

Trend Study 28-11-03

Study site name: Elliker Basin .

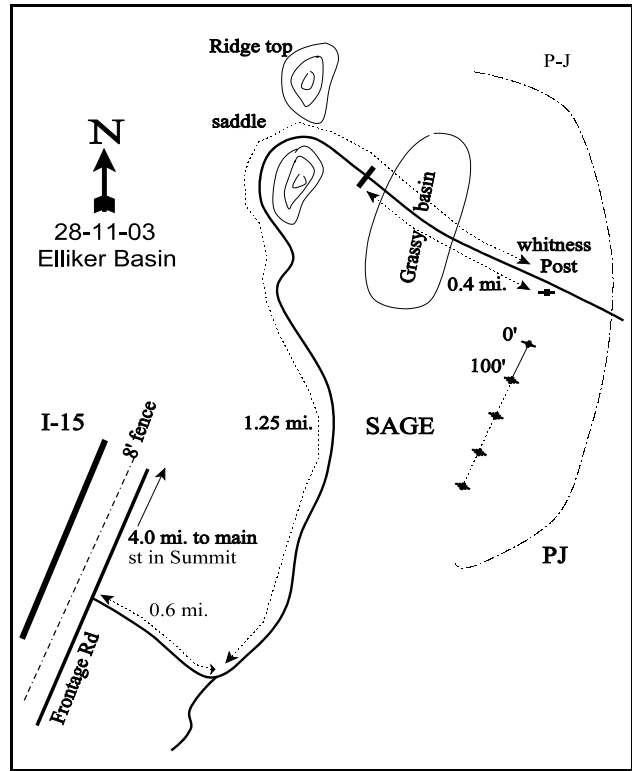
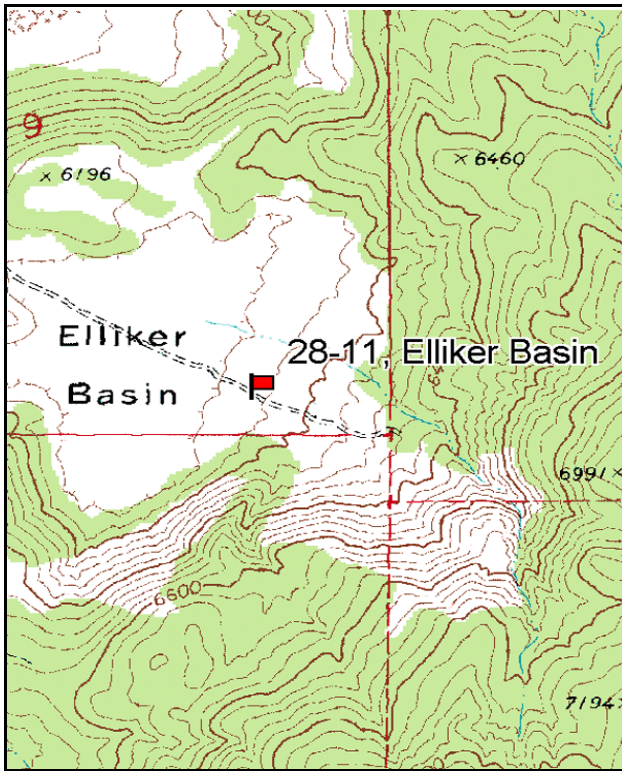
Vegetation type: Mountain Big Sagebrush .

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 27, UTM 12S 4181555 N, 325672 E

DISCUSSION

Elliker Basin - Trend Study No. 28-11

Elliker Basin is a small sagebrush valley at the base of the Hurricane Cliffs, about 8 miles northeast of Cedar City. The transect itself is located on the southeastern slope of the basin just below the line of pinyon-juniper which continue up the cliffs. The study site slopes to the west at 10-15% at an elevation of 6,160 feet. Pinyon and juniper dominate the slopes bordering the valley. The area is important deer winter range, which was acquired by the DWR 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. Many of the trees seen in 1992 were reported to be still alive and growing below the cut, however in 1998, all the trees were dead. 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. Half of the deer pellets appeared to be from fall and early winter, while the other half appeared to be from late winter and spring.

Soil textural and chemical analysis indicates a loam soil with a moderately acidic pH (5.8). In 1998, the average effective rooting depth was just over 14 inches with an average temperature of 52°F measured at a depth of 16 inches. Soil temperature was much higher in 2003 estimated at nearly 76°F. High soil temperatures in 2003 was due to several years of drought that resulted in very low soil moisture and elevated temperatures. Both the soil surface and profile are rocky throughout. Soil movement is a problem on roads up to the basin, and there were signs of overland water flow in some areas across the flat in 1998. An erosion condition class assessment completed in 2003 rated soils as stable, and signs of erosion were minimal. Vegetation and litter cover have been abundant in all surveys, and bare ground has been quite low.

The key browse species is mountain big sagebrush as it has provided 99% of the browse cover since 1992. Population density was estimated at 3,400 plants/acre in 1992, 3,120 in 1998, and 2,520 in 2003. The steady decline in population numbers is the result of moderate to high decadence in the population as well as more decadent, dying individuals than young plants since 1992. Seedlings were very abundant in 1998 due to consecutive years of above normal precipitation preceding the 1998 sampling (Utah Climate Summaries 2004). However, very few of the seedlings sampled in 1998 lived as evidenced by the very low number of young and the population decline in 2003. Percent decadence was high in 1992 and 2003 at 51% and 57% respectively, and moderate in 1987 and 1998 at 27% and 25% respectively. Utilization has varied between individuals and location in the basin. It was noted in 1998 that plants in the lowest area appeared heavily hedged and had comparatively poor growth and vigor, although this condition could also be related to soil type and/or water table conditions which could cause problems during exceptionally wet years. Differential use was noted in 2003 as some plants were heavily hedged and nearby ones had received little to no use. Overall, utilization on big sagebrush was moderate to heavy in 1987, 1992, and 2003, but light to moderate in 1998. Seed production was fair to good in 2003 with annual leaders averaging 1.4 inches of growth by mid-June.

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 highlined in 1987. The chainsaw treatment cut down all the juniper on the study site, but some trees were still alive at the time of the 1992 reading. In 1998, the pinyon and juniper trees that were cut down, but reported to be alive on the site in 1992, were dead. Other browse sampled on the site include small numbers of Utah serviceberry, bitterbrush, rubber rabbitbrush, low rabbitbrush, broom snakeweed, yucca, and prickly pear cactus.

The herbaceous understory is dominated by cheatgrass. Even with several years of below normal spring precipitation between the 1998 and 2003 readings, cheatgrass maintained a stable nested frequency and

increased in average cover in 2003. Cheatgrass has been sampled in nearly every quadrat since 1992, and its presence on the site has created a severe fire hazard which would be detrimental to this area as the sagebrush would be lost. Another annual, sixweeks fescue, is moderately abundant but is low in stature. All perennial grasses combined are less abundant than cheatgrass. Intermediate wheatgrass is the most abundant perennial grass on the site and did significantly increase in 2003. Other grasses that have been sampled include purple three-awn, galleta, sand dropseed, bulbous bluegrass, and bottlebrush squirreltail. Most of the perennial grasses found on the site grow under the protection of sagebrush plants. Forbs are insignificant on this site, especially perennial species. All forbs combined have provided less than 1% average cover since 1992.

1987 APPARENT TREND ASSESSMENT

Litter greatly contributes to the ground cover beneath sagebrush plants, but in the shrub interspaces vegetation and litter cover are limited. The very high concentration of pavement and rocks on the surface in the exposed areas made up 58% of the ground cover. Therefore, the soil itself is fairly well protected and only 2% of the surface was identified as bare soil. The key browse consisting of mountain big sagebrush is mostly mature, 30% of which are heavily hedged. Vigor is generally good and percent decadence is average for a site like this (27%). Sagebrush recruitment is very low however, with only a few seedlings and no young encountered. The abundance of grasses is fair and dominated by warm season species. Cheatgrass is prevalent in the understory. Forbs are rare.

1992 TREND ASSESSMENT

Soil conditions are similar to the 1987 reading. Some of the differences in bare soil and rock cover are likely due to the new and larger sample size. Litter increased due to downed juniper trees from the chainsaw treatment. Some soil movement is still detectable, but the nearly continuous cover of rock, pavement and cheatgrass adequately protects what is left of the soil. Trend for soil is stable. Sagebrush, the key browse species, has an increased density estimate, but decadence has increased from 27% to 51%, and nearly half of the decadent plants were classified as dying. Along with increased decadence, vigor is also reduced with 28% of the mature and decadent shrubs displaying poor vigor. These factors, combined with a poor biotic and reproductive potential indicate a downward trend. 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 3 warm season species. Perennial forbs are rare. Sum of nested frequencies for perennial grasses and forbs combined, have remained stable since 1987.

TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - stable (3)

1998 TREND ASSESSMENT

The soil trend is stable. Percent vegetation cover has declined while percent litter cover increased. The browse trend is slightly up. Both percent decadence and the percentage of plants classified as dying have decreased since 1992. Biotic potential is extremely high this season, but it is unlikely that many of the seedling plants will survive through the summer. Population density has declined by 8% since 1992, but vigor has greatly improved and use is lighter. Utilization has shifted from moderate to heavy use in 1987 to light to moderate in 1998. The herbaceous understory is stable. Cheatgrass still dominates the herbaceous understory, but has significantly declined in nested frequency since 1992. Sum of nested frequency of perennial species increased.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is stable. Bare soil declined and remains very low. Vegetation and litter cover are abundant and effectively limit erosion on the site. Trend for browse is down. Density of mountain big sagebrush continues to decline, and recruitment decreased for the third consecutive survey. Percent decadence increased from 25% to 57%, and poor vigor slightly increased to 11%. The number of decadent plants classified as dying remains higher than the number of young, and further population losses are likely. In addition, heavy use increased to 46% of the population in 2003. Trend for the herbaceous understory is stable, but remains in poor condition. Cheatgrass remains the dominant species with a cover value of 25%, and the hazard for a wildfire is high. Perennial grasses and forbs maintained stable sum of nested frequency values but they fail in comparison to cheatgrass.

TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 28 , Study no: 11

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
G	Agropyron cristatum	7	-	-	-	-	-	-
G	Agropyron intermedium	_a 25	_a 17	_a 38	_b 65	.89	2.65	2.87
G	Agropyron smithii	3	-	-	-	-	-	-
G	Aristida purpurea	_c 77	_b 34	_{ab} 9	_a 9	.42	.19	.07
G	Bromus tectorum (a)	-	_b 369	_a 330	_{ab} 347	32.16	7.40	25.13
G	Hilaria jamesii	_a -	_b 21	_b 30	_b 29	1.70	1.88	2.24
G	Oryzopsis hymenoides	-	1	-	-	.03	-	-
G	Poa bulbosa	_a -	_a -	_a -	_b 20	-	-	.23
G	Poa secunda	-	-	6	4	-	.18	.06
G	Sitanion hystrix	18	12	8	15	.49	.09	.44
G	Sporobolus cryptandrus	_a 6	_b 32	_b 43	_a 4	1.23	2.52	.18
G	Stipa comata	-	3	1	6	.15	.15	.18
G	Vulpia octoflora (a)	-	145	146	170	.77	.58	2.33
Total for Annual Grasses		0	514	476	517	32.94	7.99	27.46
Total for Perennial Grasses		136	120	135	152	4.91	7.69	6.29
Total for Grasses		136	634	611	669	37.85	15.68	33.76

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
F	<i>Agoseris glauca</i>	a-	a-	b ¹⁵	a ⁵	-	.14	.01
F	<i>Artemisia ludoviciana</i>	-	1	6	-	.01	.18	-
F	<i>Astragalus</i> spp.	-	2	-	-	.03	-	-
F	<i>Calochortus nuttallii</i>	-	-	6	-	-	.04	-
F	<i>Chenopodium</i> spp. (a)	-	1	-	-	.00	-	-
F	<i>Crepis acuminata</i>	-	-	-	1	-	-	.00
F	<i>Draba</i> spp. (a)	-	a-	b ⁵⁰	c ⁷⁰	-	.09	.23
F	<i>Lappula occidentalis</i> (a)	-	-	-	7	-	-	.02
F	<i>Microsteris gracilis</i> (a)	-	b ⁸¹	a ³⁷	b ⁹⁶	.23	.13	.34
F	<i>Orobanche fasciculata</i>	-	1	3	-	.00	.00	-
F	<i>Plantago patagonica</i> (a)	-	8	4	-	.01	.01	-
F	<i>Ranunculus testiculatus</i> (a)	-	a-	b ²²	b ¹⁸	-	.10	.04
F	<i>Tragopogon dubius</i>	-	-	4	-	-	.01	-
Total for Annual Forbs		0	90	113	191	0.25	0.34	0.64
Total for Perennial Forbs		0	4	34	6	0.04	0.37	0.01
Total for Forbs		0	94	147	197	0.29	0.71	0.65

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	'92	'98	'03
B	<i>Artemisia tridentata vaseyana</i>	73	76	66	23.90	23.32	20.55
B	<i>Chrysothamnus nauseosus hololeucus</i>	0	1	0	-	-	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	0	1	0	-	.15	-
B	<i>Gutierrezia sarothrae</i>	7	4	8	.15	.03	.15
B	<i>Juniperus osteosperma</i>	0	0	1	-	-	-
B	<i>Opuntia</i> spp.	2	2	2	.15	.15	.00
Total for Browse		82	84	77	24.20	23.65	20.70

CANOPY COVER, LINE INTERCEPT --
 Management unit 28 , Study no: 11

Species	Percent Cover
	'03
Artemisia tridentata vaseyana	15.14

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 28 , Study no: 11

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

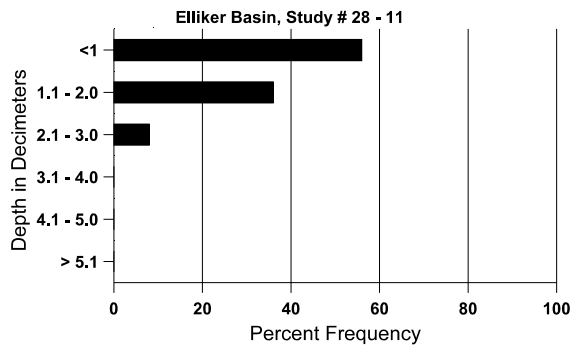
BASIC COVER --
 Management unit 28 , Study no: 11

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

SOIL ANALYSIS DATA --
 Management unit 28, Study no: 11, Study Name: Elliker Basin

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
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
Rabbit	26	19	13
Elk	-	1	1
Deer	27	47	31

Days use per acre (ha)	
'98	'03
-	-
1 (2)	-
44 (109)	151 (374)

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	% poor vigor	Average Height Crown (in)
<i>Amelanchier utahensis</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	80/71
<i>Artemisia tridentata vaseyana</i>											
87	2466	66	-	1800	666	-	57	30	27	5	27/33
92	3400	20	200	1480	1720	-	44	16	51	28	-/-
98	3120	3480	120	2220	780	540	31	0	25	5	23/39
03	2520	-	40	1040	1440	560	37	46	57	11	24/38
<i>Chrysothamnus nauseosus hololeucus</i>											
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	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	60	-	-	60	-	-	0	0	-	0	6/5
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Gutierrezia sarothrae</i>											
87	265	-	66	133	66	-	0	0	25	0	10/4
92	180	-	-	160	20	-	0	0	11	0	-/-
98	160	-	60	100	-	-	0	0	0	0	8/9
03	380	-	-	380	-	-	0	0	0	0	7/8

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Juniperus osteosperma											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	20	-	-	20	-	-	0	0	-	0	-/-
Opuntia spp.											
87	0	-	-	-	-	-	0	0	0	0	-/-
92	40	-	20	20	-	-	0	0	0	0	-/-
98	40	-	-	20	20	-	0	0	50	50	5/12
03	40	-	-	40	-	-	0	0	0	0	5/10
Purshia tridentata											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	8/27
03	0	-	-	-	-	-	0	0	-	0	22/37
Yucca spp.											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	24/21