

Trend Study 10R-33-05

Study site name: PR Spring Livestock Exclosure .

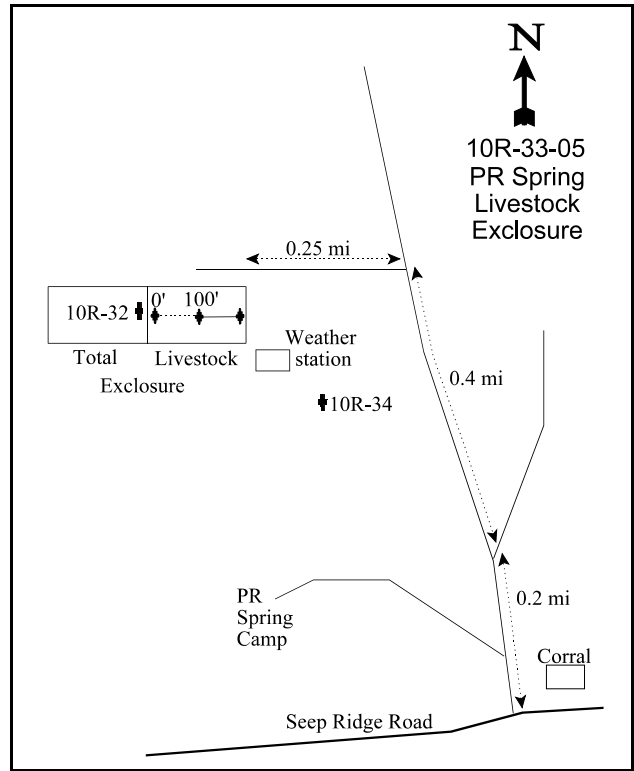
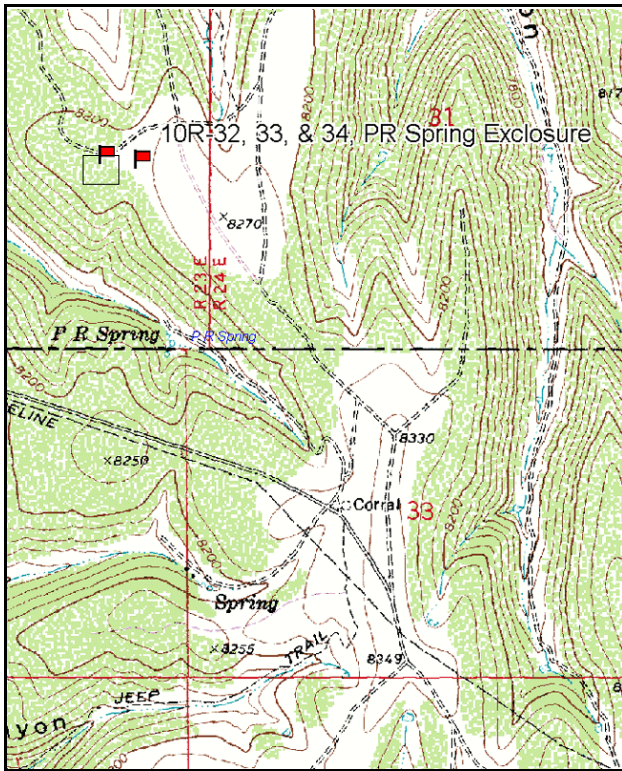
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 80 degrees magnetic.

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

LOCATION DESCRIPTION

On the Seep Ridge Road go to the PR Spring turnoff. Travel 0.2 miles staying right (do not go down road to PR Spring and campground). Continue left 0.4 miles. Turn left once again and travel approximately 0.25 miles to a weather station then the exclosure. The 0-foot stake in the livestock exclosure is located near the fence separating the total and livestock exclosures. The 0-foot stake is marked by browse tag number 423.



Map Name: P R Spring

Diagrammatic Sketch

Township 15S, Range 23E, Section 36

GPS: NAD 27, UTM 12S 4369912 N 647434 E

## DISCUSSION

### PR Spring Livestock Exclosure - Study No. 10R-33

This transect samples the livestock exclosure at PR Spring which is accessible to wildlife, but excludes livestock. The sampling baseline lies just east of the total exclosure baseline. Physical characteristics are the same as those reported for the total exclosure transect. The sampling baseline within the livestock exclosure is also only 200 feet in length. One observation worth noting is that the browse component within the livestock exclosure is not as thick compared to the total exclosure. Use inside the livestock exclosure prior to exclosure construction was light to moderate by wildlife and light by livestock. Estimated Pellet group transect data from 2002 was 19 elk days use/acre (46 edu/ha), 48 deer days use/acre (117 ddu/ha), and 14 cow days use/acre (34 cdu/ha). As with the total exclosure, cattle use inside the livestock portion of the exclosure was prior to the construction of the exclosure. In 2005, pellet group data was estimated at 21 elk, 63 deer, and 14 cow days use/acre (53 edu/ha, 155 ddu/ha, and 34 cdu/ha) in the livestock exclosure. Apparently cows had trespassed into the exclosure, but it is possible that pats were from prior to construction of the exclosure.

Soils are clay loam in texture and neutral in reactivity (pH of 6.7). Effective rooting depth along this transect was estimated at just under 12 inches in 2002. Penetrometer readings also reveal that the upper 8-12 inches of the profile are very rocky. Vegetation and litter cover are abundant and adequate to keep erosion at a minimal level. The erosion condition classification was determined as stable in 2002 and 2005.

Although diverse and abundant, the browse component in the livestock exclosure is not as dense as that in the nearby total exclosure. Line-intercept canopy cover for browse was estimated at just over 45% in 2002 and 2005. Serviceberry, mountain big sagebrush, and true mountain mahogany are the key browse species. Together they provide about two thirds of browse cover. Serviceberry had an estimated density of 1,760 plants/acre in 2002 that increased to 1,920 plants/acre in 2005. Over one-half of the population were classified as young at each reading. Vigor was good and decadence was low. Serviceberry leader growth was 2.0 inches in 2002 and 2.6 inches in 2005. Mountain big sagebrush density was estimated at 3,240 plants/acre and decreased to 2,740 plants/acre in 2005. Most of the population consisted of mature and decadent plants. In 2002, the young age class was moderately abundant (460 young plants/acre) and decreased slightly in 2005 (280 plants/acre). Line intercept cover estimates were about 17% for sagebrush in 2002 and 2005. Mahogany density was estimated at 1,240 plants/acre in 2002 and increased slightly to 1,340 plants/acre in 2005. Line intercept cover was about 5% in both 2002 and 2005. Decadence was low in 2002, but increased to 24% from only 3%. Utilization was heavy on two-thirds of the plants in 2005. Average annual leader growth was 2.2 inches in 2002 and 1.8 inches in 2005.

As with the total exclosure, snowberry has the highest density of all the browse species within the livestock exclosure at 4,640 plants/acre in 2002 and 6,060 plants/acre in 2005. Use was light, vigor normal, and decadence low. Bitterbrush, while highly preferred, occurs in low density at about 300 plants/acre in both 2002 and 2005. Bitterbrush shows heavy use, normal vigor, and decadence was low in 2002 (13%), but increased to 40% in 2005. Other browse sampled within the livestock exclosure include dwarf rabbitbrush, low rabbitbrush, broom snakeweed, Gambel oak, and grey horsebrush.

The understory is slightly more abundant within the livestock exclosure than it was in the total exclosure. Grasses provided about a quarter of the total vegetation cover on the site, with forbs providing an additional 16-18%. *Carex* sp. was the most abundant species, and provided nearly 9% average cover in 2002 and 6% in 2005. This was 63% of the total grass cover in 2002 and 36% in 2005. Kentucky bluegrass and thickspike wheatgrass were also moderately abundant. Kentucky bluegrass increased from 3% to 7% cover in 2005.

The forb component has good diversity and composition. Two species, weedy milkvetch and mat penstemon, are the dominant species as together they accounted for 74% of the total forb cover in 2002 and 69% in 2005.

Desirable forbs include pale agoseris, Utah milkvetch, yellow Indian paintbrush, tapertip hawksbeard, redroot eriogonum, Lewis flax, lobeleaf groundsel, and globemallow.

2002 APPARENT TREND ASSESSMENT

Soils are in good condition due to good vegetation and litter cover and the nearly level terrain. Bare ground is moderately high at 20%, but with a dry spring and summer, this is not excessive. The browse component appears healthy overall. Preferred species provide the bulk of the total cover and have good recruitment from young plants, low decadence, and generally good vigor. Use on the key species is moderate to heavy, except on mountain big sagebrush, which shows mostly light use. Less preferred increasers such as broom snakeweed and stickyleaf low rabbitbrush are only a minor component and should remain so. The herbaceous understory has fair diversity, but good composition within the livestock enclosure. Although a handful of species are dominant, many desirable species are present and should increase with better precipitation in the future. Trend for both the browse and the herbaceous understory components appear stable. The DCI score is good to excellent due to excellent browse and perennial grass cover.

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

2005 TREND ASSESSMENT

The trend for soil is stable. Bare ground remained at about the same level as 2002. An erosion condition class assessment rated erosion as stable. The browse trend is stable for the entire site. Different species have different trends. Serviceberry density increased 8%, while cover declined from 9% to 8%. Mountain big sagebrush density declined 15% , while line intercept cover remained stable at 17%. True mountain mahogany density increased 7%, decadence increased to 24%, and cover remained stable at 5%. Snowberry density and cover also increased. The herbaceous understory trend is stable. Sum of nested frequency for grasses and forbs combined was unchanged. Grasses increased slightly, while forbs decreased slightly. The DCI score remained good to excellent.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - stable (0)

winter range condition (DC Index) - good to excellent (88) Higher potential scale

HERBACEOUS TRENDS --

Management unit 10R, Study no: 33

Type	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
G	Agropyron dasystachyum	102	124	1.14	2.24
G	Agropyron spicatum	<sub>a</sub> 1	<sub>b</sub> 41	.00	.69
G	Carex sp.	<sub>b</sub> 187	<sub>a</sub> 139	8.90	6.26
G	Koeleria cristata	<sub>a</sub> -	<sub>b</sub> 8	-	.12
G	Poa fendleriana	24	31	.57	.62
G	Poa pratensis	136	185	3.43	7.22
G	Poa secunda	-	9	-	.18

Type	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
G	<i>Sitanion hystrix</i>	5	1	.03	.03
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		455	538	14.08	17.38
Total for Grasses		455	538	14.08	17.38
F	<i>Agoseris glauca</i>	7	-	.02	-
F	<i>Antennaria rosea</i>	<sub>a</sub> 12	<sub>b</sub> 28	.11	.37
F	<i>Androsace septentrionalis</i> (a)	<sub>a</sub> -	<sub>b</sub> 19	-	.07
F	<i>Astragalus miser</i>	<sub>b</sub> 146	<sub>a</sub> 135	5.00	5.12
F	<i>Astragalus utahensis</i>	5	6	.04	.09
F	<i>Castilleja flava</i>	25	12	.35	.14
F	<i>Cirsium</i> sp.	8	4	.02	.07
F	<i>Collinsia parviflora</i> (a)	<sub>a</sub> -	<sub>b</sub> 9	-	.02
F	<i>Crepis acuminata</i>	5	12	.01	.07
F	<i>Erigeron eatonii</i>	130	104	.83	1.08
F	<i>Eriogonum racemosum</i>	22	15	.20	.11
F	<i>Eriogonum umbellatum</i>	14	12	.14	.10
F	<i>Lepidium</i> sp. (a)	5	8	.02	.04
F	<i>Linum lewisii</i>	9	16	.02	.14
F	<i>Lupinus argenteus</i>	2	2	.15	.00
F	<i>Machaeranthera canescens</i>	13	6	.11	.05
F	<i>Penstemon caespitosus</i>	<sub>b</sub> 217	<sub>a</sub> 166	1.85	3.08
F	<i>Phlox longifolia</i>	90	87	.32	.55
F	<i>Polygonum douglasii</i> (a)	<sub>a</sub> 5	<sub>b</sub> 60	.01	.17
F	<i>Potentilla gracilis</i>	1	-	.00	.00
F	<i>Senecio integerrimus</i>	-	1	-	.18
F	<i>Senecio multilobatus</i>	3	-	.00	.00
F	<i>Sphaeralcea coccinea</i>	11	7	.06	.18
F	<i>Taraxacum officinale</i>	<sub>a</sub> 4	<sub>b</sub> 25	.02	.31
F	<i>Tragopogon dubius</i>	-	2	-	.00
Total for Annual Forbs		10	96	0.02	0.31
Total for Perennial Forbs		724	640	9.31	11.69
Total for Forbs		734	736	9.34	12.00

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

BROWSE TRENDS --

Management unit 10R, Study no: 33

Type	Species	Strip Frequency		Average Cover %	
		'02	'05	'02	'05
B	Amelanchier utahensis	53	51	5.44	4.23
B	Artemisia tridentata vaseyana	79	72	15.19	13.78
B	Cercocarpus montanus	31	36	3.41	3.48
B	Chrysothamnus depressus	4	3	.04	.03
B	Chrysothamnus viscidiflorus viscidiflorus	48	39	1.00	1.26
B	Gutierrezia sarothrae	4	7	.03	.33
B	Mahonia repens	1	2	-	.03
B	Purshia tridentata	14	11	.48	.86
B	Quercus gambelii	4	3	.01	.03
B	Symphoricarpos oreophilus	80	82	9.72	11.39
B	Tetradymia canescens	17	14	.62	.36
Total for Browse		335	320	35.95	35.81

CANOPY COVER, LINE INTERCEPT --

Management unit 10R, Study no: 33

Species	Percent Cover	
	'02	'05
Amelanchier utahensis	9.10	8.08
Artemisia tridentata vaseyana	17.66	17.48
Cercocarpus montanus	5.05	5.56
Chrysothamnus depressus	-	.06
Chrysothamnus viscidiflorus viscidiflorus	1.14	1.88
Gutierrezia sarothrae	.03	.10
Mahonia repens	-	.18
Purshia tridentata	1.28	.53
Quercus gambelii	.15	.15
Symphoricarpos oreophilus	10.63	13.96
Tetradymia canescens	.16	.01

KEY BROWSE ANNUAL LEADER GROWTH --  
Management unit 10R, Study no: 33

Species	Average leader growth (in)	
	'02	'05
Amelanchier utahensis	2.0	2.6
Artemisia tridentata vaseyana	2.2	2.1
Cercocarpus montanus	1.9	1.8

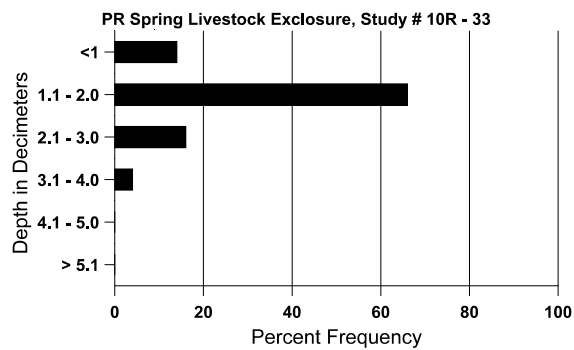
BASIC COVER --  
Management unit 10R, Study no: 33

Cover Type	Average Cover %	
	'02	'05
Vegetation	52.09	55.32
Rock	1.24	1.43
Pavement	6.34	6.40
Litter	46.46	38.85
Cryptogams	.03	.18
Bare Ground	20.18	20.83

SOIL ANALYSIS DATA --  
Herd Unit 10R, Study no: 33, PR Spring Livestock Enclosure

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	ppm P	ppm K	dS/m
11.7	-	6.8	35.3	32.7	32.0	3.6	14.9	291.2	0.8

### Stoniness Index



PELLET GROUP DATA --  
 Management unit 10R, Study no: 33

Type	Quadrat Frequency		Days use per acre (ha)	
	'02	'05	'02	'05
Rabbit	11	37	-	-
Elk	7	14	19 (46)	21 (53)
Deer	14	22	48 (117)	63 (155)
Cattle	3	1	14 (34)	14 (34)

BROWSE CHARACTERISTICS --  
 Management unit 10R, Study no: 33

		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)
<b>Amelanchier utahensis</b>												
02	<b>1760</b>	100	920	740	100	20	22	25	6	2	2	45/43
05	<b>1920</b>	400	1160	620	140	-	15	23	7	5	6	45/39
<b>Artemisia tridentata vaseyana</b>												
02	<b>3240</b>	120	460	1620	1160	400	6	10	36	11	11	29/37
05	<b>2740</b>	100	280	1600	860	520	20	1	31	17	17	29/37
<b>Cercocarpus montanus</b>												
02	<b>1240</b>	80	420	780	40	40	15	50	3	-	0	50/36
05	<b>1340</b>	60	260	760	320	20	22	66	24	22	22	46/31
<b>Chrysothamnus depressus</b>												
02	<b>120</b>	-	-	120	-	-	33	0	-	-	0	3/8
05	<b>80</b>	-	-	80	-	-	75	0	-	-	0	3/6
<b>Chrysothamnus viscidiflorus viscidiflorus</b>												
02	<b>2160</b>	-	260	1760	140	-	.92	0	6	2	2	11/11
05	<b>1900</b>	-	440	1460	-	-	3	0	0	-	0	11/13
<b>Gutierrezia sarothrae</b>												
02	<b>240</b>	-	40	160	40	-	0	0	17	-	0	4/6
05	<b>340</b>	-	140	200	-	-	0	6	0	-	0	5/8
<b>Mahonia repens</b>												
02	<b>120</b>	-	-	120	-	-	0	0	-	-	0	-/-
05	<b>60</b>	-	20	40	-	-	0	33	-	-	0	3/7
<b>Purshia tridentata</b>												
02	<b>320</b>	-	40	240	40	-	6	81	13	-	0	12/25
05	<b>300</b>	-	-	180	120	-	0	73	40	7	7	15/22

		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>Quercus gambelii</i>													
02	<b>100</b>	-	80	20	-	-	0	0	-	-	0	17/7	
05	<b>100</b>	-	100	-	-	-	0	0	-	-	0	5/4	
<i>Symphoricarpos oreophilus</i>													
02	<b>4640</b>	-	1140	3400	100	20	3	0	2	1	1	15/25	
05	<b>6060</b>	100	1040	4980	40	-	9	.33	1	-	0	14/19	
<i>Tetradymia canescens</i>													
02	<b>720</b>	-	120	540	60	-	6	11	8	-	0	4/5	
05	<b>740</b>	-	160	580	-	-	43	35	0	-	0	5/6	

## PR Spring Exclosure Complex - Summary

Because the exclosure complex was built only the year prior to the establishment of these transects, treatment effects could not be determined from the data in 2002 and no effects were noticeable in 2005. However, the data does provide a baseline for the vegetation community sampled by these studies. Future readings will allow monitoring of changes and comparisons between the treatments to be evaluated.

It is important to point out that the exclosure complex was not built in a totally homogeneous area. The total and livestock exclosures were placed in an area where several browse species are moderately abundant. This includes large, tree-like serviceberry plants that provide an abundance of overhead canopy cover. The transect that monitors the community outside of the exclosures is much more open where mountain big sagebrush is the dominant species. Due to the dimensions of the exclosure, the transects established inside the total and livestock exclosures are only 200 feet in length, while the transect outside is 500 feet long. Some of the difference in vegetation characteristics between these studies arises from differing transect lengths as well as the heterogeneity of the vegetation community.

Basic ground cover characteristics are similar between all of the transects. Vegetation and litter cover are abundant, especially the browse component. Relative bare ground ranges from 16% inside the livestock exclosure to only 3% within the total exclosure. Rock and pavement are low on all the treatments.

The browse component dominates the vegetation community on all transects. Inside the total exclosure, browse accounts for 74% of the total vegetation cover. Shrubs provide about 60% of the vegetation cover both inside the livestock exclosure and outside the exclosure complex. Herbaceous species, especially forbs, are somewhat limited on these studies. Grasses provide about 28%, 24%, and 11% of the vegetation cover in the total exclosure, livestock exclosure, and outside the exclosure complex respectively. Forbs provide 18% or less of the total cover on all sites.