

Trend Study 28-18-08

Study site name: Shakespeare Hollow .

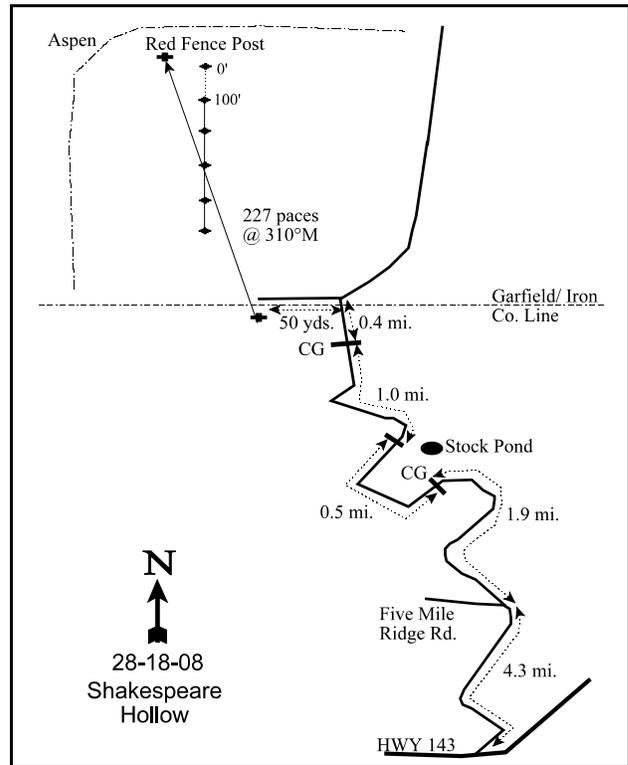
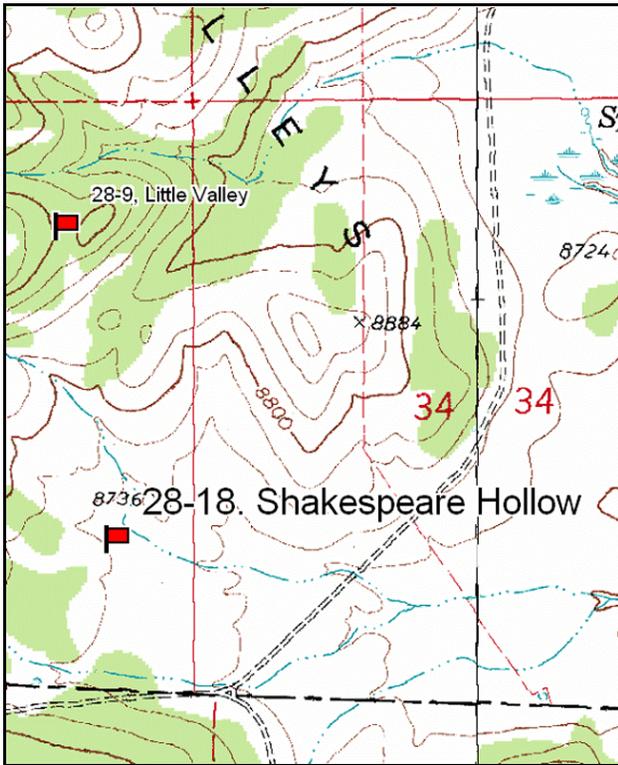
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

From Panguitch, go south towards Panguitch Lake. At mile marker 41, turn right onto a dirt road. Proceed up Pole Hollow 4.3 miles to the Five Mile Ridge Road. Continue straight 1.9 miles to a cattleguard. Continue 0.5 miles to a cattleguard and stockpond. Continue 1.0 miles to another cattleguard. Go 0.4 miles to a fork at the Iron County-Garfield County line. Bear right, go 50 yards, and park by a witness post and aspen on the left side of the road (south). From the witness post, walk 227 paces at 310 degrees magnetic to another witness post. The 0-foot stake is west-southwest of the witness post.



Map Name: Red Creek Reservoir

Diagrammatic Sketch

Township 35S, Range 7W, Section 3

GPS: NAD 83, UTM 12S 356016 E, 4185924 N

## DISCUSSION

### Shakespeare Hollow - Trend Study No. 28-18

#### Study Information

This study was established in 2003 about one-half mile south of the Little Valleys (28-9) study and samples a mountain brush community surrounded by pockets of aspen [elevation: 8,750 feet (2667 m), slope: 1-3%, aspect: east]. This study replaced the Little Valleys transect, which was no longer representative of important summer range. The Little Valleys transect was placed inside a thick aspen clone with a very dense snowberry understory that received very little use by big game or livestock. The new transect was left in the general area because of its importance to deer, elk, and sage grouse. Pellet group transect data collected on site in 2003 estimated 24 elk, 23 deer, and 16 cow days use/acre (60 edu/ha, 56 ddu/ha, and 39 cdu/ha). Pellet group data from 2008 estimated 4 elk, 23 deer, and 12 cow days use/acre (10 edu/ha, 58 ddu/ha, and 29 cdu/ha). Some of the deer pellets could be antelope because both deer and antelope were seen near the study site in 2008.

#### Soils

Soils are loam in texture and moderately acidic with a pH of 6.0. Relative combined average vegetation and litter cover was moderately high at 63%-70%, and relative combined average rock and pavement cover was fairly low at 9%-11% since 2003. Relative average bare ground cover has been moderately high at 26% in 2003, decreasing to 21% in 2008. An erosion condition class assessment rated soils as stable in 2003 and 2008.

#### Browse

Silver sagebrush (*Artemisia cana*) and bitterbrush (*Purshia tridentata*) are the dominant browse species on the site contributing a combined average of 84% of the total browse cover in both sample years. Bitterbrush is the only preferred species found in any notable density. Bitterbrush density was estimated to have an average of about 1,000 plants/acre with a mostly mature population. Average height of bitterbrush has been 21 inches. Decadence of bitterbrush was low in 2003, but increased substantially in 2008. The proportion of plants displaying poor vigor also increased in 2008, but vigor is still good. Recruitment of young bitterbrush plants was low in 2003, but also increased in 2008. Utilization of bitterbrush has been moderate to heavy, with the heaviest use measured in 2003. Other browse sampled on the site include Parry rabbitbrush (*Chrysothamnus parryi*), stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), and a few currant plants (*Ribes* sp.). Parry rabbitbrush population has displayed moderate use in the sample years.

#### Herbaceous Understory

The herbaceous understory is diverse and moderately abundant. Eight perennial grasses and 25 perennial forbs have been sampled on the site. Mutton bluegrass (*Poa secunda*), Kentucky blugrass (*Poa pratensis*), bottlebrush squirreltail (*Sitanion hystrix*), needle-and-thread grass (*Stipa comata*), and Letterman needlegrass (*Stipa lettermani*) were the most abundant grasses. Perennial forbs are diverse and fairly abundant on the site. Six species of annual forbs have also been sampled on the site.

#### 2008 TREND ASSESSMENT

Browse trend is stable. Density of the preferred browse species, bitterbrush, is similar to 2003, but decadence has increased to 32%. Plants displaying poor vigor have increased to 11% of the population, but recruitment of young bitterbrush plants has improved with young plants comprising 13% of the population. The trend for both grasses and forbs is up. The sum of nested frequency of both perennial grasses and perennial forbs increased substantially, as did their total cover. There was a significant increase in the nested frequency of Kentucky bluegrass, bottlebrush squirreltail, and Letterman needlegrass. There was also a significant increase in seven perennial forb species.

browse - stable (0)

grasses - up (+2)

forbs - up (+2)

HERBACEOUS TRENDS --  
Management unit 28 , Study no: 18

T y p e	Species	Nested Frequency		Average Cover %	
		'03	'08	'03	'08
G	<i>Bouteloua gracilis</i>	10	10	.38	.53
G	<i>Koeleria cristata</i>	38	48	.31	.83
G	<i>Poa fendleriana</i>	214	174	5.05	6.35
G	<i>Poa pratensis</i>	<sub>a</sub> 8	<sub>b</sub> 198	.16	6.26
G	<i>Sitanion hystrix</i>	<sub>a</sub> 36	<sub>b</sub> 65	.37	1.34
G	<i>Stipa columbiana</i>	10	4	.21	.18
G	<i>Stipa comata</i>	66	90	1.37	3.05
G	<i>Stipa lettermani</i>	<sub>a</sub> 63	<sub>b</sub> 119	1.00	4.12
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		445	708	8.88	22.69
Total for Grasses		445	708	8.88	22.69
F	<i>Achillea millefolium</i>	31	42	.13	1.02
F	<i>Agoseris glauca</i>	<sub>a</sub> 2	<sub>b</sub> 38	.00	.13
F	<i>Antennaria rosea</i>	<sub>a</sub> 10	<sub>b</sub> 30	.09	.48
F	<i>Androsace septentrionalis</i> (a)	-	6	-	.02
F	Apiaceae sp.	<sub>a</sub> -	<sub>b</sub> 62	-	.19
F	<i>Arabis</i> sp.	<sub>a</sub> -	<sub>b</sub> 9	-	.05
F	<i>Artemisia dracunculus</i>	5	1	.38	.00
F	<i>Artemisia ludoviciana</i>	<sub>a</sub> 79	<sub>b</sub> 138	.81	2.08
F	<i>Aster chilensis</i>	15	15	.10	.23
F	<i>Aster</i> sp.	<sub>a</sub> -	<sub>b</sub> 39	-	.45
F	<i>Astragalus</i> sp.	-	4	-	.15
F	<i>Calochortus nuttallii</i>	<sub>a</sub> 11	<sub>b</sub> 23	.03	.08
F	<i>Chenopodium album</i> (a)	-	2	-	.00
F	<i>Collinsia parviflora</i> (a)	<sub>a</sub> 127	<sub>b</sub> 228	.63	1.21
F	<i>Delphinium nuttallianum</i>	<sub>a</sub> 4	<sub>b</sub> 14	.00	.09
F	<i>Erigeron flagellaris</i>	79	51	1.05	.53
F	<i>Erigeron pumilus</i>	<sub>b</sub> 133	<sub>a</sub> 42	2.11	.32
F	<i>Eriogonum racemosum</i>	<sub>a</sub> 65	<sub>b</sub> 92	1.54	1.75
F	<i>Eriogonum umbellatum</i>	34	29	.56	.52
F	<i>Fritillaria atropurpurea</i>	-	1	-	.00
F	<i>Lomatium</i> sp.	-	3	-	.01
F	<i>Microsteris gracilis</i> (a)	<sub>a</sub> 19	<sub>b</sub> 53	.06	.12
F	<i>Penstemon</i> sp.	21	22	.16	.18

Type	Species	Nested Frequency		Average Cover %	
		'03	'08	'03	'08
F	<i>Polygonum douglasii</i> (a)	<sub>a</sub> -	<sub>b</sub> 73	-	.21
F	<i>Potentilla</i> sp.	8	18	.10	.43
F	<i>Senecio integerrimus</i>	<sub>a</sub> 3	<sub>b</sub> 52	.04	.68
F	<i>Senecio multilobatus</i>	12	7	.05	.05
F	<i>Sisymbrium altissimum</i> (a)	1	-	.00	-
F	<i>Taraxacum officinale</i>	-	4	-	.04
F	<i>Tragopogon dubius</i>	<sub>b</sub> 20	<sub>a</sub> 5	.06	.03
F	<i>Trifolium</i> sp.	<sub>a</sub> 21	<sub>b</sub> 58	.42	.90
Total for Annual Forbs		147	362	0.69	1.57
Total for Perennial Forbs		553	799	7.69	10.47
Total for Forbs		700	1161	8.39	12.05

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

#### BROWSE TRENDS --

Management unit 28 , Study no: 18

Type	Species	Strip Frequency		Average Cover %	
		'03	'08	'03	'08
B	<i>Artemisia cana</i>	85	93	11.55	14.15
B	<i>Chrysothamnus parryi</i>	32	8	.74	.18
B	<i>Chrysothamnus viscidiflorus</i> <i>viscidiflorus</i>	48	49	3.59	3.07
B	<i>Gutierrezia sarothrae</i>	2	0	.00	-
B	<i>Purshia tridentata</i>	37	35	9.35	6.19
B	<i>Ribes</i> sp.	1	1	.01	.30
Total for Browse		205	186	25.26	23.92

CANOPY COVER, LINE INTERCEPT --  
 Management unit 28 , Study no: 18

Species	Percent Cover	
	'03	'08
Artemisia cana	11.18	13.06
Chrysothamnus parryi	1.39	.10
Chrysothamnus viscidiflorus viscidiflorus	3.75	5.86
Purshia tridentata	13.05	9.89
Ribes sp.	.11	.25

KEY BROWSE ANNUAL LEADER GROWTH --  
 Management unit 28 , Study no: 18

Species	Average leader growth (in)	
	'03	'08
Artemisia cana	1.4	1.8
Purshia tridentata	1.8	1.9

BASIC COVER --  
 Management unit 28 , Study no: 18

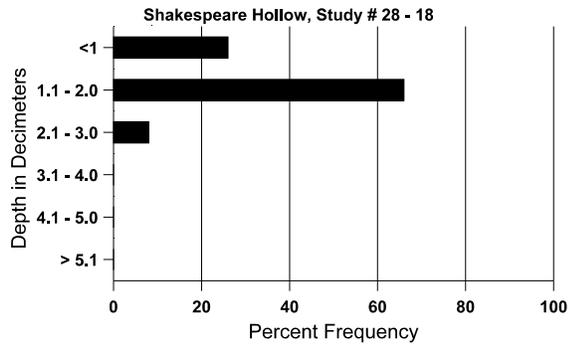
Cover Type	Average Cover %	
	'03	'08
Vegetation	39.65	55.81
Rock	9.71	6.40
Pavement	3.34	3.54
Litter	33.43	21.52
Cryptogams	.18	.18
Bare Ground	30.55	23.07

SOIL ANALYSIS DATA --

Management unit 28, Study no: 18, Study Name: Shakespeare Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
8.9	63.2 (13.0)	6.0	44.7	32.0	23.3	3.3	30.0	787.2	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 28, Study no: 18

Type	Quadrat Frequency		Days use per acre (ha)	
	'03	'08	'03	'08
Rabbit	2	2	-	-
Elk	8	4	24 (60)	4 (10)
Deer	17	15	23 (56)	23 (58)
Cattle	5	9	16 (39)	12 (29)

BROWSE CHARACTERISTICS --  
Management unit 28 , Study no: 18

		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 cana</i>												
03	<b>6400</b>	-	60	5100	1240	20	14	2	19	6	6	12/19
08	<b>8480</b>	1260	1060	4180	3240	100	4	0	38	9	9	11/21
<i>Chrysothamnus parryi</i>												
03	<b>1240</b>	-	-	1160	80	-	32	2	6	-	0	8/10
08	<b>280</b>	-	40	160	80	-	21	0	29	7	7	10/19
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
03	<b>3020</b>	-	-	2700	320	-	0	0	11	3	3	13/15
08	<b>3040</b>	140	240	2180	620	-	0	0	20	5	5	11/17
<i>Gutierrezia sarothrae</i>												
03	<b>60</b>	-	-	60	-	-	0	0	-	-	0	6/6
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	9/12
<i>Purshia tridentata</i>												
03	<b>1000</b>	-	20	900	80	-	20	80	8	-	0	21/59
08	<b>1060</b>	80	140	580	340	-	40	55	32	11	11	21/48
<i>Ribes sp.</i>												
03	<b>20</b>	-	-	20	-	-	0	0	-	-	0	32/24
08	<b>20</b>	-	-	20	-	-	0	0	-	-	0	37/58
<i>Symphoricarpos oreophilus</i>												
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	15/18
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-