

Trend Study 28-11-08

Study site name: Elliker Basin.

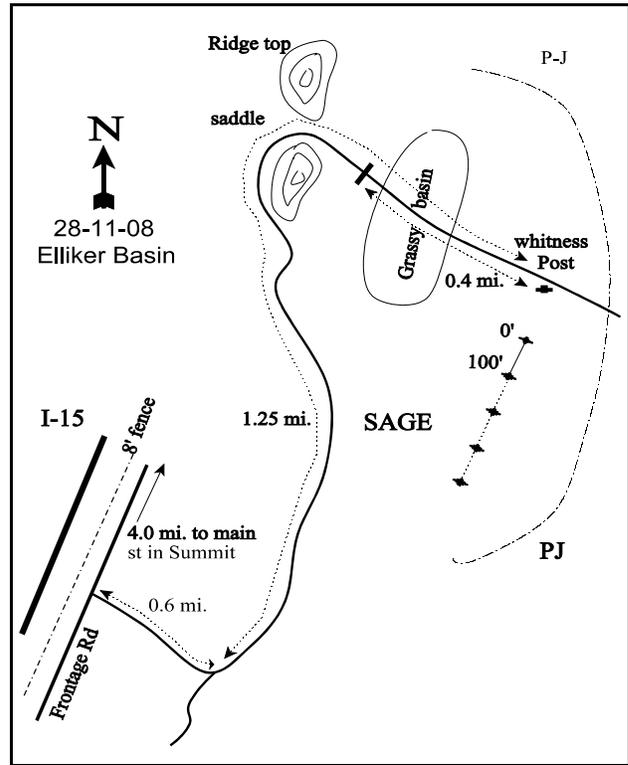
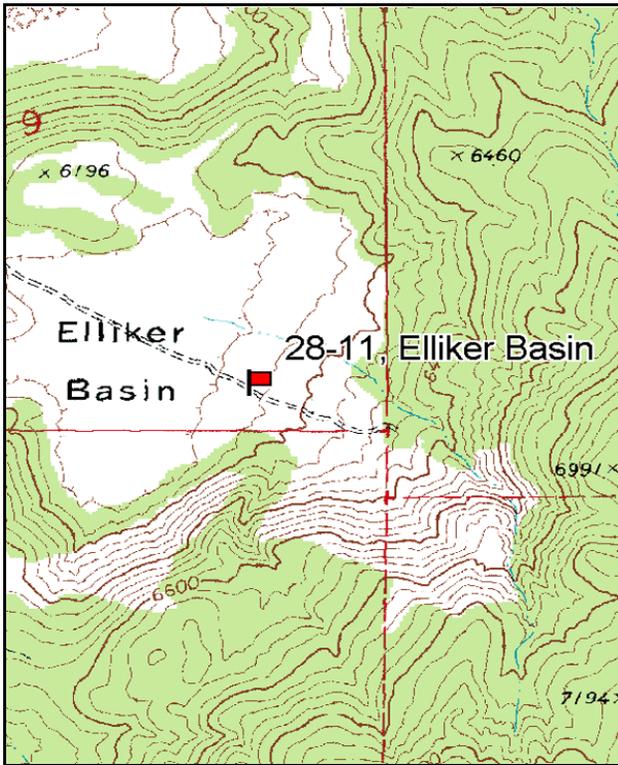
Vegetation type: Mountain Big Sagebrush.

Compass bearing: frequency baseline 231 degrees magnetic.

Frequency belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft). Rebar: belts 1, 2, 4 on 3ft, belt 3&5 on 1ft.

LOCATION DESCRIPTION

At the I-15 interchange (exit 71) in Summit, go south on the frontage road (Summer Tree Dr.) on the east side of the freeway for 4.0 miles. Turn left onto a dirt road, proceed through a gate and go east for 0.6 miles. Bear left at the fork and continue 1.25 miles to Elliker Basin and up to a half-high witness post in the sagebrush on the right. The transect starts 12 paces away at a bearing of 221 degrees magnetic. The 0-foot stake is marked with browse tag #495.



Map Name: Summit

Diagrammatic Sketch

Township 35S, Range 10W, Section 9

GPS: NAD 83, UTM 12S 325608 E, 4181759 N

## DISCUSSION

### Elliker Basin - Trend Study No. 28-11

#### Study Information

This study is located in Elliker Basin, a small sagebrush valley at the base of the Hurricane Cliffs about eight miles northeast of Cedar City [elevation: 6,160 feet (1,878 m), slope: 10%-15%, aspect: west]. The transect itself is located on the southeastern slope of the basin just below the line of pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) which continue up the cliffs. Pinyon and juniper dominate the slopes bordering the valley. The area is important deer winter range, which was acquired by the UDWR in a trade with the BLM. The area was apparently seeded years ago. Additionally, a hand chainsaw treatment was done during the spring of 1992 to eliminate encroaching juniper trees. A pellet group transect read on site in 1998 estimated 44 deer and 1 elk day use/acre (109 ddu/ha and 3 edu/ha). Use increased on the site in 2003 with 151 deer days use/acre (374 ddu/ha). Pellet groups were difficult to differentiate between in 2003 as they were very abundant and piled on top of one another. Pellet data in 2008 estimated 16 elk days use/acre (40 edu/ha) and 106 deer days use/acre (261 ddu/ha).

#### Soils

Soil textural and chemical analysis indicates a loam soil with a moderately acidic pH (5.8). Relative combined average vegetation and litter cover was 58%-70%, and relative combined average rock and pavement cover was 26%-39% since 1992. Relative average bare ground cover was low at 4%-8% since 1992. An erosion condition class assessment rated the as stable in 2003, but erosion on the site was rated as slight in 2008 with flow patterns and litter movement being the predominant factors.

#### Browse

The key browse species is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as it has provided 99% or more of the browse cover since 1992. Density of sagebrush has steadily declined from a high of 3,400 plants/acre in 1992 to a low of 2,220 plants/acre in 2008. The sagebrush population on the site has been moderately to highly decadent (25%-64%). The proportion of plants displaying poor vigor has been low to moderate (5%-39%). The highest decadence and poorest vigor occurred in 2008. Recruitment of young plants has been poor on this site with young plants comprising only 0%-6% of the population in any of the sample years. Utilization of sagebrush has been mostly moderate to heavy with the heaviest use recorded in 2003.

Pinyon and juniper dominate the surrounding slopes and have invaded into the upper part of the sagebrush valley. The juniper trees to the west and on the slope below the basin were severely high-lined in 1987. The chainsaw treatment cut down all the juniper on the study site, but of all the trees alive during the 1992 reading were dead by 1998. The only other browse with any density estimates on the site include small numbers of broom snakeweed (*Gutierrezia sarothrae*) and prickly pear cactus (*Opuntia* sp.).

#### Herbaceous Understory

The herbaceous understory was dominated by cheatgrass (*Bromus tectorum*) from 1992 to 2003, but frequency and cover of cheatgrass declined markedly in 2008. Another annual, sixweeks fescue (*Vulpia octoflora*), was also moderately abundant, but declined in 2008 as well. In 2008, the site was dominated by the perennial grasses intermediate wheatgrass (*Agropyron intermedium*) and galletta (*Hilaria jamesii*). Other common grasses are purple three-awn (*Aristida purpurea*), sand dropseed (*Sporobolus cryptandrus*). Bulbous bluegrass (*Poa bulbosa*) was sampled on the site in 2003, but not in any other sample year. Forbs are insignificant on this site, especially perennial species. All forbs combined have provided less than 1% average cover since 1992.

### 1992 TREND ASSESSMENT

Trend for browse is slightly down. Density differences in browse species may be related to the larger sample area used in 1992, therefore, trend for browse was determined using other parameters. Decadence of the primary browse species, mountain big sagebrush, increased to 51%, and the proportion of plants displaying poor vigor increased to 28%. Recruitment of young sagebrush plants has improved, but is still low with young plants comprising only 6% of the population. The trend for grasses is slightly down. The herbaceous understory is dominated by cheatgrass, sixweeks fescue, and a few annual forbs which make up 55% of the herbaceous understory cover. Perennial grasses consist primarily of three warm season species. The sum of nested frequencies for perennial grasses decreased by 12% since 1987. Trend for forbs is stable. Perennial forbs are rare.

winter range condition (DCI) - very poor (23) Mid-level potential  
browse - slightly down (-1)      grass - slightly down (-1)      forb - stable (0)

### 1998 TREND ASSESSMENT

The browse trend is slightly up. Density of mountain big sagebrush has declined slightly, though both sagebrush decadence and vigor improved from 1992. Recruitment of young sagebrush plants remained similar to 1992. Trend for the grasses is slightly up. Sum of nested frequency of perennial grasses increased by 13%, and production of perennial grasses increased to about 8% of the total cover. Cheatgrass still dominates the herbaceous understory, but has significantly declined in nested frequency since 1992. Trend for forbs is stable. There was a slight increase in the sum of nested frequency of perennial forbs, but forbs are rare.

winter range condition (DCI) - poor-fair (49) Mid-level potential  
browse - slightly up (+1)      grass - slightly up (+1)      forb - stable (0)

### 2003 TREND ASSESSMENT

Trend for browse is down. Density of mountain big sagebrush continues to decline, and decadence of sagebrush increased to 57%. Sagebrush plants displaying poor vigor increased slightly to 11%. Recruitment of young plants continued to decline and young plants comprised only 2% of the population. Trend for grasses is stable. Sum of nested frequency of perennial grasses increased somewhat, but cover of perennial grasses declined slightly. Cheatgrass remains the dominant species with and cover was very high at 25%. Trend for the forbs is stable. Forbs are rare and contribute little to this site.

winter range condition (DCI) - very poor (17) Mid-level potential  
browse - down (-2)      grass - stable (0)      forb - stable (0)

### 2008 TREND ASSESSMENT

Trend for browse is slightly down. Density of mountain big sagebrush continued to decrease 12% since 2003 to 2,220 plants/acre, the lowest estimated density since sampling began. Decadence of sagebrush declined to 64% of the population, and the proportion of plants displaying poor vigor increased to 39%. Both decadence and poor vigor are the highest measurement since sampling began. Recruitment of young plants is still poor at 3%. Trend for grasses is up. The sum of nested frequency of perennial grasses increased by 43%, and production increased to over 12% total cover. The annual species, cheatgrass and six weeks fescue, decreased significantly in nested frequency, and cover of annual species was less than 1%. This is a drastic improvement with perennial grasses now dominating the herbaceous understory. Trend for forbs is stable. Forbs continue to account for less than 1% of total cover.

winter range condition (DCI) - poor (40) Mid-level potential  
browse - slightly down (-1)      grass - up (+2)      forb - stable (0)

HERBACEOUS TRENDS --  
Management unit 28 , Study no: 11

T y p e	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
G	Agropyron cristatum	7	-	-	-	-	-	-	-	-
G	Agropyron intermedium	<sub>a</sub> 25	<sub>a</sub> 17	<sub>ab</sub> 38	<sub>cd</sub> 65	<sub>c</sub> 78	.89	2.65	2.87	4.71
G	Agropyron smithii	3	-	-	-	-	-	-	-	-
G	Aristida purpurea	<sub>c</sub> 77	<sub>b</sub> 34	<sub>ab</sub> 9	<sub>a</sub> 9	<sub>b</sub> 35	.42	.19	.07	.52
G	Bromus tectorum (a)	-	<sub>c</sub> 369	<sub>b</sub> 330	<sub>bc</sub> 347	<sub>a</sub> 27	32.16	7.40	25.13	.22
G	Hilaria jamesii	<sub>a</sub> -	<sub>b</sub> 21	<sub>bc</sub> 30	<sub>bc</sub> 29	<sub>c</sub> 43	1.70	1.88	2.24	5.35
G	Oryzopsis hymenoides	-	1	-	-	1	.03	-	-	.00
G	Poa bulbosa	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 20	<sub>a</sub> -	-	-	.23	-
G	Poa secunda	-	-	6	4	3	-	.18	.06	.01
G	Sitanion hystrix	<sub>ab</sub> 18	<sub>ab</sub> 12	<sub>a</sub> 8	<sub>ab</sub> 15	<sub>b</sub> 32	.49	.09	.44	.63
G	Sporobolus cryptandrus	<sub>a</sub> 6	<sub>c</sub> 32	<sub>c</sub> 43	<sub>a</sub> 4	<sub>bc</sub> 25	1.23	2.52	.18	1.24
G	Stipa comata	-	3	1	6	-	.15	.15	.18	.00
G	Vulpia octoflora (a)	-	<sub>b</sub> 145	<sub>b</sub> 146	<sub>b</sub> 170	<sub>a</sub> -	.77	.58	2.33	-
Total for Annual Grasses		0	514	476	517	27	32.94	7.99	27.46	0.22
Total for Perennial Grasses		136	120	135	152	217	4.91	7.69	6.29	12.49
Total for Grasses		136	634	611	669	244	37.85	15.68	33.76	12.72
F	Agoseris glauca	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 15	<sub>a</sub> 5	<sub>b</sub> 18	-	.14	.01	.14
F	Artemisia ludoviciana	-	1	6	-	2	.01	.18	-	.00
F	Astragalus sp.	-	2	-	-	-	.03	-	-	-
F	Calochortus nuttallii	-	-	6	-	1	-	.04	-	.00
F	Chenopodium sp. (a)	-	1	-	-	-	.00	-	-	-
F	Crepis acuminata	-	-	-	1	-	-	-	.00	-
F	Draba sp. (a)	-	<sub>a</sub> -	<sub>b</sub> 50	<sub>c</sub> 70	<sub>a</sub> -	-	.09	.23	-
F	Lappula occidentalis (a)	-	-	-	7	-	-	-	.02	-
F	Microsteris gracilis (a)	-	<sub>c</sub> 81	<sub>b</sub> 37	<sub>c</sub> 96	<sub>a</sub> -	.23	.13	.34	-
F	Orobanche fasciculata	-	1	3	-	2	.00	.00	-	.03
F	Plantago patagonica (a)	-	8	4	-	3	.01	.01	-	.00
F	Ranunculus testiculatus (a)	-	<sub>a</sub> -	<sub>b</sub> 22	<sub>b</sub> 18	<sub>c</sub> 63	-	.10	.04	.14
F	Tragopogon dubius	-	-	4	-	-	-	.01	-	-
Total for Annual Forbs		0	90	113	191	66	0.25	0.34	0.64	0.14
Total for Perennial Forbs		0	4	34	6	23	0.04	0.37	0.01	0.18
Total for Forbs		0	94	147	197	89	0.29	0.71	0.65	0.33

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

BROWSE TRENDS --

Management unit 28 , Study no: 11

Type	Species	Strip Frequency				Average Cover %			
		'92	'98	'03	'08	'92	'98	'03	'08
B	Artemisia tridentata vaseyana	73	76	66	66	23.90	23.32	20.55	13.93
B	Chrysothamnus nauseosus hololeucus	0	1	0	0	-	.00	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	0	0	-	.15	-	-
B	Gutierrezia sarothrae	7	4	8	5	.15	.03	.15	.00
B	Juniperus osteosperma	0	0	1	0	-	-	.00	-
B	Opuntia sp.	2	2	2	3	.15	.15	.00	.03
Total for Browse		82	84	77	74	24.20	23.65	20.70	13.96

CANOPY COVER, LINE INTERCEPT --

Management unit 28 , Study no: 11

Species	Percent Cover	
	'03	'08
Artemisia tridentata vaseyana	15.14	11.94
Gutierrezia sarothrae	-	.01
Opuntia sp.	-	.11

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 28 , Study no: 11

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata vaseyana	1.4	2.1

BASIC COVER --

Management unit 28 , Study no: 11

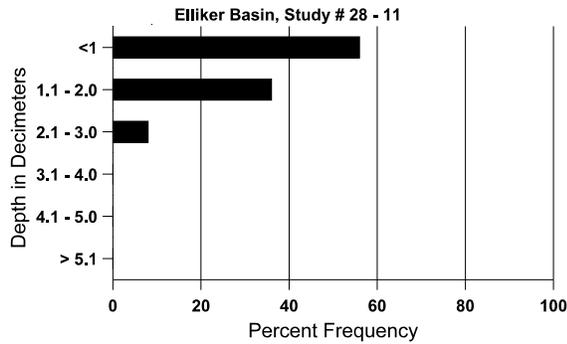
Cover Type	Average Cover %				
	'87	'92	'98	'03	'08
Vegetation	3.75	47.87	38.06	52.34	26.62
Rock	19.75	48.12	11.02	8.87	9.35
Pavement	37.75	0	27.36	22.20	24.41
Litter	37.25	23.97	41.11	31.03	51.99
Cryptogams	0	.04	.12	0	.24
Bare Ground	1.50	4.53	9.89	4.15	6.11

SOIL ANALYSIS DATA --

Management unit 28, Study no: 11, Study Name: Elliker Basin

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
14.2	75.8 (11.2)	5.8	50.7	31.4	17.8	2.8	10.6	99.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 28, Study no: 11

Type	Quadrat Frequency			
	'92	'98	'03	'08
Rabbit	26	19	13	54
Elk	-	1	1	-
Deer	27	47	31	70

Days use per acre (ha)		
'98	'03	'08
-	-	-
1 (2)	-	16 (40)
44 (109)	151 (374)	106 (261)

BROWSE CHARACTERISTICS --  
Management unit 28 , Study no: 11

		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)
<b>Amelanchier utahensis</b>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	80/71
08	0	-	-	-	-	-	0	0	-	-	0	55/53
<b>Artemisia tridentata vaseyana</b>												
87	2465	66	-	1799	666	-	57	30	27	.81	5	27/33
92	3400	20	200	1480	1720	-	44	16	51	24	28	-/-
98	3120	3480	120	2220	780	540	31	0	25	5	5	23/39
03	2520	-	40	1040	1440	560	37	46	57	11	11	24/38
08	2220	3000	60	740	1420	800	38	30	64	38	39	21/34
<b>Chrysothamnus nauseosus hololeucus</b>												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	0	-	0	-/-
98	60	-	-	-	60	-	100	0	100	-	0	-/-
03	0	-	-	-	-	-	0	0	0	-	0	-/-
08	0	-	-	-	-	-	0	0	0	-	0	-/-
<b>Chrysothamnus viscidiflorus viscidiflorus</b>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	60	-	-	60	-	-	0	0	-	-	0	6/5
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<b>Cowania mexicana stansburiana</b>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	22/40

		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>Gutierrezia sarothrae</i>												
87	<b>265</b>	-	66	133	66	-	0	0	25	-	0	10/4
92	<b>180</b>	-	-	160	20	-	0	0	11	-	0	-/-
98	<b>160</b>	-	60	100	-	-	0	0	0	-	0	8/9
03	<b>380</b>	-	-	380	-	-	0	0	0	-	0	7/8
08	<b>140</b>	-	20	100	20	-	0	0	14	14	14	7/8
<i>Juniperus osteosperma</i>												
87	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
92	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
03	<b>20</b>	-	-	20	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Opuntia sp.</i>												
87	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
92	<b>40</b>	-	20	20	-	-	0	0	0	-	0	-/-
98	<b>40</b>	-	-	20	20	-	0	0	50	-	50	5/12
03	<b>40</b>	-	-	40	-	-	0	0	0	-	0	5/10
08	<b>60</b>	-	-	60	-	-	0	0	0	-	0	7/18
<i>Pediocactus simpsonii</i>												
87	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
92	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	4/4
<i>Purshia tridentata</i>												
87	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
92	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	8/27
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	22/37
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Yucca sp.</i>												
87	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
92	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	24/21
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	23/30