

BLACK HORSE - TREND STUDY NO. 10-8-10

Vegetation Type: Mountain Brush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: [Mountain Stony Loam \(Browse\), R048AY451UT](#)

Land Ownership: BLM

Elevation: 8341 ft. (2543 m)

Aspect: East

Slope: 10%

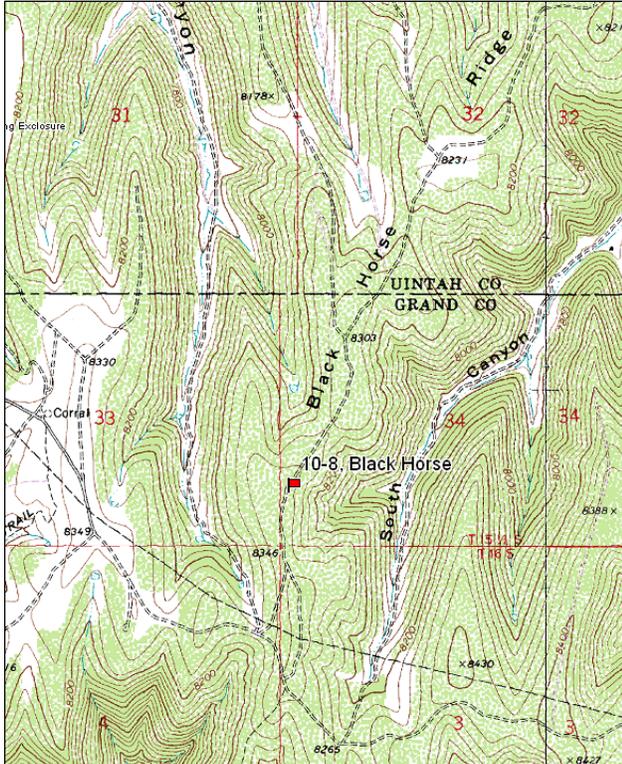
Transect bearing: 21° magnetic

Belt placement: line 1 (11ft*), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). **Belt 1 centered at 40 feet.

Directions:

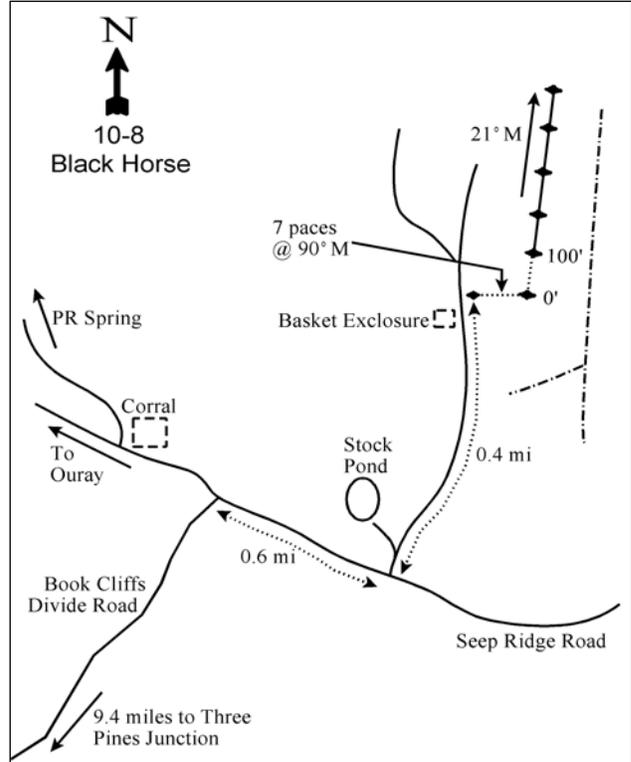
At 0.6 miles southeast of the intersection of the Seep Ridge road and the Book Cliff Divide road, a road turns north off the divide road and heads up Black Horse Ridge. Go up this road 0.4 miles to a witness post on the right side of the road. The study site is on the east slope of the ridge. From the witness post, walk 7 paces bearing 90°M to the 0-foot baseline stake, which is marked by browse tag #9039 attached. The frequency baseline runs parallel to the road. Study markers are 18" green metal fenceposts.

Map Name: PR Spring



Township: 15½S Range: 24E Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 649346 E 4368607 N

BLACK HORSE - TREND STUDY NO. 10-8

Site Information

Site Description: The study is located near the Book Cliffs summit in mountain brush vegetation which is used by deer and elk as summer range. This is the highest elevation trend study on the unit. There are small stands of aspen (*Populus tremuloides*) and conifers in the drainages, but the dominant vegetation is Gambel oak (*Quercus gambelii*) and associated mountain brush. Deer are commonly observed in the area. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Sweetwater allotment. Pellet group data estimated moderate deer use in 2000 and 2010, with heavy use in 2005. In 2005, a deer fawn carcass was found on the site. Estimated use of elk and cattle has been light since 2000 (Table - Pellet Group Data).

Browse: This mixed mountain brush community is composed of a variety of valuable shrubs. Large Utah serviceberry (*Amelanchier utahensis*) and clones of Gambel oak are the primary overstory species. Mature serviceberry average over 4 feet in height with some individuals being over 5 feet in height. Recruitment of young serviceberry plants has been excellent over the course of the study. The majority of the plants showed mostly light hedging in all sample years with heavier hedging in 2005 and 2010. Gambel oak is mostly a young population that has displayed light to moderate use since the outset of the study in 1988. Other preferred browse species include: mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*) and true mountain mahogany (*Cercocarpus montanus*). Mahogany and bitterbrush are more heavily utilized than sagebrush. Mahogany and sagebrush have had mixed populations of young and mature plants over the course of the study, while the bitterbrush population is mostly mature with little recruitment of young plants. Sagebrush is the most abundant of the three species, followed by mahogany. Bitterbrush is much less abundant on the site (Table - Browse Characteristics).

Herbaceous Understory: Since the area is primarily summer range, herbaceous forage is especially important on this site. Herbaceous vegetation is fairly abundant with grasses providing 14%-18% average cover since 1995. Most grasses were at least moderately utilized by cattle during the 1988 reading. The most numerous species are thickspike wheatgrass (*Agropyron dasystachyum*), sedge (*Carex* sp.), Kentucky bluegrass (*Poa pratensis*), mutton bluegrass (*P. fendleriana*) and Lettermen needlegrass (*Stipa comata*). The sedge is the most abundant species. Forbs are also moderately abundant and diverse. Weedy milkvetch (*Astragalus miser*), ballhead sandwort (*Arenaria congesta*), mat penstemon (*Penstemon caespitosus*) and Eaton fleabane (*Erigeron eatonii*) are the most abundant species. Several valuable forb species occur on the site including Pacific aster (*Aster chilensis*), arrowleaf balsamroot (*Balsamorhiza sagittata*), thistleleaf penstemon (*Penstemon pachyphyllus*), yellow Indian paintbrush (*Castilleja flava*) and sulfur buckwheat (*Eriogonum umbellatum*) (Table - Herbaceous Trends).

Soil: The soil texture is clay and soils are in the Seeprid-Utso loam complex. These soils typically are moderately deep and well-drained. Organic matter is moderately high at 4.4% with soil reaction being neutral (pH 6.8) (Table - Soil Analysis Data). Bare ground cover is low with good vegetation and litter cover (Table - Basic Cover). The soil erosion condition was classified as slight in 2005 due to surface movement of litter, rock and soil, and pedestaling of plants. The soil erosion condition was classified as stable in 2010.

Trend Assessments

Browse:

- **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 in mountain big sagebrush and true mountain mahogany decreased substantially and vigor improved markedly in the Utah serviceberry population.
- **1995 to 2000 - stable (0):** The key browse species, serviceberry and true mountain mahogany, have remained similar in density, decadence remained low, and recruitment of young plants has remained good.

- **2000 to 2005 - stable (0):** Serviceberry density has remained similar, with slight increase in recruitment of young plants. There was an increase in the decadence of true mountain mahogany and mountain big sagebrush and a decrease in the recruitment of young plants in both species.
- **2005 to 2010 - slightly down (-1):** There was a 47% decrease in the density of serviceberry from 2,720 plants/acre to 1,440 plants/acre and cover decreased from 4% to 2%. Recruitment of young serviceberry plants remained high and decadence decreased to just 3%. Mountain big sagebrush density increased by 21% from 2,040 plants/acre to 2,460 plants/acre with a decrease in decadence and an increase in recruitment. True mountain mahogany and bitterbrush densities remained similar, but decadence decreased in mahogany and recruitment of young mahogany plants increased.

Grass:

- **1988 to 1995 - slightly up (+1):** The perennial grass sum of nested frequency increased by 11% with a significant increase in the nested frequency of bottlebrush squirreltail (*Sitanion hystrix*).
- **1995 to 2000 - slightly up (+1):** There was a 12% increase in the sum of nested frequency of perennial grasses with a slight increase in cover.
- **2000 to 2005 - stable (0):** The sum of nested frequency of perennial grasses changed little, though cover increased from 17% to 18%. There was a significantly increase in the nested frequency of the increaser species Kentucky bluegrass.
- **2005 to 2010 - slightly down (-1):** There was little change in the sum of nested frequency of perennial grasses since 2005, but frequency has decreased by 12% since 2000 returning to 1995 levels. Cover of perennial grasses also decreased to 14%. Kentucky bluegrass continues to be more abundant.

Forb:

- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though composition has changed somewhat with significant decreases in the nested frequency of many species and significant increases in others.
- **1995 to 2000 - down (-2):** The sum of nested frequency of perennial forbs decreased by 24% and cover decreased from 10% to 9%.
- **2000 to 2005 - stable (0):** The perennial forb sum of nested frequency changed little, though cover increased to 12%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 14% and cover decreased to 6%.

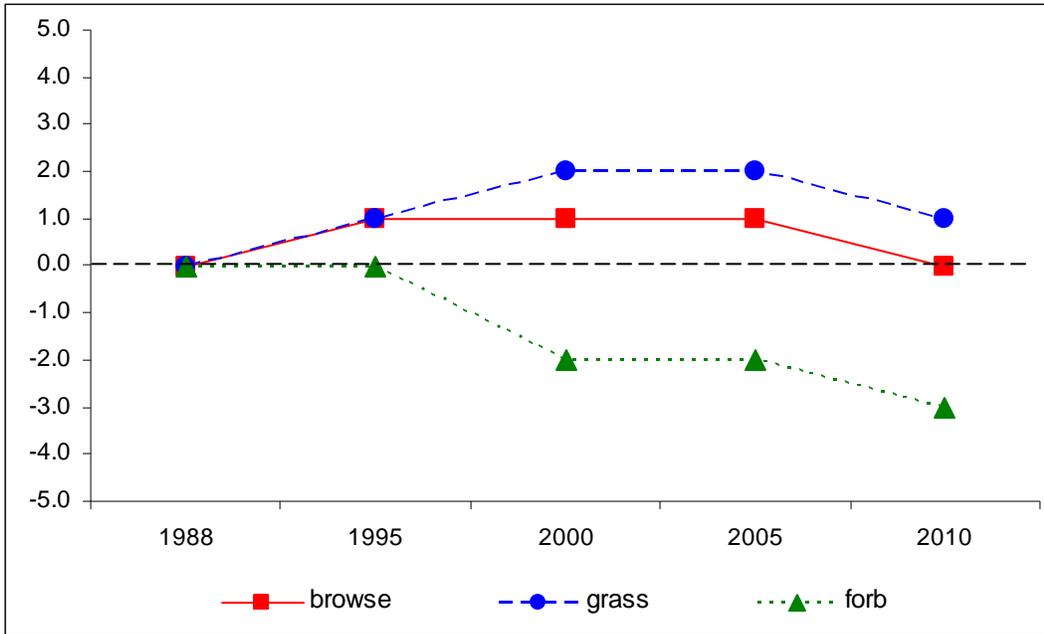
DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

Management unit 10, study no: 8

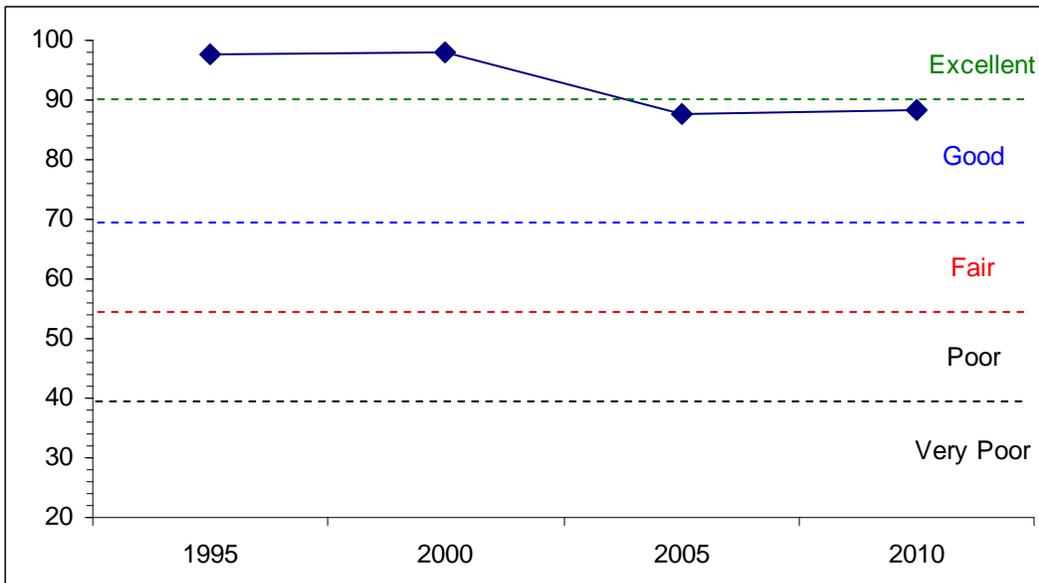
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	28.1	14.6	15.0	30.0	0.0	10.0	0.0	97.7	Excellent
00	30.0	13.0	15.0	30.0	0.0	10.0	0.0	98.0	Excellent
05	26.5	9.5	11.8	30.0	0.0	10.0	0.0	87.8	Good
10	20.7	14.0	15.0	28.5	0.0	10.0	0.0	88.2	Good-Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 10, Study no: 8



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--
Management unit 10, Study no: 8



HERBACEOUS TRENDS--
Management unit 10, Study no: 8

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	Agropyron cristatum	-	-	6	-	-	-	.03	-	-
G	Agropyron dasystachyum	108	103	128	135	121	1.58	1.92	2.40	1.22
G	Bromus anomalus	c71	c67	b27	a-	a-	.95	.23	-	-
G	Bromus tectorum (a)	-	3	-	-	-	.00	-	-	-
G	Carex sp.	b215	b234	b235	a146	a139	9.30	9.65	7.62	5.75
G	Koeleria cristata	a-	ab3	b15	b16	a-	.00	.27	.51	-
G	Phleum pratense	-	-	7	-	-	-	.30	-	-
G	Poa fendleriana	a35	a29	ab40	c85	bc86	1.18	.46	2.63	2.01
G	Poa pratensis	a39	a54	a63	b123	b155	1.74	2.42	3.65	5.10
G	Sitanion hystrix	a3	b13	ab6	a-	a-	.28	.03	-	-
G	Stipa columbiana	-	-	-	9	3	-	-	.19	.00
G	Stipa comata	-	-	-	5	5	-	-	.36	.06
G	Stipa lettermani	a4	a23	b62	a22	a10	.70	1.13	.48	.07
Total for Annual Grasses		0	3	0	0	0	0.00	0	0	0
Total for Perennial Grasses		475	526	589	541	519	15.76	16.47	17.85	14.23
Total for Grasses		475	529	589	541	519	15.76	16.47	17.85	14.23
F	Achillea millefolium	a15	b44	ab30	ab26	ab23	.60	.19	.45	.24
F	Agoseris glauca	a-	a3	b26	b32	b44	.00	.19	.72	.21
F	Androsace septentrionalis (a)	-	1	3	2	2	.00	.00	.00	.01
F	Arabis sp.	-	-	6	-	1	-	.21	-	.00
F	Arenaria congesta	b141	ab104	a74	ab108	a74	1.27	.65	1.93	1.02
F	Artemisia ludoviciana	4	-	-	-	-	-	-	-	-
F	Aster chilensis	b89	a51	a29	a23	a21	.45	.21	.36	.06
F	Aster sp.	-	-	-	-	12	-	-	-	.09
F	Astragalus miser	78	95	112	96	84	3.54	4.46	3.11	2.29
F	Balsamorhiza sagittata	b79	a18	a21	a14	a6	.73	.66	.86	.12
F	Calochortus nuttallii	a-	b7	ab3	a-	a-	.05	.00	-	-
F	Castilleja flava	b27	a6	ab17	a1	a3	.01	.09	.03	.00
F	Chenopodium sp. (a)	-	3	-	-	-	.00	-	-	-
F	Cirsium sp.	c28	ab23	abc11	a2	ab6	.41	.37	.18	.04
F	Collinsia parviflora (a)	-	4	-	-	4	.01	-	-	.01
F	Comandra pallida	b120	a37	a18	a39	a30	.17	.09	.20	.06
F	Crepis acuminata	a3	c48	bc29	ab9	ab8	.26	.26	.10	.02
F	Cymopterus sp.	-	-	8	3	3	-	.09	.00	.03
F	Delphinium nuttallianum	a-	ab8	a-	b16	b6	.03	-	.07	.03
F	Erigeron eatonii	a-	c101	b47	bc79	b53	.67	.28	.91	.39
F	Erigeron flagellaris	c53	a-	b25	a-	a-	-	.32	-	-
F	Eriogonum alatum	a-	a-	ab1	ab1	b14	-	.00	.03	.05
F	Eriogonum umbellatum	ab20	b36	a6	a15	a17	.24	.03	.47	.13
F	Gayophytum ramosissimum(a)	-	8	-	-	-	.04	-	-	-
F	Gilia sp. (a)	-	2	-	-	-	.00	-	-	-
F	Hymenoxys acaulis	-	8	1	-	5	.04	.03	-	.06
F	Ipomopsis aggregata	2	-	-	-	-	-	-	-	-

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
F	Lathyrus brachycalyx	a ⁻	b ¹⁴	b ²¹	b ¹⁷	b ¹⁷	.60	.34	.31	.29
F	Linum lewisii	-	3	7	7	6	.01	.04	.21	.01
F	Lithospermum sp.	-	-	-	1	-	-	-	.00	-
F	Lomatium sp.	-	7	4	2	3	.02	.06	.04	.00
F	Lupinus argenteus	ab ³	b ¹¹	a ⁻	ab ⁶	a ⁻	.12	-	.04	-
F	Lychnis drummondii	-	-	-	-	6	-	-	-	.01
F	Oenothera sp.	2	-	-	-	-	-	-	-	-
F	Pedicularis centranthera	-	8	-	-	-	.10	-	-	-
F	Penstemon caespitosus	61	43	57	29	45	.21	.47	.57	.87
F	Penstemon pachyphyllus	3	6	2	-	3	.04	.00	-	.00
F	Phlox longifolia	abc ³⁷	bc ⁴¹	ab ²⁰	c ⁶¹	a ¹⁹	.15	.04	.36	.06
F	Polygonum douglasii (a)	-	b ²⁸	a ⁻	b ³⁸	a ⁹	.14	-	.11	.04
F	Senecio integerrimus	a ⁻	ab ³	ab ²	b ¹⁰	ab ¹⁰	.03	.00	.18	.09
F	Taraxacum officinale	1	36	12	21	16	.26	.09	.19	.03
F	Tragopogon dubius	3	-	-	-	-	-	-	-	-
F	Unknown forb-annual (a)	-	3	-	-	-	.00	-	-	-
F	Unknown forb-perennial	5	8	-	2	-	.04	-	.15	-
F	Viguiera multiflora	ab ³	b ¹⁵	ab ⁴	a ⁻	a ⁻	.13	.01	-	-
Total for Annual Forbs		0	49	3	40	15	0.21	0.00	0.11	0.06
Total for Perennial Forbs		777	784	593	620	535	10.28	9.26	11.51	6.28
Total for Forbs		777	833	596	660	550	10.49	9.27	11.63	6.35

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

BROWSE TRENDS--

Management unit 10, Study no: 8

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Amelanchier utahensis	43	55	58	39	3.55	4.26	3.67	1.70
B	Artemisia tridentata vaseyana	31	56	60	65	9.49	8.51	8.46	8.23
B	Cercocarpus montanus	27	30	30	36	4.30	4.50	3.99	2.87
B	Chrysothamnus depressus	5	4	3	5	.01	-	.18	.01
B	Chrysothamnus nauseosus	0	1	0	0	-	-	-	-
B	Chrysothamnus viscidiflorus lanceolatus	68	71	67	65	3.51	2.12	4.13	2.83
B	Gutierrezia sarothrae	4	8	11	1	.19	.10	1.01	.18
B	Juniperus osteosperma	0	0	0	1	-	-	-	-
B	Mahonia repens	25	43	36	47	1.05	2.43	1.97	.94
B	Opuntia sp.	2	2	2	2	-	-	-	-
B	Prunus virginiana	8	9	12	7	.51	.33	.62	.09
B	Purshia tridentata	3	8	5	6	.68	1.03	.24	.53
B	Quercus gambelii	10	44	33	30	2.83	6.07	3.07	2.66
B	Rosa woodsii	2	1	0	0	.18	.00	-	-
B	Symphoricarpos oreophilus	75	86	84	89	13.24	10.39	15.38	11.29
B	Tetradymia canescens	3	4	3	2	.00	.15	.03	-
Total for Browse		306	422	404	395	39.60	39.93	42.78	31.37

CANOPY COVER, LINE INTERCEPT--

Management unit 10, Study no: 8

Species	Percent Cover		
	'00	'05	'10
Amelanchier utahensis	2.40	7.48	3.96
Artemisia tridentata vaseyana	-	9.46	11.39
Cercocarpus montanus	-	6.83	6.94
Chrysothamnus depressus	-	.06	-
Chrysothamnus viscidiflorus lanceolatus	-	4.48	6.75
Gutierrezia sarothrae	-	.20	.05
Juniperus osteosperma	-	.01	.18
Mahonia repens	-	1.06	1.20
Opuntia sp.	-	.06	.05
Prunus virginiana	-	.20	.10
Purshia tridentata	-	.15	.50
Quercus gambelii	2.40	4.55	1.81
Symphoricarpos oreophilus	-	17.43	17.71
Tetradymia canescens	-	.18	.55

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10, Study no: 8

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	2.4	1.9
Artemisia tridentata vaseyana	2.0	1.9

BASIC COVER--

Management unit 10, Study no: 8

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	11.75	55.30	61.88	57.64	58.84
Rock	4.25	6.09	4.62	4.90	2.88
Pavement	6.00	.51	1.54	3.79	1.81
Litter	55.50	53.79	56.37	39.45	51.31
Cryptogams	0	.07	.00	.07	0
Bare Ground	22.50	10.82	12.18	14.80	14.82

SOIL ANALYSIS DATA --

Management unit 10, Study no: 8, Study Name: Black Horse

Effective rooting depth (in)	pH	clay			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.2	6.8	26.0	33.4	40.6	4.4	10.8	252.8	0.8

PELLET GROUP DATA--

Management unit 10, Study no: 8

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	5	13	14	1
Elk	-	4	1	10
Deer	19	16	35	12
Cattle	6	-	4	3

Days use per acre (ha)		
'00	'05	'10
-	-	-
22 (54)	5 (13)	1 (3)
57 (141)	86 (212)	41 (101)
4 (10)	12 (29)	9 (23)

BROWSE CHARACTERISTICS--

Management unit 10, Study no: 8

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
88	3598	94	2	4	466	9	9	22	54/55
95	2400	65	33	3	-	28	3	.83	44/34
00	2660	26	65	9	160	13	14	4	51/36
05	2720	42	46	12	40	18	30	1	47/30
10	1440	58	39	3	700	19	21	1	59/42
<i>Artemisia tridentata vaseyana</i>									
88	1332	10	35	55	133	0	0	0	34/31
95	1160	22	76	2	120	19	0	3	29/40
00	1980	16	73	11	240	22	8	1	29/36
05	2040	7	67	26	1180	16	4	12	21/28
10	2460	30	66	4	600	18	0	3	25/35
<i>Cercocarpus montanus</i>									
88	66	0	0	100	-	0	100	0	-/-
95	1140	37	63	0	-	54	11	0	44/49
00	1160	45	52	3	20	40	19	0	41/37
05	1140	7	74	19	20	2	98	4	54/46
10	1200	30	65	5	140	33	25	5	42/36
<i>Chrysothamnus depressus</i>									
88	0	0	0	-	-	0	0	0	-/-
95	120	17	83	-	-	17	0	0	4/7
00	160	38	63	-	-	0	0	0	14/5
05	100	0	100	-	-	0	0	0	4/10
10	160	0	100	-	-	0	0	0	4/6
<i>Chrysothamnus nauseosus</i>									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	100	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
88	4132	29	71	0	-	0	0	0	14/9
95	4660	28	72	0	40	0	0	0	12/14
00	5000	6	92	2	40	8	0	.40	15/16
05	3700	0	95	5	-	2	0	2	11/14
10	4380	15	85	0	100	4	0	0	14/18

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	300	33	67	-	-	0	0	0	6/7	
00	1020	27	73	-	-	0	0	0	6/6	
05	880	7	93	-	-	0	0	0	5/10	
10	40	0	100	-	-	0	0	0	3/7	
<i>Juniperus osteosperma</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	20	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	20	100	0	-	-	0	0	0	-/-	
<i>Mahonia repens</i>										
88	2199	76	24	0	-	0	0	0	10/6	
95	3220	55	45	0	-	2	0	0	3/5	
00	6280	6	94	0	-	0	0	8	3/6	
05	5080	7	93	0	-	0	0	.39	4/5	
10	9560	46	54	0	80	0	0	0	3/5	
<i>Opuntia sp.</i>										
88	0	0	0	-	-	0	0	0	-/-	
95	60	0	100	-	-	0	0	0	5/9	
00	40	0	100	-	-	0	0	0	4/8	
05	60	0	100	-	-	0	0	0	4/11	
10	40	0	100	-	-	50	0	0	5/8	
<i>Prunus virginiana</i>										
88	799	100	0	0	-	17	0	0	-/-	
95	720	92	8	0	-	0	0	0	10/11	
00	760	100	0	0	260	0	0	0	18/19	
05	420	71	24	5	-	5	0	5	9/9	
10	500	100	0	0	-	0	0	0	8/8	
<i>Purshia tridentata</i>										
88	199	33	67	-	-	0	67	0	7/15	
95	80	0	100	-	-	0	0	0	8/23	
00	240	8	92	-	-	25	25	0	10/29	
05	120	0	100	-	-	0	83	0	8/19	
10	160	0	100	-	-	0	100	13	8/16	
<i>Quercus gambelii</i>										
88	5064	87	12	1	266	17	0	1	70/56	
95	480	42	58	0	-	38	4	0	57/64	
00	4580	72	24	3	-	6	0	1	59/41	
05	3020	63	27	10	180	17	1	11	55/34	
10	3460	94	6	0	1300	0	0	0	29/27	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Rosa woodsii</i>										
88	1332	80	20	-	-	0	0	10	16/10	
95	40	50	50	-	-	0	0	0	7/5	
00	20	100	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	8/6	
10	0	0	0	-	-	0	0	0	12/7	
<i>Symphoricarpos oreophilus</i>										
88	6265	68	30	2	333	0	0	49	15/12	
95	5480	27	73	0	160	11	.72	0	17/27	
00	5720	5	95	0	200	15	0	0	14/23	
05	8020	14	85	0	-	.74	0	0	14/19	
10	6860	19	81	0	300	3	0	0	15/24	
<i>Tetradymia canescens</i>										
88	66	100	0	0	-	0	0	0	-/-	
95	80	0	100	0	-	25	0	0	14/12	
00	120	17	83	0	-	0	0	0	15/9	
05	80	0	75	25	-	50	25	0	19/13	
10	40	0	100	0	-	50	0	0	7/11	