

Trend Study 4-3-06

Study site name: Tank Canyon.

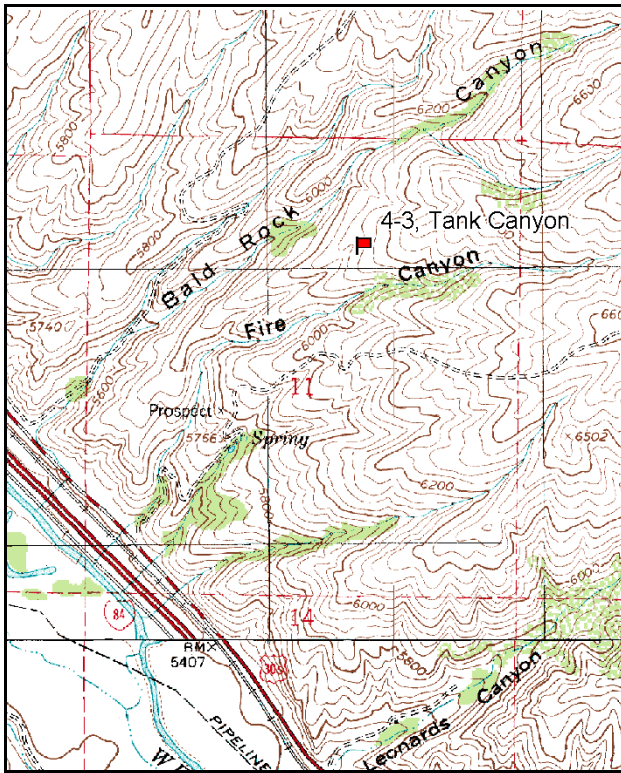
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 146 degrees magnetic.

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

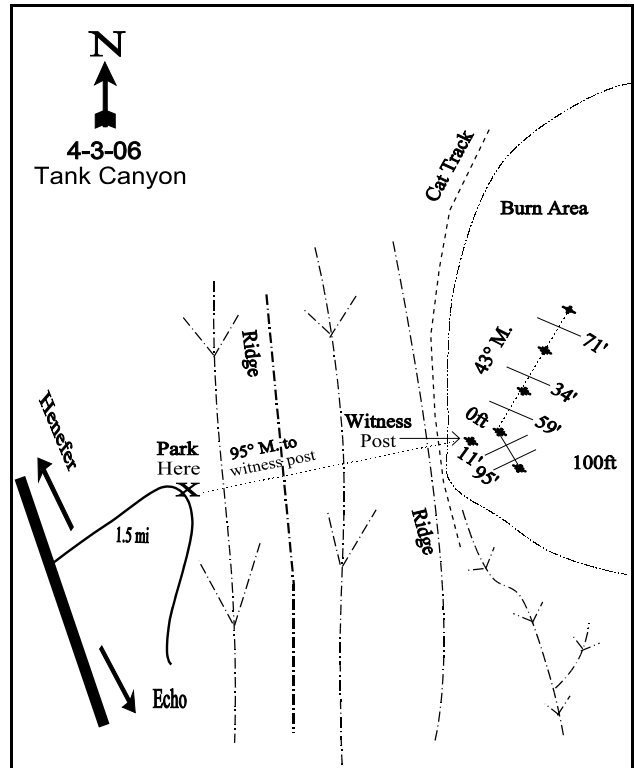
LOCATION DESCRIPTION

From the East Henefer/Echo Exit, travel east parallel to the freeway. Turn left (north) up fire canyon to the DWR gate. Proceed 0.8 miles to the Fire Canyon Access road to a point where the road switchbacks. Park at 3 full high posts before the switchback. Walk at a bearing of 11 degrees magnetic walking down and back up the ravine to the next ridge to an open area that has been burned. A witness post is in the opening. The 0-foot baseline stake is just north of the witness post. The 0-foot baseline stake is marked with browse tag #7944. Line 1 runs at a bearing of 146 degrees magnetic. The rest of the baseline runs off the 0-foot baseline in a direction of 43 degrees magnetic.



Map Name: Henefer

Township 3N, Range 4E, Section 11



Diagrammatic Sketch

UTM NAD 27, UTM 12T 4540050 N 461327 E

DISCUSSION

Tank Canyon - Trend Study No. 4-3

Study Information

This study samples critical deer winter range on the Henefer-Echo wildlife management area between Tank Canyon and Bald Rock Canyon (elevation: 6,100 feet, slope: 23%, aspect: west). The area was dominated by mountain big sagebrush prior to a 1982 fire and appears to have been seeded afterward. Another small fire burned 40 acres of the area, including the study, some time between 1984 and 1990. In 1990, the frequency data was collected where it had burned and density data was collected mainly in an unburned area, which caused an incongruity between the two. During the 1996 reading, the sampling area was enlarged and the entire study was moved completely into the burned area. Therefore, all data and trends from 1984 and 1990 can be found in previous reports, but will not be compared to data after 1996. Cattle and sheep, owned by ranchers to the north and south of the property, graze the lower elevations of the WMA from April 15 to July 15. On the original studies, pellet groups were abundant and several winter-killed carcasses were seen in the immediate vicinity. Pellet group quadrat frequencies were low for deer and elk in 1996, but some sheep had used the area during the summer. The pellet group transect data in 2001 estimated 46 elk and 21 deer days use/acre (112 edu/ha and 51 ddu/ha). The 2006 pellet group data estimates were 56 elk, 15 deer, and 35 cow days/use acre (137 edu/ha, 38 ddu/ha, and 86 cdu/ha). Most of the deer pellet groups appeared to be from spring use. About half of the elk pellet groups were from spring use and the other half were from winter use.

Soil

The soil is in the Horrocks-Cutoff series complex which is moderately deep, well drained, moderately permeable and formed in glacial deposits, residuum, and colluvium derived from andesite, quartzite, sandstone, and conglomerate (USDA-NRCS 2006). It is excessively drained and probably holds little available water in mid-summer. Soil texture is a clay loam with a neutral soil reaction (pH of 7.0). The effective rooting depth is estimated at just over 16 inches. Soil erosion is minimal due to the abundant herbaceous understory cover, which was 50% in 1996, 76% in 2001, and 62% in 2006. The relative bare ground cover has been at or below 4% since 1996. The erosion condition class was determined to be stable in 2001 and 2006.

Browse

Prior to the burn, the browse composition consisted primarily of mountain big sagebrush with lesser densities of stickyleaf low rabbitbrush, mountain snowberry, and Saskatoon serviceberry. In 1996, the sagebrush density was 220 plants/acre, over half of which were mature, and utilization was light. In 2001 and 2006, only 60 plants/acre were sampled each year and utilization was light. The sagebrush cover has not exceeded 1% since the study location was changed.

The most abundant shrub is stickyleaf low rabbitbrush, which had a density of 3,500 plants/acre in 1996, 1,900 plants/acre in 2001, and 2,060 plants/acre in 2006. The population appears to have increased following the fire, but has stabilized at around 2,000 plants/acre.

Herbaceous Understory

Grasses and forbs were rare prior to the burn. In the new study established in 1996, crested wheatgrass cover was 14% and bulbous bluegrass cover was 19%. During the 2001 reading, crested wheatgrass and bulbous bluegrass nested frequencies increased significantly and the nested frequency of bulbous had surpassed that of crested wheatgrass. The bulbous bluegrass appears to be preventing sagebrush seedling establishment. The aggressive growth of the bulbous bluegrass could prevent continued growth of more desirable species. The nested frequency of cheatgrass decreased significantly in 2001 and was sampled in only 1 quadrat. In 2006, bulbous bluegrass cover (29%) surpassed that of crested wheatgrass (15%). Alfalfa has been the dominant forb; it provided 12% cover 1996, 16% in 2001, and 10% in 2006. American vetch is also abundant.

2001 TREND ASSESSMENT

Density of mountain big sagebrush has declined slightly to 60 plants/acre. Density of serviceberry has increased from 60 plants/acre in 1996 to 220 plants/acre. The most abundant shrub on the site is still stickyleaf low rabbitbrush, which declined 46% since 1996. The browse trend is stable. The grass trend is slightly down. The nested frequency of perennial grasses, excluding bulbous bluegrass, remained unchanged. Bulbous bluegrass has begun to dominate the area and is preventing the establishment of more desirable grass, forb, and browse species. The forb trend is slightly down. The nested frequency of perennial forbs decreased 18%, mainly due to significant decreases in the nested frequency of yellow salsify and American vetch. The Desirable Components Index score was poor in 1996 and 2001.

1996 winter range condition (DC Index) - poor (41) Mid-level potential scale
2001 winter range condition (DC Index) - poor (42) Mid-level potential scale
browse - stable (0) grass - slightly down (-1) forb - slightly down (-1)

2006 TREND ASSESSMENT

The browse trend is stable. The mountain big sagebrush and serviceberry populations continue to be extremely low. Recruitment is very low and the opportunity for seedling establishment in the dense grass is low. The grass trend is stable. The nested frequency of perennial grasses remained unchanged. Crested wheatgrass and bulbous bluegrass nested frequencies remained unchanged. Cheatgrass was not sampled. The forb trend is down. The nested frequency of perennial forbs decreased 38%. Alfalfa and American vetch nested frequencies both decreased significantly. The Desirable Components Index score remained unchanged.

winter range condition (DC Index) - poor (41) Mid-level potential scale
browse - stable (0) grass - stable (0) forb - down (-2)

HERBACEOUS TRENDS -- Management unit 04 , Study no: 3

T y p e	Species	Nested Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
G	Agropyron cristatum	_a 327	_b 389	_{ab} 384	14.40	28.78	14.76
G	Agropyron dasystachyum	13	-	-	.10	-	-
G	Agropyron intermedium	64	79	48	.77	2.92	1.03
G	Agropyron spicatum	16	4	-	1.08	.18	-
G	Bromus inermis	_b 58	_a 22	_a 38	.70	.38	.61
G	Bromus japonicus (a)	3	-	-	.00	-	-
G	Bromus tectorum (a)	_b 17	_a 1	_a -	.21	.00	-
G	Festuca ovina	3	3	-	.18	.00	-
G	Poa bulbosa	_a 346	_b 440	404	18.70	24.53	29.17
G	Poa secunda	-	19	62	-	.81	5.03
G	Sitanion hystrix	1	1	-	.00	.00	-
Total for Annual Grasses		20	1	0	0.21	0.00	0
Total for Perennial Grasses		828	957	936	35.96	57.62	50.63
Total for Grasses		848	958	936	36.18	57.62	50.63

Type	Species	Nested Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
		F	<i>Alyssum alyssoides</i> (a)	_b 75	_b 58	_a 27	.26
F	<i>Astragalus cibarius</i>	-	-	-	-	-	.00
F	<i>Astragalus</i> sp.	-	-	2	-	-	.00
F	<i>Calochortus nuttallii</i>	-	3	-	-	.01	-
F	<i>Cirsium undulatum</i>	2	4	4	.00	.30	.01
F	<i>Collomia linearis</i> (a)	-	2	-	-	.00	-
F	<i>Comandra pallida</i>	1	-	-	.00	-	-
F	<i>Collinsia parviflora</i> (a)	_a -	_a 2	_b 13	-	.00	.03
F	<i>Cymopterus</i> sp.	-	5	3	-	.04	.01
F	<i>Descurainia pinnata</i> (a)	-	1	-	-	.00	-
F	<i>Epilobium brachycarpum</i> (a)	-	-	9	-	-	.01
F	<i>Erodium cicutarium</i> (a)	-	7	1	-	.04	.00
F	<i>Eriogonum ovalifolium</i>	3	-	-	.00	-	-
F	<i>Lesquerella</i> sp.	-	3	-	-	.00	-
F	<i>Medicago sativa</i>	_b 186	_b 201	_a 138	11.81	16.42	10.31
F	<i>Microsteris gracilis</i> (a)	-	-	4	-	-	.00
F	<i>Pedicularis centranthera</i>	-	-	1	-	-	.15
F	<i>Polygonum douglasii</i> (a)	5	-	3	.01	-	.01
F	<i>Sanguisorba minor</i>	9	6	-	.06	.18	-
F	<i>Sisymbrium altissimum</i> (a)	-	1	-	-	.00	-
F	<i>Sphaeralcea coccinea</i>	2	-	-	.03	-	-
F	<i>Tragopogon dubius</i>	_b 25	_a 7	_a 1	.11	.09	.00
F	<i>Vicia americana</i>	_c 183	_b 111	_a 55	1.22	1.50	.42
Total for Annual Forbs		80	71	57	0.26	0.24	0.11
Total for Perennial Forbs		411	340	204	13.26	18.55	10.93
Total for Forbs		491	411	261	13.53	18.80	11.04

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

BROWSE TRENDS --

Management unit 04 , Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Amelanchier alnifolia	3	1	1	-	-	-
B	Artemisia tridentata vaseyana	10	3	3	.68	1.13	.38
B	Chrysothamnus nauseosus albicaulis	6	6	5	.48	.39	.94
B	Chrysothamnus viscidiflorus viscidiflorus	66	38	51	3.00	1.44	2.59
B	Gutierrezia sarothrae	6	6	4	.01	-	-
Total for Browse		91	54	64	4.18	2.97	3.92

CANOPY COVER, LINE INTERCEPT --

Management unit 04 , Study no: 3

Species	Percent Cover '06
Artemisia tridentata vaseyana	.18
Chrysothamnus nauseosus albicaulis	.88
Chrysothamnus viscidiflorus viscidiflorus	1.26
Gutierrezia sarothrae	.11

BASIC COVER --

Management unit 04 , Study no: 3

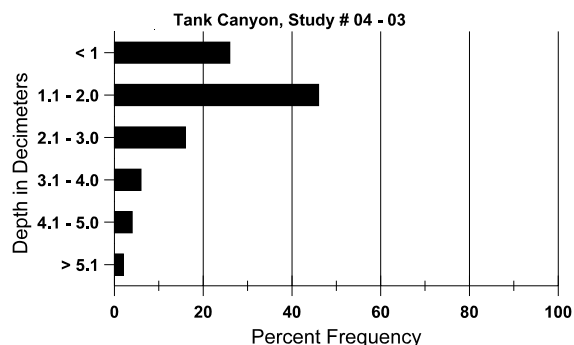
Cover Type	Average Cover %		
	'96	'01	'06
Vegetation	53.31	68.63	66.61
Rock	3.11	2.72	3.68
Pavement	1.29	3.76	4.38
Litter	63.50	34.77	29.13
Cryptogams	.40	.58	.30
Bare Ground	1.60	3.50	4.73

SOIL ANALYSIS DATA --

Herd Unit 04, Study no: 03, Tank Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
16.3	64.0 (16.0)	7.0	41.9	29.7	28.4	3.8	9.8	108.8	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 04 , Study no: 3

Type	Quadrat Frequency		
	'96	'01	'06
Sheep	26	-	-
Rabbit	-	6	26
Elk	9	15	63
Deer	11	12	12
Cattle	-	4	24

Days use per acre (ha)	
'01	'06
-	-
-	-
46 (112)	56 (137)
21 (51)	15 (38)
-	35 (86)

BROWSE CHARACTERISTICS --

Management unit 04 , Study no: 3

		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 alnifolia												
96	60	-	-	60	-	-	67	33	-	-	0	22/26
01	220	-	220	-	-	-	0	0	-	-	0	14/20
06	20	-	-	20	-	-	0	0	-	-	0	13/24
Artemisia tridentata vaseyana												
96	200	-	80	120	-	1940	10	0	0	-	0	21/27
01	60	-	-	60	-	1280	0	33	0	-	0	22/22
06	60	160	20	20	20	-	0	0	33	33	33	26/39
Chrysothamnus nauseosus albicaulis												
96	140	-	20	100	20	-	0	0	14	-	0	24/36
01	140	-	20	60	60	40	0	0	43	-	0	24/27
06	140	-	40	80	20	-	57	0	14	-	0	25/39

		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)
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
96	3500	140	560	2860	80	-	26	0	2	-	2	13/19
01	1900	-	120	1680	100	60	0	0	5	1	1	8/11
06	2060	20	220	1780	60	-	10	0	3	.97	.97	8/12
<i>Gutierrezia sarothrae</i>												
96	220	40	140	80	-	-	0	0	0	-	0	7/10
01	280	-	20	260	-	-	0	0	0	-	0	9/9
06	120	-	-	100	20	-	0	0	17	17	17	10/11
<i>Opuntia sp.</i>												
96	0	-	-	-	-	-	0	0	-	-	0	6/21
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	3/7
<i>Symphoricarpos oreophilus</i>												
96	0	-	-	-	-	-	0	0	-	-	0	18/45
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	15/26
<i>Tetradymia canescens</i>												
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	13/20