

Trend Study 10R-12-05

Study site name: Horse Ridge .

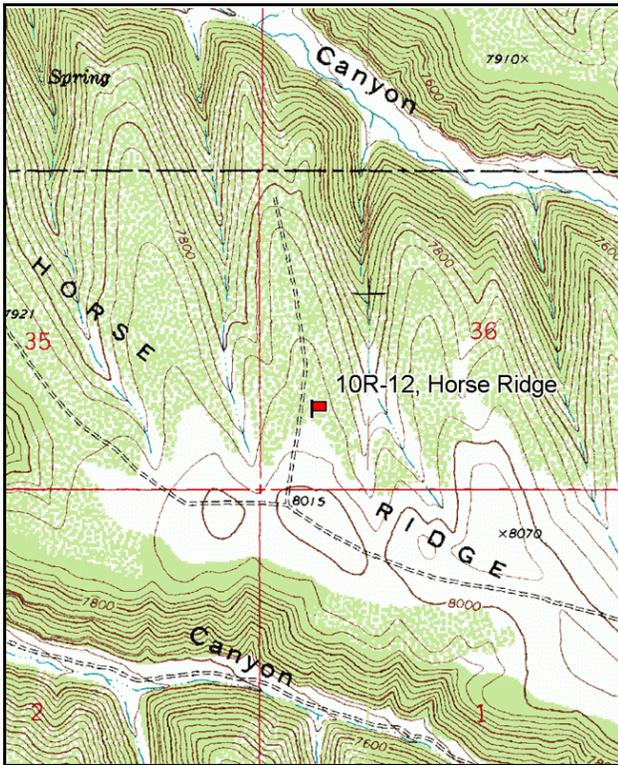
Vegetation Type: Mountain Brush .

Compass bearing: frequency baseline 158 degrees magnetic.

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

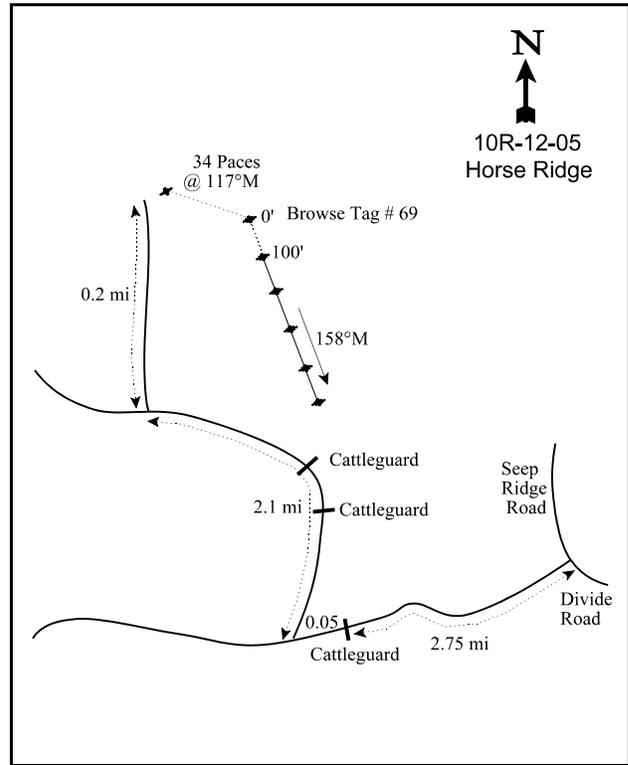
LOCATION DESCRIPTION

From the intersection of Divide road and Seep Ridge, turn west off of Divide road. Drive down this road 2.75 miles to a cattle guard. Proceed 0.05 miles, turn right (north) and drive 2.1 miles crossing two cattle guards. At this point there is a fork. Take the right fork for 0.2 miles to a witness post on the right side of the road. The 0-foot stake is 34 paces from the witness post at 117°M. The study is marked by green, steel fenceposts approximately 12-18 inches in height. The 0-foot stake is marked by browse tag number 69.



Map name: P R Spring .

Township 15½S , Range 23E , Section 36



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4368302 N, 643199 E

DISCUSSION

Horse Ridge - Trend Study 10R-12

The Horse Ridge trend study is located on Horse Ridge about 2.5 miles west of the Seep Ridge Road and Divide Ridge Road intersection. The site has a slope of 5-10% with a slight northwest aspect and an elevation of approximately 7,900 feet. The area is dominated by mixed mountain brush species, which include serviceberry, bitterbrush, and mountain big sagebrush. Pellet group data indicated moderate big game use in 1997 with an estimated 71 elk and 68 deer days use/acre (175 edu/ha and 168 ddu/ha). Use was lighter in 2000 with 45 elk, 47 deer and 3 cow days use/acre estimated (111 edu/ha, 116 ddu/ha and 7 cdu/ha). In 2005, pellet group data estimated 60 elk, 40 deer and 2 cow days use/acre (147 edu/ha, 98 ddu/ha and 5 cdu/ha).

Soil is moderately deep with an effective rooting depth of over 19 inches. It has a clay loam texture with a moderately acid soil reaction (5.9 pH). Soil organic matter is very high at 11%. There is little rock or pavement on the surface and percent bare ground is low. Some soil pedestaling is evident under shrubs, but the site has a low erosion potential due to the levelness of the terrain combined with the abundant vegetation and litter cover. The erosion condition was stable in 2005.

The area supports a variety of useful browse species including serviceberry, mountain big sagebrush, bitterbrush, and snowberry. The most numerous browse is mountain big sagebrush which provides more than half of the browse cover with 21% cover estimated in 2005. This was a decrease from 25% cover in 2000. Density was 7,380 plants/acre in 2000, which declined to 6,260 plants/acre in 2005. This decline may be attributed to a high amount of rodent damage that was noted in 2005. Sagebrush stems were girdled by rodents which resulted in crown death. Bitterbrush was also girdled, but less frequently. Most likely, the species which caused the girdling were the long-tailed vole (*Microtus longicaudus*) and the deer mouse (*Peromyscus maniculatus*). This occurs when rodent populations are high and food is scarce especially during winters with long lasting snow packs (Parmenter et al. 1987). Utilization of sagebrush has been light to moderate. Reproduction was good in 2000 with young plants making up 18% of the population, but declined to only 7% of the population in 2005.

Bitterbrush cover was high in 2000 at 12%, but declined to 6% in 2005 after rodent damage. In 2000, it provided 27% of the browse cover. In 2005 this declined to 16% of the total browse cover. Density in 2000 was estimated at 2,960 plants/acre. This only declined 5% to 2,800 plants/acre in 2005, but decadence increased from 20% to 34%. Twenty-six percent of the population was classified as dying in 2005. Utilization was classified as moderate to heavy in 1997 with many of the plants exhibiting a clubbed appearance. Some of the current years growth was protected by dead stems on the outer portions of the plants making it partially unavailable to browsing. During the 2000 reading, use was classified as heavy (>60% of stems browsed) on 74% of the population and nearly 30% of the bitterbrush were considered unavailable due to heavy browsing growth form. These bitterbrush have a prostrate growth form with an average height of only 11-14 inches. Some plants appear to be layering (vegetative reproduction) as well as reproducing from seed.

Serviceberry is visually more noticeable because of its height, averaging four to five feet in height with a crown of five feet. These plants exhibit good vigor and low decadence with moderate to heavy hedging. Serviceberry density and cover declined slightly in 2005. Some of the current years growth is protected by dead stems on the outer portions of the plants, making much of it unavailable to browsing. Snowberry is also present with an estimated density of over 1,000 plants/acre. Vigor has been good with little decadence.

Grasses and forbs are diverse and abundant. The most abundant grass is mutton bluegrass which provided 30% of the grass cover in 1997 and over 50% in 2000 and 2005. Other common grasses include: thickspike wheatgrass, a sedge, Kentucky bluegrass, and needle-and-thread grass. Some use was noted on grasses in 1997. Twenty-five species of forbs were sampled in 1997, 27 in 2000, and 29 in 2005. The most abundant forbs are low growing species, rose pussytoes and longleaf phlox.

1997 APPARENT TREND ASSESSMENT

Soil is classified as a clay loam with abundant vegetation and litter cover. Erosion potential is low due to the slight slope and well disbursed vegetation and litter cover. This site appears to receive use by elk and deer but may be too far removed from water to be utilized by livestock. Mountain big sagebrush appears to be stable at this time with many young plants in the population. Bitterbrush exhibits a mostly mature population with a clubbed appearance. Although these plants show moderate to heavy hedging, they still show good vigor with only one plant classified as dying. The large serviceberry plants dominate the landscape because of their size. They appear to be moderate to heavily hedged. The dominant grasses encountered are muttongrass and thickspike wheatgrass, which both showed recent utilization. Many of the forbs encountered are caespitose and do not provide much forage. The Desirable Components Index rating scored this site as good to excellent due to excellent browse cover, low browse decadence, good perennial grass cover, and excellent perennial forb cover.

winter range condition (DC Index) - good to excellent (89) Higher potential scale

2000 TREND ASSESSMENT

Trend for soil is fairly stable with abundant vegetation and litter cover protecting the soil. There is little bare ground on the site and no noticeable erosion. Trend for the key browse species, Utah serviceberry, mountain big sagebrush, and bitterbrush is stable. Use is heavy on most of the bitterbrush and some of the serviceberry but vigor is good, percent decadence low, and reproduction adequate. Due to the mild winters of the past couple of years, it appears that sagebrush is only being lightly utilized at the present time. Sagebrush also shows good vigor, low decadence, and excellent reproduction. Trend for the herbaceous understory is slightly down. The sum of nested frequency for perennial grasses has declined by 20% while frequency for perennial forbs has increased slightly (6%). The biggest change is the significant decline in nested frequency of thickspike wheatgrass. The DCI score remained good to excellent.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - good to excellent (90) Higher potential scale

2005 TREND ASSESSMENT

Trend for soil is slightly down. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) decreased noticeably, but still considered quite good. Relative litter cover decreased from 50% to 36% after many years of drought. The browse trend is slightly down. Sagebrush cover and density declined, which was due to rodent damage and drought. Bitterbrush cover declined and percent decadency increased, but density only slightly declined. Serviceberry cover and density slightly declined also. The herbaceous understory trend is stable. Perennial grasses increased, but perennial forbs declined. Prairie junegrass and Kentucky bluegrass increased in nested frequency. The DCI score declined to 83 which is a rating of good. This decline was due to higher decadence of preferred shrubs.

TREND ASSESSMENT

soil - slightly down (-1)

browse - slightly down (-1)

herbaceous understory - stable (0)

winter range condition (DC Index) - good (83) Higher potential scale

HERBACEOUS TRENDS --
Management unit 10R, Study no: 12

T y p e	Species	Nested Frequency			Average Cover %		
		'97	'00	'05	'97	'00	'05
G	<i>Agropyron dasystachyum</i>	_b 252	_a 76	_a 86	3.03	.50	1.51
G	<i>Bromus anomalus</i>	-	1	-	-	.00	-
G	<i>Carex</i> sp.	77	70	80	2.00	2.02	2.69
G	<i>Koeleria cristata</i>	_a 46	_a 45	_b 125	.48	.70	1.78
G	<i>Poa fendleriana</i>	_b 288	_b 295	_a 233	3.47	8.97	11.43
G	<i>Poa pratensis</i>	_{ab} 62	_a 46	_b 96	1.85	2.92	2.30
G	<i>Poa secunda</i>	_a -	_b 19	_b 20	-	.08	.28
G	<i>Stipa comata</i>	27	50	31	.79	2.86	.53
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		752	602	671	11.64	18.08	20.56
Total for Grasses		752	602	671	11.64	18.08	20.56
F	<i>Agoseris glauca</i>	_a 7	_{ab} 27	_b 38	.02	.57	.30
F	<i>Antennaria rosea</i>	126	133	104	5.01	3.18	2.31
F	<i>Androsace septentrionalis</i> (a)	_a 3	_a 5	_b 49	.01	.01	.28
F	<i>Arabis</i> sp.	-	12	6	-	.02	.01
F	<i>Arenaria fendleri</i>	_{ab} 50	_b 67	_a 30	.91	1.97	.40
F	<i>Astragalus convallarius</i>	31	41	22	.37	.55	.14
F	<i>Astragalus tenellus</i>	_b 33	_{ab} 17	_a 14	.40	.72	.58
F	<i>Aster</i> sp.	5	9	-	.04	.02	-
F	<i>Astragalus utahensis</i>	-	2	2	-	.03	.00
F	<i>Balsamorhiza sagittata</i>	_b 21	_a 7	_a 8	.21	.08	.27
F	<i>Castilleja linariaefolia</i>	-	1	1	-	.00	.00
F	<i>Calochortus nuttallii</i>	2	-	-	.00	-	-
F	<i>Comandra pallida</i>	23	30	14	.13	.16	.05
F	<i>Collinsia parviflora</i> (a)	_b 39	_a -	_c 143	.14	-	1.75
F	<i>Crepis acuminata</i>	63	78	73	.42	.58	.93
F	<i>Delphinium nuttallianum</i>	1	-	3	.00	-	.01
F	<i>Eriogonum alatum</i>	-	2	11	-	.00	.05
F	<i>Erigeron eatonii</i>	_b 62	_a 33	_b 78	.38	.06	.60
F	<i>Erigeron pumilus</i>	_a -	_b 23	_a 3	-	.16	.03
F	<i>Eriogonum umbellatum</i>	29	43	30	.57	.92	.96
F	<i>Gayophytum ramosissimum</i> (a)	_a -	_a -	_b 28	-	-	.11
F	<i>Lesquerella</i> sp.	-	4	1	-	.00	.00
F	<i>Linum lewisii</i>	3	8	-	.03	.06	-
F	<i>Lupinus argenteus</i>	_{ab} 9	_b 9	_a -	.08	.20	.03

Type	Species	Nested Frequency			Average Cover %		
		'97	'00	'05	'97	'00	'05
		F	<i>Lychnis drummondii</i>	-	3	-	-
F	<i>Penstemon caespitosus</i>	_b 33	_a -	_b 36	.70	-	.82
F	<i>Pedicularis centranthera</i>	7	-	-	.04	-	-
F	<i>Penstemon watsonii</i>	_a 3	_b 45	_a -	.01	.70	-
F	<i>Phlox longifolia</i>	_a 107	_{ab} 145	_b 160	.49	.82	1.11
F	<i>Polygonum douglasii</i> (a)	_b 89	_a 5	_b 76	.18	.00	.19
F	<i>Senecio integerrimus</i>	_b 44	_a -	_b 52	.27	-	1.11
F	<i>Sphaeralcea coccinea</i>	2	-	-	.00	-	-
F	<i>Taraxacum officinale</i>	_b 50	_a 28	_a 24	.76	.13	.26
F	<i>Thlaspi</i> sp.	-	4	8	-	.01	.04
F	<i>Tragopogon dubius</i>	-	2	1	-	.00	.03
F	Unknown forb-perennial	19	-	-	.30	-	-
Total for Annual Forbs		131	10	296	0.33	0.01	2.34
Total for Perennial Forbs		730	773	719	11.20	11.01	10.11
Total for Forbs		861	783	1015	11.53	11.03	12.45

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

BROWSE TRENDS --

Management unit 10R, Study no: 12

Type	Species	Strip Frequency			Average Cover %		
		'97	'00	'05	'97	'00	'05
		B	<i>Amelanchier utahensis</i>	35	39	25	4.67
B	<i>Artemisia tridentata vaseyana</i>	92	93	94	16.44	25.25	21.46
B	<i>Chrysothamnus depressus</i>	0	1	1	-	.03	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	42	53	50	1.00	.87	.92
B	<i>Gutierrezia sarothrae</i>	0	0	2	-	-	-
B	<i>Purshia tridentata</i>	60	74	70	8.35	12.19	5.82
B	<i>Symphoricarpos oreophilus</i>	28	33	33	2.30	1.96	2.29
B	<i>Tetradymia canescens</i>	4	5	6	.15	.36	.34
Total for Browse		261	298	281	32.93	44.93	32.89

CANOPY COVER, LINE INTERCEPT --
 Management unit 10R, Study no: 12

Species	Percent Cover	
	'00	'05
Amelanchier utahensis	.40	5.43
Artemisia tridentata vaseyana	-	29.83
Chrysothamnus viscidiflorus viscidiflorus	-	1.63
Purshia tridentata	-	5.50
Symphoricarpos oreophilus	-	1.86
Tetradymia canescens	-	.03

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 10R, Study no: 12

Species	Average leader growth (in)
	'05
Amelanchier utahensis	2.2
Artemisia tridentata vaseyana	2.2
Purshia tridentata	1.6

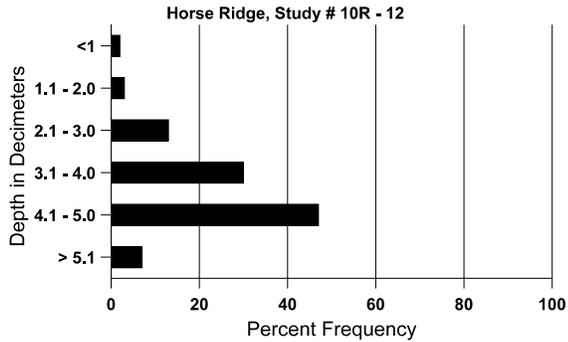
BASIC COVER --
 Management unit 10R, Study no: 12

Cover Type	Average Cover %		
	'97	'00	'05
Vegetation	44.94	62.26	56.68
Rock	.04	.03	.04
Pavement	.95	.17	.30
Litter	66.99	75.81	41.70
Cryptogams	.59	.41	.00
Bare Ground	6.67	12.63	18.22

SOIL ANALYSIS DATA --
 Herd Unit 10R, Study no: 12, Study Name: Horse Ridge

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
19.2	59.2 (16.7)	5.9	35.3	34.2	30.5	3.54	11.1	160.0	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 10R, Study no: 12

Type	Quadrat Frequency		
	'97	'00	'05
Rabbit	1	12	18
Elk	28	22	32
Deer	19	16	13
Cattle	-	-	-

Days use per acre (ha)	
'00	'05
-	-
45 (111)	60 (147)
47 (116)	40 (98)
3 (8)	2 (5)

BROWSE CHARACTERISTICS --

Management unit 10R, Study no: 12

		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)
Amelanchier utahensis												
97	1060	-	520	500	40	-	51	21	4	-	0	51/59
00	1280	20	820	400	60	20	14	20	5	2	3	60/55
05	940	20	540	280	120	-	30	26	13	4	6	63/52
Artemisia tridentata vaseyana												
97	4800	620	1120	3600	80	860	38	3	2	1	1	27/36
00	7380	980	1300	4840	1240	660	9	.81	17	.81	2	27/30
05	6260	180	440	4520	1300	680	26	6	21	12	13	26/33
Chrysothamnus depressus												
97	0	-	-	-	-	-	0	0	0	-	0	-/-
00	40	-	-	40	-	-	0	0	0	-	0	2/4
05	40	-	-	20	20	20	0	100	50	50	50	4/8

		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>Chrysothamnus viscidiflorus viscidiflorus</i>												
97	1640	-	80	1560	-	20	0	0	0	-	0	11/12
00	3280	-	820	2380	80	-	.60	.60	2	1	1	10/9
05	2460	100	580	1760	120	-	2	0	5	2	2	9/10
<i>Gutierrezia sarothrae</i>												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	-	0	0	-	-	0	-/-
05	40	-	-	40	-	-	0	0	-	-	0	4/3
<i>Purshia tridentata</i>												
97	2300	20	260	1940	100	-	43	43	4	.86	.86	14/27
00	2960	20	200	2160	600	-	11	74	20	5	5	14/28
05	2800	-	100	1740	960	80	11	68	34	26	26	11/26
<i>Symphoricarpos oreophilus</i>												
97	1100	20	320	780	-	-	15	11	0	-	0	13/20
00	1240	-	680	540	20	-	0	5	2	-	0	14/19
05	1300	-	220	1040	40	-	9	0	3	2	2	11/15
<i>Tetradymia canescens</i>												
97	80	-	-	80	-	-	0	25	0	-	0	13/14
00	120	-	-	-	120	-	0	17	100	-	0	16/14
05	140	-	60	80	-	-	14	14	0	-	0	7/11