

Trend Study 16A-13-07

Study site name: Steele Ranch.

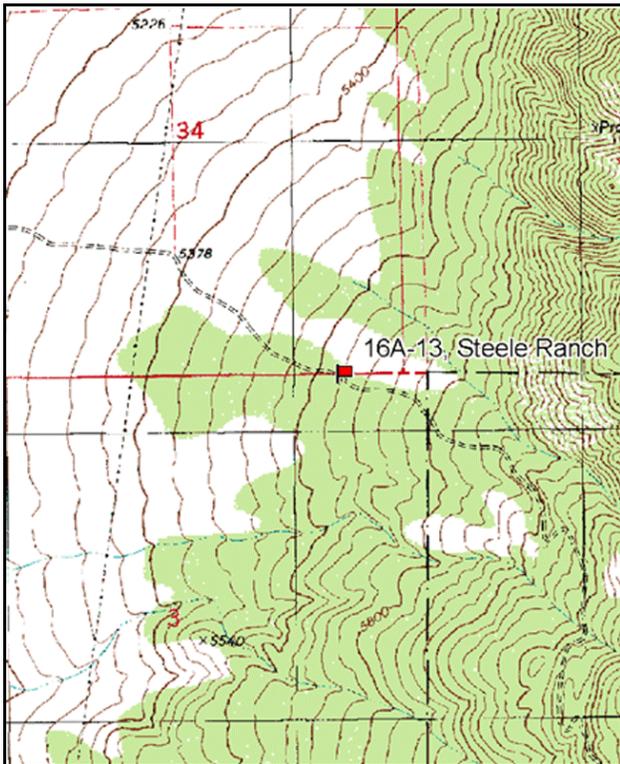
Vegetation type: Mixed Oak-Sage.

Compass bearing: frequency baseline 185 degrees magnetic.

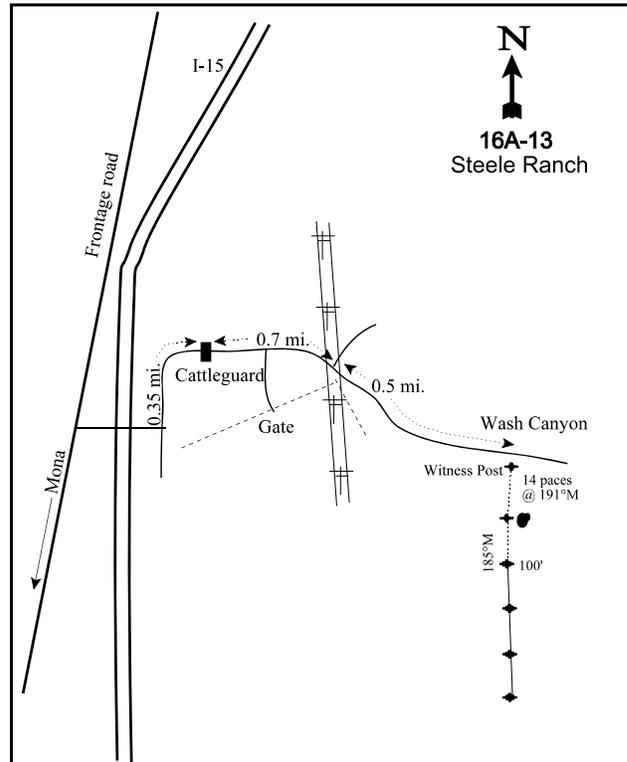
Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From 200 North Main Street in Mona, take the frontage road north towards Santaquin. Go 5.35 miles and turn east onto a gravel road that goes beneath the I-15 overpass. After passing beneath I-15, the road comes to a "T", go left 0.35 miles to a cattle guard. Continue up the road 0.7 miles to a fence corner and a fork in the road. Stay to the right (south) for 0.5 miles to the witness post on the south side of the road. From the witness post the 0-foot baseline stake is 14 paces away at 187 degrees magnetic. The 0-foot stake is marked with browse tag #182.



Map Name: Santaquin



Diagrammatic Sketch

Township 11S, Range 1E, Section 3

GPS: NAD 83, UTM 12S 431085 E 4416365 N

DISCUSSION

Steele Ranch - Trend Study No. 16A-13

Study Information

This study is on UDWR property and is typical of the mixed oak-big sagebrush vegetation type along the foothills of the Wasatch Front [elevation: 5,620 feet (1,713 m), slope: 15%, aspect: west]. Much of this type has been converted to agriculture or has been heavily grazed by domestic livestock. However, the study is representative of the remaining native winter range along the mountain front. Depending on the severity of the winter, the area receives moderate-heavy use by deer and light use from elk. Pellet group data from 1997 estimated little deer use with a quadrat frequency of 7%. Deer use was estimated at 62 days use/acre (154 ddu/ha) in 2002 and 90 days use (223 ddu/ha) in 2007.

Soil

The soil is classified within the Lizzant series (USDA-NRCS 2007). Soils in this series are very deep and well-drained, and formed in alluvium and colluvium derived from sedimentary rocks. The soil texture is a loam with a neutral pH of 7.2. Rocks are common on the surface and within the profile. Soil phosphorus is marginal at 9.1 ppm. Vegetation and litter have provided at least 80% relative ground cover since 1997, which has prevented erosion. The erosion condition was classified as stable in 2002 and 2007.

Browse

Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) density has fluctuated between 2,480 plants/acre (6,128 plants/ha) and 3,340 plants/acre (8,253 plants/ha) since 1989. Average cover was 13% to 14% between 1997 and 2007. When the study was established, the sagebrush population was mostly decadent, but young recruitment was good at 11% of the population. In 1997, the age structure improved and was largely mature, although recruitment was almost nonexistent. Decadence increased from 19% in 1997 to 60% in 2002 and 53% in 2007, while recruitment remained low. Plants displaying poor vigor greatly increased from 7% of the population in 1997 to 39% by 2007. Use was moderate in 1989, moderate-heavy in 1997 and 2002, and mostly light with some moderate-heavy use in 2007. Annual leader growth averaged 1.8 inches (4.6 cm) in 2002 and 0.9 inches (2.3 cm) in 2007.

Gambel oak (*Quercus gambelii*) is patchy in its distribution, but has provided 50% to 64% of the browse cover since 1997. Its density increased from 9,532 plants/acre (23,553 plants/ha) in 1989 to 15,940 plants/acre (39,387 plants/ha) by 2002, then decreased to 10,560 plants/acre (26,093 plants/ha) in 2007. The age structure has been indicative of a stable population, with mostly mature plants and high young recruitment. The plants have been generally vigorous, except in 2002 when 25% of the sampled plants displayed poor vigor due to frost damage. The oak height is variable, with some clones growing to 10 feet (3 m) while others are less than two feet (0.6 m). Use is mostly light on the lower-growing plants, with some moderate-heavy hedging.

Herbaceous Understory

Perennial grasses have provided 3% cover in 1997, 5% in 2002, and 6% in 2007. Sandberg bluegrass (*Poa secunda*) is the most abundant grass, and has comprised 75% to 88% of the total grass cover since 1997. Other perennial grasses, such as bluebunch wheatgrass (*Agropyron spicatum*), mutton bluegrass (*Poa fendleriana*), and sheep fescue (*Festuca ovina*), were sampled only occasionally. Cheatgrass (*Bromus tectorum*) is present, but has provided less than 1% average cover since 1997.

Forbs are diverse, but provide little quality forage. Pale alyssum (*Alyssum alyssoides*), bedstraw (*Galium aparine*), holosteum (*Holosteum umbellatum*), and bur buttercup (*Ranunculus testiculatus*) were the most abundant forb species in 2002 and 2007. Forb cover was 3% in 1997 and 4% in 2002, but greatly increased to 9% in 2007. Most of the increase was attributed to annual species.

1997 TREND ASSESSMENT

The trend for browse is slightly down. Sagebrush density decreased from 3,132 plants/acre (7,739 plants/ha) to 2,480 plants/acre (6,128 plants/ha), and decadence also decreased from 55% of the population to 19%. Some of the change in density is likely due to the increase in sample area. Young recruitment declined from 11% of the population to only 1%. Vigor remained good, and use slightly increased to moderate-heavy. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little. The trend for forbs is up. The sum of nested frequency for perennial forbs increased substantially. Beckwith milkvetch (*Astragalus beckwithii*) and desert parsley (*Lomatium* sp.) increased significantly in nested frequency. The Desirable Components Index (DCI) was rated as fair due to high preferred browse cover, but low browse recruitment and limited perennial herbaceous cover.

winter range condition (DCI) - fair (56) Mid-level potential scale

browse - slightly down (-1)

grass - stable (0)

forb - up (+2)

2002 TREND ASSESSMENT

The trend for browse is slightly up. Sagebrush density increased from 2,480 plants/acre (6,128 plants/ha) to 3,340 plants/acre (8,253 plants/ha), and young recruitment slightly improved from 1% of the population to 7%. However, decadence greatly increased from 19% of the population to 60%, and 35% of the sampled plants displayed poor vigor and were classified as dying. Use remained moderate-heavy. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little, however, average perennial grass cover increased from 3% to 5%. Cheatgrass increased significantly in nested frequency, but its average cover remained below 1%. The trend for forbs is up. The sum of nested frequency for perennial forbs increased 28%. Sego lily (*Calochortus nuttallii*) increased significantly in nested frequency, while pale alyssum decreased significantly in nested frequency. Average forb cover increased from 3% to 4%. Although diverse, the forb component has relatively few species beneficial to big game. The DCI rating declined to poor-fair due to the increase in preferred browse decadence.

winter range condition (DCI) - poor-fair (52) Mid-level potential scale

browse - slightly up (+1)

grass - stable (0)

forb - up (+2)

2007 TREND ASSESSMENT

The trend for browse is slightly down. Sagebrush density decreased from 3,340 plants/acre (8,253 plants/ha) to 2,680 plants/acre (6,622 plants/ha). Decadence remained high at 53% of the population, and recruitment slightly decreased from 7% of the population to 4%. Plants displaying poor vigor slightly increased from 35% to 39% of the population, and use decreased to mostly light, with some moderate-heavy hedging. Gambel oak cover increased from 14% to 23%, and the population structure shifted from 94% mature to 55% mature and 40% young. The trend for grass is stable. The sum of nested frequency for perennial grasses remained relatively unchanged, however, bluebunch wheatgrass increased significantly in nested frequency. Cheatgrass nested frequency changed little, and its average cover remained less than 1%. The trend for forbs is up. The sum of nested frequency for perennial forbs increased 54%, and numerous forbs increased significantly in nested frequency. Average forb cover increased from 4% to 9%, however, the majority of the increase was attributed to annual species. The DCI rating increased to good, mainly due to the increase in oak recruitment.

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

browse - slightly down (-1)

grass - stable (0)

forb - up (+2)

HERBACEOUS TRENDS --
Management unit 16A, Study no: 13

T y p e	Species	Nested Frequency				Average Cover %		
		'89	'97	'02	'07	'97	'02	'07
G	Agropyron spicatum	-	-	a8	b19	-	.09	.53
G	Bromus tectorum (a)	-	a100	b131	ab120	.29	.65	.90
G	Festuca myuros (a)	-	a30	-	a48	.06	-	.12
G	Festuca ovina	-	-	-	3	-	-	.02
G	Poa fendleriana	a1	ab16	b26	b17	.08	.61	.31
G	Poa secunda	a235	a233	a218	a207	3.29	4.68	5.60
G	Sitanion hystrix	-	-	2	-	-	.03	-
Total for Annual Grasses		0	130	131	168	0.35	0.64	1.02
Total for Perennial Grasses		236	249	254	246	3.37	5.42	6.46
Total for Grasses		236	379	385	414	3.73	6.07	7.49
F	Agoseris glauca	-	a8	a5	a12	.02	.04	.05
F	Alyssum alyssoides (a)	-	b234	a163	b255	.51	.83	3.74
F	Allium sp.	-	2	-	-	.00	-	-
F	Antennaria rosea	-	-	1	-	-	.00	-
F	Arabis sp.	a5	a1	a2	a6	.00	.00	.01
F	Astragalus beckwithii	a3	b11	-	-	.08	-	-
F	Astragalus eurekaensis	-	-	b30	a14	-	.18	.04
F	Astragalus utahensis	-	2	-	-	.03	-	-
F	Castilleja linariaefolia	-	a6	a6	a6	.04	.06	.10
F	Calochortus nuttallii	a21	a34	b77	b67	.08	.23	.18
F	Castilleja sp.	a6	a3	-	-	.01	-	-
F	Cirsium undulatum	-	-	-	6	-	-	.01
F	Comandra pallida	-	-	a4	b12	-	.03	.09
F	Collinsia parviflora (a)	-	a6	a21	a10	.01	.04	.02
F	Crepis acuminata	-	-	a5	a8	-	.07	.21
F	Cryptantha sp.	-	a3	-	a1	.00	-	.00
F	Draba sp. (a)	-	-	a1	b121	-	.00	.48
F	Epilobium brachycarpum (a)	-	a12	a6	a7	.03	.02	.02
F	Erigeron pumilus	-	-	-	-	-	.00	-
F	Eriogonum racemosum	a3	a2	-	a9	.00	-	.01
F	Galium aparine (a)	-	a77	a58	b108	.96	.23	1.70
F	Helianthus annuus (a)	-	-	-	4	-	-	.06
F	Helianthella uniflora	-	-	-	4	-	-	.03
F	Holosteum umbellatum (a)	-	a51	a32	b157	.13	.06	.97
F	Lactuca serriola	-	-	a3	b23	-	.00	.06

Type	Species	Nested Frequency				Average Cover %		
		'89	'97	'02	'07	'97	'02	'07
F	Lomatium sp.	_a 5	_b 33	_b 23	_b 46	.48	.36	.37
F	Microsteris gracilis (a)	-	-	_a 6	_b 51	-	.01	.13
F	Montia perfoliata (a)	-	-	-	7	-	-	.04
F	Petradoria pumila	_a 3	-	_a 1	_a 2	-	.00	.06
F	Phlox longifolia	_a 20	_{ab} 35	_{ab} 24	_b 38	.10	.11	.14
F	Ranunculus testiculatus (a)	-	_a 116	_a 147	_a 116	.47	1.95	.57
F	Sanguisorba minor	-	-	-	3	-	-	.00
F	Tragopogon dubius	_a 3	_a 4	_a 1	_b 32	.01	.01	.23
F	Unknown forb-annual (a)	-	6	-	-	.01	-	-
F	Veronica biloba (a)	-	_a 2	_a 6	_a 7	.00	.01	.07
F	Viola sp.	-	_a 3	_a 5	-	.01	.01	-
F	Zigadenus paniculatus	-	_a -	_a 1	-	.01	.01	-
Total for Annual Forbs		0	504	440	843	2.15	3.18	7.84
Total for Perennial Forbs		69	147	188	289	0.91	1.17	1.65
Total for Forbs		69	651	628	1132	3.07	4.35	9.49

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

BROWSE TRENDS --

Management unit 16A, Study no: 13

Type	Species	Strip Frequency			Average Cover %		
		'97	'02	'07	'97	'02	'07
B	Artemisia tridentata vaseyana	75	75	72	13.34	13.93	12.58
B	Gutierrezia sarothrae	2	5	5	.06	.19	.01
B	Quercus gambelii	55	58	62	18.79	13.64	22.78
Total for Browse		132	138	139	32.20	27.76	35.38

CANOPY COVER, LINE INTERCEPT --

Management unit 16A, Study no: 13

Species	Percent Cover	
	'02	'07
Artemisia tridentata vaseyana	-	16.26
Gutierrezia sarothrae	-	.23
Quercus gambelii	1.39	42.70

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 16A, Study no: 13

Species	Average leader growth (in)	
	'02	'07
Artemisia tridentata vaseyana	1.8	0.9

BASIC COVER --

Management unit 16A, Study no: 13

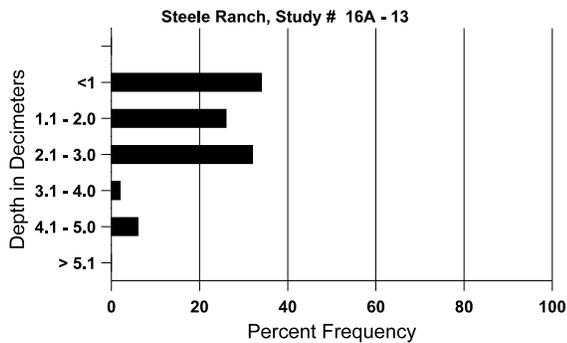
Cover Type	Average Cover %			
	'89	'97	'02	'07
Vegetation	3.00	38.51	36.13	47.69
Rock	3.75	5.61	5.34	5.85
Pavement	26.75	9.78	8.90	7.96
Litter	56.75	58.58	60.54	52.81
Cryptogams	5.75	3.87	4.72	5.41
Bare Ground	4.00	4.83	6.14	3.49

SOIL ANALYSIS DATA --

Herd Unit 16A, Study no: 13, Steele Ranch

Effective rooting depth (in)	Temp °F (depth)	pH	Loam			%OM	ppm P	ppm K	dS/m
			%sand	%silt	%clay				
10.6	47.6 (13.1)	7.2	37.1	41.1	21.8	4.0	9.1	86.4	.7

Stoniness Index



PELLET GROUP DATA --

Management unit 16A, Study no: 13

Type	Quadrat Frequency			
	'89	'97	'02	'07
Rabbit	-	5	3	8
Deer	-	7	15	19

Days use per acre (ha)	
'02	'07
-	-
62 (154)	90 (223)

BROWSE CHARACTERISTICS --
 Management unit 16A, Study no: 13

		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 vaseyana</i>												
89	3132	66	333	1066	1733	-	55	0	55	-	9	22/23
97	2480	80	20	2000	460	460	44	22	19	7	7	26/40
02	3340	40	240	1080	2020	820	29	37	60	35	35	25/36
07	2680	180	120	1140	1420	580	28	17	53	28	39	23/33
<i>Gutierrezia sarothrae</i>												
89	532	200	400	66	66	-	0	0	12	-	0	4/2
97	80	-	-	80	-	-	0	0	0	-	0	6/9
02	120	-	-	100	20	20	0	0	17	-	0	4/5
07	360	1160	140	200	20	-	0	0	6	-	0	9/11
<i>Quercus gambelii</i>												
89	9532	733	7200	1266	1066	-	22	.69	11	-	.69	33/24
97	10320	260	1700	8380	240	920	0	0	2	.19	.19	54/40
02	15940	20	1020	14920	-	320	4	11	0	-	25	44/27
07	10560	920	4200	5860	500	900	2	1	5	2	2	42/28