

Trend Study 27-11-08

Study site name: Crocodile.

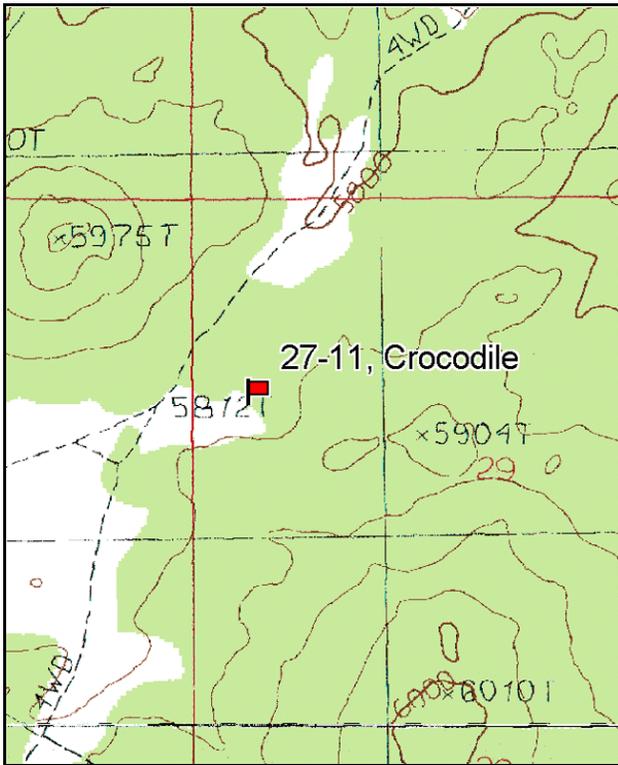
Vegetation type: Basin Big Sagebrush.

Compass bearing: frequency baseline 192 degrees magnetic.

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

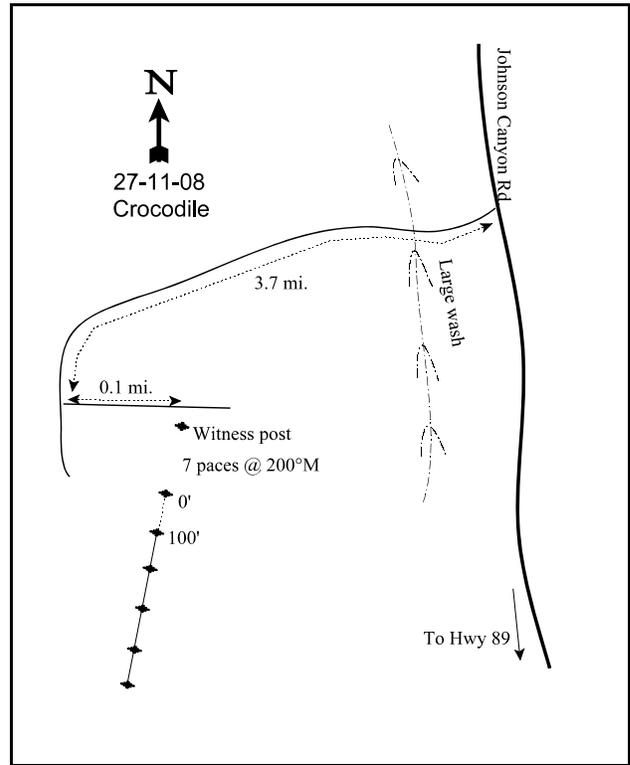
LOCATION DESCRIPTION

From the LDS church in Alton, travel south 10.8 miles. At this intersection turn left and head towards Kanab. Continue 6.8 miles to another intersection. Turn south on the pavement and go 9.8 miles to another intersection. Turn right (west) and go 0.1 miles to a left fork. Take this fork and go 3.7 miles across a large wash to a two track on the left. Go 0.1 miles to a witness post on the right (south) side of the road. From the witness post, walk 7 paces at 200 degrees magnetic to the 0-foot stake.



Map name: Cutler Point

Township 42S, Range 5W, Section 29



Diagrammatic Sketch

GPS: NAD 83, UTM 12S 371555 E, 4110527 N

DISCUSSION

Crocodile - Trend Study No. 27-11

Study Information

This study is located west of the Johnson Valley Road along the Wygaret Terrace about one and a half miles north of the head of Dairy Canyon [elevation: 5,800 feet (1,767 m), slope: 3%-10%, aspect: north]. The site was established in 1997 to sample critical winter range on the Paunsaugunt unit. The study samples a basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) community with a scattered Utah juniper (*Juniperus osteosperma*) overstory that was seeded with crested wheatgrass (*Agropyron cristatum*) in the mid-1960's. The vicinity is a concentration area for wintering deer. A pellet group transect read along the baseline estimated deer use to be very heavy in 1997 and 2003 (128 ddu/acre:316 ddu/ha and 88 ddu/acre:218 ddu/ha, respectively), and moderate in 2008 (21 ddu/acre:53 ddu/ha). Cattle use was estimated to be moderate in 1997 (28 cdu/acre:69 cdu/ha), declining to light in 2003 and 2008 (12 cdu/acre:30 cdu/ha and 6 cdu/acre:14 cdu/ha, respectively). Most of the herbaceous vegetation was heavily utilized at the time the transect was established on August 19, 1997, and a watering trough was found about a quarter of a mile to the west of the study area.

Soil

Soils at the study site are very deep with an effective rooting depth estimated at nearly 35 inches. Soil texture is a fine sand, and is moderately acidic (pH 5.8). Rock and pavement are rare on the surface or in the profile. Relative combined vegetation and litter cover ranged from 49%-53% from 1997 to 2008. Relative bare ground cover has been fairly high ranging from 46%-51% from 1997 to 2008. The soil erosion condition was classified as slight in 2003 primarily due to pedestaling around plants, but was classified as stable in 2008.

Browse

Basin big sagebrush and antelope bitterbrush (*Purshia tridentata*) represent the key browse on the site. Big sagebrush accounted for an average of about 55% of the total shrub cover in 1997, 2003, and 2008. Bitterbrush provided an average of just under 35% of the browse cover in the same years. Basin big sagebrush had an estimated population density of 2,860 plants/acre in 1997, 2,340 plants/acre in 2003, and 1,860 plants/acre in 2008. Along with the slight decline in density, a major age class shift also occurred in the basin big sagebrush population in 2003. Recruitment of young sagebrush steadily declined from 28% of the population in 1997, to 13% in 2003, and 5% in 2008. Utilization of sagebrush has been mostly moderate, with poor vigor being found on 8% of the population in 1997, increasing to 26% in 2003, and decreasing to 18% in 2008. Annual leader growth for sagebrush averaged 2.5 inches in 2003 and 1.7 inches in 2008.

Bitterbrush density was estimated at 900 plants/acre in 1997, increasing to 1,160 in 2003, and decreasing to 780 plants/acre in 2008. This population consists of mostly heavily hedged, mature plants that have both upright and prostrate growth forms. Decadence was low in 1997 at 2%, increasing to 28% in 2003, and to 49% in 2008. Both basin big sagebrush and bitterbrush had good seed total cover in 2003. Annual leader growth for bitterbrush averaged 4.5 inches in 2003 and 3.9 inches in 2008. Other browse species that have been sampled on the site include broom snakeweed (*Gutierrezia sarothrae*), rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*), prickly phlox (*Leptodactylon pungens*), sand sagebrush (*Artemisia filifolia*), and yucca (*Yucca* sp.).

Herbaceous Understory

The herbaceous understory is lacking. Grasses and forbs provide fair diversity but low total cover. Eight perennial grasses and one annual grass have been sampled on the site with needle-and-thread (*Stipa comata*), sandhill muhly (*Muhlenbergia pungens*), Indian ricegrass (*Oryzopsis hymenoides*), and blue grama (*Bouteloua gracilis*) being the most abundant. The area was seeded with crested wheatgrass in the 1960's, and this species was sampled in 20 quadrats in 1997. As with the Telegraph Flat study, crested wheatgrass was not sampled at all in 2003, and may have been "droughted out". Most of the cool season grasses had been heavily utilized by

livestock prior to sampling in 1997, but there was no noticeable use on grasses in 2003 or 2008. Forbs are nearly nonexistent with four annual and seven perennial species being sampled between all three surveys. Forbs combined to produce a high of about 1% average cover in 2003.

1997 DESIRABLE COMPONENTS INDEX

winter range condition (DCI) - good (50) Low potential scale

2003 TREND ASSESSMENT

Trend for browse is down. The most abundant browse, basin big sagebrush, declined in density from 2,860 plants/acre in 1997 to 2,340 plants/acre. Recruitment declined from young sagebrush comprising 28% of the population 1997 to 13%. Sagebrush displaying poor vigor increased from 8% in 1997 to 26%, and decadence increased from 12% in 1997 to 57%. Bitterbrush density slightly increased, but recruitment was poor with young plants comprising only 2% of the population. Decadence increased from 2% in 1997 to 28%, vigor remained mostly normal for bitterbrush. Trend for the grasses is down and in very poor condition. Perennial grasses significantly declined in sum of nested frequency and in total cover. Crested wheatgrass was not sampled in 2003 and sandhill muhly, needle-and-thread, and sand dropseed (*Sporobolus cryptandrus*) all declined individually in nested frequency. Trend for forbs is slightly up. The sum of nested frequency and total cover of perennial forbs increased slightly, but remain very low. Forbs are rare and provide little forage or diversity on this site.

winter range condition (DCI) - fair (32) Low potential scale

browse - down (-2)

grass - down (-2)

forb - slightly up (+1)

2008 TREND ASSESSMENT

Trend for browse is down. The primary browse species, basin big sagebrush, continued to decline in density to 1,860 plants/acre. Recruitment of sagebrush continued to decline, as well, with young plants comprising only 5% of the population. Plants displaying poor vigor decreased since 2003 to 18%, and decadence decreased slightly to 42%, but is still high. The density of the other preferred browse species, bitterbrush, declined since 2003 to 780 plants/acre. Recruitment of young bitterbrush plants remains similar to 2003. Bitterbrush plants displaying poor vigor has increased to 36% since 2003, and decadence has increased to 49%. The trend for grasses is down and is in very poor condition. The sum of nested frequency and total cover of perennial grasses continued to decline, with a significant decline in the frequency of needle-and-thread grass. The trend for forbs is down. Only three species of forbs were sampled on the site. The frequency and total cover of forbs was so low as to be almost nonexistent on the site.

winter range condition (DCI) - poor-fair (26) Low potential scale

browse - down (-2)

grass - down (-2)

forb - down (-2)

HERBACEOUS TRENDS --
Management unit 27 , Study no: 11

Type	Species	Nested Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
G	<i>Agropyron cristatum</i>	_b 43	_a -	_a -	.30	-	-
G	<i>Aristida purpurea</i>	-	2	-	-	.03	-
G	<i>Bouteloua gracilis</i>	19	15	13	.11	.26	.11
G	<i>Muhlenbergia pungens</i>	_b 49	_a 26	_{ab} 39	1.64	.43	.57
G	<i>Oryzopsis hymenoides</i>	_a -	_b 31	_b 17	.00	.40	.15
G	<i>Sitanion hystrix</i>	10	2	1	.12	.06	.03
G	<i>Sporobolus cryptandrus</i>	_b 60	_a 8	_a 10	.43	.01	.05
G	<i>Stipa comata</i>	_b 106	_b 73	_a 13	1.47	1.31	.07
G	<i>Vulpia octoflora</i> (a)	_b 54	_a -	_a -	.15	-	-
Total for Annual Grasses		54	0	0	0.15	0	0
Total for Perennial Grasses		287	157	93	4.10	2.51	0.99
Total for Grasses		341	157	93	4.25	2.51	0.99
F	<i>Astragalus convallarius</i>	-	3	-	-	.03	-
F	<i>Astragalus</i> sp.	_b 14	_a -	_a -	.02	-	-
F	<i>Comandra pallida</i>	_{ab} 6	_b 10	_a -	.06	.34	-
F	<i>Cryptantha</i> sp.	-	-	1	-	-	.00
F	<i>Eriogonum cernuum</i> (a)	3	-	-	.00	-	-
F	<i>Gilia</i> sp. (a)	-	12	1	-	.09	.00
F	<i>Lappula occidentalis</i> (a)	3	-	-	.01	-	-
F	<i>Lotus utahensis</i>	4	6	-	.01	.01	.03
F	<i>Oenothera pallida</i>	_a -	_b 10	_a -	-	.21	-
F	<i>Plantago patagonica</i> (a)	_a 5	_b 27	_a -	.01	.32	-
F	<i>Sphaeralcea grossulariifolia</i>	_a 3	_b 19	_a 2	.03	.10	.00
Total for Annual Forbs		11	39	1	0.02	0.41	0.00
Total for Perennial Forbs		27	48	3	0.12	0.70	0.03
Total for Forbs		38	87	4	0.15	1.12	0.04

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

BROWSE TRENDS --

Management unit 27 , Study no: 11

Type	Species	Strip Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
B	Artemisia filifolia	2	4	2	.15	.85	.38
B	Artemisia tridentata tridentata	65	60	62	7.94	8.96	9.60
B	Chrysothamnus nauseosus hololeucus	15	10	9	.28	.15	.30
B	Gutierrezia sarothrae	33	25	24	1.04	.11	.09
B	Leptodactylon pungens	3	5	3	.04	.06	.00
B	Opuntia sp.	3	0	0	.03	-	-
B	Purshia tridentata	28	33	30	6.02	5.97	4.59
B	Yucca sp.	1	1	1	.15	.15	.38
Total for Browse		150	138	131	15.66	16.25	15.36

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 11

Species	Percent Cover	
	'03	'08
Artemisia filifolia	.56	.65
Artemisia tridentata tridentata	11.61	14.39
Chrysothamnus nauseosus hololeucus	.71	1.41
Chrysothamnus viscidiflorus	.43	-
Gutierrezia sarothrae	-	.08
Leptodactylon pungens	.01	-
Purshia tridentata	10.00	8.69
Yucca sp.	.66	.58

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 27 , Study no: 11

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata tridentata	2.5	1.7
Purshia tridentata	4.5	3.9

POINT-QUARTER TREE DATA --
Management unit 27 , Study no: 11

Species	Trees per Acre		
	'97	'03	'08
Juniper osteosperma	10	<18	<18

Average diameter (in)		
'97	'03	'08
13.4	-	-

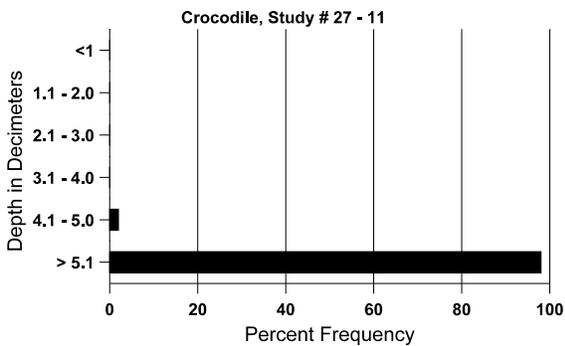
BASIC COVER --
Management unit 27 , Study no: 11

Cover Type	Average Cover %		
	'97	'03	'08
Vegetation	18.82	20.57	17.27
Rock	.02	.06	.05
Pavement	.08	.04	.26
Litter	34.13	39.60	44.00
Cryptogams	.28	1.09	.48
Bare Ground	54.99	55.61	53.47

SOIL ANALYSIS DATA --
Management unit 27, Study no: 11, Study Name: Crocodile

Effective rooting depth (in)	Temp °F (depth)	pH	sand			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
34.8	70.7 (18.1)	5.8	91.6	2.4	5.9	0.3	9.6	19.2	0.2

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 11

Type	Quadrat Frequency		
	'97	'03	'08
Rabbit	29	16	81
Elk	8	-	-
Deer	44	37	33
Cattle	6	2	2

Days use per acre (ha)		
'97	'03	'08
-	-	-
1 (2)	-	-
86 (212)	88 (218)	21 (53)
20 (49)	12 (30)	6 (14)

BROWSE CHARACTERISTICS --

Management unit 27 , 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)
<i>Artemisia filifolia</i>												
97	60	-	-	60	-	-	0	0	0	-	0	20/19
03	120	-	-	80	40	-	0	0	33	-	0	23/18
08	80	-	-	20	60	-	100	0	75	-	0	34/34
<i>Artemisia tridentata tridentata</i>												
97	2860	280	800	1720	340	420	32	7	12	7	8	46/49
03	2340	-	300	700	1340	680	53	.85	57	26	26	33/35
08	1860	40	100	980	780	440	31	5	42	17	18	40/48
<i>Chrysothamnus nauseosus hololeucus</i>												
97	400	-	60	280	60	40	0	0	15	5	5	23/27
03	280	-	-	160	120	-	0	0	43	7	7	28/31
08	240	-	-	-	240	60	25	8	100	17	17	33/45
<i>Chrysothamnus viscidiflorus</i>												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	22/23
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Ephedra viridis</i>												
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	44/46
08	0	-	-	-	-	-	0	0	-	-	0	55/72
<i>Gutierrezia sarothrae</i>												
97	1620	-	140	1380	100	260	0	0	6	6	6	8/11
03	1020	-	740	240	40	-	0	0	4	-	0	9/10
08	680	-	40	460	180	540	15	3	26	24	24	5/6

		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)
Leptodactylon pungens												
97	120	-	-	120	-	-	0	0	0	-	0	6/3
03	340	-	-	340	-	-	0	0	0	-	0	5/6
08	80	-	20	40	20	-	0	0	25	25	25	-/-
Opuntia sp.												
97	60	-	-	60	-	-	0	0	-	-	0	3/6
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	4/9
Purshia tridentata												
97	900	-	80	800	20	20	36	56	2	2	2	71/81
03	1160	-	20	820	320	20	10	86	28	10	10	35/52
08	780	-	60	340	380	160	23	10	49	36	36	32/54
Yucca sp.												
97	20	-	-	20	-	-	0	0	-	-	0	20/37
03	20	-	-	20	-	-	0	0	-	-	0	39/57
08	20	-	-	20	-	-	100	0	-	-	0	40/42