TRENDS--

Management unit 09, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	90	96	83	85	21.34	20.20	14.88	16.44
B	Chrysothamnus viscidiflorus viscidiflorus	40	34	14	6	4.00	2.15	.16	-
B	Leptodactylon pungens	1	0	0	0	.15	-	-	-
B	Opuntia sp.	2	3	5	3	-	-	.03	.18
Total for Browse		133	133	102	94	25.50	22.36	15.08	16.62

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 1

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	20.06	17.61
Chrysothamnus viscidiflorus viscidiflorus	.81	.36
Opuntia sp.	-	.18

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 1

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.9	1.5

BASIC COVER--

Management unit 09, Study no: 1

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	.25	3.25	34.27	30.36	37.63	36.78
Rock	0	0	.02	0	.00	.01
Pavement	0	0	.01	.06	.05	0
Litter	63.50	55.50	43.87	43.37	45.06	56.87
Cryptogams	1.00	11.75	15.97	18.43	14.35	9.77
Bare Ground	35.25	29.50	21.13	25.96	16.45	20.83

SOIL ANALYSIS DATA --

Management unit 9, Study no: 1, Study Name: Red Mountain Allotment

Effective rooting depth (in)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
16.4	7.9	77.0	12.7	10.3	0.6	6.3	64.0	0.6

PELLET GROUP DATA--

Management unit 09, Study no: 1

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	14	65	90	28
Elk	2	1	1	2
Deer	47	30	29	40
Cattle	-	1	1	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
-	-	6 (15)
47 (116)	59 (146)	65 (160)
1 (2)	2 (5)	-

BROWSE CHARACTERISTICS--

Management unit 09, Study no: 1

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata wyomingensis</i>									
82	5131	1	91	8	-	34	52	5	23/26
88	9665	3	44	53	199	41	17	19	24/21
95	4360	8	77	15	120	39	8	6	33/42
00	5440	1	34	65	40	28	3	25	29/31
05	4360	11	26	62	3280	9	30	30	36/37
10	3080	3	65	32	-	34	.64	28	35/42
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	1000	6	86	8	-	0	0	2	23/32
00	1020	8	65	27	20	0	0	12	18/22
05	320	13	63	25	40	0	0	6	17/17
10	120	0	50	50	-	0	0	50	20/25
<i>Cowania mexicana stansburiana</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	0	0	0	-	-	0	0	0	30/41
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	12/23
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Juniperus osteosperma										
82	66	0	100	-	-	100	0	0	36/15	
88	66	100	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	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Leptodactylon pungens										
82	0	0	0	-	-	0	0	0	-/-	
88	0	0	0	-	-	0	0	0	-/-	
95	60	0	100	-	-	0	0	0	5/19	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
Opuntia sp.										
82	66	0	100	0	-	0	0	0	4/16	
88	399	17	83	0	-	0	0	0	3/6	
95	40	0	100	0	20	0	0	0	4/13	
00	100	0	60	40	-	0	0	0	3/7	
05	100	20	80	0	-	0	0	0	5/6	
10	80	0	100	0	-	0	0	0	4/12	