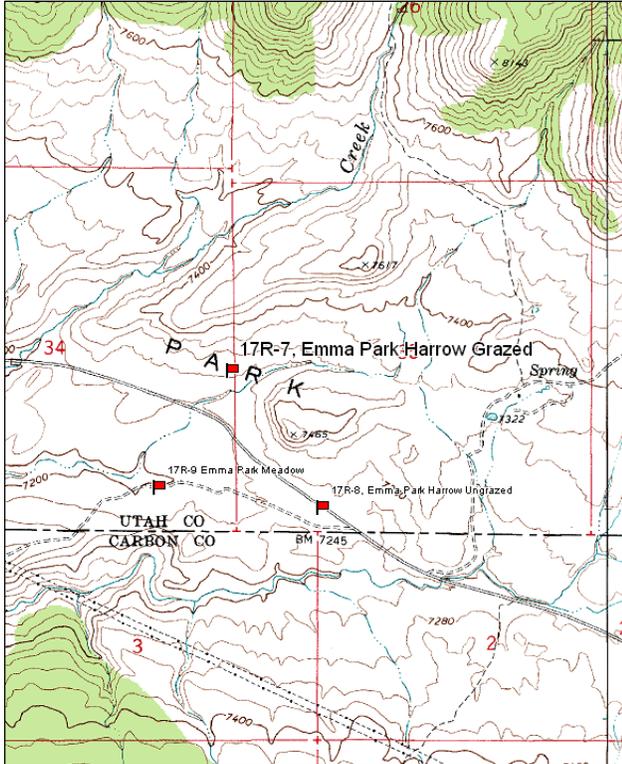


EMMA PARK HARROW GRAZED - TREND STUDY NO. 17R-7-10

Vegetation Type: Harrowed, Seeded Mountain Big Sagebrush
Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer
NRCS Ecological Site Description: Not Available
Land Ownership: BLM
Elevation: 7270 ft. (2216 m)
Aspect: Southwest
Slope: 5%
Transect bearing: 246° magnetic
Belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).

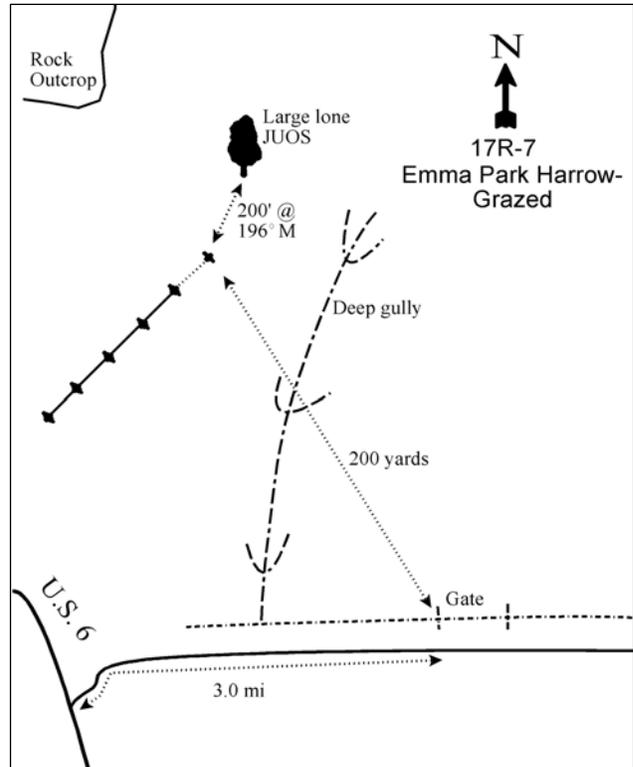
Directions:
From the Kyune turnoff on U.S. 6 travel 3.0 miles to a gate on the north side of the road. From the gate walk approximately 200 yards towards a lone, large juniper tree on the other side of the deep gully. The 0-foot post is about 200 feet south of the juniper and is marked by browse tag #422.

Map Name: Kyune



Township: 11S Range: 9E Section: 34

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 508917 E 4407739 N

EMMA PARK HARROW GRAZED - TREND STUDY NO. 17R-7

Site Information

Site Description: The study is located about three miles east of the junction of Highway 6 and Kyune in Spanish Fork Canyon. The area had been pipe harrowed one-way and seeded prior to placement of the transect. This study was paired with study 17R-8 to monitor site differences with and without livestock grazing following a pipe harrow treatment. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Kyune I allotment. Cattle grazing will still occur on this site, but not on study 17R-8. Pellet group transect data has indicated light use by deer and elk since 2001. Estimated use by cattle was light in 2005, but was moderate in 2010 (Table - Pellet Group Data).

Browse: The dominant browse species on the site is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), which provides nearly all of the browse cover on the site. The cover (Table - Browse Trends) and density of sagebrush have increased since the outset of the study in 2001. In 2001, the sagebrush population was mostly mature with a high amount of decadence and poor vigor. In 2010, the population was a mixture of young and mature sagebrush plants with low decadence and good vigor. It appears the sagebrush population has rebounded quickly from the treatment. Utilization of sagebrush has been mostly light over the course of the study. The only other common browse species sampled was stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) (Table - Browse Characteristics). A small number of snowberry (*Symphoricarpos oreophilus*) and Utah serviceberry (*Amelanchier utahensis*) occur on and around the site, and it was noted that they all exhibited moderate to heavy use in 2010.

Herbaceous Understory: Grasses on the site are fairly diverse, but are not overly abundant. The grasses are comprised of a mixture of native and seeded species. The most common species include western wheatgrass (*Agropyron smithii*) and Salina wildrye (*Elymus salina*). Grasses were difficult to identify in 2001 due to the lack of seedheads on many individuals, and in 2010 due to grazing. Western wheatgrass and Salina wildrye were particularly hard to distinguish from each other. Forbs are diverse and fairly abundant, though most of the forb cover is provided by desert phlox (*Phlox austromontana*) which provides little forage value. Several seeded species were sampled in 2001 including Lewis flax (*Linum lewisii*), alfalfa (*Medicago sativa*) and small burnet (*Sanguisorba minor*), but only Lewis flax was sampled in 2010 (Table - Herbaceous Trends).

Soil: The soils are clay loam in texture with a soil reaction that is slightly alkaline (pH 7.5). Phosphorus may have limited availability for plant growth and development at 2.8 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Bare ground cover is moderately high with all of the protective ground cover coming from vegetation and litter cover (Table - Basic Cover). The soil erosion condition was classified as slight in 2001, 2005 and 2010 because of pedestals around vegetation and flow patterns. Several active gullies also traverse the study.

Trend Assessments

Browse:

- **2001 to 2005 - slightly up (+1):** There was a 20% increase in the density of mountain big sagebrush from 3,980 plants/acre to 4,780 plants/acre, and cover increased from 11% to 14%. Decadence of sagebrush decreased from 39% to 8% and poor vigor decreased from 57% to 4%.
- **2005 to 2010 - up (+2):** The density of sagebrush increased three-fold to 15,400 plants/acre due to a large increase in the recruitment of young plants. Cover of sagebrush also increased slightly to 15%.

Grass:

- **2001 to 2005 - up (+2):** There was a 26% increase in the sum of nested frequency of perennial grasses, but cover increased only slightly from 12% to 13%.
- **2005 to 2010 - stable (0):** The sum of nested frequency of perennial grasses changed little, but cover decreased to 9%.

Forb:

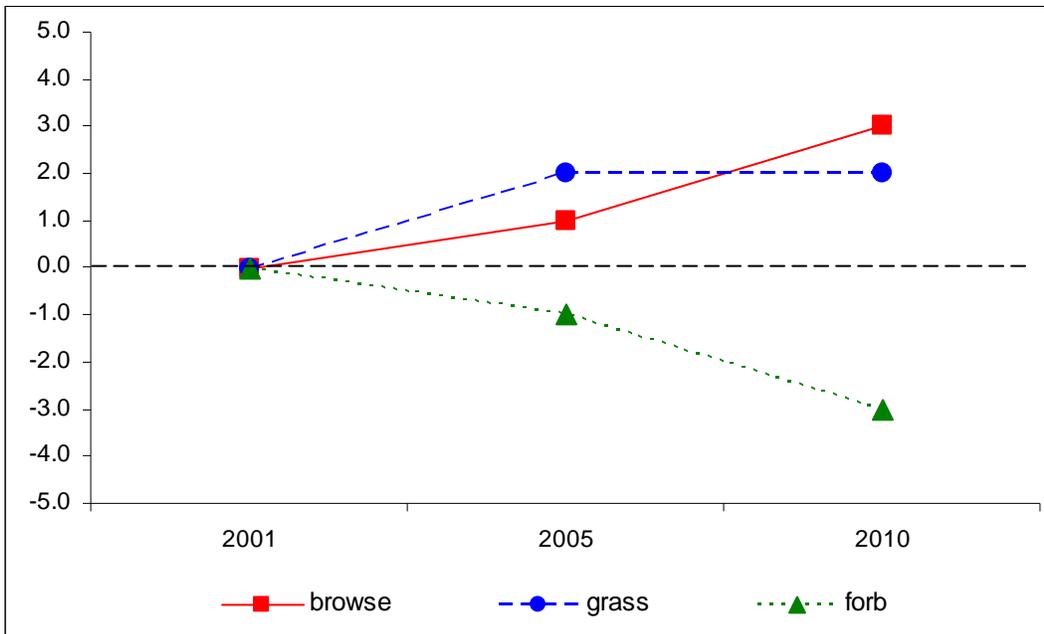
- **2001 to 2005 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased by 18% and cover decreased from 5% to 4%. There was a significant decrease in the nested frequency of yellow Indian paintbrush (*Castilleja flava*).
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 23%, though cover remained similar.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 17R, study no: 7

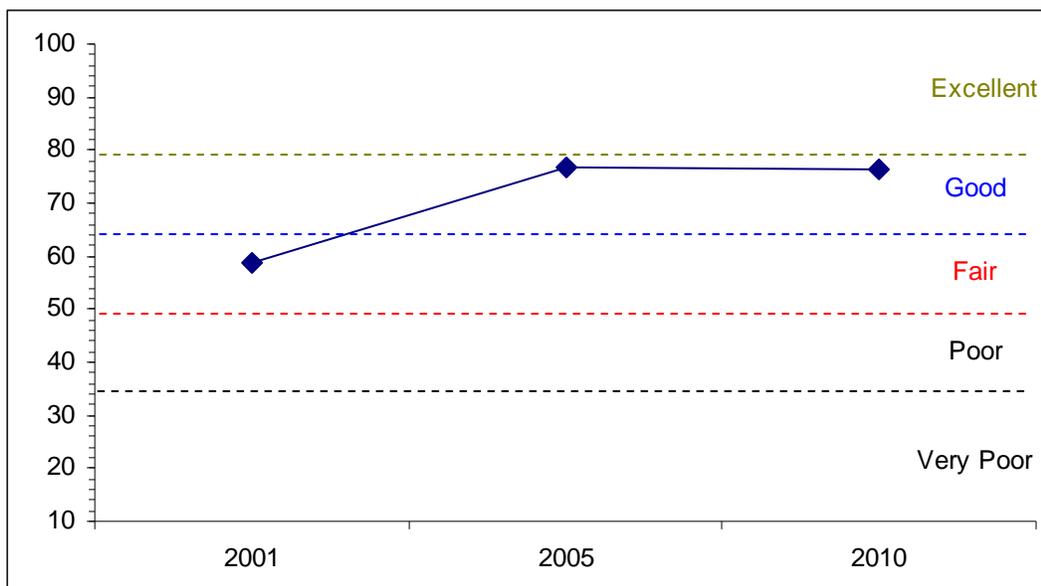
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
01	14.0	3.3	8.5	23.0	0.0	10.0	0.0	58.7	Fair
05	17.2	12.6	12.5	25.7	0.0	8.7	0.0	76.7	Good
10	19.3	14.4	15.0	18.7	0.0	8.9	0.0	76.3	Good

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 17R, Study no: 7



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 17R, Study no: 7



HERBACEOUS TRENDS--
 Management unit 17R, Study no: 7

Type	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
G	Agropyron dasystachyum	a-	a4	b21	-	.16	.16
G	Agropyron intermedium	9	10	10	.07	.16	.02
G	Agropyron smithii	b208	a137	b197	7.38	2.05	3.59
G	Agropyron spicatum	18	17	26	.27	.31	.66
G	Bromus inermis	-	1	1	-	.00	.03
G	Carex sp.	-	7	5	.03	.04	.03
G	Elymus cinereus	2	-	-	.03	-	-
G	Elymus junceus	-	-	-	-	.03	-
G	Elymus salina	a87	b164	b175	2.52	6.44	3.86
G	Oryzopsis hymenoides	4	2	-	.06	.00	-
G	Poa fendleriana	a4	b92	a31	.01	2.46	.49
G	Poa pratensis	b17	a4	a8	.43	.06	.18
G	Poa secunda	20	36	23	.54	.81	.25
G	Stipa lettermani	b17	b11	a3	.14	.27	.03
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		386	485	500	11.49	12.83	9.34
Total for Grasses		386	485	500	11.49	12.83	9.34
F	Achillea millefolium	-	-	2	-	-	.00
F	Androsace septentrionalis (a)	-	2	-	-	.03	-
F	Antennaria rosea	4	4	9	.03	.00	.21
F	Arabis sp.	a2	b27	a-	.00	.10	-
F	Aster chilensis	-	10	6	-	.19	.04
F	Astragalus cicer	b13	a-	a4	.41	-	.03
F	Astragalus convallarius	b18	ab12	a5	.21	.04	.03

T y p e	Species	Nested Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
F	Astragalus tenellus	1	3	1	.03	.00	.03
F	Castilleja flava	_b 66	_a 6	_a 25	1.18	.04	.38
F	Chaenactis douglasii	_{ab} 24	_b 26	_a 6	.14	.35	.04
F	Chenopodium album (a)	-	8	3	-	.02	.00
F	Chenopodium leptophyllum(a)	_b 15	_{ab} 11	_a 5	.04	.02	.01
F	Cirsium sp.	-	3	4	-	.03	.15
F	Cleome serrulata (a)	-	-	-	.00	-	-
F	Descurainia pinnata (a)	2	-	-	.00	-	-
F	Erigeron sp.	-	2	-	-	.00	-
F	Gilia sp. (a)	4	-	-	.01	-	-
F	Hedysarum boreale	_a 11	_b 29	_{ab} 25	.06	.96	.67
F	Ipomopsis aggregata	_a -	_b 19	_a -	-	.06	-
F	Lactuca serriola	-	2	-	-	.00	-
F	Linum lewisii	7	6	1	.04	.05	.00
F	Lomatium sp.	-	-	-	-	.00	-
F	Lotus utahensis	2	-	-	.00	-	-
F	Machaeranthera canescens	_b 36	_b 45	_a 5	.43	.76	.01
F	Medicago sativa	4	-	-	.03	.00	-
F	Penstemon caespitosus	_b 71	_a 20	_a 14	.65	.15	.11
F	Penstemon palmeri	15	7	13	.40	.04	.05
F	Penstemon watsonii	-	1	-	-	.00	-
F	Petradoria pumila	-	5	-	-	.00	-
F	Phlox austromontana	64	72	86	1.06	1.16	2.30
F	Phlox longifolia	-	5	4	-	.03	.04
F	Polygonum douglasii (a)	2	2	-	.00	.00	-
F	Potentilla gracilis	7	-	6	.04	-	.06
F	Sanguisorba minor	_b 13	_a 2	_a -	.18	.00	-
F	Schoenocrambe linifolia	-	3	-	-	.01	-
F	Senecio multilobatus	3	1	-	.01	.01	.00
F	Sphaeralcea coccinea	39	24	37	.25	.29	.21
F	Taraxacum officinale	2	-	-	.03	-	-
F	Tragopogon dubius	4	-	-	.00	-	-
F	Trifolium sp.	2	-	3	.01	-	.04
Total for Annual Forbs		23	23	8	0.07	0.08	0.01
Total for Perennial Forbs		408	334	256	5.26	4.34	4.46
Total for Forbs		431	357	264	5.33	4.42	4.48

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

BROWSE TRENDS--

Management unit 17R, Study no: 7

Type	Species	Strip Frequency			Average Cover %		
		'01	'05	'10	'01	'05	'10
B	Artemisia tridentata vaseyana	82	82	98	11.17	13.79	15.25
B	Atriplex canescens	-	-	-	-	-	.18
B	Chrysothamnus depressus	-	-	-	-	-	.03
B	Chrysothamnus nauseosus	9	12	16	.21	1.58	.40
B	Chrysothamnus viscidiflorus viscidiflorus	48	45	54	2.52	2.35	2.44
B	Gutierrezia sarothrae	0	11	1	-	1.21	.03
B	Symphoricarpos oreophilus	5	10	7	.00	.01	.07
B	Tetradymia canescens	4	8	7	-	.15	.18
Total for Browse		148	168	183	13.92	19.10	18.58

CANOPY COVER, LINE INTERCEPT--

Management unit 17R, Study no: 7

Species	Percent Cover	
	'05	'10
Artemisia tridentata vaseyana	17.63	20.41
Chrysothamnus nauseosus	1.60	.73
Chrysothamnus viscidiflorus viscidiflorus	4.13	3.08
Gutierrezia sarothrae	.15	-
Symphoricarpos oreophilus	.48	.33
Tetradymia canescens	.21	.03

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 17R, Study no: 7

Species	Average leader growth (in)	
	'05	'10
Amelanchier utahensis	-	1.5
Artemisia tridentata vaseyana	2.2	1.2
Cowania mexicana stansburiana	-	2.3

BASIC COVER--

Management unit 17R, Study no: 7

Cover Type	Average Cover %		
	'01	'05	'10
Vegetation	32.43	33.45	31.03
Rock	.14	.01	0
Pavement	.38	.40	.19
Litter	46.17	38.37	47.15
Cryptogams	.31	.06	.00
Bare Ground	35.73	38.75	32.29

SOIL ANALYSIS DATA --

Management unit 17R, Study no: 7, Study Name: Emma Park Harrow-Grazed

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.8	7.5	38.9	31.4	29.7	1.8	2.8	332.8	0.7

PELLET GROUP DATA--

Management unit 17R, Study no: 7

Type	Quadrat Frequency			Days use per acre (ha)		
	'01	'05	'10	'01	'05	'10
Rabbit	5	14	1	-	-	-
Elk	-	4	2	1 (2)	5 (13)	-
Deer	8	-	5	9 (22)	5 (12)	5 (13)
Cattle	-	3	8	-	15 (36)	44 (107)

BROWSE CHARACTERISTICS--

Management unit 17R, Study no: 7

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Amelanchier utahensis									
01	0	0	0	-	-	0	0	0	13/21
05	0	0	0	-	-	0	0	0	11/15
10	0	0	0	-	-	0	0	0	9/11
Artemisia tridentata vaseyana									
01	3980	17	45	39	260	0	0	57	17/24
05	4780	25	67	8	23380	2	0	4	20/27
10	15400	67	32	2	7140	13	2	3	20/29
Chrysothamnus nauseosus									
01	180	22	22	56	-	0	0	22	19/21
05	260	8	92	0	40	0	0	0	22/25
10	400	20	80	0	20	0	0	0	21/22
Chrysothamnus viscidiflorus viscidiflorus									
01	3820	3	93	4	-	0	0	1	5/9
05	3440	1	97	2	20	0	0	.58	8/14
10	4420	21	79	0	180	1	5	0	6/11
Eriogonum corymbosum									
01	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	11/17
10	0	0	0	-	-	0	0	0	-/-
Gutierrezia sarothrae									
01	0	0	0	-	-	0	0	0	-/-
05	340	0	100	-	-	0	0	0	8/13
10	20	0	100	-	-	0	0	0	6/12

		Age class distribution						Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)		
<i>Symphoricarpos oreophilus</i>											
01	240	42	25	33	-	0	0	8	9/16		
05	280	50	50	0	-	0	7	0	11/20		
10	220	18	82	0	-	36	9	0	14/21		
<i>Tetradymia canescens</i>											
01	80	0	25	75	20	0	0	50	-/-		
05	220	36	64	0	20	0	0	0	9/12		
10	160	38	63	0	-	0	0	13	10/12		