

Trend Study 10R-34-05

Study site name: P R Spring Enclosure Outside

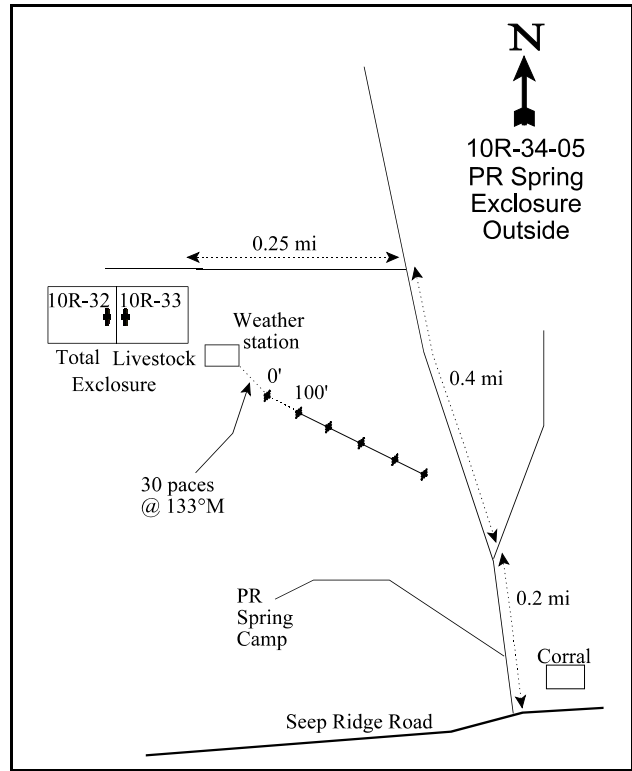
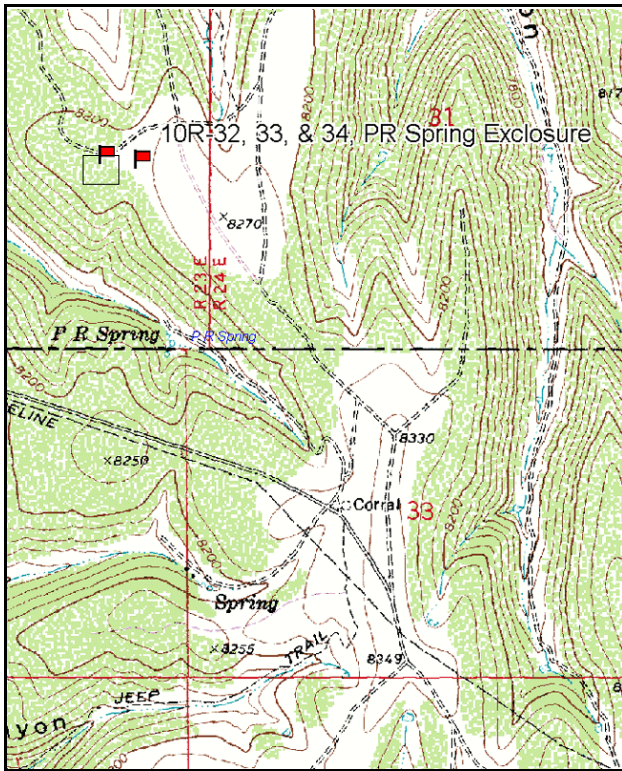
Vegetation type: Mountain Brush

Compass bearing: frequency baseline__degrees magnetic.

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

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 enclosure. From the southeast corner of the weather station the 0-foot stake is 150 feet at 133 degrees magnetic. The 0-foot stake is marked by browse tag number 424.



Map Name: P R Spring

Diagrammatic Sketch

Township 15S, Range 23E, Section 36

GPS: NAD 27, UTM 12S 4369889 N 647559 E

DISCUSSION

PR Spring Exclosure Outside - Study No. 10R-34

This transect samples the mountain brush community outside of and surrounding the exclosure complex at PR Spring. This site slopes gently (5-10%) to the southwest at an elevation of about 8,200 feet. This site is accessible by all classes of animals as it lies outside the exclosure. Because this transect lies outside of the exclosure complex, it is a full 500 feet in length. In 2002, big game use was moderate while livestock use was light. A pellet group transect estimate was 31 elk days use/acre (78 edu/ha), 73 deer days use/acre (180 ddu/ha), and 14 cow days use/acre (34 cdu/ha). In 2005, pellet group data reflected less utilization with 7 elk days use/acre (17 edu/ha), 23 deer days use/acre (56 ddu/ha), and 10 cow days use/acre (25 cdu/ha).

Soils are clay loam in texture and neutral in reactivity (pH of 6.7). Effective rooting depth along the baseline averaged nearly 13 inches. The soil profile is rocky throughout. The soil surface outside the exclosure has moderately high pedestaling around shrubs leaving the interspaces with a pitted appearance. There are many game and livestock trails transecting the site. This is where most of the bare ground is found. Vegetation and litter cover are abundant and erosion appears to be minimized, except along the trails. The erosion condition class bordered on being stable and slight in 2002 and was slight in 2005. It was noted in 2005 that slight erosion was occurring where trails had been created.

The key browse component outside the exclosure complex contains the same species as those within both the total and livestock exclosures, but dominance levels of these species differ. These difference are not due to the effects of excluding grazing, but rather placement of the study site and exclosure. Mountain big sagebrush remains abundant, but bitterbrush is more abundant outside the exclosure while serviceberry and true mountain mahogany are minor components. Mountain big sagebrush and bitterbrush provided more than 72% of the browse cover in 2002 and 2005. Sagebrush density was estimated at 4,180 plants/acre in 2002 and 3,940 plants/acre in 2005. Decadence increased from 32% to 38%, while plants classified as dying rose from 8% to 22%. Sagebrush cover has been very high with an estimated 26% in 2002 and 24% in 2005, using the line intercept method. Annual leader growth increased from 0.8 inches to 2.0 inches in 2005. Bitterbrush density remained stable from 2002 to 2005 with an estimated 1,840 plants/acre in 2002 and 1,820 plants/acre in 2005. Bitterbrush has been heavily utilized, but had good recruitment by young plants (22% in 2002), low decadence, and normal vigor. Serviceberry density was estimated at 1,220 plants/acre in both 2002 and 2005. Utilization was light to moderate, vigor good, recruitment very high, and decadence low. Annual leader growth improved from 1.1 inches to 2.5 inches in 2005. Mahogany density was estimated at 480 plants/acre in both 2002 and 2005 with high recruitment in 2002 (46%), mostly good vigor, and moderate to heavy use. Annual leader growth for these key species was low in 2002 averaging about one inch outside the exclosure. Snowberry is also abundant outside the exclosure with an estimated 3,340 plants/acre in 2002.

As with the total and livestock exclosure transects, the understory outside has fair diversity and good composition. Three perennial grasses are particularly abundant outside the exclosure, *Carex*, mutton bluegrass, and Kentucky bluegrass. Thickspike wheatgrass is also moderately abundant. The majority of the grass plants occur underneath shrub crowns, which did not appear to have been utilized at the time of sampling in June 2002 and 2005. Forbs are diverse and well distributed throughout the site. The most abundant species include mat penstemon, longleaf phlox, rose pussytoes, Eaton fleabane, silvery lupine, and weedy milkvetch. As this is summer range for wildlife, forbs are of particular importance. With the abundance of browse throughout this area, the understory could be greatly improved with a prescribed burn or other treatment to decrease the canopy and density of shrubs and favor an increase in herbaceous plants.

2002 APPARENT TREND ASSESSMENT

Soils are well protected by vegetation and litter cover on the site, except for the areas impacted by nearby game and livestock trails. Erosion is apparent on the trails transecting the site but the condition class was determined as stable to slight overall. The browse component outside the enclosure is abundant and diverse, but currently but the proportion of mountain big sagebrush is too high. Although palatable, mountain big sagebrush is less preferred in the summer than bitterbrush, serviceberry, and mahogany, and a treatment to reduce the amount of sagebrush should be considered. Prescribed burning is a good option because most of the highly preferred browse species will resprout after fire, while most of the mountain big sagebrush would be removed. Because the herbaceous component is diverse and moderately abundant, there is an adequate seed-bank and the herbaceous understory would be greatly improved following treatment. Both the browse and herbaceous components appear stable at this time. Further increases in shrub densities and canopy cover would be negative for the herbaceous understory. The DCI score is good. It is slightly lower than the other two enclosure sites due to slightly higher decadence and lower numbers of young shrubs.

winter range condition (DC Index) - good (82) Higher potential scale

2005 TREND ASSESSMENT

The soil trend is stable. Percent bare ground remained stable at about 14%. Erosion may be slight with pedestaling occurring and erosion on livestock/game trails. The browse trend is stable. Density and cover has remained stable for the key species: mountain big sagebrush, bitterbrush, serviceberry, true mountain mahogany, and snowberry. Sagebrush is more abundant than would be desired for this high elevation site. The herbaceous understory is also stable. Perennial grasses declined very slightly, while perennial forbs increased very slightly. Thickspike wheatgrass increased significantly in nested frequency, while Kentucky bluegrass decreased significantly. The DCI score remained good with a slight increase in browse decadence and decrease in browse recruitment.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory - stable (0)

winter range condition (DC Index) - good (78) Higher potential scale

HERBACEOUS TRENDS --

Management unit 10R, Study no: 34

T y p e	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
G	Agropyron cristatum	-	1	-	.00
G	Agropyron dasystachyum	_a 144	_b 205	1.09	2.59
G	Agropyron spicatum	4	7	.06	.21
G	Carex sp.	147	115	5.56	5.61
G	Festuca ovina	4	-	.00	-
G	Poa fendleriana	189	169	4.75	3.93
G	Poa pratensis	_b 178	_a 127	4.47	5.00
G	Poa secunda	10	2	.02	.03

Type	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
G	<i>Stipa columbiana</i>	3	9	.38	.07
G	<i>Stipa comata</i>	-	1	-	.03
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		679	636	16.36	17.50
Total for Grasses		679	636	16.36	17.50
F	<i>Agoseris glauca</i>	28	25	.11	.31
F	<i>Alyssum alyssoides</i> (a)	9	-	.02	-
F	<i>Antennaria rosea</i>	_a 26	_b 37	.93	1.54
F	<i>Androsace septentrionalis</i> (a)	_a 8	_b 43	.05	.17
F	<i>Arenaria</i> sp.	21	36	.25	.59
F	<i>Astragalus miser</i>	30	31	.49	.87
F	<i>Astragalus utahensis</i>	_a 13	_b 36	.06	.15
F	<i>Castilleja flava</i>	13	9	.05	.07
F	<i>Cirsium</i> sp.	2	4	.00	.06
F	<i>Collinsia parviflora</i> (a)	_a -	_b 53	-	.11
F	<i>Crepis acuminata</i>	9	12	.05	.10
F	<i>Delphinium nuttallianum</i>	_a -	_b 9	-	.02
F	<i>Eriogonum alatum</i>	-	3	-	.18
F	<i>Erigeron eatonii</i>	92	75	.65	.76
F	<i>Eriogonum umbellatum</i>	23	22	.13	.23
F	<i>Hackelia patens</i>	1	-	.03	-
F	<i>Lepidium</i> sp. (a)	_a 4	_b 12	.01	.03
F	<i>Linum lewisii</i>	1	-	.00	.00
F	<i>Lomatium</i> sp.	-	1	-	.00
F	<i>Lupinus argenteus</i>	43	52	.54	1.79
F	<i>Microsteris gracilis</i> (a)	7	4	.01	.00
F	<i>Penstemon caespitosus</i>	_b 129	_a 71	1.33	1.56
F	<i>Phlox hoodii</i>	2	-	.00	-
F	<i>Phlox longifolia</i>	129	144	.98	1.12
F	<i>Polygonum douglasii</i> (a)	_a 4	_b 73	.01	.30
F	<i>Potentilla gracilis</i>	2	-	.03	-
F	<i>Senecio integerrimus</i>	_a 6	_b 27	.03	1.07
F	<i>Sphaeralcea coccinea</i>	-	1	-	.00
F	<i>Taraxacum officinale</i>	_a 54	_b 106	.30	1.98
F	<i>Tragopogon dubius</i>	2	-	.00	-
F	Unknown forb-perennial	-	4	-	.01

T y p e	Species	Nested Frequency		Average Cover %	
		'02	'05	'02	'05
F	Viola sp.	2	1	.03	.03
F	Zigadenus paniculatus	-	4	-	.00
Total for Annual Forbs		32	185	0.10	0.62
Total for Perennial Forbs		628	710	6.05	12.53
Total for Forbs		660	895	6.16	13.16

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

BROWSE TRENDS --

Management unit 10R, Study no: 34

T y p e	Species	Strip Frequency		Average Cover %	
		'02	'05	'02	'05
B	Amelanchier utahensis	41	32	.39	.54
B	Artemisia tridentata vaseyana	91	87	22.69	21.13
B	Cercocarpus montanus	15	14	.76	.39
B	Chrysothamnus depressus	1	3	.00	.00
B	Chrysothamnus viscidiflorus viscidiflorus	35	15	.78	.67
B	Gutierrezia sarothrae	0	1	-	-
B	Purshia tridentata	63	54	2.77	2.87
B	Quercus gambelii	1	0	-	-
B	Sclerocactus sp.	0	0	-	.15
B	Symphoricarpos oreophilus	77	78	8.12	6.76
B	Tetradymia canescens	3	2	-	.01
Total for Browse		327	286	35.54	32.54

CANOPY COVER, LINE INTERCEPT --

Management unit 10R, Study no: 34

Species	Percent Cover	
	'02	'05
Amelanchier utahensis	1.08	.41
Artemisia tridentata vaseyana	26.10	24.14
Cercocarpus montanus	1.11	.91
Chrysothamnus viscidiflorus viscidiflorus	.63	.38
Purshia tridentata	5.00	3.15
Symphoricarpos oreophilus	8.53	7.65
Tetradymia canescens	.06	.05

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10R, Study no: 34

Species	Average leader growth (in)	
	'02	'05
Amelanchier utahensis	1.1	2.5
Artemisia tridentata vaseyana	0.8	2.0
Cercocarpus montanus	0.9	1.3
Purshia tridentata	-	1.4

BASIC COVER --

Management unit 10R, Study no: 34

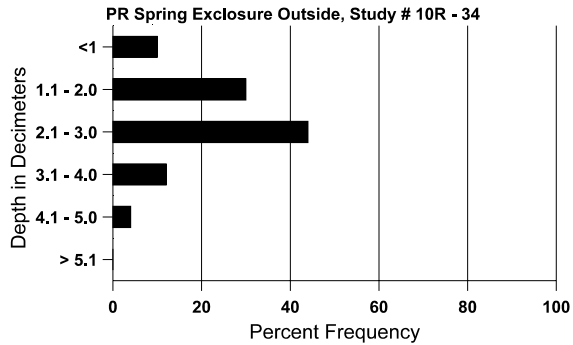
Cover Type	Average Cover %	
	'02	'05
Vegetation	52.77	53.62
Rock	.16	1.01
Pavement	2.59	3.01
Litter	53.15	47.06
Cryptogams	.03	.10
Bare Ground	13.12	14.86

SOIL ANALYSIS DATA --

Herd Unit 10R, Study no: 34, PR Spring Outside Enclosure

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
12.9	-	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: 34

Type	Quadrat Frequency		Days use per acre (ha)	
	'02	'05	'02	'05
Rabbit	12	41	-	-
Grouse	1	-	-	-
Elk	24	17	31 (78)	7 (17)
Deer	19	18	73 (180)	23 (56)
Cattle	2	4	14 (34)	10 (25)

BROWSE CHARACTERISTICS --
Management unit 10R, Study no: 34

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
02	1220	20	800	240	180	80	16	28	15	3	3	43/33
05	1220	20	540	600	80	180	11	34	7	3	3	27/21
Artemisia tridentata vaseyana												
02	4180	240	300	2560	1320	520	14	2	32	8	8	31/38
05	3940	40	260	2200	1480	560	17	3	38	22	22	30/38
Cercocarpus montanus												
02	480	20	220	220	40	-	33	38	8	8	8	49/36
05	480	-	40	320	120	-	17	71	25	17	21	45/43
Chrysothamnus depressus												
02	40	-	-	40	-	-	0	0	0	-	0	2/3
05	80	-	-	60	20	-	25	25	25	-	0	-/-

		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)
Chrysothamnus viscidiflorus viscidiflorus												
02	1300	-	140	980	180	-	5	0	14	5	5	14/17
05	580	-	40	540	-	-	3	0	0	-	0	15/18
Gutierrezia sarothrae												
02	0	-	-	-	-	-	0	0	-	-	0	-/-
05	20	-	20	-	-	-	0	0	-	-	0	-/-
Purshia tridentata												
02	1840	-	400	1320	120	-	14	70	7	1	1	14/25
05	1820	-	40	1620	160	-	7	56	9	2	2	9/19
Quercus gambelii												
02	20	-	20	-	-	-	0	0	-	-	0	76/36
05	0	-	-	-	-	-	0	0	-	-	0	-/-
Symphoricarpos oreophilus												
02	3340	-	500	2780	60	80	5	8	2	1	1	16/25
05	5200	20	1520	3620	60	-	6	.76	1	1	1	15/22
Tetradymia canescens												
02	60	-	20	40	-	-	33	0	0	-	0	8/8
05	40	-	20	-	20	-	50	0	50	50	50	4/6

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.