

Trend Study 28-14-08

Study site name: Sheep Hollow West .

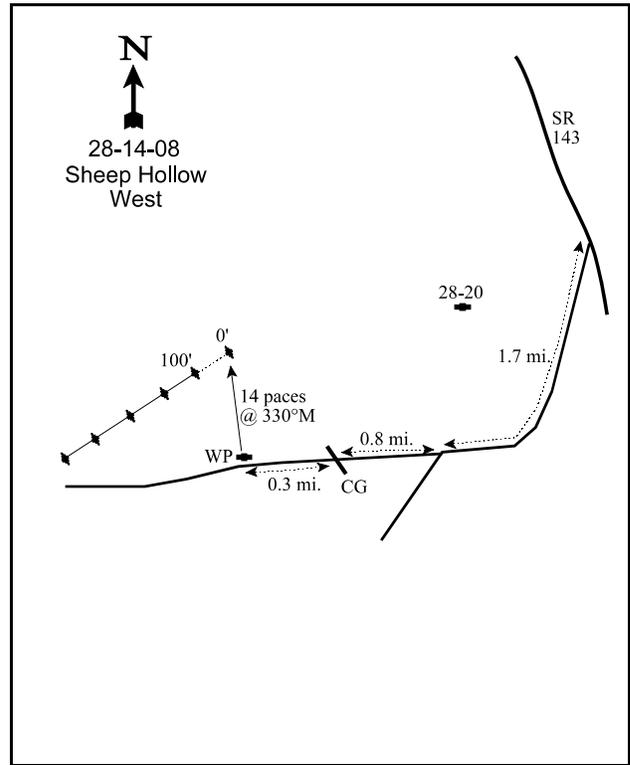
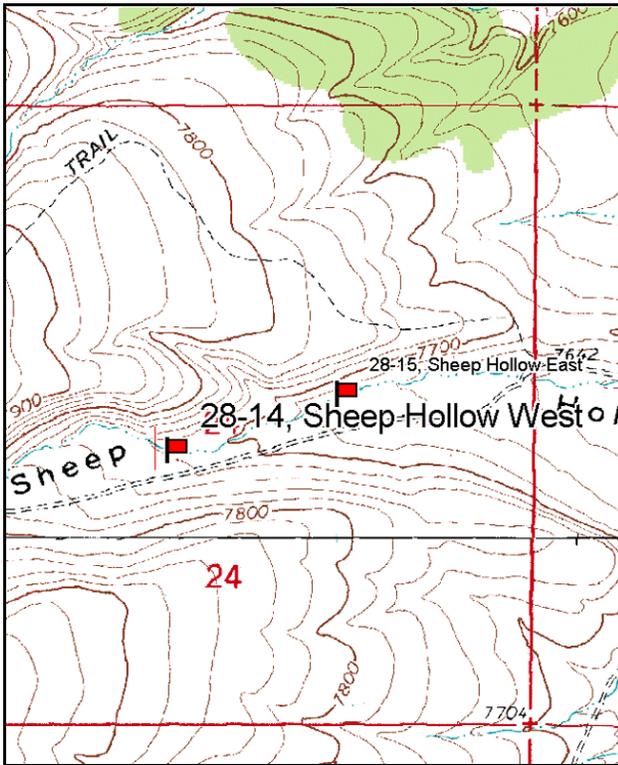
Vegetation type: Black Sagebrush .

Compass bearing: frequency baseline 246 degrees magnetic.

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

LOCATION DESCRIPTION

From Panguitch, head south on SR 143 to mile marker 47. Go 0.1 mile west of mile marker 47 and turn south onto a dirt road heading towards Sheep Hollow. Drive 1.7 miles to a fork. Stay right and continue 0.8 miles to a fence and cattleguard. Cross the cattleguard and go 0.3 miles to a witness post on the right side of the road. The 0-foot baseline stake is 14 paces from the witness post at 330 degrees magnetic. The 0-foot stake has browse tag #500 attached.



Map Name: Panguitch

Diagrammatic Sketch

Township 35S, Range 6W, Section 24

GPS: NAD 83, UTM 12S 369494 E, 4179303 N

DISCUSSION

Sheep Hollow West - Study Site No. 28-14

Study Information

This site was established in 1998 to monitor important winter range on the east side of the unit [elevation: 7,800 feet (2,377 m), slope: 2%-5%, aspect: east]. Much of the winter range on this side of unit 28 is being effected by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) encroachment. The area is represented by black sagebrush (*Artemisia nova*) ridges with antelope bitterbrush (*Purshia tridentata*) and basin big sagebrush (*Artemisia tridentata* spp. *tridentata*) in the deeper soils of the drainage bottoms. This site samples a wide drainage bottom which supports a dense population of black sagebrush with a good bitterbrush component. The area is used by a variety of wildlife during most of the year, especially during the winter when deep snow pushes them to lower elevations, as well as livestock. This area was historically a sheep range but has been switched to cattle. The west side of the fence is permitted to be grazed by 296 AUM's from June to October (1998 grazing management information). The east side of the fence is grazed heavier and is monitored by trend study 28-15. Pellet data collected in 1998 estimated 15 deer, 7 elk and 12 cow days use/acre (37 ddu/ha, 17 edu/ha, and 30 cdu/ha). Pellet group data from 2003 estimated 32 deer, less than 1 elk, and 7 cow days use/acre (79 ddu/ha, 2 edu/ha, and 18 cdu/ha). Pellet group data from 2008 estimated 16 deer, 1 elk, and 4 cow days use/acre (40 ddu/ha, 2 edu/ha, and 11 dcu/ha). Deer and antelope pellets are difficult to differentiate and were all classified as deer pellets. Two dozen antelope and some deer were seen west of the site during study site establishment in 1998.

Soils

Soil texture is a clay loam with a slightly acidic pH (6.3). Parent material is basalt. The soil profile is moderately rocky. Relative combined average vegetation and litter cover was 60%-73%, and relative combined average rock and pavement cover was 8%-12% since 1998. Relative average bare ground cover was moderate in 1998 at 14%, increasing to 35% in 2003, and decreasing to 18% in 2008. An erosion condition class assessment rated erosion as slight in 2003 due primarily to a gully in the road that was active and had dumped a lot of new soil on the site. The erosion condition class was rated as stable in 2008.

Browse

The site supports a dense stand of black sagebrush, which is the primary browse species and has represented 64%-67% of the total browse cover since 1998. Black sagebrush has had an estimated average density around 8,700 plants/acre since 1998. Decadence of black sagebrush has been moderately high from 34%-41% since 1998. Recruitment of young black sagebrush plants has been poor with young plants comprising only 4%-7% of the population since 1998. Sagebrush vigor was good in all sample years. The black sagebrush shows mostly light to moderate use with some heavy use. The heaviest use was noted in 1998.

Antelope bitterbrush also provides important forage and has had an average estimated population density of about 500 plants/acre since 1998. Decadence was very low in 1998, but increased to moderate levels in 2003 and 2008. Bitterbrush vigor has been mostly good except for 2003, when plants displaying poor vigor increased to 21%. Recruitment by young bitterbrush plants has been low to moderate at 4%-15% since 1998. Utilization of bitterbrush has been moderate to heavy.

Other browse encountered on the site include several rabbitbrush species [dwarf rabbitbrush (*Chrysothamnus depressus*), stickyleaf low rabbitbrush (*C. viscidiflorus viscidiflorus*), and Parry rabbitbrush (*C. parryi*)], broom snakeweed (*Gutierrezia sarothrae*), and isolated patches of basin big sagebrush. Combined pinyon/juniper tree density was estimated at 10 to 15 trees/acre in 1998. These were hand cut prior to the 1998 reading as part of a tree thinning treatment. Only a few scattered young trees were left. By 2008 a few seedlings were seen across the site but nothing that was sampled.

Herbaceous Understory

The herbaceous understory is diverse and abundant considering the high amount of shrub cover. Grasses dominate the herbaceous cover with 14 perennial species and one annual species being sampled between 1998 and 2008. The most common species are mutton bluegrass (*Poa fendleriana*) and Letterman needlegrass (*Stipa lettermani*), which together produced over half of the total grass cover in all surveys. Less abundant perennials include western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), prairie junegrass (*Koeleria cristata*), bottlebrush squirreltail (*Sitanion hystrix*), and needle-and-thread grass (*Stipa comata*). Forbs are also diverse. The most common species include Indian paintbrush (*Castilleja linariaefolia*), Eaton fleabane (*Erigeron eatonii*), sulfur and redroot eriogonum (*Eriogonum umbellatum* and *Eriogonum racemosum*), Lewis flax (*Linum lewisii*), and longleaf phlox (*Phlox longifolia*). These species provide important succulent spring forage for big game animals.

1998 DESIRABLE COMPONENTS INDEX

winter range condition (DCI) - good (75) Mid-level potential scale

2003 TREND ASSESSMENT

Trend for browse is stable. Density of the primary browse species, black sagebrush, declined slightly from 1998 to 8,160 plants/acre. Decadence of black sagebrush improved slightly, but plants displaying poor vigor increased to 14%. Recruitment of young plants remains poor. Density of the preferred browse species, antelope bitterbrush, also declined slightly to 480 plants/acre. Decadence of bitterbrush increased markedly to 38%, and the proportion of plants displaying poor vigor increased to 21%. Recruitment of young bitterbrush plants declined to just 4% of the population. There was a large increase in the density of basin big sagebrush, but decadence and the proportion of plants displaying poor vigor increased markedly. Recruitment of young big sagebrush also declined with no young plants sampled. Trend for grasses is down. Sum of nested frequency of perennial grasses decreased by 21% from 1998, and production declined from 16% total cover in 1998 to 8%. There was a significant decrease in the nested frequency of sedge (*Carex sp.*) and Letterman needlegrass. Trend for forbs is down. Sum of nested frequency of perennial forbs declined by 59%, and production decreased to just over 1% of the total cover. Only eight of the eighteen species that were sampled in 1998 were sampled in 2003.

winter range condition (DCI) - fair (54) Mid-level potential scale

browse - stable (0)

grass - down (-2)

forb - down (-2)

2008 TREND ASSESSMENT

Trend for browse is stable. Density of the primary browse species, black sagebrush, increased by 13% since 2003 to 9,360 plants/acre. Decadence of black sagebrush increased slightly, but is similar to 2003 levels. Vigor of black sagebrush and recruitment of young plants has changed little since 2003. There was little change in the population of the preferred browse species, antelope bitterbrush, except for an improvement in vigor. Density of basin big sagebrush has declined, but decadence and vigor of the population improved since 2003. Recruitment of young big sagebrush also increased from 2003. Trend for grasses is slightly up. Sum of nested frequency of perennial grasses increased from 2003, and production of perennial grasses increased to 15% of the total cover. There was a significant increase in the nested frequency of sedge and Letterman needlegrass, but a significant decrease in nested frequency of bottlebrush squirreltail. Trend for forbs is up. Sum of nested frequency of perennial forbs increased markedly, and total cover of perennial forbs increased to 3%. Fourteen of the original eighteen forbs sampled in 1998 were sampled, as well as five new species including segolilly (*Calochortus nuttallii*) and lobeleaf groundsel (*Senecio multilobatus*).

winter range condition (DCI) - fair-good (67) Mid-level potential scale

browse - stable (0)

grass - slightly up (+1)

forb - up (+2)

HERBACEOUS TRENDS --
Management unit 28 , Study no: 14

T y p e	Species	Nested Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
G	Agropyron intermedium	-	8	-	-	.08	-
G	Agropyron smithii	3	4	2	.00	.03	.03
G	Agropyron spicatum	6	-	-	.03	-	-
G	Agropyron trachycaulum	4	3	-	.03	.03	-
G	Bouteloua gracilis	4	7	6	.03	.06	.03
G	Bromus inermis	5	-	-	.03	-	-
G	Bromus tectorum (a)	-	4	-	-	.01	-
G	Carex sp.	_b 21	_a -	_c 53	.63	-	1.11
G	Koeleria cristata	_a 27	_b 64	_{ab} 48	.44	1.48	.74
G	Oryzopsis hymenoides	2	4	5	.03	.15	.03
G	Poa fendleriana	_b 232	_{ab} 186	_a 163	8.61	4.21	6.92
G	Sitanion hystrix	_b 74	_b 71	_a 24	.97	.90	.18
G	Stipa columbiana	8	-	6	.19	-	.01
G	Stipa comata	12	13	8	.10	.35	.08
G	Stipa lettermani	_b 183	_a 102	_b 186	4.86	1.08	5.90
Total for Annual Grasses		0	4	0	0	0.00	0
Total for Perennial Grasses		581	462	501	15.97	8.39	15.06
Total for Grasses		581	466	501	15.97	8.40	15.06
F	Antennaria rosea	_b 16	_{ab} 9	_a 1	.36	.01	.00
F	Arabis sp.	1	-	2	.01	-	.03
F	Astragalus convallarius	8	-	20	.21	-	.51
F	Astragalus sp.	3	-	-	.00	-	-
F	Castilleja linariaefolia	_b 49	_a 2	_{ab} 37	1.24	.03	.61
F	Calochortus nuttallii	-	-	22	-	-	.12
F	Chenopodium leptophyllum(a)	_a -	_b 15	_a 3	-	.09	.00
F	Cirsium sp.	-	-	1	-	-	.00
F	Erigeron eatonii	_c 63	_a 5	_b 28	.59	.03	.08
F	Erigeron flagellaris	9	-	-	.07	-	-
F	Erigeron pumilus	_b 25	_a -	_a 3	.04	-	.01
F	Eriogonum racemosum	55	54	70	.45	.50	.59
F	Eriogonum umbellatum	46	33	30	.79	.61	.44
F	Gayophytum ramosissimum(a)	-	87	-	-	.43	-
F	Hymenoxys richardsonii	1	-	2	.03	-	.03
F	Lappula occidentalis (a)	-	-	1	-	-	.00

T y p e	Species	Nested Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
		F	Linum lewisii	_b 46	_a 14	_a 9	.25
F	Lomatium sp.	-	-	5	-	-	.02
F	Lotus utahensis	35	-	3	.42	-	.04
F	Lupinus kingii (a)	4	-	11	.03	-	.03
F	Lychnis drummondii	7	-	-	.01	-	-
F	Machaeranthera canescens	5	-	4	.06	-	.01
F	Microsteris gracilis (a)	-	-	3	-	-	.00
F	Penstemon caespitosus	3	-	-	.03	-	-
F	Penstemon sp.	3	4	1	.00	.01	.03
F	Phlox longifolia	58	56	74	.17	.19	.24
F	Polygonum douglasii (a)	_a 11	_a 5	_b 21	.02	.01	.05
F	Senecio multilobatus	_a -	_a -	_b 16	-	-	.11
F	Trifolium sp.	-	-	5	-	-	.01
Total for Annual Forbs		15	107	39	0.05	0.53	0.09
Total for Perennial Forbs		433	177	333	4.79	1.45	3.00
Total for Forbs		448	284	372	4.84	1.99	3.10

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

BROWSE TRENDS --

Management unit 28 , Study no: 14

T y p e	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
		B	Artemisia nova	95	98	100	13.73
B	Artemisia tridentata tridentata	2	12	1	.00	.36	.00
B	Chrysothamnus depressus	10	12	15	.40	.12	.22
B	Chrysothamnus parryi	0	1	0	-	.00	-
B	Chrysothamnus viscidiflorus viscidiflorus	54	66	69	2.79	4.17	3.65
B	Gutierrezia sarothrae	3	8	3	.21	.31	.01
B	Opuntia sp.	1	2	2	.00	.00	.00
B	Purshia tridentata	23	21	22	4.41	3.42	3.51
B	Tetradymia canescens	0	0	2	-	-	.06
Total for Browse		188	220	214	21.54	25.46	22.78

CANOPY COVER, LINE INTERCEPT --
 Management unit 28 , Study no: 14

Species	Average Line Intercept	
	'03	'08
Artemisia nova	16.66	27.93
Chrysothamnus depressus	.11	.31
Chrysothamnus viscidiflorus viscidiflorus	1.86	4.40
Gutierrezia sarothrae	.05	-
Purshia tridentata	3.45	5.36

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 28 , Study no: 14

Species	Average leader growth (in)	
	'03	'08
Artemisia nova	0.9	0.6
Purshia tridentata	1.6	1.0

BASIC COVER --
 Management unit 28 , Study no: 14

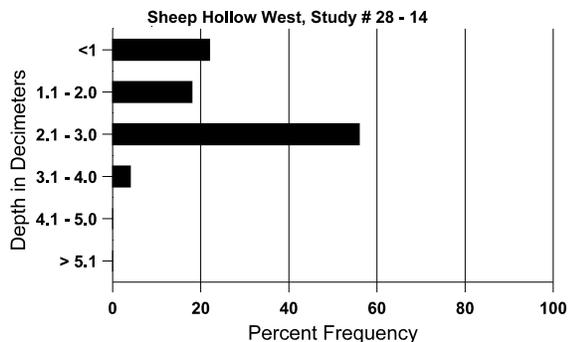
Cover Type	Average Cover %		
	'98	'03	'08
Vegetation	51.18	35.06	43.72
Rock	5.71	5.79	5.90
Pavement	6.77	3.70	7.75
Litter	39.84	34.54	32.64
Cryptogams	3.50	1.47	.97
Bare Ground	18.07	35.31	20.43

SOIL ANALYSIS DATA --

Management unit 28, Study no: 14, Study Name: Sheep Hollow West

Effective rooting depth (in)	Temp °F (depth)	pH	clay loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
15.0	57.3 (14.3)	6.3	40.7	27.4	31.8	2.2	18.4	131.2	0.3

Stoniness Index



PELLET GROUP DATA --

Management unit 28, Study no: 14

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	6	2	70
Elk	5	2	1
Deer	11	11	4
Cattle	1	3	5

Days use per acre (ha)		
'98	'03	'08
-	-	-
7 (17)	1 (2)	1 (2)
15 (37)	32 (79)	16 (40)
12 (30)	7 (18)	4 (11)

BROWSE CHARACTERISTICS --

Management unit 28, Study no: 14

		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)
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	11/12
Artemisia nova												
98	8560	380	580	4680	3300	1560	43	13	39	3	3	16/22
03	8160	-	400	4980	2780	2320	25	1	34	14	14	15/20
08	9360	540	420	5060	3880	1980	26	13	41	13	13	14/23

		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 tridentata</i>												
98	60	-	20	40	-	-	0	33	0	-	0	-/-
03	560	-	-	320	240	40	18	0	43	21	21	20/26
08	120	-	40	80	-	-	100	0	0	-	0	-/-
<i>Chrysothamnus depressus</i>												
98	240	20	40	200	-	-	0	0	0	-	0	7/10
03	340	-	20	280	40	-	71	12	12	-	0	5/9
08	380	-	20	300	60	-	21	47	16	-	0	5/8
<i>Chrysothamnus parryi</i>												
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	20	-	20	-	-	-	0	0	-	-	0	7/9
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
98	2740	-	320	2420	-	-	0	0	0	-	0	8/12
03	4120	-	200	3820	100	-	0	0	2	.48	.48	7/12
08	3980	120	160	3080	740	-	30	8	19	.50	.50	7/12
<i>Gutierrezia sarothrae</i>												
98	80	-	-	80	-	-	0	0	0	-	0	6/8
03	260	-	-	260	-	-	0	0	0	-	0	7/6
08	100	60	20	60	20	-	0	0	20	-	0	5/4
<i>Opuntia sp.</i>												
98	20	-	-	20	-	-	0	0	0	-	0	7/12
03	40	-	-	40	-	-	0	0	0	-	0	6/12
08	40	-	-	20	20	-	0	0	50	-	0	6/11
<i>Purshia tridentata</i>												
98	540	-	80	440	20	-	59	19	4	-	0	23/36
03	480	-	20	280	180	40	71	29	38	21	21	30/45
08	460	20	40	280	140	20	48	35	30	4	4	27/47
<i>Tetradymia canescens</i>												
98	0	-	-	-	-	-	0	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	0	-	0	-/-
08	40	-	-	20	20	-	100	0	50	-	0	-/-