

PR SPRING ENCLOSURE OUTSIDE - TREND STUDY NO. 10R-34-10

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: SITLA

Elevation: 8200 ft. (2500 m)

Aspect: Southwest

Slope: 5-10%

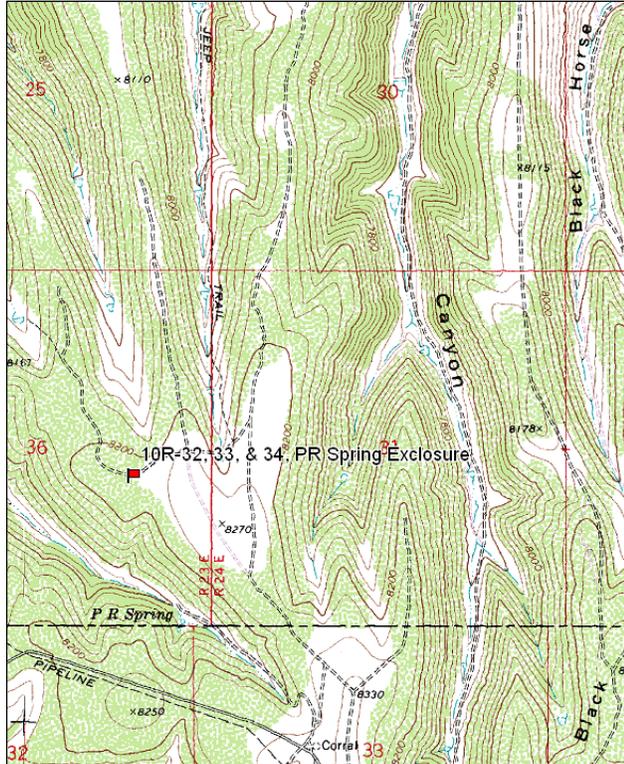
Transect bearing: 0° magnetic

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

Directions:

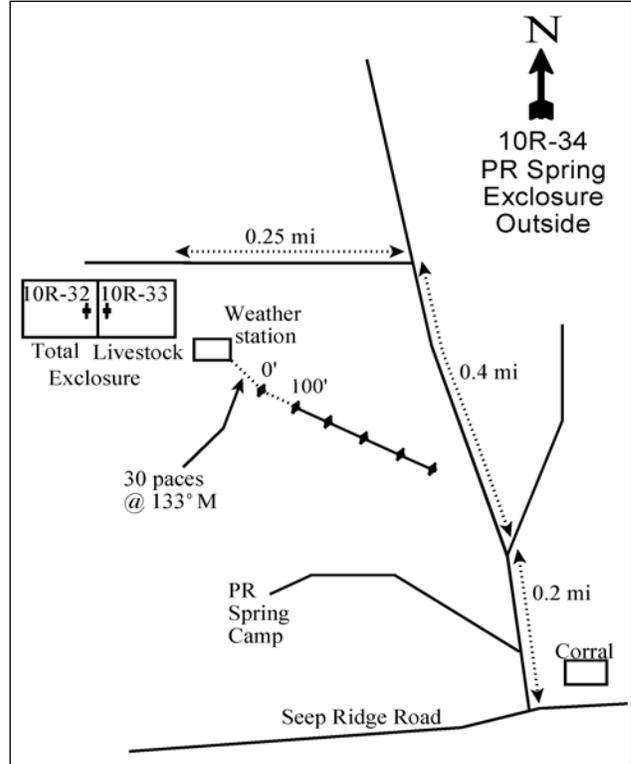
On the Seep Ridge Road go to the PR Spring turnoff. Travel 0.2 miles staying right (do not go down road to PR Spring and campground). Continue left 0.4 miles. Turn left once again and travel approximately 0.25 miles to a weather station then the enclosure. From the southeast corner of the weather station the 0-foot stake is 150 feet at 133°M and is marked by browse tag #424.

Map Name: PR Spring



Township: 15S Range: 23E Section: 36

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 647498 E 4370094 N

## PR SPRING ENCLOSURE OUTSIDE - TREND STUDY NO. 10R-34

### Site Information

Site Description: The study samples the mountain brush community outside of and surrounding the enclosure complex at PR Spring. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Sweetwater allotment. This site is accessible by all classes of animals as it lies outside the enclosure. Because this transect lies outside of the enclosure complex, it is a full 500 feet in length. Pellet group transect data has estimated elk use to be moderate in 2002 and 2010, with lighter use in 2005. Estimated deer use was heavy in 2002, but was more moderate in 2005 and 2010. A fawn was found on the site in 2010. Estimated cattle use has been light since 2002 (Table - Pellet Group Data).

Browse: The key browse component outside the enclosure complex contains the same species as those within both the total and livestock enclosures, but dominance levels of these species differ. These differences are not due to the effects of excluding grazing, but rather placement of the study site and enclosure. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) remains abundant, but bitterbrush (*Purshia tridentata*) is more abundant outside the enclosure while serviceberry (*Amelanchier utahensis*) and true mountain mahogany (*Cercocarpus montanus*) are minor components. It was noted in 2010 that many young serviceberry plants were growing in the shelter of mature mountain big sagebrush. Utilization was heavy on serviceberry, true mountain mahogany and bitterbrush, but was mostly light on mountain big sagebrush. Snowberry (*Symphoricarpos oreophilus*) is also abundant outside the enclosure (Table - Browse Characteristics).

Herbaceous Understory: Grasses are diverse and abundant with three perennial grasses particularly abundant outside the enclosure, sedge (*Carex* sp.), mutton bluegrass (*Poa fendleriana*) and Kentucky bluegrass (*P. pratensis*). Thickspike wheatgrass (*Agropyron dasystachyum*) is also moderately abundant. The majority of the grass plants occur underneath shrub crowns. Forbs are diverse and well distributed throughout the site. The most abundant species include mat penstemon (*Penstemon caespitosus*), longleaf phlox (*Phlox longifolia*), rose pussytoes (*Antennaria rosea*), Eaton fleabane (*Erigeron eatonii*), silvery lupine (*Lupinus argenteus*) and weedy milkvetch (*Astragalus miser*). As this is summer range for wildlife, forbs are of particular importance (Table - Herbaceous Trends).

Soil: Soils are clay loam in texture and neutral in reactivity (pH 6.7) (Table - Soil Analysis Data). Bare ground cover is low with most bare ground found on the many game and livestock trails transecting the site. Vegetation and litter cover are abundant and erosion appears to be minimized, except along the trails (Table - Basic Cover). The soil surface outside the enclosure has moderately high pedestaling around shrubs leaving the interspaces with a pitted appearance. The soil erosion condition was classified on the border of stable and slight in 2002, was slight in 2005, but was stable in 2010. It was noted in 2005 that slight erosion was occurring where trails had been created.

### Trend Assessments

#### Browse:

- **2002 to 2005 - stable (0):** There was little change in the preferred browse components on the site, though decadence of true mountain mahogany increased slightly.
- **2005 to 2010 - stable (0):** There was little change in the preferred browse components.

#### Grass:

- **2002 to 2005 - stable (0):** The sum of nested frequency of perennial grasses decreased by 6%, but cover increased from 16% to 18%.
- **2005 to 2010 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial grasses, but cover increased to 25%.

Forb:

- **2002 to 2005 - slightly up (+1):** The perennial forb sum of nested frequency increased by 13% and cover increased from 6% to 13%.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 14% and cover decreased to 9%.

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

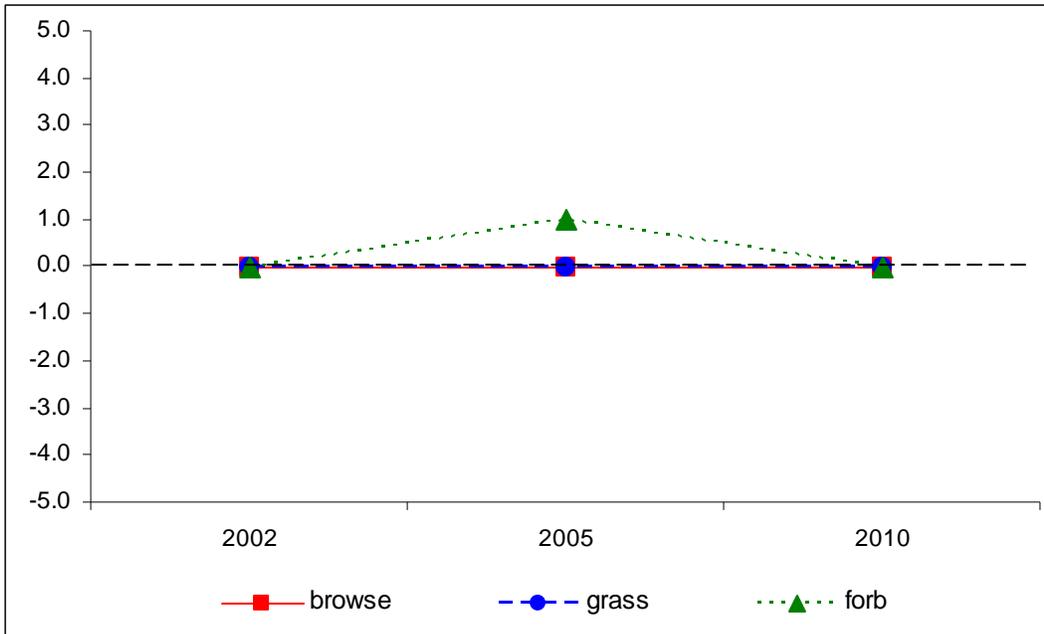
Management unit 10R, study no: 34

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
02	30.0	6.5	5.3	30.0	0.0	10.0	0.0	<b>81.7</b>	Good
05	30.0	4.9	3.6	30.0	0.0	10.0	0.0	<b>78.5</b>	Good
10	30.0	10.7	3.6	30.0	0.0	10.0	0.0	<b>84.3</b>	Good

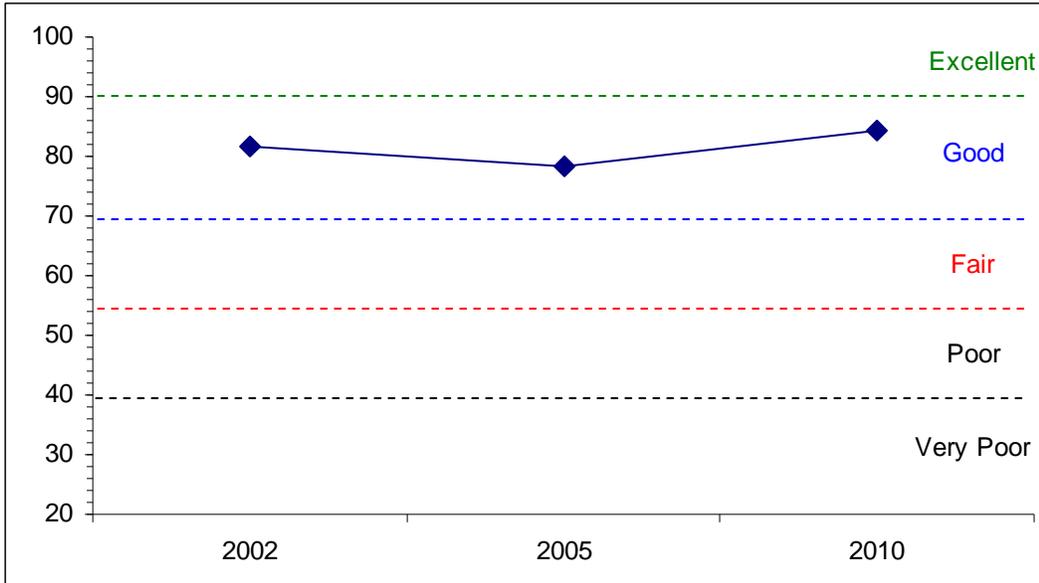
**Trend Summary**

CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 10R, Study no: 34



DEER DESIRABLE COMPONENTS INDEX TREND, HIGH POTENTIAL--  
 Management unit 10R, Study no: 34



HERBACEOUS TRENDS--  
 Management unit 10R, Study no: 34

Type	Species	Nested Frequency			Average Cover %		
		'02	'05	'10	'02	'05	'10
G	<i>Agropyron dasystachyum</i>	a144	b206	ab167	1.09	2.59	1.41
G	<i>Agropyron spicatum</i>	4	7	-	.06	.21	.03
G	<i>Carex sp.</i>	b147	ab115	a103	5.56	5.61	6.32
G	<i>Festuca ovina</i>	4	-	2	.00	-	.00
G	<i>Poa fendleriana</i>	189	169	178	4.75	3.93	7.76
G	<i>Poa pratensis</i>	b178	ab127	a144	4.47	5.00	8.10
G	<i>Poa secunda</i>	ab10	a2	b22	.02	.03	1.29
G	<i>Stipa columbiana</i>	3	10	3	.38	.1	.06
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		679	636	619	16.36	17.50	25.00
Total for Grasses		679	636	619	16.36	17.50	25.00
F	<i>Agoseris glauca</i>	28	25	26	.11	.31	.38
F	<i>Alyssum alyssoides (a)</i>	9	-	5	.02	-	.00
F	<i>Androsace septentrionalis (a)</i>	a8	b43	a7	.05	.17	.02
F	<i>Antennaria rosea</i>	a26	ab37	b46	.93	1.54	1.90
F	<i>Arenaria sp.</i>	21	36	20	.25	.59	.22
F	<i>Astragalus miser</i>	30	31	30	.49	.87	.91
F	<i>Astragalus utahensis</i>	ab13	b36	a7	.06	.15	.04
F	<i>Castilleja flava</i>	b13	ab9	a-	.05	.07	-
F	<i>Cirsium sp.</i>	2	4	7	.00	.06	.07
F	<i>Collinsia parviflora (a)</i>	a-	b53	b45	-	.11	.09
F	<i>Crepis acuminata</i>	9	12	6	.05	.10	.01
F	<i>Delphinium nuttallianum</i>	a-	b9	a-	-	.02	-
F	<i>Erigeron eatonii</i>	92	75	89	.65	.76	.59

Type	Species	Nested Frequency			Average Cover %		
		'02	'05	'10	'02	'05	'10
F	Eriogonum alatum	-	3	2	-	.18	.00
F	Eriogonum umbellatum	23	22	25	.13	.23	.18
F	Hackelia patens	1	-	-	.03	-	-
F	Lepidium sp. (a)	a4	b12	a-	.01	.03	-
F	Linum lewisii	1	-	-	.00	.00	-
F	Lomatium sp.	-	1	-	-	.00	-
F	Lupinus argenteus	43	52	61	.54	1.79	1.49
F	Lychnis drummondii	-	-	5	-	-	.01
F	Microsteris gracilis (a)	7	4	-	.01	.00	-
F	Penstemon caespitosus	b129	a71	a68	1.33	1.56	.88
F	Phlox hoodii	2	-	-	.00	-	-
F	Phlox longifolia	ab129	b144	a97	.98	1.12	.73
F	Polygonum douglasii (a)	a4	b73	a-	.01	.30	-
F	Potentilla gracilis	2	-	-	.03	-	-
F	Schoenocrambe linifolia	a-	a-	b13	-	-	.05
F	Senecio integerrimus	a6	b27	b36	.03	1.07	.35
F	Sphaeralcea coccinea	-	1	-	-	.00	-
F	Taraxacum officinale	a54	b106	ab76	.30	1.98	.95
F	Tragopogon dubius	2	-	-	.00	-	-
F	Unknown forb-perennial	-	4	-	-	.01	-
F	Viola sp.	2	1	-	.03	.03	-
F	Zigadenus paniculatus	-	4	-	-	.00	-
Total for Annual Forbs		32	185	57	0.10	0.62	0.12
Total for Perennial Forbs		628	710	614	6.05	12.53	8.81
Total for Forbs		660	895	671	6.16	13.16	8.93

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

#### BROWSE TRENDS--

Management unit 10R, Study no: 34

Type	Species	Strip Frequency			Average Cover %		
		'02	'05	'10	'02	'05	'10
B	Amelanchier utahensis	41	32	21	.39	.54	.11
B	Artemisia tridentata vaseyana	91	87	85	22.69	21.13	21.61
B	Cercocarpus montanus	15	14	14	.76	.39	.43
B	Chrysothamnus depressus	1	3	2	.00	.00	.03
B	Chrysothamnus viscidiflorus viscidiflorus	35	15	9	.78	.67	.39
B	Gutierrezia sarothrae	0	1	0	-	-	-
B	Purshia tridentata	63	54	55	2.77	2.87	1.83
B	Quercus gambelii	1	0	0	-	-	-
B	Sclerocactus sp.	-	-	-	-	.15	-
B	Symphoricarpos oreophilus	77	78	80	8.12	6.76	5.87
B	Tetradymia canescens	3	2	1	-	.01	.00
Total for Browse		327	286	267	35.54	32.54	30.30

CANOPY COVER, LINE INTERCEPT--

Management unit 10R, Study no: 34

Species	Percent Cover		
	'02	'05	'10
Amelanchier utahensis	1.08	.41	.21
Artemisia tridentata vaseyana	26.10	24.14	30.36
Cercocarpus montanus	1.11	.91	1.23
Chrysothamnus viscidiflorus viscidiflorus	.63	.38	.81
Purshia tridentata	5.00	3.15	4.25
Symphoricarpos oreophilus	8.53	7.65	9.63
Tetradymia canescens	.06	.05	-

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10R, Study no: 34

Species	Average leader growth (in)		
	'02	'05	'10
Amelanchier utahensis	1.1	2.5	2.4
Artemisia tridentata vaseyana	0.8	2.0	1.7
Cercocarpus montanus	0.9	1.3	3.1
Purshia tridentata	-	1.4	1.6

BASIC COVER--

Management unit 10R, Study no: 34

Cover Type	Average Cover %		
	'02	'05	'10
Vegetation	52.77	53.62	60.09
Rock	.16	1.01	1.07
Pavement	2.59	3.01	.65
Litter	53.15	47.06	59.84
Cryptogams	.03	.10	.18
Bare Ground	13.12	14.86	11.58

SOIL ANALYSIS DATA --

Management unit 10R, Study no: 34, Study Name: PR Spring Outside Exclosure

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
12.9	6.8	35.3	32.7	32.0	3.6	14.9	291.2	0.8

PELLET GROUP DATA--

Management unit 10R, Study no: 34

Type	Quadrat Frequency			Days use per acre (ha)		
	'02	'05	'10	'02	'05	'10
Rabbit	12	41	2	-	-	-
Grouse	1	-	-	-	-	-
Elk	24	17	8	31 (78)	7 (17)	23 (58)
Deer	19	18	25	73 (180)	23 (56)	42 (104)
Cattle	2	4	2	14 (34)	10 (25)	13 (33)

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

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>									
02	1220	66	20	15	20	16	28	3	43/33
05	1220	44	49	7	20	11	34	3	27/21
10	780	72	26	3	100	8	5	3	31/26
<i>Artemisia tridentata vaseyana</i>									
02	4180	7	61	32	240	14	2	8	31/38
05	3940	7	56	38	40	17	3	22	30/38
10	3900	6	78	16	-	23	11	10	32/43
<i>Cercocarpus montanus</i>									
02	480	46	46	8	20	33	38	8	49/36
05	480	8	67	25	-	17	71	21	45/43
10	500	48	48	4	80	16	40	0	38/28
<i>Chrysothamnus depressus</i>									
02	40	0	100	0	-	0	0	0	2/3
05	80	0	75	25	-	25	25	0	-/-
10	40	0	100	0	-	50	0	0	4/8
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
02	1300	11	75	14	-	5	0	5	14/17
05	580	7	93	0	-	3	0	0	15/18
10	260	8	92	0	-	8	0	0	14/17
<i>Gutierrezia sarothrae</i>									
02	0	0	0	-	-	0	0	0	-/-
05	20	100	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
02	1840	22	72	7	-	14	70	1	14/25
05	1820	2	89	9	-	7	56	2	9/19
10	1760	8	92	0	-	5	88	0	11/20
<i>Quercus gambelii</i>									
02	20	100	0	-	-	0	0	0	76/36
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
02	3340	15	83	2	-	5	8	1	16/25
05	5920	26	73	1	20	8	.67	1	15/22
10	4220	46	54	0	260	6	4	0	15/22
<i>Tetradymia canescens</i>									
02	60	33	67	0	-	33	0	0	8/8
05	40	50	0	50	-	50	0	50	4/6
10	20	0	100	0	-	0	0	0	9/5

PR SPRING EXCLOSURE COMPARISON  
TREND STUDY NO. 10R-32, 10R-33 & 10R-34

**Site Information**

Site Description: The studies were established in 2002 to gather baseline data for a three-way enclosure that was built in 2001 by the Bureau of Land Management (BLM) near PR Spring on the North Book Cliffs. Grazing in the area is managed by the BLM as part of the Sweetwater allotment. The enclosure complex was not built in a totally homogeneous area. The total and livestock enclosures were placed in an area where several browse species are moderately abundant. This includes large, tree-like serviceberry (*Amelanchier utahensis*) plants that provide an abundance of overhead canopy cover. The transect that monitors the community outside of the enclosures is much more open where mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) is the dominant species. Due to the dimensions of the enclosure, the transects established inside the total (10R-32) and livestock (10R-33) enclosures are only 200 feet in length, while the transect outside (10R-34) is 500 feet long. Some of the difference in vegetation characteristics between these studies may arise from differing transect lengths, as well as the heterogeneity of the vegetation community. Pellet group data was collected inside the total enclosure for 2002 to capture the construction year utilization. Pellet group data has indicated moderate to heavy use by deer and light to moderate use by elk throughout the study years. There has been variability in wildlife use between the livestock enclosure and outside the enclosure, with higher use by deer and elk in 2002 and 2010 outside the enclosure, but higher use inside the livestock enclosure in 2005. Cattle use appears to be light in the area (Table 1).

Browse: The browse component dominates the vegetation community on all three of the study transects. Browse cover is highest inside the total enclosure with serviceberry, mountain big sagebrush, snowberry (*Symphoricarpos oreophilus*) and true mountain mahogany (*Cercocarpus montanus*) providing nearly all of the browse cover. These four species also dominate the livestock enclosure, but mountain big sagebrush is the predominant species. Outside of the enclosure, mountain big sagebrush dominates the sample area with a large component of snowberry and bitterbrush (*Purshia tridentata*). Serviceberry and mahogany are less common outside the enclosure. Utilization of sagebrush has been mostly light to moderate outside the enclosure and in the livestock enclosure. Use of sagebrush was moderate in the livestock enclosure in 2010. The total and livestock enclosures have displayed decreasing recruitment of young mountain big sagebrush plants over the course of the study, while recruitment has remained similar outside the enclosure. All three studies have shown a decrease in decadence of mountain big sagebrush from 2005 to 2010 (Table 2).

Herbaceous Understory: Perennial grasses are abundant on the studies, but are not particularly diverse. Bluegrass species (*Poa spp.*), including Kentucky bluegrass (*P. pratensis*), dominate the grass component on all three studies, and have generally increased in cover since 2002. Perennial grasses tend to have higher cover and sum of nested frequency outside the enclosure primarily due higher values provided by the bluegrass species. Perennial forbs are diverse and fairly abundant on the three studies. Perennial forb sum of nested frequency and cover are higher outside the enclosure and in the livestock enclosure than in the total enclosure. There was a general increase in the cover of perennial forbs on all three studies in 2005, but cover decreased again in 2010. The sum of nested frequency of perennial forbs has steadily decreased in the total and livestock enclosures since 2002, but has remained similar outside of the enclosure (Table 3).

Soil: Due to the close proximity of the studies, soil attributes are similar on the studies. Soils have a clay loam texture with a neutral pH. Basic ground cover characteristics are similar between all of the transects. Vegetation and litter cover are abundant, especially the browse component. Bare ground cover is low on all three studies, but is lowest within the total enclosure.

## Exclosure Complex Summary

Study Name	Year	Deer	Elk	Cattle
		days use/acre (ha)	days use/acre (ha)	days use/acre (ha)
Total Exclosure (10R-32)	2002	39 (96)	23 (56)	7 (18)
	2005	--	--	--
	2010	--	--	--
Livestock Exclosure (10R-33)	2002	48 (117)	19 (46)	14 (34)
	2005	63 (155)	21 (53)	14 (34)
	2010	25 (61)	11 (26)	--
Outside Exclosure (10R-34)	2002	73 (180)	31 (78)	14 (34)
	2005	23 (5)	7 (17)	10 (25)
	2010	42 (104)	23 (58)	13 (33)

**Table 1.** Pellet group transect data estimated use for the PR Spring exclosure complex.

Study Name	Year	Percent Canopy Cover	Density Plants/acre	Percent Young (Plants/acre)	Percent Mature (Plants/acre)	Percent Decadent (Plants/acre)	Ave. height/crown (in)
		Total Exclosure (10R-32)	2002	20.08	3560	21	64
	2005	15.36	3180	13	60	27	23/31
	2010	18.64	3000	9	83	9	27/36
Livestock Exclosure (10R-33)	2002	17.66	3240	14	50	36	29/37
	2005	17.48	2940	10	61	29	29/37
	2010	20.83	2980	6	76	18	28/40
Outside Exclosure (10R-34)	2002	26.10	4180	7	61	32	31/38
	2005	24.14	3940	7	56	38	30/38
	2010	30.36	3900	6	78	16	32/43

**Table 2.** Browse characteristics of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) for the PR Spring exclosure study sites.

Study Name	Year	Perennial Grass Species			Perennial Forb Species		
		<i>n</i>	Sum of Nested Frequency	Percent Cover	<i>n</i>	Sum of Nested Frequency	Percent Cover
Total Exclosure (10R-32)	2002	6	442	12.55	19	452	6.51
	2005	5	466	13.14	19	388	8.17
	2010	6	417	18.21	17	267	6.83
Livestock Exclosure (10R-33)	2002	6	455	14.08	19	724	9.31
	2005	8	538	17.38	18	640	11.69
	2010	7	498	17.06	19	569	7.91
Outside Exclosure (10R-34)	2002	8	679	16.36	21	628	6.05
	2005	7	636	17.50	22	710	12.53
	2010	7	619	25.00	19	614	8.81

**Table 3.** Number of species sampled (*n*), sum of nested frequency and cover of perennial grasses and perennial forbs in the three studies at the PR Spring exclosure complex.