

BLACK MOUNTAIN - TREND STUDY NO. 25A-2-09

Vegetation Type: Chained, Seeded P-J

Range Type: Crucial Deer Winter, Substantial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 6,400 ft (1,951 m)

Aspect: South

Slope: 5%

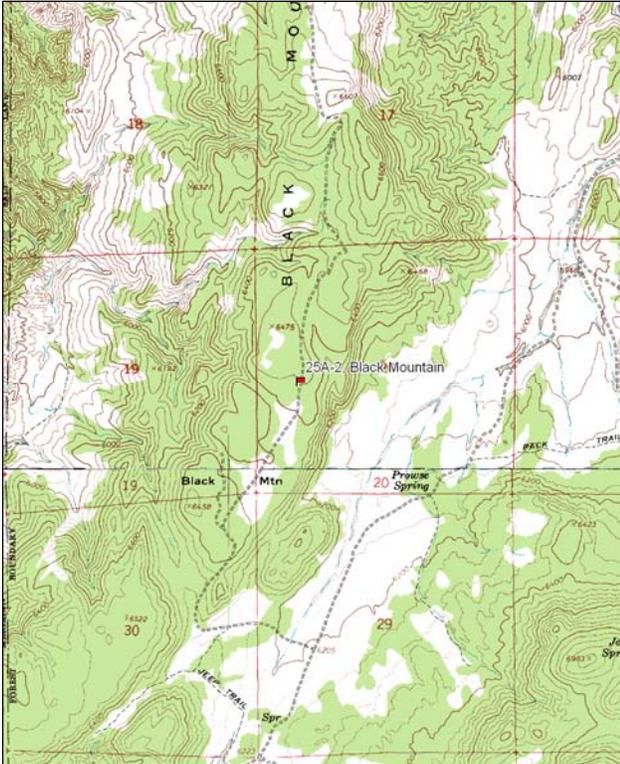
Transect bearing: 180 degrees magnetic

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

Directions:

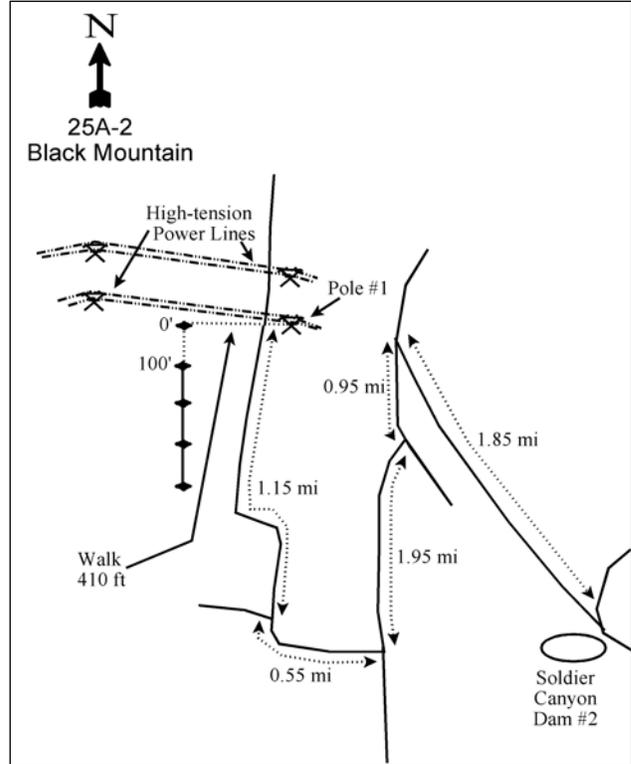
From Soldier Canyon Dam #2, proceed 1.85 miles west on the Soldier Canyon Road to the Black Mountain Road. Make a sharp left turn onto this road and travel south-southeast 0.95 miles to a junction. Take the right fork 0.85 miles to the double high-tension powerlines. The transect starts under these lines on the mesa to the right. Continue 1.1 miles beyond the powerlines to a 90-degree fork to the right. Turn right and go 0.55 miles to another fork. Stay to the right and proceed 1.15 miles up the hill and across a chaining until you are between the powerlines. Starting from the pole (#1) east of the road, pace off 410 feet west directly under the lines to the start of the frequency baseline which is 10 feet to the right. The 0 foot post is marked with browse tag #7028.

Map Name: Salina, Utah



Township: 22S, Range: 1E, Section: 20

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 428021 E 4303957 N

BLACK MOUNTAIN - TREND STUDY NO. 25A-2

Site Information

Site Description: This study was established within the Browns Hole cattle allotment in an area that was chained and seeded in 1984. The dominant species are black sagebrush (*Artemisia nova*) and sticklyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* spp. *viscidiflorus*) with a healthy perennial grass understory. The area was treated by a lop-and-scatter to remove pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) between the 2004 and 2009 sample years. Cattle have grazed this area for more than 30 years, however, the nearest water is 1.5 to 2 miles away and limits livestock use to two weeks while they are moving to summer range. Pellet group data has estimated that deer use has been high on this site since 1999. Estimated elk use is moderate to high and cattle use has varied (Tables – Pellet group Data).

Browse: The key browse species on this site is black sagebrush. It has had moderate to low densities since 1985. Sticklyleaf low rabbitbrush is the dominant browse (Table - Browse Characteristics). Utah juniper density decreased in 2009, following the treatment. Pinyon pine densities have been consistently low, averaging 22 tree/acre from 1999 to 2009 (Table - Point Quarter Tree Data).

Herbaceous Understory: Numerous perennial grass species are present on the site and have provided an average of 10% cover from 1999 to 2009. Indian ricegrass (*Oryzopsis hymenoides*) has been the dominant species in each sample year. Other common species include crested wheatgrass (*Agropyron cristatum*) and bottlebrush squirreltail (*Sitanion hystrix*). Cheatgrass (*Bromus tectorum*) is present in small quantities. Perennial forbs are very rare on this site. Weedy annual forbs have increased in frequency each year since 1985 and are dominated by pale alyssum (*Alyssum alyssoides*) and bur buttercup (*Ranunculus testiculatus*) (Table - Herbaceous Trends).

Soil: The soil is classified as sandy clay loam with a slightly alkaline pH (7.6). Phosphorous is low at 5.7 ppm and has limited availability for plant growth and development (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground is moderate on the site and has ranged from 20% to 38% over the sample years (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **1985 to 1991 - down (-2):** Black sagebrush density decreased 40% from 999 plants/acre to 598 plants/acre. Decadence of black sagebrush increased from 13% to 33% and no recruitment of young plants was noted. Sticklyleaf low rabbitbrush was sampled for the first time in 1991.
- **1991 to 1999 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1999; therefore trend was determined using other parameters. Black sagebrush decadence decreased to 5% and recruitment of young increased to 21% of the population.
- **1999 to 2004 - down (-2):** Black sagebrush density decreased 37% to 540 plants/acre and decadence increased to 63% with no new recruitment of young plants. Sticklyleaf low rabbitbrush density also decreased, to 1,400 plants/acre.
- **2004 to 2009 – slightly down (-1):** Black sagebrush density decreased 11% and decadence is still high at 42%, recruitment is low at 8%. Sticklyleaf low rabbitbrush density increased to 4,600 plants/acre.

Grass:

- **1985 to 1991 - up (+2):** Perennial grass sum of nested frequency increased over two-fold. There was a significant increase in the nested frequency of crested wheatgrass, intermediate wheatgrass and bluebunch wheatgrass (*Agropyron spicatum*).

- **1991 to 1999 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. There was a significant decrease in the nested frequency of intermediate wheatgrass and bluebunch wheatgrass, and a significant increase in the nested frequency of smooth brome (*Bromus inermis*).
- **1999 to 2004 - slightly up (+1):** There was little change in the sum of nested frequency of perennial grasses, but cover increased from 8% to 12%. Also, cheatgrass nested frequency decreased significantly and cover decreased to less than 1%. There was a significant increase in the nested frequency of crested wheatgrass.
- **2004 to 2009 - stable (0):** The sum of nested frequency and cover of perennial grasses remained similar.

Forb:

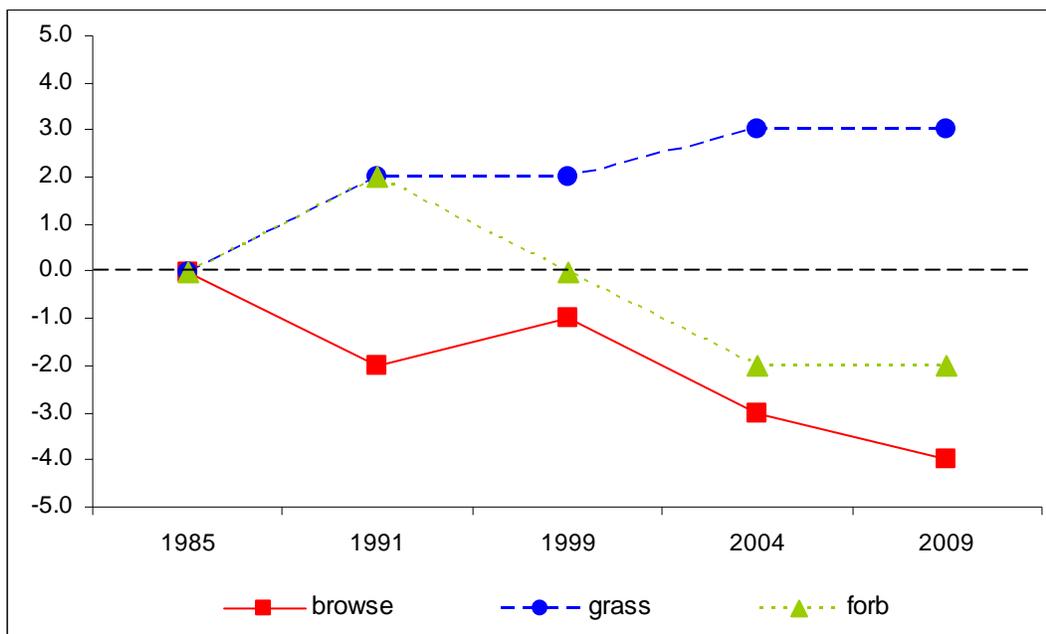
- **1985 to 1991 - up (+2):** There was a large increase in the sum of nested frequency of perennial forbs.
- **1991 to 1999 - down (-2):** The sum of nested frequency of perennial forbs decreased by 73% and cover was very low at less than 1%. Annual forbs increased markedly on the site.
- **1999 to 2004 - down (-2):** No perennial forbs were sampled on the site and annual forbs continued to increase.
- **2004 to 2009 - stable (0):** Perennial forbs remain extremely rare on the site and the sum of nested frequency and cover of annual forbs continued to increase.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 25A, study no: 2

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
99	2.1	0.0	0.0	16.1	-1.0	0.3	0.0	17.5	Very Poor
04	1.4	0.0	0.0	24.5	-0.1	0.0	0.0	25.8	Very Poor
09	1.1	0.0	0.0	21.0	-0.4	0.3	0.0	22.0	Very Poor

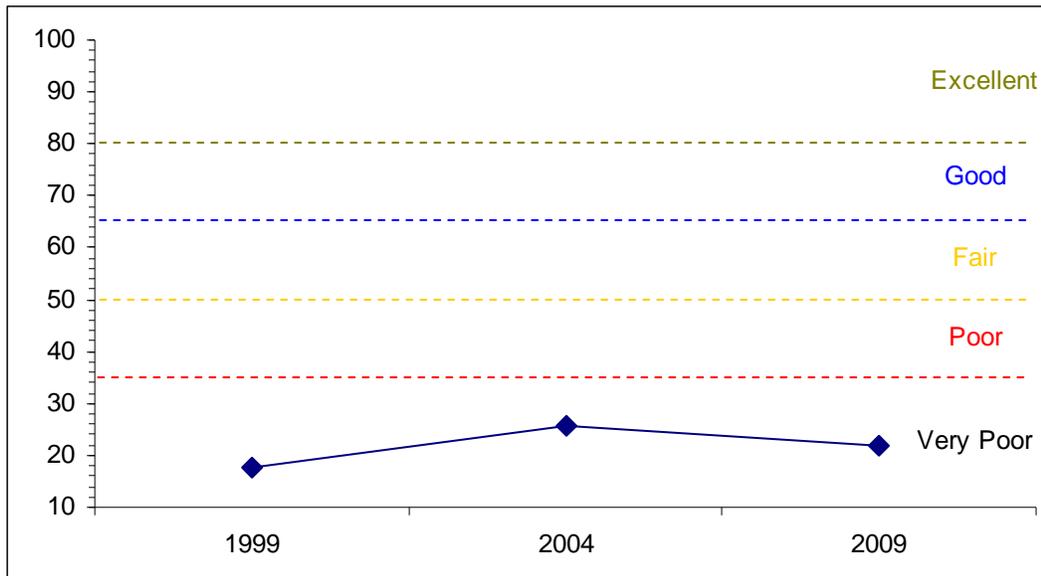
Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 25A Study no: 2



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL

Management unit 25A, Study no: 2



HERBACEOUS TRENDS--

Management unit 25A, Study no: 2

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'99	'04	'09	'99	'04	'09
G	Agropyron cristatum	a14	bc57	ab41	d98	cd78	.75	3.25	2.52
G	Agropyron intermedium	a9	c88	ab42	bc55	bc60	.89	1.26	.72
G	Agropyron smithii	4	-	-	-	2	-	-	.03
G	Agropyron spicatum	a5	b45	a6	a10	a15	.09	.48	.36
G	Bromus inermis	a4	a6	b73	a11	a10	1.20	.12	.10
G	Bromus tectorum (a)	-	-	b133	a14	a26	1.31	.18	.52
G	Elymus junceus	-	9	12	6	10	.11	.22	.24
G	Festuca ovina	a-	ab10	b27	a2	a-	.37	.00	-
G	Oryzopsis hymenoides	a68	a77	a95	ab105	b136	2.92	4.10	5.74
G	Poa fendleriana	2	-	6	2	-	.06	.03	-
G	Poa secunda	-	-	5	5	5	.06	.04	.04
G	Sitanion hystrix	ab49	b89	b80	b79	a31	1.58	2.74	.73
Total for Annual Grasses		0	0	133	14	26	1.31	0.18	0.51
Total for Perennial Grasses		155	381	387	373	347	8.06	12.25	10.51
Total for Grasses		155	381	520	387	373	9.38	12.44	11.03
F	Alyssum alyssoides (a)	-	-	b189	a137	b207	.62	1.31	1.91
F	Antennaria rosea	6	-	-	-	-	-	-	-
F	Astragalus sp.	ab4	b30	ab14	a-	ab7	.11	-	.16
F	Castilleja sp.	-	2	-	-	-	-	-	-
F	Chaenactis douglasii	a-	b12	a-	a-	a-	-	-	-
F	Cryptantha sp.	-	-	1	-	-	.00	-	-
F	Erigeron engelmannii	-	2	-	-	-	-	-	-
F	Eriogonum ovalifolium	a-	b14	a-	a-	a2	-	-	.00
F	Gilia sp. (a)	-	-	-	10	-	-	.02	-

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'99	'04	'09	'99	'04	'09
F	<i>Lactuca serriola</i>	a ⁻	b ⁷	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Machaeranthera canescens</i>	-	4	-	-	-	-	-	-
F	<i>Medicago sativa</i>	b ¹⁴	a ¹	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Phlox longifolia</i>	a ⁻	b ¹²	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Ranunculus testiculatus</i> (a)	-	-	a ⁻	b ¹⁷⁴	c ²⁵⁵	-	1.11	4.06
F	<i>Salsola iberica</i> (a)	a ¹	b ¹⁹	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Sanguisorba minor</i>	b ²⁹	a ¹	a ⁻	a ⁻	a ⁻	-	-	-
F	<i>Senecio multilobatus</i>	3	-	-	-	-	-	-	-
F	<i>Streptanthus cordatus</i>	2	2	-	-	-	-	-	-
F	<i>Taraxacum officinale</i>	-	1	-	-	-	-	-	-
F	<i>Tragopogon dubius</i>	-	3	10	-	-	.02	-	-
F	Unknown forb-perennial	-	2	-	-	-	-	-	-
Total for Annual Forbs		1	19	189	321	462	0.62	2.45	5.97
Total for Perennial Forbs		58	93	25	0	9	0.13	0	0.16
Total for Forbs		59	112	214	321	471	0.75	2.45	6.13

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

BROWSE TRENDS--

Management unit 25A, Study no: 2

Type	Species	Strip Frequency			Average Cover %		
		'99	'04	'09	'99	'04	'09
B	<i>Artemisia nova</i>	26	16	13	1.70	1.03	.86
B	<i>Artemisia tridentata vaseyana</i>	1	2	0	-	.12	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	42	36	63	2.12	1.97	2.45
B	<i>Juniperus osteosperma</i>	8	4	0	1.83	2.27	1.94
B	<i>Pinus edulis</i>	1	0	0	.03	.15	-
Total for Browse		78	58	76	5.70	5.55	5.26

CANOPY COVER, LINE INTERCEPT--

Management unit 25A, Study no: 2

Species	Percent Cover	
	'04	'09
<i>Artemisia nova</i>	1.50	1.08
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	4.55	3.83
<i>Juniperus osteosperma</i>	1.81	1.98

POINT-QUARTER TREE DATA--
Management unit 25A, Study no: 2

Species	Trees per Acre			Average diameter (in)		
	'99	'04	'09	'99	'04	'09
Juniperus osteosperma	72	-	35	2.3	-	4.7
Pinus edulis	23	-	20	1.7	-	3.5

BASIC COVER--
Management unit 25A, Study no: 2

Cover Type	Average Cover %				
	'85	'91	'99	'04	'09
Vegetation	1.50	3.00	18.36	19.96	22.52
Rock	1.75	3.25	4.71	4.80	5.59
Pavement	30.25	14.00	11.60	31.67	16.30
Litter	46.50	42.00	21.79	29.77	34.37
Cryptogams	0	0	.05	1.04	.98
Bare Ground	20.00	37.75	29.98	26.72	27.22

SOIL ANALYSIS DATA --
Management unit 25A, Study no: 2, Study Name: Black Mountain

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11.7	7.6	50	25.1	24.9	3.5	5.7	316.8	0.5

PELLET GROUP DATA--
Management unit 25A, Study no: 2

Type	Quadrat Frequency			Days use per acre (ha)		
	'99	'04	'09	'99	'04	'09
Rabbit	18	56	42	-	-	-
Elk	15	16	8	38 (93)	20 (50)	15 (36)
Deer	24	39	37	78 (192)	52 (127)	44 (107)
Cattle	16	6	16	24 (59)	12 (30)	36 (90)

BROWSE CHARACTERISTICS--
Management unit 25A, Study no: 2

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Artemisia nova									
85	999	0	87	13	-	7	0	0	6/7
91	598	0	67	33	-	0	0	0	8/11
99	860	21	74	5	20	40	0	0	11/18
04	540	0	37	63	-	22	15	48	11/18
09	480	8	50	42	-	38	21	8	9/15

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 vaseyana</i>									
85	0	0	0	0	-	0	0	0	-/-
91	0	0	0	0	-	0	0	0	-/-
99	40	100	0	0	-	100	0	0	13/16
04	40	0	50	50	-	50	50	50	11/15
09	0	0	0	0	-	0	0	0	19/44
<i>Chrysothamnus depressus</i>									
85	532	0	75	25	-	0	0	0	7/7
91	265	25	75	0	-	0	0	0	13/14
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	5/9
<i>Chrysothamnus nauseosus</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	13/15
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
85	0	0	0	0	-	0	0	0	-/-
91	599	44	56	0	66	0	0	0	15/19
99	2200	25	73	3	40	20	16	16	14/22
04	1400	0	96	4	-	0	6	3	13/23
09	4600	42	57	1	40	16	13	.86	9/15
<i>Juniperus osteosperma</i>									
85	132	50	0	50	-	0	0	0	-/-
91	66	100	0	0	-	0	0	0	-/-
99	160	75	25	0	20	0	0	0	-/-
04	80	25	75	0	-	25	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
<i>Pinus edulis</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	-	0	0	100	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-