

Trend Study 1-12-06

Study site name: Red Butte Exclosure .

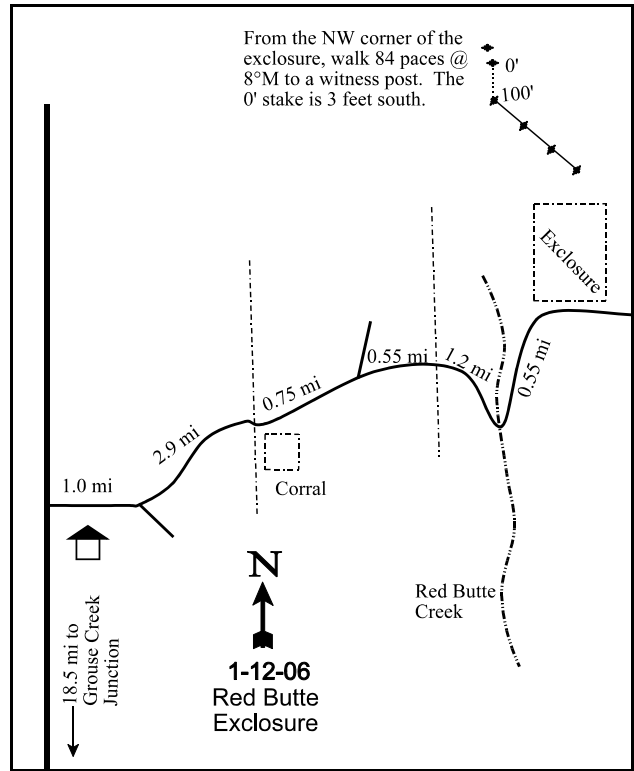
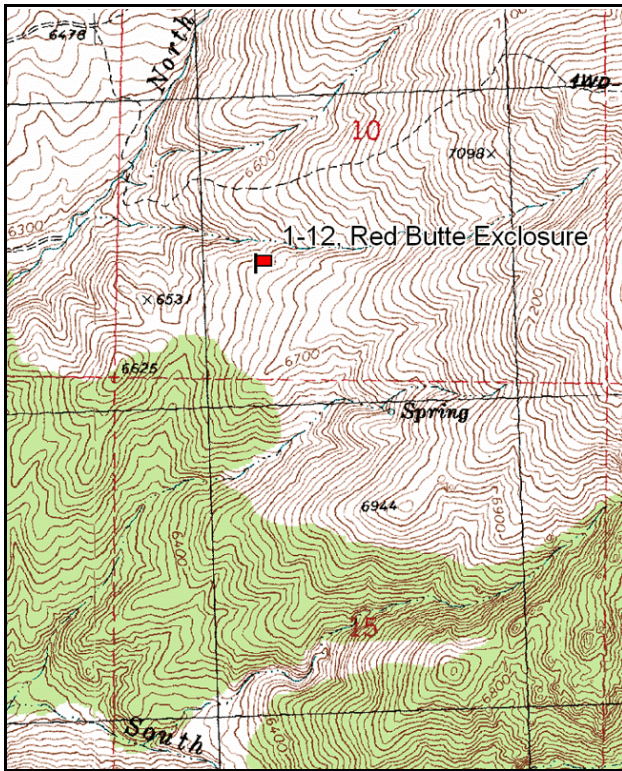
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

A four-wheel drive vehicle is needed to access this study. Proceed about 18.5 miles north from Grouse Creek Junction and turn right onto Ingham Canyon Road. Travel 1.0 miles to the first significant fork and turn left. Proceed 2.9 miles to a fence with a corral on the east side. Continue east and north for 0.75 miles to a fork and turn right. Proceed 0.55 miles to a fence. From the fence go 1.2 miles, staying right, to the bottom of the creek. From the creek, proceed up the dugway 0.55 miles to the southwest corner of the Red Butte exclosure. From the northwest corner of the exclosure, walk 84 paces at 8 degrees magnetic to the 0-foot stake of the baseline, which is marked by browse-tag #7915. Bearing of the baseline is 165 degrees magnetic and turns to 91 degrees magnetic.



Map Name: Ingham Canyon

Diagrammatic Sketch

Township 11N, Range 17W, Section 10

UTM NAD 27, UTM 12T 4618669 N, 268169 E

DISCUSSION

Red Butte Exclosure - Trend Study No. 1-12

Study Information

This study is located on the west slope of the Grouse Creek Mountains adjacent to the Red Butte exclosure (elevation: 6,590 feet, slope: 10-15%, aspect: southwest). This area is considered preferred winter range. During most years, it is used as an area where deer remain in fall and winter as long as snow conditions permit. As snow depths increase, deer migrate further south to lower elevations. This area is also important fawning habitat. The vegetation type is basin big sagebrush-grass with antelope bitterbrush, mountain snowberry, and Saskatoon serviceberry. Deer use appears light, as judged from pellet group frequency and browse utilization. Summer cattle grazing is probably more significant. Cattle were on the area in 1984 and had already made a noticeable impact, especially on grasses and forbs. This area is within the Ingham allotment which is used from May 1 to September 15. A pellet group transect in 2001 estimated light deer use at 21 days use/acre (53 deer days use/ha) and cow use at 2 days use/acre (4 cow days use/ha). Some sage grouse scat was also seen along the baseline but not sampled within the pellet group transect. In 2006, 18 deer days use/acre and 31 cow days use/acre (45 ddu/ha and 75 cdu/ha) were estimated. Cattle were on the study in 2006.

Soil

The soil is part of the Bullump series, which consists of deep, well drained soils that formed in colluvium derived from quartzite, welded tuff, chert, argillite, shale, conglomerate, and rhyolite with a component of loess (USDA-NRCS 2006). The soil is fertile with a sandy loam texture and a moderate amount of surface rock. Soil reaction is neutral (6.8 pH). Effective rooting depth estimates taken in 1996 averaged just over 20 inches. Although numerous areas of bare ground are exposed, the thickness and permanence of vegetation and litter cover on the remaining area has prevented serious soil loss. The ratio of bare soil to protective cover has decreased from 1:4.9 in 1996 to 1:3.5 in 2006. The erosion condition was classified as stable in 2001, but was slight in 2006 due to pedestalling, small rills, and flow patterns.

Browse

Shrubs are abundant and on average account for over 50% of the vegetation cover. The key browse species are basin big sagebrush and bitterbrush, which contribute about half of the browse cover. Big sagebrush appears to be a mix of both basin and mountain big sagebrush. Sagebrush cover has averaged about 8% and density has remained stable at about 1,400 plants/acre since 1996. Density estimates were higher in 1984 and 1990, but these differences are likely due to the smaller sampling size used prior to 1992. Decadence was highest in 1984 and 1990 with over half of the population showing signs of decadence. Percent decadence has been moderate in recent years. Utilization was moderate in 1984 and light in subsequent years.

Antelope bitterbrush cover has averaged about 10% in both 2001 and 2006. Bitterbrush density has averaged nearly 800 plants/acre since 1996. Vigor has been good and 0% of the population was classified as decadent in 2006. Utilization has been mostly moderate to heavy. Mountain snowberry is not a preferred shrub, but is abundant in the area with an average of 8% cover. This population has remained stable. Stickyleaf low rabbitbrush cover has been about 6% and density has declined with each reading.

Herbaceous Understory

Perennial grasses comprise an important part of the understory. Unfortunately, annual cheatgrass is also abundant, but it has declined. Quadrat frequency has changed very little (86% in 1996, 85% in 2001, and 80% in 2006), but nested frequency has declined significantly with each reading. Percent cover has also declined (15%, 11%, 4% respectively). The most abundant perennial species is thickspike wheatgrass, an open sod former that can be grazing tolerant. Sandberg bluegrass is also fairly abundant. Other grass species occur much less frequently but almost all showed evidence of use during past readings.

The study area has a good mixture of forbs that includes a few conspicuous and desirable species in addition to

larger numbers of less desirable ones. Showy forbs include: arrowleaf balsamroot, narrowleaf lomatium, tapertip hawksbeard, and penstemon.

1990 TREND ASSESSMENT

Narrowleaf low rabbitbrush is the most abundant shrub. The big sagebrush population is stable. The sagebrush shows light to moderate hedging but a high amount of decadence (53%). However, this was lower than in 1984 when decadence was estimated at 60%. Bitterbrush has shown little change except that decadence has declined from 50% to 25%. Bitterbrush is more heavily hedged but still maintains good vigor. Low rabbitbrush has not increased. There is a fair diversity of grasses and forbs. The grass trend is up. Thickspike wheatgrass and mutton bluegrass both increased in nested frequency. Sum of nested frequency for forbs was stable. Sum of nested frequency for arrowleaf balsamroot has remained constant while the most numerous forb, longleaf phlox, has increased significantly.

browse - stable (0)

grass - up (+2)

forb - stable (0)

1996 TREND ASSESSMENT

Trend for the key browse species is stable with basin big sagebrush and bitterbrush showing basically stable populations. Utilization is mostly light on both species and percent decadence has also declined. Changes in density of these two species is likely due to the larger sample used in 1996. Snowberry appears to have a stable trend also. The increaser, narrowleaf low rabbitbrush, shows a stable trend and the only major change is a reduced decadence rate (27% to 0%). Trend for grasses is down due to a decline in the sum of nested frequency for perennial grasses. Thickspike wheatgrass declined significantly in sum of nested frequency. The forb trend is also down. The majority of the decline in sum of nested frequency is due to significant declines in less desirable forbs including tapertip hawksbeard, larkspur, and longleaf phlox. The DCI score is poor-fair. Perennial grass cover is low and cheatgrass cover is high, which lowers the score.

winter range condition (DC Index) - poor-fair (50) Mid-level potential scale

browse - stable (0)

grass - down (-2)

forb - down (-2)

2001 TREND ASSESSMENT

Trend for the key browse species, basin big sagebrush and bitterbrush is stable. Utilization is light and percent decadence still remains within satisfactory limits. The increaser, narrowleaf low rabbitbrush, continues to show slight decreases of density. The grass trend is stable. Sum of nested frequency of perennial grasses declined slightly, but cheatgrass also decreased. Cheatgrass still makes up 66% of the grass cover. The forb trend is stable. The majority of the forb cover comes from two species, arrowleaf balsamroot and the annual, blue eyed Mary. Both species have remained stable since 1996. The DCI score remained poor-fair. Shrub decadence was higher.

winter range condition (DC Index) - poor-fair (50) Mid-level potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2006 TREND ASSESSMENT

The soil trend is slightly down. Relative percent bare ground increased from 8% to 15%. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) declined from 1:4.6 to 1:3.5. Litter cover has also declined, likely due to the decrease of cheatgrass. The browse trend is stable. The basin big sagebrush and bitterbrush populations have changed very little. The grass trend is slightly up. Cheatgrass nested frequency declined significantly and cover was much lower. Perennial grass sum of nested frequency was basically unchanged. The forb trend is up. Longleaf phlox and cryptantha were significantly more abundant in 2006. The DCI score improved to fair as cheatgrass cover and shrub decadence improved.

winter range condition (DC Index) - fair (56) Mid-level potential scale
 browse - stable (0) grass - slightly up (+1) forb - up (+2)

HERBACEOUS TRENDS --
 Management unit 01 , Study no: 12

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron dasystachyum	bc237	c267	ab185	a176	a150	2.44	3.51	1.66
G	Agropyron spicatum	a-	a-	b21	a-	a4	.56	-	.06
G	Bromus anomalus	-	-	-	3	-	-	.03	-
G	Bromus tectorum (a)	-	-	c320	b273	a224	15.28	10.79	3.85
G	Koeleria cristata	2	-	5	-	2	.18	-	.04
G	Oryzopsis hymenoides	-	-	8	4	-	.04	.03	-
G	Poa fendleriana	a7	b102	a-	a-	a1	-	-	.03
G	Poa secunda	a47	a47	b91	b92	b126	2.19	1.93	2.92
G	Sitanion hystrix	a-	ab1	ab13	ab5	b12	.04	.03	.07
G	Stipa comata	-	1	-	-	-	-	-	-
Total for Annual Grasses		0	0	320	273	224	15.28	10.79	3.85
Total for Perennial Grasses		293	418	323	280	295	5.47	5.54	4.79
Total for Grasses		293	418	643	553	519	20.75	16.34	8.65
F	Agoseris glauca	b66	ab43	ab57	a31	c125	.15	.17	1.56
F	Allium acuminatum	b94	a36	a21	b107	a29	.06	.42	.06
F	Antennaria rosea	-	8	3	-	3	.15	-	.03
F	Arabis sp.	a-	a1	ab10	a-	b17	.02	-	.12
F	Astragalus beckwithii	b13	a-	ab5	ab8	ab6	.03	.21	.03
F	Astragalus cibirius	ab16	b26	ab25	a7	ab17	.18	.07	.31
F	Astragalus convallarius	-	2	-	-	-	-	-	-
F	Balsamorhiza sagittata	60	60	56	45	42	5.59	6.66	8.22
F	Camelina microcarpa (a)	-	-	1	3	3	.00	.00	.00
F	Chenopodium fremontii (a)	-	-	-	1	-	-	.00	-
F	Collomia linearis (a)	-	-	15	19	32	.04	.04	.14
F	Comandra pallida	2	7	1	7	2	.00	.18	.00
F	Collinsia parviflora (a)	-	-	217	230	223	1.45	5.28	.90
F	Cordylanthus ramosus (a)	-	-	-	3	-	-	.15	-
F	Crepis acuminata	b56	b70	a9	a17	a16	.02	.48	.55
F	Cryptantha sp.	a-	a-	b27	a-	b49	.08	-	.12
F	Delphinium nuttallianum	b22	b18	a-	b21	b17	-	.06	.04
F	Descurainia pinnata (a)	-	-	-	2	-	-	.00	-
F	Eriogonum umbellatum	-	6	6	4	3	.18	.03	.15

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Gayophytum ramosissimum(a)	-	-	1	12	8	.00	.04	.02
F	Gilia sp. (a)	-	-	-	-	7	-	.00	.01
F	Haplopappus acaulis	-	-	7	-	2	.03	-	.03
F	Hackelia patens	_{ab} 11	_{ab} 13	_{ab} 16	_a 1	_b 19	.14	.03	.62
F	Holosteum umbellatum (a)	-	-	3	-	-	.00	-	-
F	Lappula occidentalis (a)	-	-	-	2	3	-	.00	.00
F	Lithophragma parviflora	-	-	-	-	11	-	-	.05
F	Lithospermum ruderales	-	-	-	3	-	-	.01	-
F	Lomatium triternatum	_{ab} 21	_{ab} 24	_a 3	_b 24	_{ab} 23	.01	.22	.32
F	Lupinus argenteus	-	-	-	1	-	-	.03	-
F	Machaeranthera spp	-	-	4	-	-	.01	-	-
F	Microsteris gracilis (a)	-	-	_a -	_c 92	_b 61	-	.72	.13
F	Nemophila breviflora (a)	-	-	-	-	3	-	-	.03
F	Phlox longifolia	_c 154	_d 217	_{ab} 81	_a 54	_{bc} 122	.56	.46	1.25
F	Polygonum douglasii (a)	-	-	_b 46	_a -	_b 46	.10	-	.17
F	Ranunculus testiculatus (a)	-	-	2	-	3	.00	-	.00
F	Sedum lanceolatum	-	-	6	-	1	.01	-	.00
F	Tragopogon dubius	-	-	-	3	-	.00	.03	-
F	Unknown forb-perennial	_{ab} 4	_a -	_b 13	_a -	_a -	.07	-	-
F	Veronica biloba (a)	-	-	_a 3	_a 8	_b 42	.00	.06	.46
F	Viguiera multiflora	-	-	8	11	-	.04	.04	-
Total for Annual Forbs		0	0	288	372	431	1.62	6.33	1.89
Total for Perennial Forbs		519	531	358	344	504	7.39	9.16	13.50
Total for Forbs		519	531	646	716	935	9.02	15.50	15.40

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

BROWSE TRENDS --

Management unit 01 , Study no: 12

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Amelanchier utahensis	3	1	1	.30	.00	-
B	Artemisia tridentata tridentata	48	51	51	9.52	8.38	7.52
B	Chrysothamnus nauseosus consimilis	2	1	1	.15	-	.15
B	Chrysothamnus viscidiflorus viscidiflorus	76	73	62	6.46	6.42	5.61
B	Eriogonum microthecum	2	2	2	.15	.15	-
B	Opuntia sp.	49	45	52	3.35	2.71	2.36
B	Purshia tridentata	31	31	31	6.71	10.81	9.68
B	Symphoricarpos oreophilus	53	50	51	6.17	8.47	8.93
Total for Browse		264	254	251	32.82	36.95	34.27

CANOPY COVER, LINE INTERCEPT --

Management unit 01 , Study no: 12

Species	Percent Cover
	'06
Artemisia tridentata tridentata	11.23
Chrysothamnus viscidiflorus viscidiflorus	7.50
Opuntia sp.	1.70
Purshia tridentata	11.16
Symphoricarpos oreophilus	14.63

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 01 , Study no: 12

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata tridentata	2.9	1.5
Purshia tridentata	0.9	0.6

BASIC COVER --

Management unit 01 , Study no: 12

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	3.00	11.50	56.69	62.91	51.35
Rock	1.75	1.00	4.32	3.58	3.66
Pavement	3.00	2.50	4.30	4.63	8.68
Litter	59.25	54.25	59.50	47.27	36.26
Cryptogams	2.50	.75	.34	.25	.76
Bare Ground	30.50	30.00	6.39	10.42	17.04

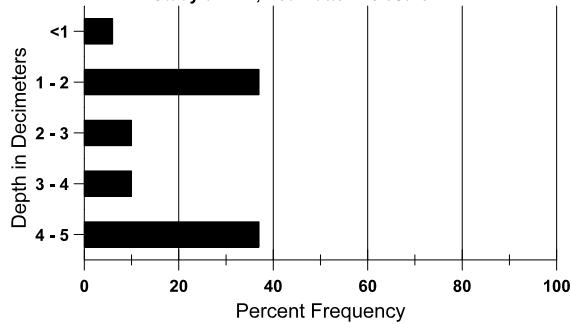
SOIL ANALYSIS DATA --

Herd Unit 01, Study no: 12, Red Butte Exclosure

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
20.3	52.6 (17.1)	6.8	68.6	15.4	16.0	2.6	20.7	201.6	0.5

Stoniness Index

Study 01 - 12, Red Butte Exclosure



PELLET GROUP DATA --

Management unit 01 , Study no: 12

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	-	2	12
Deer	6	7	11
Cattle	4	4	7

Days use per acre (ha)	
'01	'06
-	-
21 (53)	18 (45)
2 (4)	31 (75)

BROWSE CHARACTERISTICS --
Management unit 01 , 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												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	266	-	266	-	-	-	0	0	0	-	0	-/-
96	60	-	-	20	40	-	0	33	67	-	0	24/26
01	20	-	-	20	-	-	100	0	0	-	0	27/26
06	20	-	-	20	-	-	0	0	0	-	0	32/33
Artemisia tridentata tridentata												
84	2332	666	266	666	1400	-	43	6	60	-	23	33/33
90	2532	-	266	933	1333	-	13	3	53	-	3	24/30
96	1440	80	220	880	340	520	15	0	24	8	8	28/35
01	1320	-	60	800	460	420	2	0	35	12	12	28/37
06	1400	2700	120	880	400	540	11	4	29	13	14	32/43
Chrysothamnus nauseosus consimilis												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	100	-	-	100	-	-	0	0	0	-	0	21/20
01	40	-	-	40	-	-	0	0	0	-	0	21/30
06	20	-	-	-	20	-	0	0	100	100	100	26/27
Chrysothamnus viscidiflorus viscidiflorus												
84	4066	133	1133	1600	1333	-	20	0	33	-	2	11/10
90	3932	266	1666	1200	1066	-	12	7	27	-	5	15/17
96	3640	-	340	3300	-	-	2	0	0	-	0	17/27
01	2940	20	120	2400	420	60	1	0	14	4	5	15/19
06	2240	-	120	1940	180	40	0	0	8	.89	.89	17/25
Eriogonum heracleoides												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	5/17

		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)
Eriogonum microthecum												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	60	-	-	60	-	-	33	0	-	-	0	10/11
01	40	-	-	40	-	-	0	0	-	-	0	10/17
06	40	-	-	40	-	-	50	0	-	-	0	13/15
Opuntia sp.												
84	1600	-	-	1600	-	-	0	0	0	-	0	4/3
90	799	200	266	333	200	-	8	0	25	-	33	4/10
96	1820	-	100	1660	60	-	0	0	3	3	5	5/16
01	2080	-	200	1780	100	20	0	0	5	4	4	4/12
06	2140	-	40	2020	80	-	0	0	4	2	2	5/16
Purshia tridentata												
84	266	-	-	133	133	-	25	75	50	-	25	11/13
90	266	-	-	200	66	-	0	0	25	-	0	13/17
96	780	-	60	680	40	60	36	3	5	3	3	24/47
01	720	-	60	440	220	60	53	17	31	-	0	30/62
06	860	480	-	860	-	80	35	40	0	-	0	31/53
Symphoricarpos oreophilus												
84	4466	-	3800	666	-	-	0	0	0	-	0	17/46
90	532	266	66	466	-	-	25	0	0	-	0	10/15
96	3820	140	1520	2240	60	-	2	1	2	.52	.52	17/38
01	2820	-	440	2360	20	20	.70	0	1	.70	.70	19/38
06	2960	-	680	2180	100	20	0	3	3	-	0	19/36