

Trend Study 3-4-06

Study site name: Anderson Ranch .

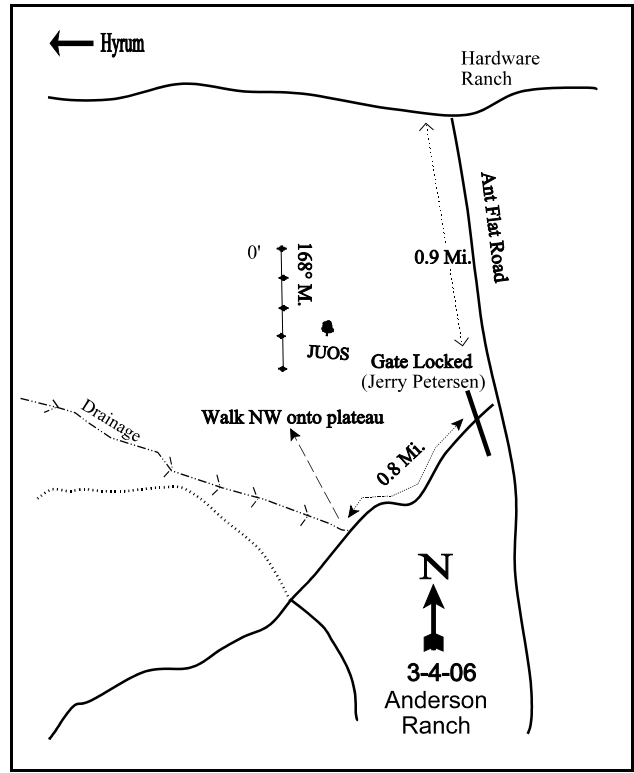
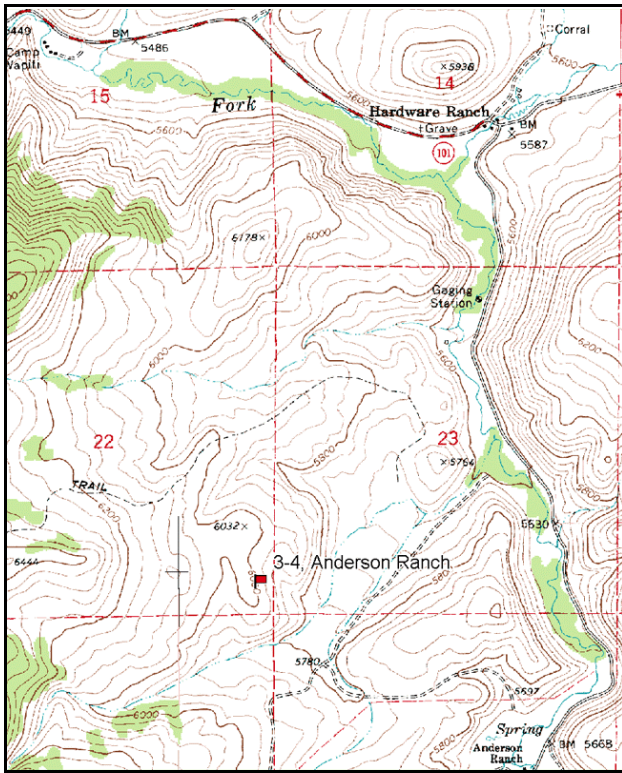
Vegetation type: Sagebrush-Bitterbrush .

Compass bearing: frequency baseline 168 degrees magnetic.

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

LOCATION DESCRIPTION

From Hardware Ranch, travel south on the Ant Flat Road for 0.9 miles. Turn right and go through a locked gate. Cross the Blacksmith Fork River and then proceed up the canyon 0.8 to where the drainage and road separate. Walk approximately 1500 ft. at 310 degrees to the 0 foot stake. The 0-foot stake is marked by browse tag #7932. Baseline bearing is 168 degrees magnetic.



Map Name: Hardware Ranch

Diagrammatic Sketch

Township 10N, Range 3E, Section 22

UTM NAD 27, UTM 12T 4603382 N 451731 E

DISCUSSION

Anderson Ranch - Trend Study No. 3-4

Study Information

This study is located on what was formerly called the Anderson Ranch and is now part of the Coldwater Ranch. It is located on deer and elk winter range in upper Blacksmith Fork Canyon (elevation 6,000 feet, slope 25%, aspect nearly level). The plant community is dominated by mountain big sagebrush, antelope bitterbrush, and grasses. Mule deer use was moderate in 1996 and 2006, but was heavy in 2001. Pellet group data taken in 2001 estimated 140 deer, 32 elk, 20 sheep days use/acre, and 1 sage grouse pellet grouping (346 ddu/ha, 79edu/ha, and 50 sdu/ha). Pellet group data from 2006 estimated 55 deer, 38 elk, 27 sheep, and 1 cow days use/acre (136 ddu/ha, 94 edu/ha, 68 sdu/ha, and 2 cdu/ha). Sheep and deer pellet numbers may have some overlap due to the difficulty in distinguishing between the two species.

Soil

The soil is classified in the Ant Flat series, a well drained, slowly permeable soils on terraces and mountain slopes. They formed in colluvium, residuum, and alluvium from calcareous sandstone and some quartzite, conglomerate, limestone and shale (USDA-NRCS 2006). This soil has a porous surface horizon about 7 inches thick. Below this depth, the subsoil is increasingly clay in texture and has concentrations of leached calcium carbonate at about 60 inches. Plant root penetration is not a problem until the calcareous zone is reached. Effective rooting depth was estimated at over 11 inches in 1996. Soils have an extremely rocky and compacted clay loam texture with a neutral soil reaction (pH of 7.0). Although the erosion hazard is moderate for this soil type (Erickson and Mortensen, 1974), the erosion condition classification in 2001 and 2006 shows stable soils with minimal erosion occurring. The ratio of protective cover (vegetation, litter, and cryptogams) to bare ground is high at 4 to 1.

Browse

The key browse species are bitterbrush and mountain big sagebrush, which average 11% browse cover combined. Bitterbrush cover averaged 6% in 2006 with 420 plants/acre. This is an increase in density from 320 plants/acre in 1996 and 2001. Decadence in the bitterbrush population was very high in 1984 and 1990, at 92% and 67%, respectively. The high decadence in 1984 to 1990 might have been correlated to the decreases in density in 1996. Decadence was less than 6% in 1996 and 2001, but slightly increased to 19% in 2006. Use on bitterbrush has been moderate to heavy in all sampling years. Vigor has been good and bitterbrush annual leader growth has averaged just over 4 inches in 2001 and 2006.

Mountain big sagebrush was also heavily utilized in 1984; all plants sampled displayed a heavily hedged growth form. Utilization has since stabilized at a more moderate level. Sagebrush density was estimated at 620 plants/acre in 2006, which is a slight increase from 400 plants/acre in 1996 and 2001. Decadent plants made up 67% of the population in 1984, but decreased to around 20% in 1990, 2001, and 2006. Young recruitment has averaged about 23% during sampling years since 1990. Sagebrush seedlings were also very numerous in 2006. Annual leader growth averaged just over 2 inches in 2001 and 2006.

The most abundant shrub is stickyleaf low rabbitbrush. It has provided around 4% cover and density has averaged between 2,300 to 3,100 plants/acre since 1996. This species appears to be stable with a predominantly mature population. Plants are only lightly utilized and vigor is normal.

Herbaceous Understory

Understory composition is dominated by perennial grasses, most notably bluebunch wheatgrass and Sandberg bluegrass. Annual grasses were first included in the sample in 1996 and were abundant at 8% cover. In 2001, Japanese brome and cheatgrass each decreased to less than 1% cover and have remained less than 1% in 2006. Bulbous bluegrass, a low value perennial, increased significantly in nested frequency between 2001 and 2006. In 2001, cover was estimated at 3% and increased to 15% in 2006.

Considering elevation and annual precipitation, the forb composition is not very abundant and its composition is poor. A long history of sheep grazing has possibly given grasses a competitive advantage. The most common forb in 1996 and 2006 was western yarrow, which is reputedly unpalatable to livestock but is used by deer and elk. Storksbill was also common and provided the most forb cover in 2001. Most forbs are occasional in their occurrence and provide relatively little forage.

1990 TREND ASSESSMENT

Trend for browse is up. Mountain big sagebrush and bitterbrush density have both increased while percent decadence has decreased. The sagebrush and bitterbrush have a more balanced age class structure now. Low rabbitbrush remains a prominent factor in the understory as it also increased. There is still a high percentage of decadence in the bitterbrush population. The sagebrush and bitterbrush have a heavily hedged growth form, as some forage production is unavailable. The grasses trend is slightly up. Sandberg bluegrass did significantly increase in nested frequency. Forbs also slightly increased mostly due to an increase in false dandelion. The understory provides adequate vegetative and litter ground cover.

browse - up (+2)

grasses - slightly up (+1)

forbs - slightly up (+1)

1996 TREND ASSESSMENT

The browse trend appears stable. Bitterbrush density declined from 999 plants/acre in 1990 to 320 by 1996. However, the lack of a high number of dead plants (only 100 plants/acre) would indicate that most of the change in density is due to the much larger sample size giving a more accurate population estimate. Utilization is moderate to heavy, vigor normal, with no decadent plants encountered. The mountain big sagebrush population has declined 60% since 1990. The large number of dead plants (460 plants/acre) would suggest that this change is less related to sample size, and more closely associated with many years of drought (1987 to 1990). Stickyleaf low rabbitbrush is currently the most abundant shrub. It appears to have a stable population. Trend for grasses is slightly down. Sum of nested frequency for perennial grasses has declined since 1990. Bluebunch wheatgrass has maintained a stable nested frequency. However, prairie junegrass and Sandberg bluegrass have declined. Annual grasses are also common but were not included in the previous samples so no comparisons can be made. Trend for perennial forbs is down. The forb component is still poor. Sum of nested frequency for perennial forbs has declined 53% in nested frequency since 1990. The Desirable Components Index rated this site as fair with a score of 61 due to moderate browse cover, low decadence, and good perennial grass cover.

winter range condition (DC Index) - fair (61) Mid Potential scale

browse - stable (0)

grasses - slightly down (-1)

forbs - down (-2)

2001 TREND ASSESSMENT

Trend for the key browse species is stable. Densities for bitterbrush and mountain big sagebrush remain stable. Percent decadence increased for both species in 2001 due to the drought conditions the past few years. Although these increases are small, the vigor remains good. Trend for grasses is slightly up. Sum of nested frequency for perennial grasses slightly increased, with the most abundant species, bluebunch wheatgrass, remaining stable. Sandberg bluegrass and bulbous bluegrass both significantly increased in nested frequency. Another positive aspect is the significant decrease in annual brome grasses due to drought. Trend for forbs is stable. Perennial forbs remained similar to 1996, while the annual forbs decreased by 36%. The Desirable Components Index rated this site as good-fair with a score of 65 due to moderate browse cover, low decadence, and good perennial grass cover.

winter range condition (DC Index) - good-fair (65) Mid Potential scale

browse - stable (0)

grasses - slightly up (+1)

forbs - stable (0)

2006 TREND ASSESSMENT

Trend for key browse mountain big sagebrush and bitterbrush is up. Density for both species increased by at least 20%. Sagebrush decadence decreased to 13%, while bitterbrush increased slightly to 19%. Vigor is good and young recruitment makes up 26% of the sagebrush population and 10% for bitterbrush. Trend for grasses is stable. The sum of nested frequency of perennial grasses remained the same with the exception of bulbous bluegrass. Bulbous bluegrass, a low value perennial, increased significantly in nested frequency and cover increased from 3% in 2001 to 15% in 2006. Annual grass (cheatgrass and Japanese brome) nested frequency continues to decline. Trend for forbs is up. Sum of nested frequency of perennial forbs increased, but remain under 3% cover. Annual forbs also increased with the return of normal precipitation. The Desirable Components Index rated this site as good-fair with a score of 69 due to moderate browse cover, moderate decadence, and good perennial grass cover.

winter range condition (DC Index) - good-fair (69) Mid Potential scale
browse - up (+2) grasses - stable (0) forbs - up (+2)

HERBACEOUS TRENDS --
 Management unit 03 , Study no: 4

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron smithii	a-	a-	a-	a-	b19	-	-	.16
G	Agropyron spicatum	271	276	267	237	224	12.89	12.87	16.86
G	Bromus japonicus (a)	-	-	c186	b81	a20	5.14	.85	.12
G	Bromus tectorum (a)	-	-	b114	a46	a35	2.62	.73	.91
G	Elymus cinereus	-	-	2	3	2	.53	.85	1.00
G	Hordeum jubatum	4	5	-	-	-	-	-	-
G	Koeleria cristata	52	53	28	32	42	.79	.55	.94
G	Poa bulbosa	a-	a-	b52	b85	c225	1.55	2.82	15.37
G	Poa pratensis	-	-	-	4	10	-	.04	.04
G	Poa secunda	ab202	c267	a160	b213	ab162	3.42	4.59	7.33
G	Stipa comata	-	-	-	1	-	-	.00	-
G	Stipa lettermani	-	-	-	-	1	-	-	.00
Total for Annual Grasses		0	0	300	127	55	7.76	1.59	1.03
Total for Perennial Grasses		529	601	509	575	685	19.20	21.74	41.72
Total for Grasses		529	601	809	702	740	26.96	23.33	42.76
F	Achillea millefolium	b191	a84	a49	a55	a56	.60	.42	1.07
F	Agoseris glauca	a-	c126	a1	a2	b25	.00	.00	.08
F	Allium acuminatum	b23	a4	a-	a1	a6	-	.00	.03
F	Alyssum alyssoides (a)	-	-	b114	a67	a39	.32	.18	.08
F	Antennaria rosea	-	-	-	2	4	-	.03	.03
F	Arabis drummondii	a-	ab1	b9	a-	ab1	.02	-	.00
F	Aster chilensis	-	1	3	3	1	.00	.03	.00
F	Astragalus convallarius	a-	ab17	ab10	a2	b18	.05	.03	.13

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Aster sp.	-	-	-	-	1	-	-	.00
F	Calochortus nuttallii	3	-	-	1	-	-	.00	-
F	Cirsium sp.	-	-	-	-	5	-	-	.16
F	Cirsium undulatum	12	12	14	7	7	.39	.24	.21
F	Collomia linearis (a)	-	-	a9	a4	b80	.02	.01	.19
F	Collinsia parviflora (a)	-	-	60	58	58	.11	.16	.17
F	Cordylanthus sp. (a)	-	-	b19	a-	b13	.30	-	.57
F	Crepis acuminata	a-	b10	a-	a-	ab5	-	-	.09
F	Cryptantha sp.	-	6	-	-	-	-	-	-
F	Descurainia pinnata (a)	-	-	3	-	-	.00	-	-
F	Draba sp. (a)	-	-	-	3	11	-	.00	.02
F	Epilobium brachycarpum (a)	-	-	a13	a19	b46	.03	.16	.18
F	Eriogonum cernuum (a)	-	-	1	-	-	.00	-	-
F	Erodium cicutarium (a)	-	-	a7	b50	b42	.07	1.65	.76
F	Erigeron sp.	-	-	-	3	4	-	.06	.03
F	Eriogonum umbellatum	-	3	1	2	2	.03	.00	.15
F	Holosteum umbellatum (a)	-	-	b76	a29	a17	.28	.44	.10
F	Lappula occidentalis (a)	-	-	ab2	b11	a-	.00	.03	-
F	Lactuca serriola	-	-	-	3	3	-	.01	.03
F	Lithospermum ruderales	a-	a-	b10	a-	a1	.24	-	.03
F	Lomatium triternatum	-	-	-	-	9	-	-	.01
F	Lupinus argenteus	9	7	8	3	6	.06	.04	.05
F	Microsteris gracilis (a)	-	-	b44	a4	a3	.08	.01	.01
F	Orthocarpus tolmiei (a)	-	-	-	-	-	-	.03	-
F	Phlox longifolia	-	5	-	-	9	-	-	.01
F	Polygonum douglasii (a)	-	-	b32	a5	b43	.07	.01	.11
F	Ranunculus testiculatus (a)	-	-	9	-	6	.01	-	.01
F	Taraxacum officinale	-	9	-	-	-	-	-	-
F	Tragopogon dubius	ab21	a3	a9	b33	a17	.05	.34	.24
F	Trifolium gymnocarpon	-	-	4	-	-	.01	-	-
F	Trifolium sp.	-	-	-	-	2	-	-	.00
F	Unknown forb-perennial	-	2	-	-	-	-	-	-
F	Veronica biloba (a)	-	-	1	-	6	.00	-	.01
F	Zigadenus paniculatus	-	3	-	-	-	-	-	-
Total for Annual Forbs		0	0	390	250	364	1.34	2.71	2.22
Total for Perennial Forbs		259	293	118	117	182	1.48	1.24	2.42

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
	Total for Forbs	259	293	508	367	546	2.82	3.95	4.65

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

BROWSE TRENDS --

Management unit 03 , Study no: 4

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Artemisia tridentata vaseyana</i>	19	15	22	3.47	5.05	4.53
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	66	57	65	4.69	3.65	4.42
B	<i>Eriogonum heracleoides</i>	0	1	0	-	-	-
B	<i>Gutierrezia sarothrae</i>	9	1	6	.24	-	.15
B	<i>Purshia tridentata</i>	15	16	14	4.09	5.25	6.25
B	<i>Ribes sp.</i>	0	0	1	-	-	.38
B	<i>Tetradymia canescens</i>	2	4	6	-	-	.03
	Total for Browse	111	94	114	12.50	13.97	15.76

CANOPY COVER, LINE INTERCEPT --

Management unit 03 , Study no: 4

Species	Percent Cover
	'06
<i>Artemisia tridentata vaseyana</i>	5.86
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	5.76
<i>Purshia tridentata</i>	8.66
<i>Tetradymia canescens</i>	.43

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 03 , Study no: 4

Species	Average leader growth (in)	
	'01	'06
<i>Artemisia tridentata vaseyana</i>	2.3	2.4
<i>Purshia tridentata</i>	4.2	4.3

BASIC COVER --

Management unit 03 , Study no: 4

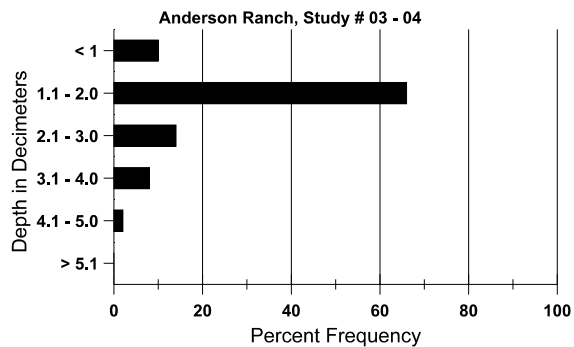
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	6.25	19.75	43.24	47.43	61.08
Rock	1.00	.75	.86	.36	.49
Pavement	1.25	0	.95	.93	1.17
Litter	70.75	50.75	51.29	52.27	36.35
Cryptogams	5.50	7.00	12.98	6.75	5.71
Bare Ground	15.25	21.75	10.92	14.55	10.28

SOIL ANALYSIS DATA --

Herd Unit 03, Study no: 04, Anderson Ranch

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
11.5	57.4 (15.1)	7.0	42.7	24.0	33.3	3.7	14.3	115.2	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 03 , Study no: 4

Type	Quadrat Frequency		
	'96	'01	'06
Sheep	4	3	1
Rabbit	5	8	11
Grouse	-	1	-
Elk	23	10	13
Deer	38	53	47
Cattle	2	-	-

Days use per acre (ha)	
'01	'06
20 (50)	27 (68)
-	-
9 (22) groups/acre	-
32 (79)	38 (94)
140 (346)	55 (136)
-	1 (2)

BROWSE CHARACTERISTICS --
Management unit 03 , Study no: 4

		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>Artemisia tridentata vaseyana</i>												
84	399	-	-	133	266	-	0	100	67	-	0	28/35
90	999	-	266	533	200	-	20	0	20	-	0	28/31
96	400	160	100	300	-	460	65	0	0	-	0	35/50
01	420	-	60	280	80	180	29	0	19	-	0	33/50
06	620	500	160	380	80	180	23	23	13	3	3	36/54
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
84	2466	-	466	2000	-	-	0	0	0	-	0	12/13
90	3399	-	666	2600	133	-	6	0	4	.58	2	13/17
96	3120	20	80	2980	60	40	8	0	2	-	0	15/23
01	2380	-	60	2020	300	140	2	0	13	.84	.84	12/20
06	2620	-	180	2260	180	-	4	3	7	2	4	15/23
<i>Eriogonum heracleoides</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	20	-	-	20	-	-	0	0	-	-	0	4/10
06	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Gutierrezia sarothrae</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	440	-	20	420	-	-	0	0	-	-	0	7/9
01	20	-	-	20	-	-	0	0	-	-	0	4/5
06	140	-	-	140	-	-	0	0	-	-	0	10/16
<i>Juniperus scopulorum</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	66	-	-	66	-	-	0	0	-	-	0	134/81
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	-/-

		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)
Purshia tridentata												
84	866	-	-	66	800	-	8	92	92	-	8	32/37
90	999	-	200	133	666	-	33	33	67	4	13	15/26
96	320	-	20	300	-	100	44	25	0	-	0	29/55
01	340	-	40	280	20	60	12	53	6	6	6	36/62
06	420	-	40	300	80	100	48	14	19	5	5	37/62
Ribes sp.												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	20	-	-	20	-	-	0	0	-	-	0	48/22
Symphoricarpos oreophilus												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	15/16
01	0	-	-	-	-	-	0	0	-	-	0	19/28
06	0	-	-	-	-	-	0	0	-	-	0	24/24
Tetradymia canescens												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	40	-	-	40	-	-	0	0	0	-	0	18/33
01	80	-	-	80	-	-	0	0	0	-	0	17/33
06	180	-	60	40	80	-	0	0	44	44	44	21/34