

RED ROCK CANYON - TREND STUDY NO. 5-15-11

Vegetation Type: Burn and Seeded

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: [Mountain Stony Loam \(Mountain Big Sagebrush\), R047XA461UT](#)

Land Ownership: DWR

Elevation: 5,675 ft (1,730 m)

Aspect: Southeast

Slope: 10%

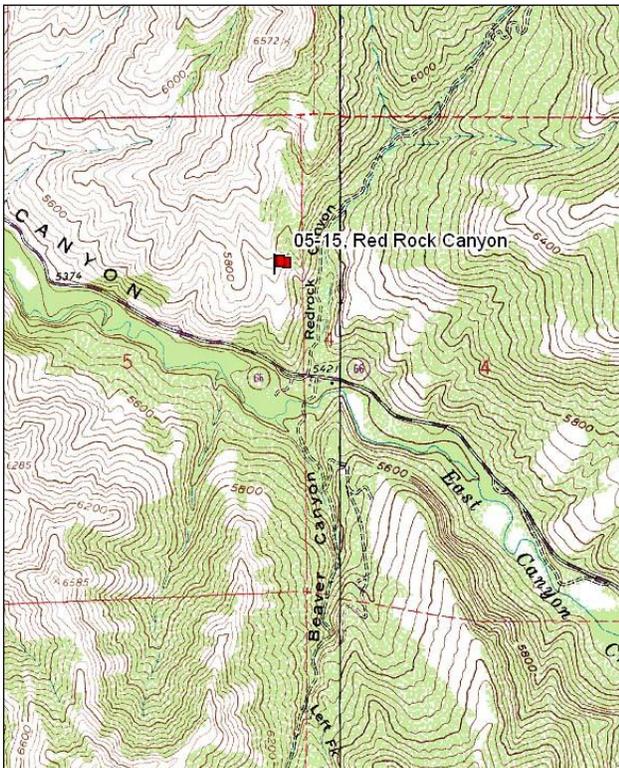
Transect bearing: 155° magnetic

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

Directions:

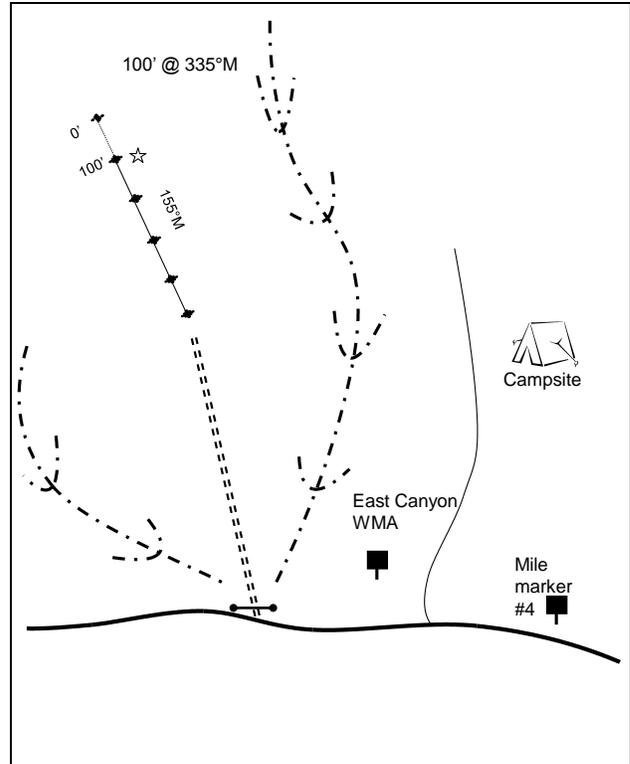
Travel east for 0.2 miles past mile marker # 4 on highway 66 heading towards Porterville and turn right (sign says East Canyon Wildlife Management Area). Travel north for 0.2 miles to a small 4-wheeler gate on the west (left) side of the road. Follow the 4-wheeler trail up and along the ridge. The 100-foot stake is marked by a full high fence post just off the trail. The 0-foot stake is 100 feet at 335 degrees magnetic. The 0-foot baseline stake is marked by a browse tag # 52.

Map Name: Porterville



Township: 2N Range: 3E Section: 5

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 447035 E 4532080 N

RED ROCK CANYON - TREND STUDY NO. 5-15

Site Information

Site Description: This trend study was established in 1996 on a small bench north of East Canyon. The site burned and was seeded in 1992 with a combination of grasses, forbs, and browse species (Table - Seed Mix). The area is considered winter range, although it also receives year round use. Big game presence was low in 1996. However, deer pellet groups were sampled in high abundance in 2001 and 2006. Deer pellet groups were not encountered in 2011. A few bedding areas were encountered in 2001 and two deer carcasses were identified in 2006. Elk pellet groups were sampled in moderate abundance in 2006. Cattle pats were sampled in high abundance in 2006, but low abundance in 2011 (Table - Pellet Group Data).

Browse: Browse species are not abundant and are likely absent due to the fire. The key browse species found on the study site is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). The most common species include stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and some broom snakeweed (*Gutierrezia sarothrae*). Mountain big sagebrush is a small population that has varied in density, and is centered within the mature age class. Young sagebrush dominated the population in 1996 and 2001, but no new recruitment has been sampled since 2006. Decadence and poor vigor of sagebrush have been low over the course of the study. Other browse species include white rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *albicaulis*) and mountain snowberry (*Symphoricarpos oreophilus*) (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory is abundant and diverse. Seeded grasses established well after the fire and include crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass (*A. spicatum*), and Great Basin wildrye (*Elymus cinereus*) (Table - Seed Mix). The most frequent and dominant perennial grass species is crested wheatgrass, which is followed by the weedy species bulbous bluegrass (*Poa bulbosa*). Bulbous bluegrass was sampled in 2001 and has steadily increased over the duration of the study in frequency and cover. Other perennial grass species include Kentucky bluegrass (*P. pratensis*), Sandberg bluegrass (*P. secunda*), orchard grass (*Dactylis glomerata*), mountain rye (*Secale montanum*), and thickspike wheatgrass (*Agropyron dasystachyum*). The weedy annual species Japanese chess (*Bromus japonicus*) and cheatgrass (*B. tectorum*) were dominant species within the herbaceous understory in 1996, but have significantly decreased over the duration of the study in frequency and cover (Table - Herbaceous Trends).

Forbs are also abundant, and several useful species are found on the site. In 1996 and 2001, the annual species yellow salsify (*Tragopogon dubius*) was the dominant forb, but decreased significantly in 2006. The seeded species alfalfa (*Medicago sativa*) and small burnet (*Sanguisorba minor*) (Table - Seed Mix) were also abundant in 1996, but have varied in frequency and production over the duration of the study. Overall, seeded forbs have established well. The nested frequency of perennial forbs increased in 2001, but decreased in 2006. Some utilization was noted on alfalfa and yellow salsify. Annual species included autumn willow weed (*Epilobium brachycarpum*), Douglas knotweed (*Polygonum douglasii*), tumble mustard (*Sisymbrium altissimum*), and pale alyssum (*Alyssum alyssoides*) (Table - Herbaceous Trends).

Soil: The study is part of the Hoskin-Rock outcrop complex, and is likely part of the Hoskin component. These soils occur on mountainsides. The parent material consists of colluvium over residuum derived from conglomerate (Soil Survey Staff 2011). The soil texture is a clay loam to sandy clay loam texture with a neutral soil reaction (pH 7.2) (Table - Soil analysis Data). Bare ground cover is rare with the occasional patch of the bare soil formed by gopher activity. Protective ground cover is provided by a high amount of vegetation and litter (Table - Basic Cover). There is very little rock in the soil profile or on the soil surface. No erosion has been apparent and the soil erosion condition has been classified as stable since 2001.

Trend Assessments

Browse:

- **1996 to 2001 - stable (0):** The density for mountain big sagebrush displayed no change at 220 plants/acre. Decadence and poor vigor were not observed within the sagebrush population. Recruitment of young sagebrush decreased from 100% of the population to 64%.
- **2001 to 2006 - slightly up (+1):** The density for mountain big sagebrush increased 27% to 280 plants/acre. Decadence and poor vigor were not observed within the sagebrush population. Recruitment of young sagebrush were absent to the population.
- **2006 to 2011 - slightly down (-1):** The density for mountain big sagebrush decreased 21% to 220 plants/acre. Decadence and poor vigor increased from 0% to 9%. Recruitment of young sagebrush was not observed within the population.

Grass:

- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 69%, and cover increased from 13% to 25%. Mountain brome (*Bromus carinatus*) and Sandberg bluegrass increased significantly in nested frequency. Sandberg bluegrass increased in cover from near 0% to 6%. The weedy perennial species bulbous bluegrass increased significantly in nested frequency, and increased in cover from less than 1% to 5%. Mountain rye decreased significantly in nested frequency. The weedy annual species Japanese chess had a significant decrease in nested frequency, and decreased in cover from 21% to 3%.
- **2001 to 2006 - stable (0):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, remained similar, and cover decreased slightly to 20%. The perennial species crested wheatgrass and thickspike wheatgrass increased significantly in nested frequency. The weedy species bulbous bluegrass increased to 7% cover. The weedy annual species cheatgrass increased significantly in nested frequency, and increased in cover from 1% to 4%.
- **2006 to 2011 - slightly down (-1):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, remained similar, and cover increased slightly to 23%. The weedy perennial species bulbous bluegrass increased significantly in nested frequency, and increased in cover to 17%. Sandberg bluegrass decreased significantly in nested frequency, and decreased in cover from 6% to 1%. The weedy annual species Japanese chess and cheatgrass decreased significantly in nested frequency.

Forb:

- **1996 to 2001 - up (+2):** The sum of nested frequency for perennial forbs increased 68%. Wild onion (*Allium sp.*) and American vetch (*Vicia americana*) increased significantly in nested frequency. American vetch increased in cover from less than 1% to 3%.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency for perennial forbs decreased 17%. Wild onion increased significantly in nested frequency. Alfalfa decreased significantly in nested frequency, and decreased in cover from 6% to 2%. American vetch had a significant decrease in nested frequency, and decreased in cover to 1%.
- **2006 to 2011 - up (+2):** The sum of nested frequency for perennial forbs increased 37%. Wild onion increased significantly in nested frequency, and increased in cover from 1% to 5%. Alfalfa increased significantly in nested frequency, and increased in cover from 2% to 8%. Common dandelion (*Taraxacum officinale*) and American vetch increased significantly in nested frequency, and increased in cover from less than 1% to 1% and to 4%, respectively.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 5, study no: 15

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	0.1	0.0	0.0	25.2	-18.3	10.0	0.0	17.0	Very Poor
01	0.2	0.0	0.0	30.0	-3.6	10.0	0.0	36.6	Very Poor-Poor
06	0.6	0.0	0.0	30.0	-3.7	10.0	0.0	36.8	Very Poor-Poor
11	2.0	0.0	0.0	30.0	-2.0	10.0	0.0	40.0	Poor

SEED MIX--

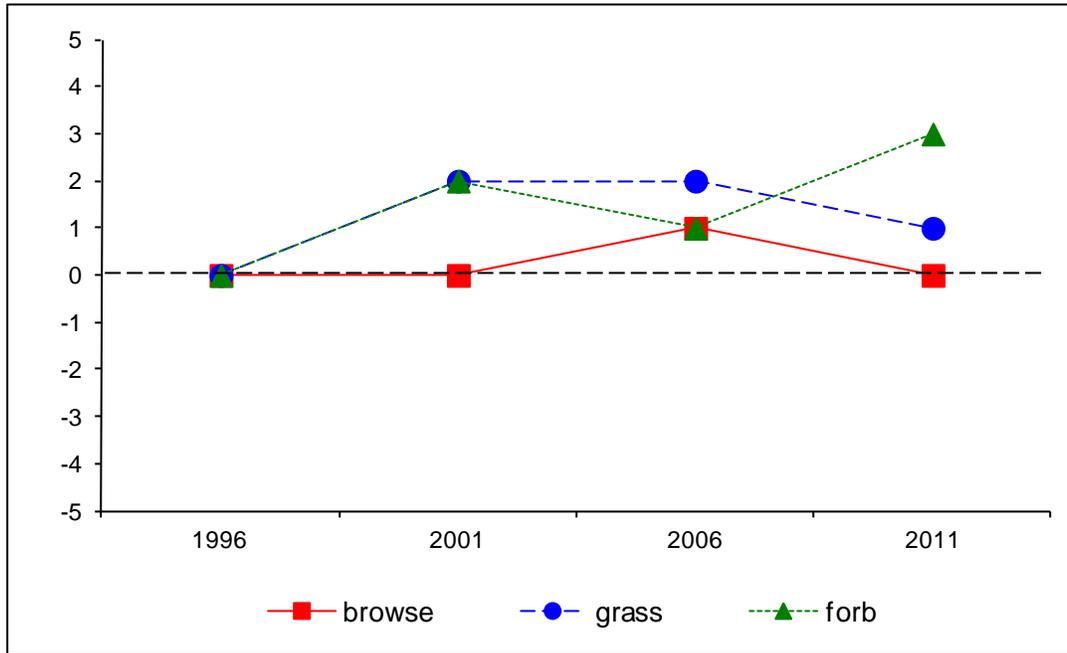
Management Unit 5, Study no: 15

Project Name: Redrock Burn	
Application: n/a	Acres: n/a
Seed Type	lbs in mix
G Big Bluegrass	600
G Bluebunch Wheatgrass 'goldar'	450
G Bromgrass, Regar	1200
G Crested Wheatgrass 'Hycrest'	1500
G Great Basin Wildrye 'Common'	200
G Orchardgrass 'Paiute'	1500
F Alfalfa 'Ladak'	3000
F Cicer Milkvetch	500
F Lewis Flax	600
F Small Burnet 'Delar'	2400
F Yellow Sweetclover	1200
B Rubber Rabbitbrush	800
B Sagebrush, Big Basin	1500
B Sagebrush, Mountain	1500
Total Pounds:	16950

Trend Summary

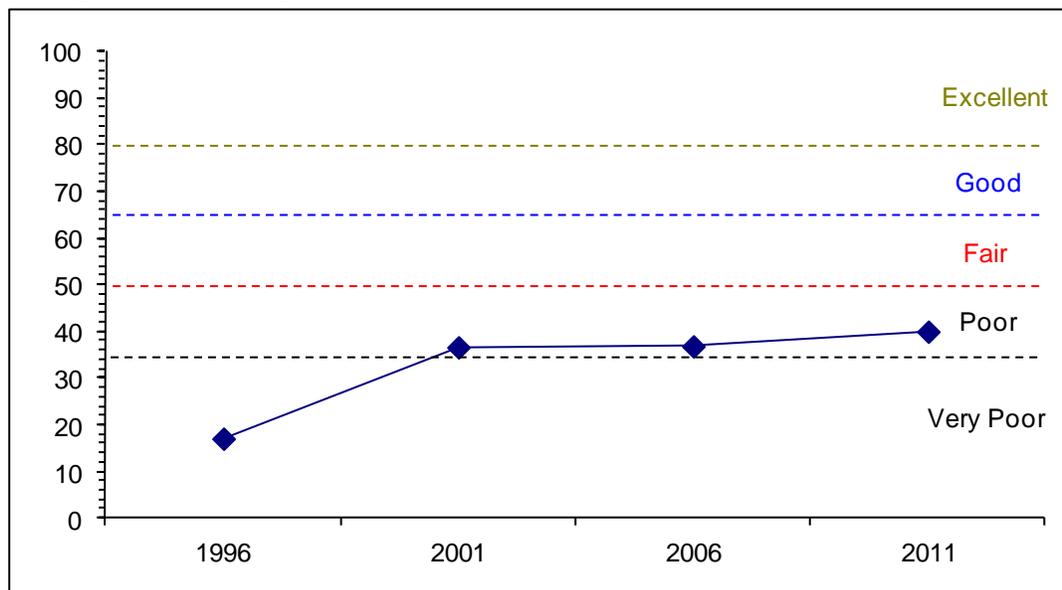
CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 5 Study no: 15



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--

Management unit 5, Study no: 15



HERBACEOUS TRENDS--
Management unit 05, Study no: 15

T y p e	Species	Nested Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	a180	a183	b228	b255	9.30	12.78	12.04	17.63
G	Agropyron dasystachyum	ab6	a1	b17	ab3	.06	.03	.11	.06
G	Agropyron intermedium	-	2	1	3	-	.03	.15	.03
G	Agropyron spicatum	27	34	15	35	.66	2.72	.80	1.58
G	Bromus brizaeformis (a)	-	10	3	3	-	.22	.01	.00
G	Bromus carinatus	a-	b22	b17	b25	-	1.25	.59	.90
G	Bromus japonicus (a)	d394	c256	b156	a90	21.03	3.12	.96	1.28
G	Bromus tectorum (a)	b121	b138	c191	a47	3.38	1.42	4.00	1.42
G	Dactylis glomerata	b18	ab7	a1	a-	.16	.22	.03	-
G	Elymus cinereus	2	7	10	5	.85	.81	.30	.18
G	Festuca myuros (a)	-	-	-	3	-	-	-	.00
G	Melica bulbosa	-	-	-	1	-	-	-	.00
G	Phleum pratense	-	3	-	-	-	.00	-	-
G	Poa bulbosa	a-	b146	b180	c299	-	5.17	7.27	17.15
G	Poa fendleriana	-	-	-	3	-	-	-	.06
G	Poa pratensis	ab51	b63	a18	c120	1.11	1.50	.08	1.91
G	Poa secunda	a9	b197	b216	a40	.05	5.60	5.70	.51
G	Secale montanum	b14	a-	a1	a4	.40	.00	.03	.03
G	Stipa comata	-	-	-	5	-	-	-	.06
Total for Annual Grasses		515	404	350	143	24.41	4.76	4.97	2.72
Total for Perennial Grasses		307	665	704	798	12.61	30.14	27.12	40.13
Total for Grasses		822	1069	1054	941	37.02	34.91	32.09	42.85
F	Achillea millefolium	27	39	42	33	.23	.67	1.40	1.75
F	Agoseris glauca	a17	ab32	ab40	b46	.10	.45	.38	.53
F	Allium sp.	a-	b89	c162	d262	-	.35	.79	5.16
F	Alyssum alyssoides (a)	a11	b116	b102	c218	.03	1.15	.25	2.52
F	Artemisia ludoviciana	-	-	-	1	-	-	-	.00
F	Aster sp.	-	3	-	2	-	.00	-	.00
F	Camelina microcarpa (a)	-	21	21	4	-	.21	.05	.03
F	Chaenactis douglasii	-	3	-	-	-	.00	-	-
F	Cirsium undulatum	c39	bc21	ab11	a6	.66	.76	.08	.41
F	Collinsia parviflora (a)	a-	c69	bc41	b27	-	.35	.09	.07
F	Collomia grandiflora (a)	1	1	7	10	.00	.00	.01	.01
F	Collomia linearis (a)	13	18	2	13	.03	.06	.00	.03
F	Comandra pallida	b19	ab13	a3	a3	.08	.10	.00	.03
F	Crepis acuminata	-	-	-	6	-	-	-	.18
F	Descurainia pinnata (a)	a-	a5	a3	b45	-	.01	.00	.47
F	Draba sp. (a)	a-	a19	a24	b176	-	.08	.05	3.28
F	Epilobium brachycarpum (a)	b122	a13	c257	c238	1.10	.10	1.10	7.75
F	Erigeron pumilus	1	-	-	-	.00	-	-	-
F	Eriogonum umbellatum	-	-	-	3	-	-	-	.00
F	Erodium cicutarium (a)	a8	b77	c147	d217	.09	1.26	.93	4.88
F	Galium aparine (a)	1	5	-	11	.00	.03	-	.09

T y p e	Species	Nested Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
F	Gayophytum ramosissimum(a)	a ⁻	a ⁻	a ³	b ³⁸	-	-	.00	.43
F	Gilia sp. (a)	-	3	-	2	-	.00	-	.00
F	Grindelia squarrosa	a ²	a ⁻	ab ¹⁵	b ¹⁷	.03	-	.24	.92
F	Helianthus annuus (a)	a ³	a ⁻	b ²¹	a ⁻	.03	-	.09	-
F	Holosteum umbellatum (a)	-	37	67	65	-	.13	.15	.25
F	Lactuca serriola (a)	b ¹⁵⁴	a ⁶	a ³⁶	c ²⁸⁰	1.77	.18	.33	8.74
F	Lappula occidentalis (a)	a ⁻	a ³²	a ⁷	b ¹⁷⁸	-	.14	.01	3.87
F	Linum lewisii	99	98	32	2	1.39	.71	.18	.03
F	Lithophragma sp.	-	-	-	2	-	-	-	.03
F	Machaeranthera canescens	a ⁴	a ⁻	b ¹⁶	a ⁻	.18	-	.04	-
F	Medicago sativa	ab ⁴⁸	b ⁶⁰	a ³²	b ⁷¹	1.71	6.19	1.58	8.10
F	Melilotus officinalis	ab ¹¹	b ⁷	b ²⁰	b ⁴	.48	.09	.93	.16
F	Microsteris gracilis (a)	a ⁻	a ¹	b ¹⁹	ab ⁵	-	.00	.06	.01
F	Onobrychis viciaefolia	-	-	-	-	-	.03	-	-
F	Phlox longifolia	2	9	-	-	.00	.01	-	-
F	Polygonum douglasii (a)	b ⁵⁰	a ³	a ³⁰	a ⁷	.19	.01	.05	.01
F	Ranunculus testiculatus (a)	-	-	4	4	-	-	.00	.03
F	Sanguisorba minor	b ³²	a ¹⁶	a ⁶	a ⁵	.60	.17	.24	.01
F	Sisymbrium altissimum (a)	16	35	15	22	.25	.61	.10	.44
F	Taraxacum officinale	a ⁻	ab ⁹	a ¹	b ²²	-	.19	.06	.67
F	Tragopogon dubius (a)	b ¹⁹⁰	b ¹⁹¹	a ⁷⁶	a ⁷⁸	3.86	8.22	.90	1.93
F	Vicia americana	a ¹¹	c ¹²⁴	b ⁵³	c ¹⁰⁸	.07	2.45	.46	3.72
Total for Annual Forbs		569	652	882	1638	7.38	12.59	4.25	34.91
Total for Perennial Forbs		312	523	433	593	5.57	12.24	6.42	21.77
Total for Forbs		881	1175	1315	2231	12.95	24.83	10.67	56.69

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

BROWSE TRENDS--

Management unit 05, Study no: 15

T y p e	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata vaseyana	10	9	12	10	.10	.15	.44	1.61
B	Chrysothamnus nauseosus albicaulis	1	3	3	2	-	-	-	.18
B	Chrysothamnus viscidiflorus viscidiflorus	51	44	41	32	7.43	4.78	5.36	5.48
B	Gutierrezia sarothrae	22	11	0	9	1.45	.65	-	.03
B	Symphoricarpos oreophilus	3	4	3	4	.38	.15	.15	.00
Total for Browse		87	71	59	57	9.37	5.74	5.96	7.31

CANOPY COVER, LINE INTERCEPT--

Management unit 05, Study no: 15

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	1.98	1.45
Chrysothamnus nauseosus albicaulis	.43	.66
Chrysothamnus viscidiflorus viscidiflorus	9.19	7.18
Gutierrezia sarothrae	-	.45
Symphoricarpos oreophilus	.20	.21

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 05, Study no: 15

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	-	3.1	3.7

BASIC COVER--

Management unit 05, Study no: 15

Cover Type	Average Cover %			
	'96	'01	'06	'11
Vegetation	63.68	64.11	53.64	81.79
Rock	.35	.51	.64	.04
Pavement	.20	2.60	2.07	.91
Litter	79.98	49.67	38.51	31.28
Cryptogams	.04	.08	.06	.08
Bare Ground	3.74	4.70	17.82	3.56

SOIL ANALYSIS DATA --

Management unit 05, Study no: 15, Study Name: Red Rock Canyon

Effective rooting depth (in)	pH	Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.5	7.2	44.6	25.4	30.0	3.3	41.4	291.2	0.6

PELLET GROUP DATA--

Management unit 05, Study no: 15

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	-	-	6	1	-	-	-
Elk	1	-	5	-	-	27 (68)	-
Deer	5	11	42	11	50 (124)	40 (98)	-
Cattle	-	-	30	2	-	42 (104)	3 (7)

BROWSE CHARACTERISTICS--

Management unit 05, Study no: 15

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 alnifolia</i>									
96	0	0	0	-	-	0	0	0	-/-
01	0	0	0	-	-	0	0	0	-/-
06	0	0	0	-	-	0	0	0	25/31
11	0	0	0	-	-	0	0	0	30/37
<i>Artemisia tridentata vaseyana</i>									
96	220	100	0	0	80	0	0	0	17/9
01	220	64	36	0	-	0	0	0	18/25
06	280	0	100	0	-	21	36	0	22/22
11	220	0	91	9	20	9	0	9	24/28
<i>Chrysothamnus nauseosus albicaulis</i>									
96	20	0	100	-	-	0	0	0	25/25
01	60	100	0	-	-	0	0	0	9/31
06	60	0	100	-	-	0	0	0	27/39
11	40	0	100	-	-	100	0	0	25/41
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
96	2200	7	92	1	-	0	0	0	17/28
01	1360	1	87	12	-	0	0	0	15/25
06	1220	0	98	2	-	0	0	0	19/30
11	860	0	100	0	-	0	0	0	17/28
<i>Gutierrezia sarothrae</i>									
96	1580	35	65	0	-	0	0	0	11/10
01	580	0	93	7	-	0	0	0	8/10
06	0	0	0	0	-	0	0	0	9/7
11	180	33	67	0	-	0	0	0	9/11
<i>Purshia tridentata</i>									
96	0	0	0	-	-	0	0	0	-/-
01	0	0	0	-	-	0	0	0	-/-
06	0	0	0	-	-	0	0	0	17/28
11	0	0	0	-	-	0	0	0	25/36
<i>Symphoricarpos oreophilus</i>									
96	80	50	50	-	-	0	0	0	23/32
01	80	50	50	-	-	25	0	0	13/21
06	60	33	67	-	-	0	0	0	19/31
11	80	75	25	-	-	0	0	0	18/33