

OWEN'S CANYON - TREND STUDY NO. 4-4-11

Vegetation Type: Burned and Seeded

Range Type: Crucial Deer Winter, Crucial Elk Winter

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

Land Ownership: DWR

Elevation: 6,300 ft (1,920 m)

Aspect: South

Slope: 22-30%

Transect bearing: 160° magnetic

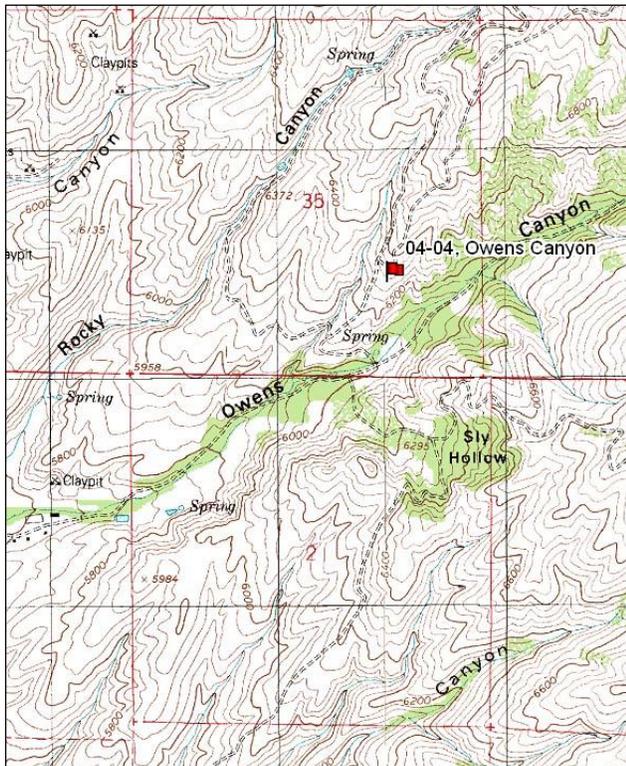
Belt placement: line 1 (11 & 71ft), line 2 (59ft), line 3 (34ft), line 4 (95ft)

Directions:

From the "R" Ranch main gate proceed 0.7 miles to the ranch buildings and a fork. Take the left fork through a white post entrance. Continue straight 0.4 miles to a culvert, then 0.45 miles farther to a DWR gate.

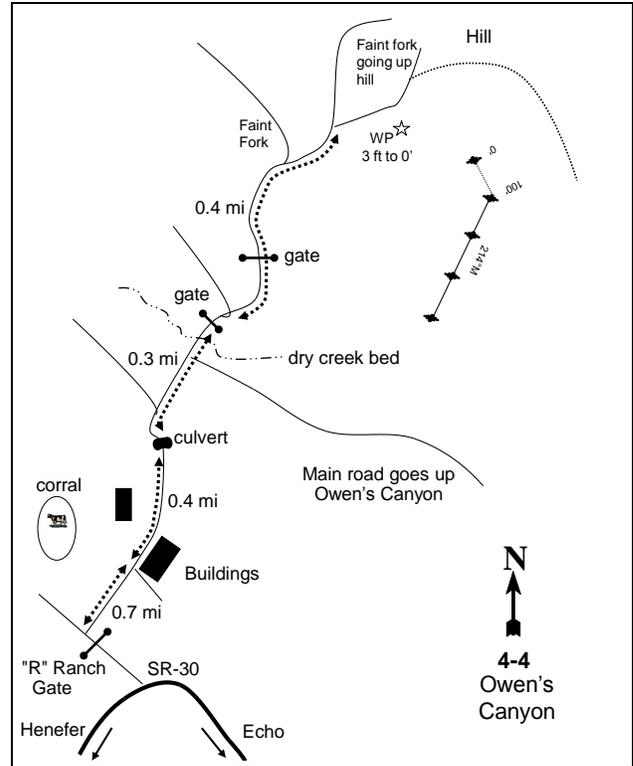
Continue through the gate 0.25 miles, turn left, cross the wash, and stay on the main road (left fork leads to DWR cabin). Proceed 0.4 miles to a fork in the road. Continue right for 0.3 miles. A witness post is three feet from the 0-foot stake. The 0-foot baseline stake is marked by browse tag #7945. The baseline doglegs after the 100-foot baseline stake and runs 214 degrees magnetic.

Map Name: Henefer



Township: 4N Range: 4E Section: 35

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 461368 E 4542573 N

OWEN'S CANYON - TREND STUDY NO. 4-4

Site Information

Site Description: The study is located in the Division of Wildlife Resources (DWR) Henefer-Echo Wildlife Management Area (WMA) on the north side of Owen's Canyon. The study samples a former mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community. The Eagle Canyon fire burned 3,744 acres, including the study site, in 1999, effectively removing the sagebrush and other browse species. The site is now dominated by grasses. Cattle and sheep, owned by ranchers to the north and south of the property, graze the lower elevations of the WMA. It was noted that deer pellet groups were moderately abundant during the 1984 reading. Deer pellet groups have been sampled in low abundance since 2001. Elk pellet groups were sampled in low abundance in 2001, but in high abundance since 2006. Sampled cattle sign has been minimal since 2001 (Table - Pellet Group Data).

Browse: The sagebrush on the site was classified as mountain big sagebrush, but also had characteristics of basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). Prior to the burn in 1996, mountain big sagebrush provided 20% cover (Table - Browse Trends) from a moderately dense stand. Utilization was mostly light to moderate, and decadence was moderately high. The fire reduced all of the preferred browse populations substantially. Forage kochia (*Kochia prostrata*) was seeded following the fire, and has become the only browse species with substantial density. Utilization of the kochia has been light to moderate since 2006. The kochia appears to be establishing well despite the dense herbaceous understory. Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) is present on the site, but density did not change after the fire (Table - Browse Characteristics).

Herbaceous Understory: Grasses have dominated the herbaceous understory, and have become the dominant vegetation since the fire. The most abundant herbaceous plants are the exotic perennial grasses crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*A. intermedium*), and smooth brome (*Bromus inermis*), all of which were seeded prior to the study establishment. Several other native perennial grasses are found, but only western wheatgrass (*Agropyron smithii*) is abundant. The weedy species bulbous bluegrass (*Poa bulbosa*) has been steadily increasing on the site since the fire. The annual grasses cheatgrass (*Bromus tectorum*) and Japanese chess (*B. japonicus*) are common, and have dominated the site at times. The majority of forbs are weedy biennials and annuals. The only common perennial forb is American vetch (*Vicia americana*). Pale alyssum (*Alyssum alyssoides*) and storksbill (*Erodium cicutarium*) are very common annual forbs. The noxious weed musk thistle (*Carduus nutans*) was sampled at very low cover in 2001 (Table - Herbaceous Trends).

Soil: The soil is in the Horrocks-Cutoff complex, likely as part of the Horrocks component. These soils occur on mountain slopes, with parent material consisting of colluvium derived from conglomerate, sandstone, and andesite. The soils are characterized as moderately deep, well drained, and moderately permeable (Soil Survey 2011). Drainage is probably excessive and soil moisture may be limited in the upper horizons during midsummer. The soil texture is a clay loam with a neutral soil reaction (pH 6.7) (Table - Soil Analysis Data). Bare ground cover increased following the fire, but is still relatively low. There is abundant vegetation and litter cover provided by herbaceous species (Table - Basic Cover). The soil erosion condition has been classified as stable since 2001.

Trend Assessments

Browse:

- **1984 to 1990 - stable (0):** There was a slight increase in the density of mountain big sagebrush from 3,964 plants/acre to 4,098 plants/acre. Decadence increased from 17% to 43%, and poor vigor increased from 3% to 17%. Recruitment of young sagebrush plants remained high at 21%.

- **1990 to 1996 - stable (0):** Differences in density may be related to the larger sample area used in 1996; therefore, trend was determined using other parameters. Sagebrush decadence decreased to 22%, and poor vigor decreased to 6%. Recruitment of young sagebrush plants decreased to 9% of the population.
- **1996 to 2001 - down (-2):** The fire effectively removed all preferred browse from the site. The density of sagebrush decreased to 60 plants/acre. The population consisted entirely of young plants.
- **2001 to 2006 - slightly up (+1):** The mountain big sagebrush density remains very low, but increased to 180 plants/acre. The seeded species forage kochia increased 73% from 1,460 plants/acre to 2,520 plants/acre, most of which were mature, established plants. Cover of kochia increased, but remained low at 1%.
- **2006 to 2011 - stable (0):** The density of forage kochia increased slightly to 2,740 plants/acre, but cover remained around 1%. There was little change in the sagebrush population.

Grass:

- **1984 to 1990 - up (+2):** The sum of nested frequency of perennial grasses increased by 73% due to a significant increase in the nested frequency of crested wheatgrass.
- **1990 to 1996 - slightly up (+1):** The sum of nested frequency of perennial grasses increased 27%. Annual grasses were included in the sample for the first time and were present at high frequency and cover.
- **1996 to 2001 - up (+2):** Following the fire, the sum of nested frequency of perennial grasses, excluding bulbous bluegrass, increased 16%, and cover increased from 12% to 24%. Both cheatgrass and Japanese chess decreased significantly in nested frequency, and annual grass cover decreased from 20% to 3%.
- **2001 to 2006 - slightly up (+1):** The sum of nested frequency of perennial grasses, excluding bulbous bluegrass, increased by 14%, and cover increased to 28%. Cheatgrass increased significantly in nested frequency, and cover of annual grasses increased to 10%.
- **2006 to 2011 - up (+2):** The sum of nested frequency of perennial grass, excluding bulbous bluegrass, increased 36%, though cover remained similar at 27%. Japanese chess increased significantly in nested frequency, but annual grass cover decreased to 7%.

Forb:

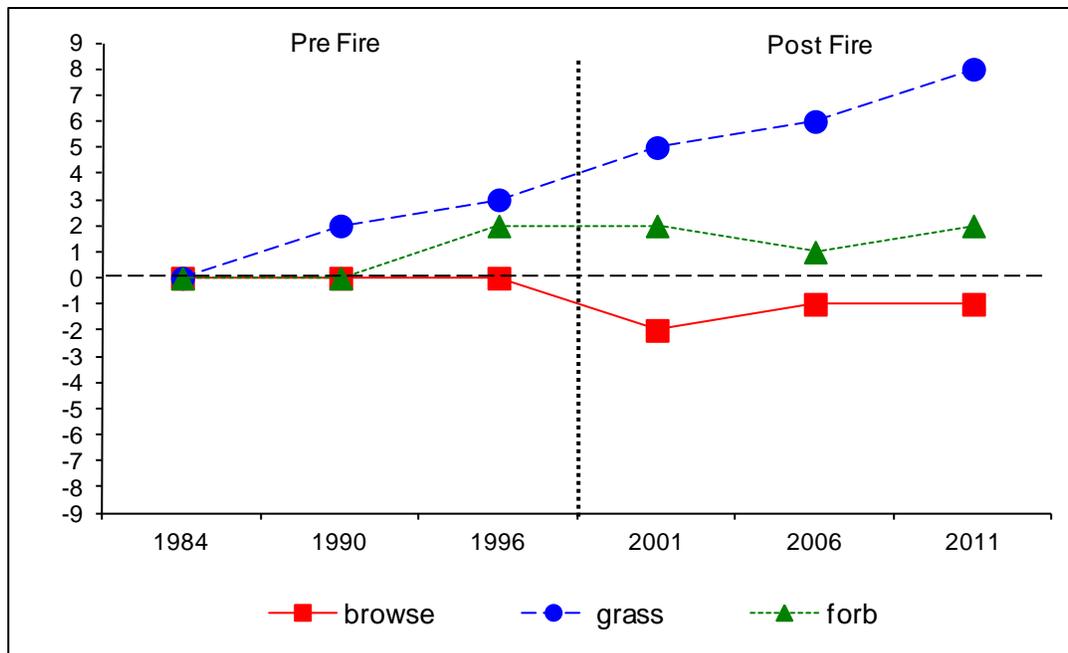
- **1984 to 1990 - stable (0):** Perennial forbs remained rare on the site.
- **1990 to 1996 - up (+2):** The sum of nested frequency of perennial forbs increased nearly seven-fold, though cover was only 1%.
- **1996 to 2001 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, though cover increased to 2%. The annual forb sum of nested frequency and cover increased substantially. Most of the increase in annual forbs was due to significant increases in the nested frequency of Pale alyssum and storksbill.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency of perennial forbs decreased 26%, but forbs were rare on the site and only provided 2% cover. The annual forb sum of nested frequency increased substantially, but cover decreased to 7%.
- **2006 to 2011 - slightly up (+1):** The sum of nested frequency of perennial forbs increased to 2001 levels, but cover remained low at 1%.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
 Management unit 4, study no: 4

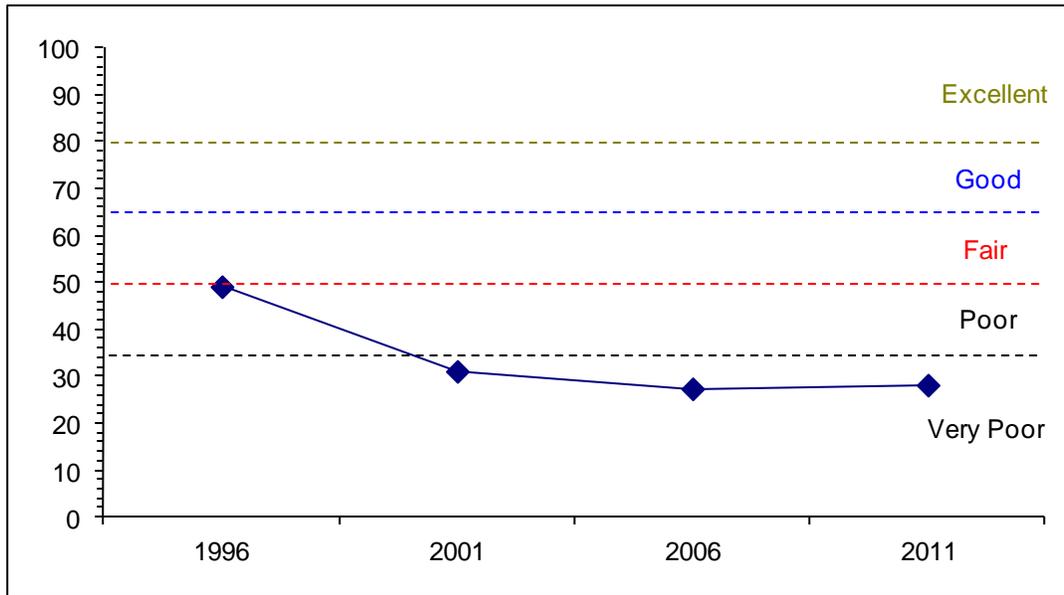
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	25.9	8.2	4.6	23.3	-14.8	2.0	0.0	49.1	Poor-Fair
01	0.5	0.0	0.0	30.0	-1.9	4.4	-2.0	31.1	Very Poor
06	2.0	0.0	0.0	30.0	-7.5	2.9	0.0	27.4	Very Poor
11	1.2	0.0	0.0	30.0	-5.3	2.2	0.0	28.2	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 4, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--
 Management unit 4, Study no: 4



HERBACEOUS TRENDS--
 Management unit 04, Study no: 4

Type	Species	Nestled Frequency						Average Cover %			
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron cristatum	a70	c132	bc133	ab87	bc127	c143	6.62	5.27	8.26	8.47
G	Agropyron intermedium	a1	a8	a15	b55	b77	b76	.69	3.37	5.58	4.81
G	Agropyron smithii	a-	a-	b29	b45	b42	c111	.39	4.52	3.94	6.85
G	Agropyron spicatum	3	-	2	-	4	2	.01	-	.76	.15
G	Bromus inermis	a50	ab83	bc99	bc105	bc113	c141	3.80	9.85	8.68	5.86
G	Bromus japonicus (a)	-	-	c203	a73	a89	b140	4.48	.50	.79	1.92
G	Bromus tectorum (a)	-	-	c321	a84	b178	b173	15.25	1.99	9.26	5.10
G	Dactylis glomerata	a-	a-	a-	b21	a1	a-	-	.35	.15	-
G	Oryzopsis hymenoides	-	2	4	10	4	-	.03	.36	.15	-
G	Poa bulbosa	a-	a-	a2	ab26	b39	c101	.01	1.43	1.12	3.55
G	Poa fendleriana	-	-	-	4	-	-	-	.15	-	-
G	Poa pratensis	-	2	5	8	1	-	.09	.18	.03	-
G	Poa secunda	a-	a1	a2	a-	a13	b45	.03	-	.30	.53
G	Sitanion hystrix	b9	a2	a-	a-	a-	a1	-	-	.00	.00
Total for Annual Grasses		0	0	524	157	267	313	19.74	2.50	10.05	7.02
Total for Perennial Grasses		133	230	291	361	421	620	11.68	25.51	29.01	30.25
Total for Grasses		133	230	815	518	688	933	31.43	28.01	39.06	37.27
F	Agoseris glauca	-	-	-	3	-	-	-	.00	-	-
F	Allium sp.	a-	a-	a-	c32	b9	c35	-	.20	.02	.10
F	Alyssum alyssoides (a)	-	-	a157	c324	b279	c332	.81	25.80	2.18	6.28
F	Ambrosia psilostachya	-	-	-	7	-	-	-	.04	-	-
F	Arabis sp.	2	13	2	-	-	-	.01	-	-	-
F	Arenaria sp.	-	-	-	-	4	-	-	-	.03	-

Type	Species	Nested Frequency					Average Cover %				
		'84	'90	'96	'01	'06	'11	'96	'01	'06	'11
F	Aster sp.	-	-	4	7	6	1	.03	.18	.18	.03
F	Astragalus sp.	-	-	2	1	-	-	.03	.03	-	-
F	Astragalus utahensis	-	-	-	-	-	1	-	-	-	.03
F	Calochortus nuttallii	-	-	-	3	-	-	-	.00	-	-
F	Camelina microcarpa (a)	-	-	a4	b23	a-	a-	.38	.06	-	-
F	Carduus nutans (a)	-	-	-	-	-	-	-	.03	-	-
F	Cirsium undulatum	-	2	8	5	-	-	.06	.01	-	-
F	Collinsia parviflora (a)	-	-	a3	bc45	c60	ab22	.00	.68	.15	.05
F	Collomia linearis (a)	-	-	a-	b14	cd19	c23	-	.02	.08	.06
F	Cymopterus sp.	-	-	1	-	7	6	.00	-	.07	.01
F	Descurainia pinnata (a)	-	-	-	10	3	3	-	.04	.00	.00
F	Draba sp. (a)	-	-	a-	b18	b41	c127	-	.04	.08	.58
F	Epilobium brachycarpum (a)	-	-	a-	bc39	c57	b22	-	.75	.31	.04
F	Erigeron strigosus	-	-	5	-	-	-	.03	-	-	-
F	Eriogonum umbellatum	-	-	-	-	-	3	-	-	-	.00
F	Erodium cicutarium (a)	-	-	a-	b70	b69	c109	-	3.65	1.08	1.26
F	Gayophytum ramosissimum(a)	-	-	-	-	2	-	-	-	.00	-
F	Grindelia squarrosa	8	-	-	3	1	-	-	.03	.03	-
F	Hedysarum boreale	a-	a-	b40	a-	a-	a-	.42	-	-	-
F	Helianthus annuus (a)	-	-	a-	a-	b16	c37	-	-	.07	.16
F	Holosteum umbellatum (a)	-	-	a31	a69	b128	b97	.36	.43	.47	.28
F	Lactuca serriola (a)	-	-	a-	bc17	b14	c34	-	.06	.04	.11
F	Lappula occidentalis (a)	-	-	-	-	2	-	-	-	.00	-
F	Machaeranthera spp	-	-	6	-	-	-	.01	-	-	-
F	Medicago sativa	-	-	-	-	-	3	-	-	.15	.03
F	Melilotus officinalis	-	-	-	5	-	-	-	.18	.03	-
F	Microsteris gracilis (a)	-	-	a-	b12	c44	c72	-	.08	.09	.25
F	Oenothera caespitosa	3	-	-	-	-	-	-	-	-	-
F	Penstemon sp.	-	-	-	1	-	-	-	.03	-	-
F	Phlox longifolia	a-	a-	a-	b14	a-	a-	-	.36	-	-
F	Polygonum douglasii (a)	-	-	3	3	6	3	.00	.01	.01	.00
F	Ranunculus testiculatus (a)	-	-	a3	a8	c90	b40	.00	.04	.50	.12
F	Sanguisorba minor	a-	a-	a-	b7	a-	a-	-	.66	-	-
F	Sisymbrium altissimum (a)	-	-	a-	b25	a1	a-	-	.21	.00	-
F	Sphaeralcea coccinea	-	-	-	4	1	-	-	.21	.00	-
F	Tragopogon dubius (a)	a6	a6	bc20	a12	d81	c41	.16	.10	1.50	.54
F	Vicia americana	a-	a4	b61	a29	a62	a78	.36	.26	.94	.87
Total for Annual Forbs		6	6	221	689	912	962	1.73	32.04	6.60	9.77
Total for Perennial Forbs		13	19	129	121	90	127	0.98	2.22	1.47	1.09
Total for Forbs		19	25	350	810	1002	1089	2.72	34.26	8.08	10.86

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

BROWSE TRENDS--

Management unit 04, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Amelanchier alnifolia	3	0	1	1	-	-	.15	-
B	Artemisia tridentata vaseyana	82	3	7	8	19.85	-	.15	.30
B	Chrysothamnus nauseosus albicaulis	7	0	0	0	.83	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	16	16	14	10	.97	.36	.59	.38
B	Gutierrezia sarothrae	1	1	0	0	.07	-	-	-
B	Kochia prostrata	0	37	43	44	-	.35	1.04	.58
B	Symphoricarpos oreophilus	1	0	0	0	-	-	-	-
Total for Browse		110	57	65	63	21.72	0.70	1.94	1.27

CANOPY COVER, LINE INTERCEPT--

Management unit 04, Study no: 4

Species	Percent Cover	
	'06	'11
Amelanchier alnifolia	.18	-
Artemisia tridentata vaseyana	.31	.48
Chrysothamnus viscidiflorus viscidiflorus	1.03	.58
Kochia prostrata	2.29	1.79

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 04, Study no: 4

Species	Average leader growth (in)	
	'06	'11
Artemisia tridentata vaseyana	2.7	2.0

BASIC COVER--

Management unit 04, Study no: 4

Cover Type	Average Cover %					
	'84	'90	'96	'01	'06	'11
Vegetation	.50	8.50	50.47	63.19	44.72	58.20
Rock	12.75	7.00	2.49	4.01	4.59	3.23
Pavement	11.50	11.75	2.90	5.78	5.42	8.05
Litter	68.75	61.50	68.31	32.54	42.84	29.47
Cryptogams	0	0	.95	.00	.00	.03
Bare Ground	6.50	11.25	1.56	15.32	18.73	15.01

SOIL ANALYSIS DATA --

Management unit 04, Study no: 4, Study Name: Owen's Canyon

Effective rooting depth (in)	pH	Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
9.8	6.7	44.6	27.4	28.0	3.2	22.4	176.0	0.4

PELLET GROUP DATA--

Management unit 04, Study no: 4

Type	Quadrat Frequency			
	'96	'01	'06	'11
Sheep	-	-	-	1
Rabbit	1	-	1	2
Elk	4	3	49	27
Deer	12	3	2	3
Cattle	1	-	4	3

Days use per acre (ha)		
'01	'06	'11
-	-	-
-	-	-
9 (23)	66 (164)	64 (159)
4 (10)	5 (12)	5 (12)
-	9 (23)	4 (11)

BROWSE CHARACTERISTICS--

Management unit 04, Study no: 4

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Amelanchier alnifolia										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	60	33	67	-	-	0	0	0	25/20	
01	0	0	0	-	-	0	0	0	12/9	
06	20	0	100	-	-	100	0	0	17/26	
11	20	0	100	-	-	100	0	100	20/21	
Artemisia tridentata vaseyana										
84	3964	25	58	17	133	61	11	3	23/32	
90	4098	21	36	43	1066	56	20	17	14/17	
96	3420	9	69	22	120	13	2	6	26/45	
01	60	100	0	0	140	0	0	0	-/-	
06	180	0	100	0	-	11	78	0	14/13	
11	200	0	100	0	-	90	10	0	17/23	
Chrysothamnus nauseosus albicaulis										
84	33	0	100	0	-	0	0	0	9/6	
90	99	33	0	67	33	0	0	0	-/-	
96	160	13	50	38	-	0	0	0	24/34	
01	0	0	0	0	-	0	0	0	-/-	
06	0	0	0	0	-	0	0	0	21/23	
11	0	0	0	0	-	0	0	0	25/47	
Chrysothamnus viscidiflorus viscidiflorus										
84	33	0	0	100	-	0	0	0	-/-	
90	33	0	100	0	-	100	0	100	6/8	
96	420	10	81	10	-	0	0	0	14/22	
01	460	0	100	0	-	0	0	0	11/16	
06	400	10	85	5	-	10	0	5	14/24	
11	360	0	78	22	-	0	0	11	12/16	

		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>Gutierrezia sarothrae</i>										
84	1132	0	97	3	-	0	0	0	12/6	
90	33	0	100	0	33	0	0	0	5/6	
96	200	20	80	0	180	0	0	0	10/12	
01	20	0	100	0	-	0	0	0	-/-	
06	0	0	0	0	-	0	0	0	-/-	
11	0	0	0	0	-	0	0	0	-/-	
<i>Kochia prostrata</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	0	0	0	-	-	0	0	0	-/-	
01	1460	71	29	-	20	0	0	0	4/6	
06	2520	33	67	-	6380	40	21	0	10/13	
11	2740	10	90	-	-	34	.72	0	8/10	
<i>Symphoricarpos oreophilus</i>										
84	0	0	0	-	-	0	0	0	-/-	
90	0	0	0	-	-	0	0	0	-/-	
96	20	0	100	-	-	0	0	0	17/16	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	18/27	
11	0	0	0	-	-	0	0	0	19/37	