

Trend Study 27R-2-03

Study site name: John R. Flat Livestock Exclosure .

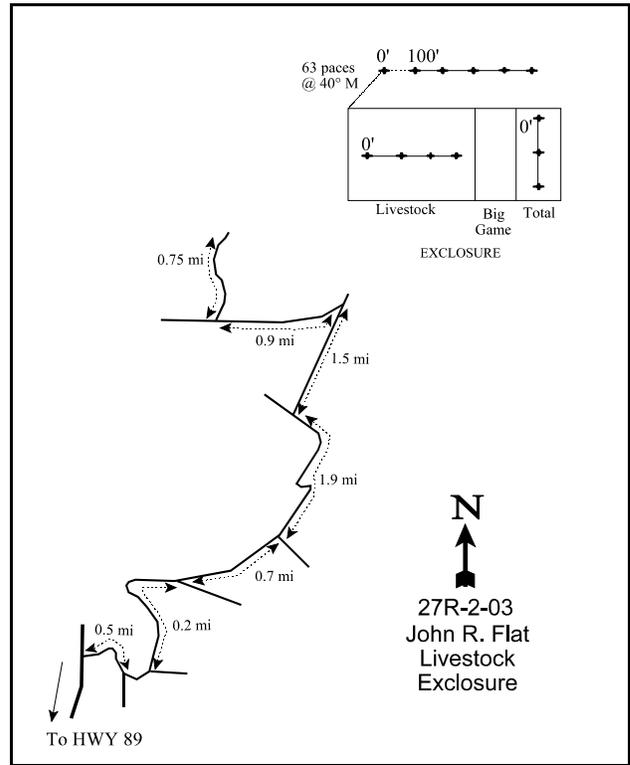
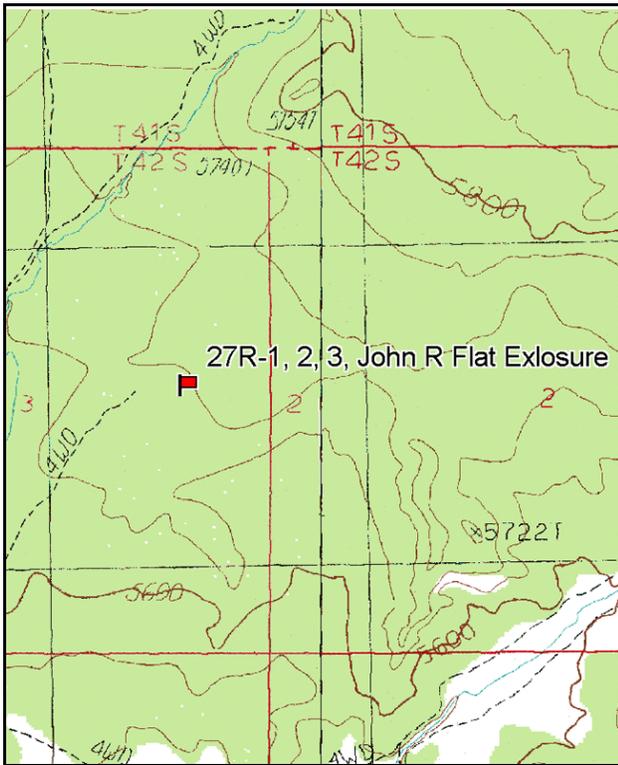
Vegetation type: P-J/ Big Sagebrush .

Compass bearing: frequency baseline 0 degrees magnetic.

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

LOCATION DESCRIPTION

From Kanab, travel north on Highway 89 to the Kanab Creek turnoff. Turn right and go 2.9 miles to another turnoff (you will pass the Best Friends Animal Sanctuary). Turn right, crossing Kanab Creek, and go 0.5 miles to a fork. Stay left and continue approximately 100 feet to another fork. Stay left again and continue 0.2 miles to the next fork. Stay left and continue 0.7 miles to the next fork. Stay left again and travel 1.9 miles to another fork. Go right at this fork and go 1.5 miles to another fork. At this fork, turn left, cross the drainage, and go 0.9 miles to a fork. Go right at the fork for 0.75 miles to the exclosure. The livestock exclosure is nearest the road (lower fence), and the baseline runs down the middle of the exclosure starting at the east side near the taller fence marking the big game exclosure. Count down to the 11th post in from either side to the 0 foot stake. The 0-foot stake is on the east side and marked by browse tag #166.



Map Name: White Tower

Diagrammatic Sketch

Township 42S, Range 6W, Section 3

GPS: NAD 27, UTM 12S 4116569 N, 366376 E

DISCUSSION

John R. Flat Livestock Exclosure - Trend Study No. 27R-2

The John R. Flat exclosure is located on BLM administered land 10 miles north of Kanab, and about 1-2 miles south of the White Cliffs. In 1998, a 3-way comparison was established to compare the vegetative community between the different exclosure treatments (for additional information on the exclosure complex, refer to the discussion for study 27R-1). This study samples the interior of the livestock exclosure which was built to exclude livestock but not big game. The area within the livestock exclosure is almost 1.4 acres (approximately 60,000 ft²). Aspect is to the south at a gentle 1-3% slope. Elevation is 5,700 feet. A pellet group transect showed abundant deer sign within the livestock exclosure with an estimated 114 days use/acre (282 ddu/ha) being estimated in 1998. Deer use was almost identical within the livestock exclosure in 2003 at an estimated 112 days use/acre (278 ddu/ha). Additionally, some rabbit pellet groups were observed in both surveys.

Soils are sandy, very deep (effective rooting depth of 27 inches), and strongly acidic (pH of 5.4). Average soil temperature was 72°F at 18 inches in depth in 1998. Both potassium and phosphorous measurements were low, 6.4 ppm and 7.7 ppm respectively, and may limit plant development. Rock and pavement are very limited on the surface and in the profile. The soil appeared to be more compacted underneath the shrubs than in the bare interspaces. Much of the protective ground cover on this site comes from litter and cryptogams. Only 6% of the vegetation cover is contributed by herbaceous species. Although percent bare ground cover is high, erosion is low due to the sandy texture and lack of slope. An erosion condition class assessment rated soils as stable in 2003.

Browse species provided 94% and 99% of the vegetation cover within the livestock exclosure in 1998 and 2003 respectively. Antelope bitterbrush, basin big sagebrush, and sand sagebrush are the most abundant browse species. Basin big sagebrush had an estimated density of 4,420 plants/acre in 1998, declining to 2,520 in 2003. The number of dead in the population more than doubled in 2003, and no young plants were sampled. The young age class made up 43% of the population in 1998. Percent decadence was low in 1998 at 14%, increasing to 93% in 2003. In addition, 67% (~1,560 plants/acre) of the decadent age class was classified as dying in 2003, an increase from 33% (~200 plants/acre) in 1998. Sixty-two percent of the population was also classified as having poor vigor in 2003. Use on basin big sagebrush was mostly light in both surveys. The effects of the current drought are obvious on big sagebrush. In addition to drought, heavy deer use and high intraspecific competition likely contribute to the declining health of big sagebrush within the livestock exclosure.

Antelope bitterbrush density numbers just under 1,000 plants/acre. Several different growth forms are present in the bitterbrush population including tall, upright plants that are partially unavailable to browsing as well as prostrate plants that receive very heavy use. The bitterbrush population had very good recruitment in 1998 at 37%, and decadence was very low at only 2%. With drought conditions in 2003, decadence increased to 46% and no young plants were sampled. Utilization was light to moderate in 1998, but much heavier in 2003. Bitterbrush has exhibited good vigor and exceptional leader growth in both surveys. The sand sagebrush population numbers about 400 plants/acre, has low reproduction, and shows mostly light use. Decadence for this species also increased in 2003 from 21% to 50%. Point-center quarter data estimated 27 juniper trees/acre in 1998. Other species scattered throughout the livestock exclosure include rubber rabbitbrush, skunkbush sumac, green ephedra, and yucca.

The herbaceous understory is sparse, diversity is low, and composition is poor. Total herbaceous cover was just over 1% in 1998 and only about 1/10 of one percent in 2003. The most abundant herbaceous species in 1998 was the annual, nodding eriogonum. In 2003, a total of 5 herbaceous species were sampled. Nodding eriogonum was not sampled in 2003 due to the very dry conditions. Blue grama was the most abundant grass on the site in 1998, but it declined in 2003. Total sum of nested frequency of all perennial grasses and forbs was 28 in 1998 and 12 in 2003.

1998 APPARENT TREND ASSESSMENT

Although there is little protective ground cover provided by herbaceous species at this time, there is currently little erosion apparent on the site. The basin big sagebrush population appears to be stable at this time with many healthy, young plants encountered. The antelope bitterbrush population also appears to be stable and healthy with only one decadent plant sampled and no dead plants found. Utilization of basin big sagebrush and bitterbrush is light with few plants exhibiting poor vigor. The herbaceous understory is nearly non-existent with only 2 grass and 7 forb species encountered.

2003 TREND ASSESSMENT

Trend for soil is slightly down as there is less protective cover on the surface. Vegetation and cryptogamic cover both declined, and bare soil increased. The ratio of protective cover (vegetation, litter, and cryptogams) to bare soil is poor at 1.5:1. Erosion is not severe due primarily to the high infiltration rate of the sandy soils and the gentle slope. Trend for browse is down. Basin big sagebrush is in very poor condition with a 43% decline in density, no recruitment, extreme decadence, and a large increase in the number of dead. This population will likely continue to decline because 67% of the decadent age class was classified as dying. Bitterbrush maintained a nearly stable population but use is heavy and decadence moderately high at 46%. The effect of the current drought on shrubs is obvious, and this is exacerbated by heavy deer use and high intraspecific competition for resources. Trend for the herbaceous understory is stable but in continued poor condition. Determining trend for the herbaceous species on this site is difficult as there is very little to compare between years. Perennial species are almost nonexistent and slightly declined in sum of nested frequency between 1998 and 2003.

TREND ASSESSMENT

soil - slightly down (2)

browse - down (1)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 27R, Study no: 2

T y p e	Species	Nested Frequency		Average Cover %	
		'98	'03	'98	'03
G	Aristida purpurea	3	4	.18	.03
G	Bouteloua gracilis	_b 11	_a 2	.33	.03
G	Hilaria jamesii	-	5	-	.03
G	Vulpia octoflora (a)	2	-	.00	-
Total for Annual Grasses		2	0	0.00	0
Total for Perennial Grasses		14	11	0.51	0.10
Total for Grasses		16	11	0.51	0.10
F	Artemisia dracunculul	2	-	.03	-
F	Draba spp. (a)	2	-	.00	-
F	Eriogonum cernuum (a)	_b 132	_a -	.66	-
F	Euphorbia albomarginata	10	-	.02	-

Type	Species	Nested Frequency		Average Cover %	
		'98	'03	'98	'03
F	Gilia spp. (a)	1	-	.00	-
F	Oenothera spp.	1	1	.00	.00
F	Sphaeralcea grossulariaefolia	1	-	.03	-
F	Unknown forb-annual (a)	-	2	-	.03
Total for Annual Forbs		135	2	0.67	0.03
Total for Perennial Forbs		14	1	0.08	0.00
Total for Forbs		149	3	0.75	0.03

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

BROWSE TRENDS --

Management unit 27R, Study no: 2

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia filifolia	18	14	1.50	1.10
B	Artemisia tridentata tridentata	75	63	10.03	5.81
B	Chrysothamnus nauseosus	3	1	.15	.15
B	Eriogonum nummulare	0	1	-	.03
B	Juniperus osteosperma	1	1	3.12	2.87
B	Purshia tridentata	38	35	5.48	3.70
B	Rhus trilobata	0	0	-	.03
B	Yucca spp.	1	2	.38	.63
Total for Browse		136	117	20.67	14.32

CANOPY COVER, LINE INTERCEPT --

Management unit 27R, Study no: 2

Species	Percent Cover	
	'98	'03
Artemisia filifolia	-	1.66
Artemisia tridentata tridentata	-	5.08
Chrysothamnus nauseosus	-	.16
Juniperus osteosperma	5.00	6.00
Purshia tridentata	1.00	5.46
Rhus trilobata	-	.10
Yucca spp.	-	.30

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 27R, Study no: 2

Species	Average leader growth (in)	
	'98	'03
Artemisia tridentata tridentata	2.6	
Purshia tridentata	5.9	

POINT-QUARTER TREE DATA --
Management unit 27R, Study no: 2

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	27	N/A

Average diameter (in)	
'98	'03
6.4	N/A

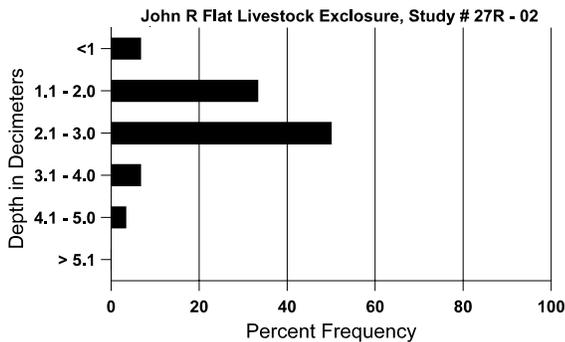
BASIC COVER --
Management unit 27R, Study no: 2

Cover Type	Average Cover %	
	'98	'03
Vegetation	22.86	15.37
Pavement	0	2.61
Litter	47.95	49.73
Cryptogams	4.34	1.34
Bare Ground	42.29	48.85

SOIL ANALYSIS DATA --
Management unit 27R, Study no: 2, Study Name: John R. Flat Livestock Enclosure

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
26.8	71.0 (17.7)	5.4	90.2	4.0	5.8	0.6	7.7	6.4	0.3

Stoniness Index



PELLET GROUP DATA --
 Management unit 27R, Study no: 2

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	9	10	-	-
Elk	5	-	-	-
Deer	46	43	114 (282)	112 (277)

BROWSE CHARACTERISTICS --
 Management unit 27R, Study no: 2

		Age class distribution (plants per acre)					Utilization				
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia filifolia</i>											
98	480	100	20	360	100	60	4	0	21	4	27/29
03	360	-	-	180	180	80	0	0	50	17	25/24
<i>Artemisia tridentata tridentata</i>											
98	4420	180	1920	1900	600	1180	25	2	14	5	33/37
03	2520	-	-	180	2340	2480	19	5	93	62	20/21
<i>Chrysothamnus nauseosus</i>											
98	80	-	-	20	60	-	0	0	75	50	32/45
03	20	-	-	-	20	-	0	0	100	100	31/41
<i>Ephedra viridis</i>											
98	0	-	-	-	-	-	0	0	-	0	45/83
03	0	-	-	-	-	-	0	0	-	0	45/60
<i>Eriogonum nummularre</i>											
98	0	-	-	-	-	-	0	0	-	0	-/-
03	20	-	-	20	-	-	100	0	-	0	11/13
<i>Gutierrezia sarothrae</i>											
98	0	-	-	-	-	-	0	0	-	0	11/10
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Juniperus osteosperma</i>											
98	20	-	-	20	-	20	0	0	-	0	-/-
03	20	-	-	20	-	-	0	0	-	0	-/-
<i>Purshia tridentata</i>											
98	980	-	360	600	20	-	27	0	2	2	36/50
03	920	-	-	500	420	60	4	78	46	9	29/41

		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)
Rhus trilobata											
98	0	-	-	-	-	-	0	0	-	0	87/132
03	0	-	-	-	-	-	0	0	-	0	72/173
Yucca spp.											
98	20	-	-	20	-	-	0	0	-	0	46/41
03	60	-	-	60	-	-	0	0	-	0	26/42