Trend Study 17-38-97

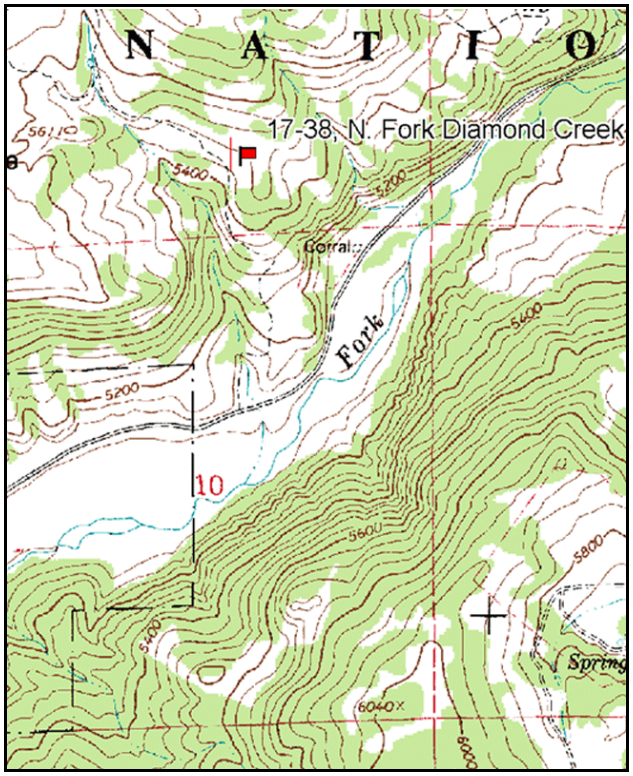
Study site name: N. Fork Diamond Creek Cyn . Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 15 degrees magnetic (lines 2-4 @ 330°M).

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

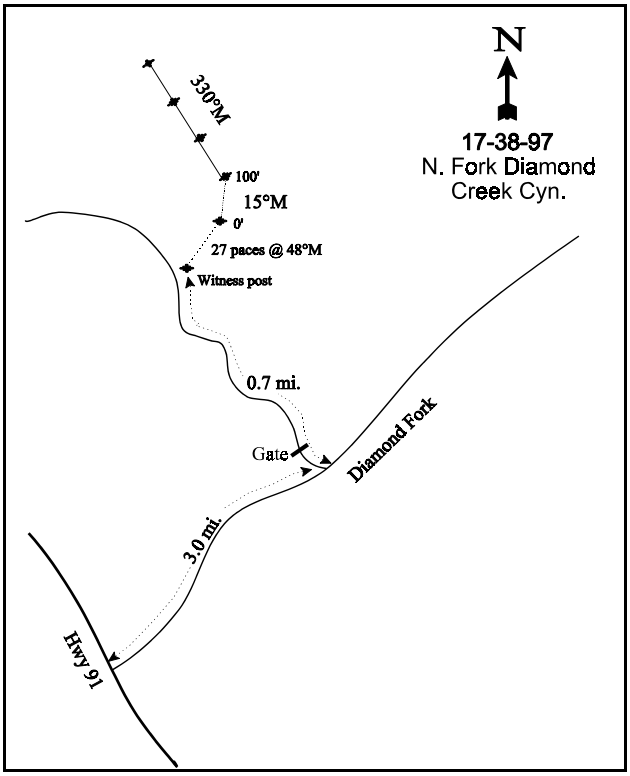
LOCATION DESCRIPTION

From the intersection of Highway 6 and the Diamond Fork Road, proceed 2.3 miles up Diamond Fork to an intersection. Turn left and proceed 0.1 miles to a locked gate. Then go 0.70 miles to a faint road to the right (northeast). Walk 27 paces up the road to the northeast, then turn and walk 5 paces to the north to the 0-foot baseline stake. The study is marked by green steel "T" fenceposts approximately 12 to 18 inches in height. A red browse tag, number 3978, is attached to the 0-foot baseline stake.



Map Name: Billies Mountain

Township 9S , Range 4E , Section 3



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4433752 N 460093 E

DISCUSSION

North Fork Diamond Canyon - Trend Study No. 17-38

***SUSPENDED - This site was suspended in 2002 due to access problems and lack of a significant browse component.

The North Fork Diamond Canyon study was located on what in the past was considered important deer winter range in the Diamond Fork drainage. The study is at 5,480 feet elevation and on a gentle (10%), south to southeast slope. The range type is mountain big sagebrush-grass with smaller numbers of antelope bitterbrush intermixed throughout. Large numbers of deer pellet groups were reported in the past, but currently they are fairly low for deer and elk. Spring through fall cattle grazing also occurs and appears quite intense. Cattle were on site in 1997 and utilization was apparent on smooth brome. Water is found in several small livestock ponds and the creek, 100 yards to the south.

Soil is moderately deep with textural analysis indicating a clay loam. Soil pH is neutral (7.1) with an effective rooting depth of a little over 18 inches. A uniform and moderately dense grass cover provides good soil protection. Shrub cover is poor, it provides only 11% of the vegetative cover and often consists of decadent sagebrush. Trampling and compaction damage from cattle is apparent. Soil erosion is not currently a serious problem, but could easily become so.

The key preferred browse species are mountain big sagebrush and antelope bitterbrush. The mountain big sagebrush density has continued to decline since the initial reading. It had an estimated density of 340 plants/acre in 1997. There were an estimated 1,833 plants/acre in 1983 and then 766 plants/acre in 1989. Percent decadency has remained relatively similar through the years (around 60%), with 60% of the decadent plants classified as dying. Currently there is a very large number of dead plants (1,140 plants/acre) which were first counted in 1997. They outnumber live plants by more then 3 to 1. The stand currently exhibits moderate to heavy hedging. Some recruitment is occurring, but may not continue to do so because of the very dense cover of smooth brome providing intense competition. There did not appear to be any seed production on the sagebrush in 1997. Bitterbrush density appears lower than in the past, but this is due to the greatly increased sample size used in 1997, since there are no dead plants to explain this loss in numbers. The larger sample size gives significantly better population estimates for browse populations that have distributions that are discontinuous or clumped. In the recent reading, bitterbrush was found only near the beginning of the transect and not in the extended area. Utilization was heavy on the estimated 100 plants/acre. Other browse encountered in low densities include broom snakeweed, rabbitbrush, and skunkbush.

Grasses primarily consist of perennial sod formers, of which two are introduced grasses. Smooth brome and Kentucky bluegrass are both very abundant. Nested frequency of smooth brome significantly increased since 1989 and 1983. It is now found in nearly every quadrat (99%). Western wheatgrass, a native that sometimes acts as an increaser, occurs in patches and has significantly decreased in nested frequency since 1989. As reported in 1983, grasses are highly competitive and are probably a significant factor along with extended drought in the general decline of mountain big sagebrush.

Forbs are also numerous but consist largely of aggressive increasers and invaders. Although, such species as Pacific aster, are moderately palatable and heavily grazed. Decreaser forbs are absent from this site. Annuals and biennials consist of false phlox, bur buttercup, autumn willoweed, and yellow salsify.

1983 APPARENT TREND ASSESSMENT

Soil condition appears stable but rather precarious. Heavy grazing is reducing grass vigor and preventing litter accumulation. Erosion is currently light but could easily become worse. Mountain big sagebrush appears to be in a state of decline. Antelope bitterbrush is only maintaining itself. Grasses and increaser forbs, especially Pacific aster, are highly competitive and discourage shrub reproduction.

1989 TREND ASSESSMENT

While litter cover remained about 50% of ground cover, vegetative basal cover increased from 1% to 6%. With the slight increase in rock and pavement cover, the amount of bare soil encountered declined. Although potentially highly erodible, the fine-textured and compacted soil is currently slightly upward. The sagebrush appears to be suffering the effects of a herbicide treatment, but past treatments on this private land are unknown at this time. The sagebrush population is unlikely to recover from whatever is effecting it, so the value of this particular slope as winter range is low and the vegetative trend is still downward. The opposing north facing slope supports a model stand of big sagebrush. While density plot data comparisons indicate decreased grass and forb density, the frequency data for these hard to count species are similar between years.

TREND ASSESSMENT
soil - up slightly (4)
browse - down (1)
herbaceous understory - stable (3)

1997 TREND ASSESSMENT

Soil trend is slightly upward. There is currently less bare ground, rock, and litter cover than reported in the past. Erosion is still low. Browse trend continues to be downward. Mountain big sagebrush density continues to decline in this decadent population. The combination of drought, competition with grasses and intense utilization will continue to reduce this mountain big sagebrush community. Some scattered patches of Gambel oakbrush surround the site and could provide wildlife escape cover during the warm season. Herbaceous understory trend is upward. This comes at the detriment to the browse component. Smooth brome nested frequency significantly increased, while western wheatgrass nested frequency significantly declined. Smooth brome is easily out-competing winter annuals like cheatgrass and Japanese brome at this elevation. Most of the forbs are increasers or invaders, similar to previous years.

TREND ASSESSMENT
soil - slightly up (4)
browse - down (1)
herbaceous understory - up (5)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 38

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'83	'89	'97	'83	'89	'97	'97
G	Agropyron cristatum	3	-	3	1	-	1	.00
G	Agropyron smithii	$_{b}$183	$_{b}$147	37	72	57	14	.14
G	Bromus inermis	$_{a}$156	$_{b}$195	$_{c}$360	49	60	99	27.53
G	Bromus japonicus (a)	-	-	55	-	-	21	.44
G	Bromus tectorum (a)	-	-	3	-	-	1	.00
G	Oryzopsis hymenoides	1	-	-	1	-	-	-
G	Poa bulbosa	$_{a}$-	$_{a}$-	$_{b}$115	-	-	37	6.55
G	Poa fendleriana	2	2	-	1	1	-	-
G	Poa pratensis	$_{ab}$94	$_{b}$118	$_{a}$81	31	44	31	1.59

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'83	'89	'97	'83	'89	'97	'97
G	Poa secunda	$_{a}$5	$_{ab}$17	$_{b}$22	2	7	9	.29
Total for Annual Grasses		0	0	58	0	0	22	0.45
Total for Perennial Grasses		444	479	618	157	169	191	36.12
Total for Grasses		444	479	676	157	169	213	36.57
F	Alyssum alyssoides (a)	-	-	285	-	-	97	1.50
F	Allium spp.	-	-	12	-	-	7	.03
F	Artemisia ludoviciana	$_{b}$55	$_{b}$40	$_{a}$19	23	21	8	.04
F	Aster chilensis	215	230	230	72	72	73	8.43
F	Astragalus convallarius	18	18	15	9	7	5	.21
F	Cardaria draba	-	-	3	-	-	1	.03
F	Camelina microcarpa (a)	-	-	10	-	-	5	.02
F	Calochortus nuttallii	$_{c}$55	$_{a}$9	$_{b}$35	26	6	16	.10
F	Chaenactis douglasii	6	-	-	2	-	-	-
F	Cirsium undulatum	$_{c}$90	$_{b}$58	$_{a}$5	45	27	3	.06
F	Collinsia parviflora (a)	-	-	6	-	-	4	.02
F	Cymopterus spp.	-	-	13	-	-	8	.06
F	Epilobium brachycarpum (a)	-	-	41	-	-	17	.11
F	Galium aparine (a)	-	-	3	-	-	1	.00
F	Lactuca serriola	$_{a}$-	$_{a}$2	$_{b}$11	-	1	5	.02
F	Lomatium spp.	-	5	-	-	2	-	-
F	Microsteris gracilis (a)	-	-	98	-	-	41	.28
F	Oenothera spp.	-	-	3	-	-	1	.03
F	Phlox longifolia	$_{b}$26	$_{c}$53	$_{a}$4	13	24	2	.01
F	Polygonum douglasii (a)	-	-	5	-	-	2	.01
F	Ranunculus testiculatus (a)	-	-	63	-	-	24	.21
F	Sphaeralcea coccinea	$_{a}$58	$_{b}$85	$_{a}$29	25	36	14	.17
F	Tragopogon dubius	$_{b}$39	$_{a}$12	$_{a}$9	20	5	5	.05
Total for Annual Forbs		0	0	511	0	0	191	2.16
Total for Perennial Forbs		562	512	388	235	201	148	9.27
Total for Forbs		562	512	899	235	201	339	11.44

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 17 , Study no: 38

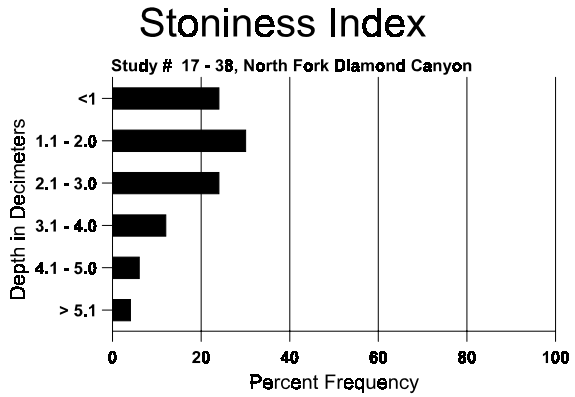
Type	Species	Strip Frequency '97	Average Cover % '97
B	Artemisia tridentata vaseyana	13	1.20
B	Chrysothamnus viscidiflorus viscidiflorus	3	.03
B	Gutierrezia sarothrae	5	.04
B	Purshia tridentata	4	1.18
B	Rhus trilobata	1	.03
Total for Browse		26	2.49

BASIC COVER --
Herd unit 17 , Study no: 38

Cover Type	Nested Frequency '97	Average Cover % '83	'89	'97
Vegetation	391	.75	6.25	47.46
Rock	78	2.25	4.00	.68
Pavement	210	3.25	5.75	1.18
Litter	399	48.00	50.25	46.87
Cryptogams	17	.50	0	.20
Bare Ground	316	45.25	33.75	20.97

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 38, North Fork Diamond Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
18.2	51.0 (17.7)	7.1	31.4	30.7	37.8	3.4	12.1	377.6	.6



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 38

Type	Quadrat Frequency '97
Elk	6
Deer	11
Cattle	8

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 38

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	4	-	-	-	-	-	-	-	-	3	-	1	-	133			4
	97	1	-	1	-	-	-	-	-	-	2	-	-	-	40			2
M	83	-	16	8	-	-	-	-	-	-	22	2	-	-	800	39	40	24
	89	1	2	-	-	-	-	-	-	-	2	-	1	-	100	26	31	3
	97	-	3	2	-	-	-	-	-	-	5	-	-	-	100	22	27	5
D	83	1	14	16	-	-	-	-	-	-	27	4	-	-	1033			31
	89	8	8	-	-	-	-	-	-	-	9	-	-	7	533			16
	97	4	1	4	-	-	1	-	-	-	4	-	-	6	200			10
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1140			57

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	55%	44%	00%	-58%
'89	43%	00%	39%	-56%
'97	24%	47%	35%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	1833	Dec:		56%
'89	766			70%
'97	340			59%

Chrysothamnus viscidiflorus viscidiflorus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	14	16	1
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	12	26	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	+45%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	0	Dec:		-
'89	33			-
'97	60			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	22	-	-	-	-	-	-	-	-	22	-	-	-	440			22
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	3	-	-	-	-	-	-	-	-	3	-	-	-	100	14	16	3
	89	10	-	-	-	-	-	-	-	-	10	-	-	-	333	8	9	10
	97	6	-	-	-	-	-	-	-	-	6	-	-	-	120	6	8	6
D	83	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+40%
'89	00%	00%	00%	-58%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	200	Dec:	50%
	'89	333		0%
	'97	140		0%

Purshia tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1
M	83	-	6	5	-	-	-	-	-	-	11	-	-	-	366	20	37	11
	89	-	-	7	-	-	-	-	-	-	7	-	-	-	233	13	33	7
	97	-	1	2	-	-	1	-	-	-	4	-	-	-	80	23	54	4
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	2	-	-	-	-	-	-	2	-	-	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	55%	45%	00%	- 9%
'89	10%	90%	00%	-70%
'97	20%	80%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	366	Dec:	0%
	'89	332		20%
	'97	100		0%

Rhus trilobata																		
M	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33	37	38	1
	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33	48	35	1
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20	58	80	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+ 0%
'89	100%	00%	00%	-39%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	33	Dec:	-
	'89	33		-
	'97	20		-