

Trend Study 10R-32-05

Study site name: PR Spring Total Exclosure .

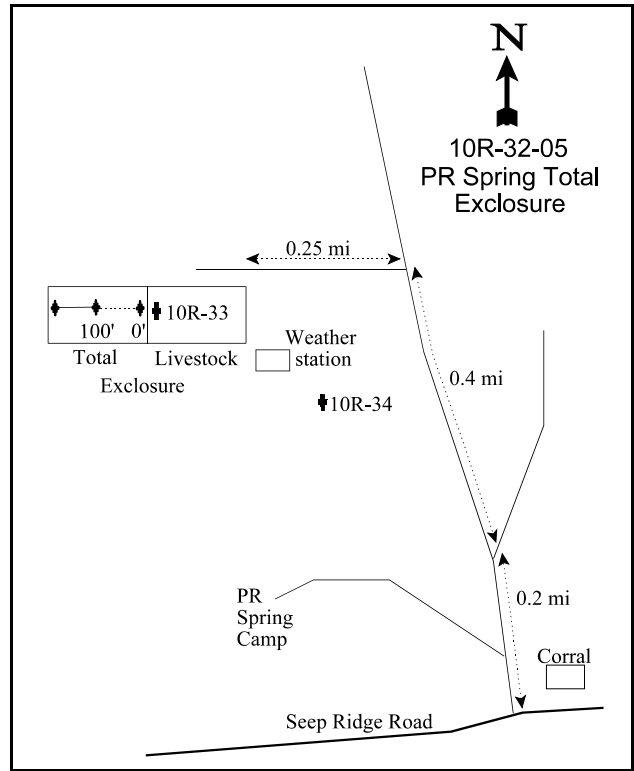
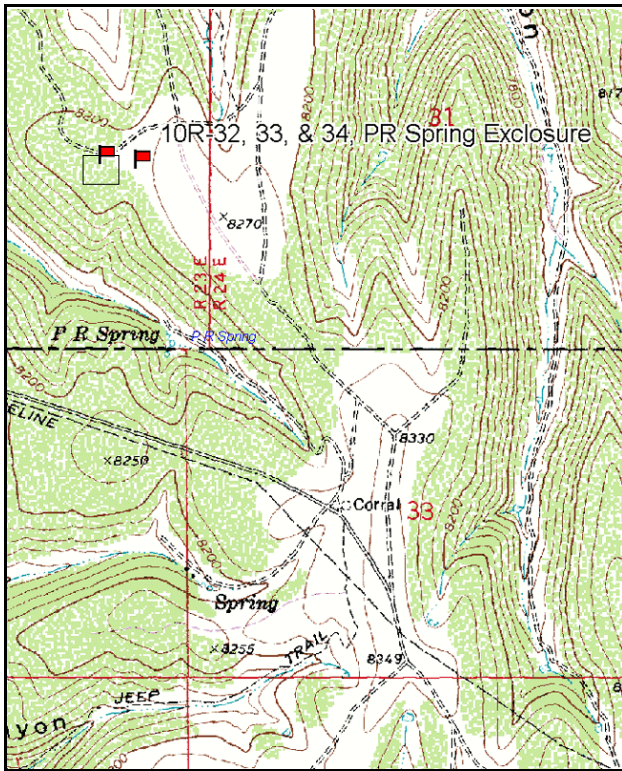
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 260 degrees magnetic.

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

LOCATION DESCRIPTION

On Seep Ridge Road go to the PR Spring turnout. 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 total exclosure is located near the fence separating the total and livestock exclosures. The 0-foot stake is five fence posts from the north fence. The first baseline is 100 feet long and the second baseline is 86 feet long. The 0-foot stake is marked by browse tag number 435.



Map Name: P R Spring

Diagrammatic Sketch

Township 15S, Range 23E, Section 36

GPS: NAD 27, UTM 12S 4369908 N 647433 E

DISCUSSION

PR Spring Total Exclosure - Study No. 10R-32

This study was established in 2002 to gather baseline data for a 3-way exclosure that was built in 2001 by the BLM near PR Spring on the North Book Cliffs. This transect samples a mountain brush community within the total exclosure which is now inaccessible to big game or livestock. The study lies on a nearly level ridge at an elevation of 8,200 feet. Due to the dimensions of the exclosure, the sampling baseline is only 200 feet in length. The area represents summer range for wildlife, and is also grazed by livestock. In 2002, a pellet group transect was read to estimate use before the exclosure was constructed. Elk, deer, and cattle use was estimated at 23, 39, and 7 days use/acre, respectively (56 edu/ha, 96 ddu/ha, and 18 cdu/ha).

Soils on the site are clay loam in texture and neutral in reactivity (pH of 6.7). Percent organic matter is moderate at 3.6%. Soils are quite shallow with an effective rooting depth of less than 10 inches. Penetrometer readings taken in 2002 also show that the upper 8 inches of the profile were very rocky. Erosion is minimal due to the abundance of vegetation and litter cover and lack of significant slope. The erosion condition class was determined as stable in 2002 and 2005.

The browse component dominates the vegetation community as it provides more than 70% of the total vegetation cover on the site. Total line-intercept canopy cover of the browse component was estimated at 61% in 2002 and 56% in 2005. Several preferred species are present including serviceberry, mountain big sagebrush, true mountain mahogany, and bitterbrush. Prior to the exclosure, use on serviceberry and mahogany was moderate to heavy, while use on mountain big sagebrush was light. Snowberry, although less preferred, provides the highest average cover and has the highest density of any single species in the total exclosure. Snowberry density was estimated at 5,320 plant/acre in 2002 and 7,780 plants/acre in 2005. Line intercept cover was 20% in 2002 and 19% in 2005. Serviceberry density declined from 1,800 plants/acre to 1,300 plants/acre in 2005. A large number of the population was made up of young plants. Decadence increased from 9% to 18% in 2005, with 12% classified as dying. Serviceberry line intercept cover declined from 13% in 2002 to 11% in 2005. Annual leader growth was 2.1 inches in 2002 and 3.3 inches in 2005.

Mountain big sagebrush density declined 11% from 3,560 plants/acre to 3,180 plants/acre in 2005. Line intercept cover also declined from 20% to 15%. Decadence increased from 15% to 27%. Young recruitment was good in 2002 at 21% of the population and 13% in 2005. Sagebrush leader growth was 2.1 inches in 2002 and 2.2 inches in 2005. True mountain mahogany density also declined 11% in 2005 from 2,920 plants/acre to 2,600 plants/acre. Decadence increased from 1% to 11%. Recruitment was excellent in 2002 and 2005 with more than a quarter of the population classified as young. Line intercept cover increased from 5% to 7%. Average leader growth for mahogany was 1.9 inches for 2002 and 2.3 inches in 2005. Less preferred browse sampled include stickyleaf low rabbitbrush, Gambel oak, and grey horsebrush.

Grasses are comprised totally of perennial species including a sedge, thickspike wheatgrass, mutton bluegrass, Kentucky bluegrass, prairie junegrass, and bluebunch wheatgrass. Most of the grasses are found underneath, or in close proximity to, shrubs and it was noted that interspaces were relatively bare in 2002. The forb component is diverse, but had only fair production. Two species, weedy milkvetch and mat penstemon, provided the majority of the forb cover. Composition is fairly good with desirable species such as pale agoseris, yellow Indian paintbrush, redroot eriogonum, sulfur eriogonum, and Lewis flax present. The understory could benefit from a reduction in shrubs.

2002 APPARENT TREND ASSESSMENT

Soils appear to be stable with an abundance of protective ground cover from vegetation and litter. Erosion is very minimal at the present time and will likely remain so. The browse component is diverse and abundant

and appears to be stable. Preferred species are plentiful and have very good reproduction. Line-intercept canopy cover for browse is estimated at over 61% which is very high. The herbaceous understory has fair diversity and a fairly good composition, but could be much more abundant with a reduction in the overstory canopy of shrubs. The DCI score is good to excellent with abundant preferred browse and a healthy understory.

winter range condition (DC Index) - good to excellent (91) Higher potential scale

2005 TREND ASSESSMENT

The soil trend stable. Bare ground decreased from 9% to only 3%, while the ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) improved. The browse trend is slightly down. Density declined slightly for serviceberry, mountain big sagebrush, true mountain mahogany, and bitterbrush. Percent decadence increased for each species, but not to extremely high levels. Drought conditions are likely the reason for the increased decadence. The herbaceous understory trend is stable. The nested frequency and percent cover of perennial grasses and forbs has changed very little since 2002. Sedge decreased significantly, while Kentucky blue grass increased even in the absence of grazing. The DCI score remained good to excellent despite a slight decrease in the cover of preferred browse.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - stable (0)

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

HERBACEOUS TRENDS --

Management unit 10R, Study no: 32

Type	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
G	Agropyron dasystachyum	193	189	3.82	2.81
G	Agropyron spicatum	5	4	.06	.03
G	Carex sp.	_b 148	_a 92	5.37	3.12
G	Koeleria cristata	6	-	.18	-
G	Poa fendleriana	74	113	2.85	4.34
G	Poa pratensis	_a 16	_b 68	.25	2.83
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		442	466	12.55	13.14
Total for Grasses		442	466	12.55	13.14
F	Agoseris glauca	4	-	.01	-
F	Antennaria rosea	4	3	.01	.03
F	Androsace septentrionalis (a)	_a -	_b 12	-	.07
F	Arenaria sp.	5	11	.03	.05
F	Astragalus miser	91	77	2.77	3.04
F	Aster sp.	-	1	-	.00

Type	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
F	<i>Astragalus utahensis</i>	6	1	.15	.00
F	<i>Balsamorhiza sagittata</i>	1	-	.00	-
F	<i>Castilleja flava</i>	31	16	.49	.11
F	<i>Cirsium</i> sp.	19	14	.15	.70
F	<i>Collinsia parviflora</i> (a)	2	9	.00	.04
F	<i>Crepis acuminata</i>	5	-	.03	.00
F	<i>Delphinium nuttallianum</i>	-	3	-	.03
F	<i>Erigeron eatonii</i>	75	80	.54	.99
F	<i>Eriogonum racemosum</i>	_b 18	_a 4	.13	.03
F	<i>Eriogonum umbellatum</i>	20	14	.37	.68
F	<i>Ipomopsis aggregata</i>	4	2	.03	.00
F	<i>Lepidium</i> sp. (a)	3	11	.01	.03
F	<i>Linum lewisii</i>	11	9	.08	.20
F	<i>Machaeranthera canescens</i>	4	4	.03	.03
F	<i>Penstemon caespitosus</i>	129	104	1.56	1.81
F	<i>Phlox longifolia</i>	7	18	.02	.11
F	<i>Polygonum douglasii</i> (a)	_a -	_b 54	-	.16
F	<i>Senecio integerrimus</i>	-	2	-	.00
F	<i>Taraxacum officinale</i>	_a 14	_b 24	.03	.26
F	<i>Tragopogon dubius</i>	4	1	.01	.00
Total for Annual Forbs		5	86	0.01	0.31
Total for Perennial Forbs		452	388	6.51	8.17
Total for Forbs		457	474	6.52	8.48

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

BROWSE TRENDS --

Management unit 10R, Study no: 32

Type	Species	Strip Frequency		Average Cover %	
		'02	'05	'02	'05
B	Amelanchier utahensis	55	47	11.43	10.35
B	Artemisia tridentata vaseyana	77	77	14.28	12.20
B	Cercocarpus montanus	66	64	7.50	6.93
B	Chrysothamnus viscidiflorus viscidiflorus	60	52	3.65	3.75
B	Gutierrezia sarothrae	0	1	-	-
B	Purshia tridentata	11	7	.33	.06
B	Quercus gambelii	20	18	.95	.39
B	Symphoricarpos oreophilus	93	97	17.60	15.85
B	Tetradymia canescens	3	2	.04	.00
Total for Browse		385	365	55.81	49.56

CANOPY COVER, LINE INTERCEPT --

Management unit 10R, Study no: 32

Species	Percent Cover	
	'02	'05
Amelanchier utahensis	13.61	11.44
Artemisia tridentata vaseyana	20.08	15.36
Cercocarpus montanus	5.36	7.15
Chrysothamnus viscidiflorus viscidiflorus	.96	2.54
Gutierrezia sarothrae	.88	-
Purshia tridentata	.20	.06
Quercus gambelii	.21	.61
Symphoricarpos oreophilus	20.31	19.25

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10R, Study no: 32

Species	Average leader growth (in)	
	'02	'05
Amelanchier utahensis	3.1	3.3
Artemisia tridentata vaseyana	2.1	2.2
Cercocarpus montanus	1.9	2.3

BASIC COVER --

Management unit 10R, Study no: 32

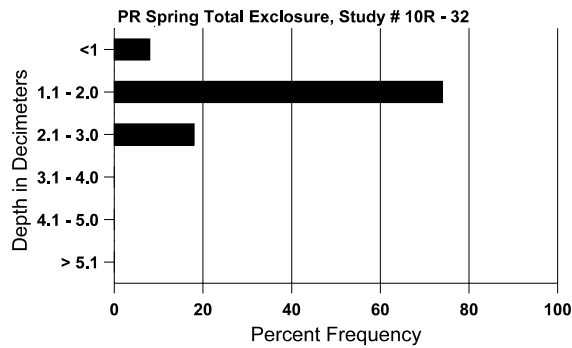
Cover Type	Average Cover %	
	'02	'05
Vegetation	58.40	59.05
Rock	.23	.04
Pavement	7.22	8.35
Litter	58.92	50.58
Cryptogams	.25	.10
Bare Ground	9.25	3.23

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 32, PR Spring Total Exclosure

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
9.7	-	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: 32

Type	Quadrat Frequency		Days use per acre (ha)	
	'02	'05	'02	'05
Rabbit	12	42	-	-
Elk	9	-	23 (56)	-
Deer	15	3	39 (96)	-
Cattle	1	1	7 (18)	-

BROWSE CHARACTERISTICS --
Management unit 10R, Study no: 32

		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												
02	1800	20	760	880	160	20	16	27	9	4	4	52/51
05	1300	20	500	560	240	20	0	0	18	12	14	46/50
Artemisia tridentata vaseyana												
02	3560	100	760	2280	520	340	10	4	15	4	4	30/38
05	3180	320	400	1920	860	580	0	0	27	19	25	23/31
Cercocarpus montanus												
02	2920	80	760	2120	40	60	14	52	1	.68	.68	43/35
05	2600	220	780	1540	280	60	0	0	11	6	12	46/37
Chrysothamnus viscidiflorus viscidiflorus												
02	2980	40	260	2680	40	-	0	0	1	-	0	13/14
05	2680	-	200	2440	40	-	4	.74	1	.74	.74	10/13
Gutierrezia sarothrae												
02	0	-	-	-	-	-	0	0	-	-	0	-/-
05	20	-	-	20	-	-	0	0	-	-	0	-/-
Mahonia repens												
02	0	-	-	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	4/7
Purshia tridentata												
02	260	-	-	240	20	-	31	46	8	-	0	12/18
05	160	-	20	140	-	-	0	0	0	-	0	12/18
Quercus gambelii												
02	560	20	280	280	-	-	4	0	-	-	0	-/-
05	920	40	860	60	-	-	0	0	-	-	0	12/9
Symphoricarpos oreophilus												
02	5320	140	980	4340	-	-	0	0	0	-	0	17/31
05	7780	-	1580	6180	20	40	0	0	0	-	0	15/21
Tetradymia canescens												
02	100	-	40	60	-	-	0	0	-	-	0	7/8
05	80	-	-	80	-	-	0	0	-	-	0	6/7

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.