

Trend Study 27-13-08

Study site name: Heaton .

Vegetation type: Black Sagebrush .

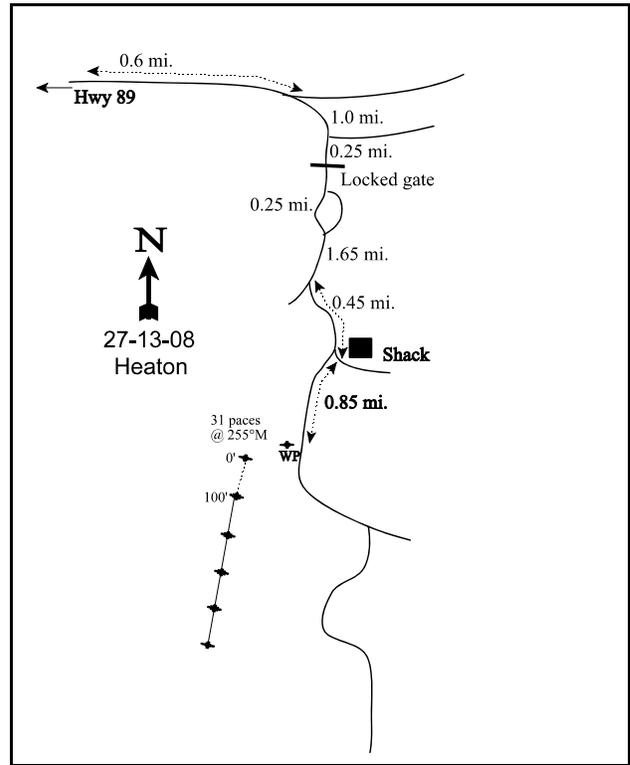
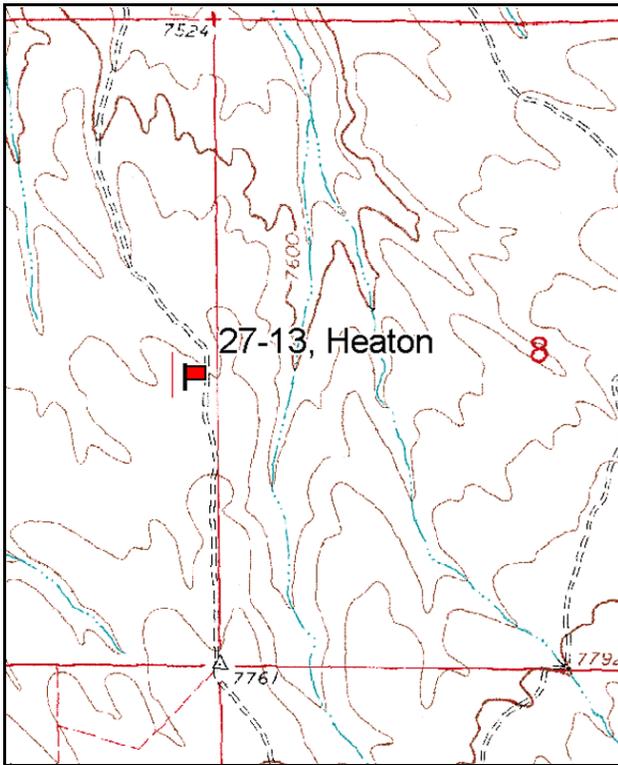
Compass bearing: frequency baseline 195 degrees magnetic.

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

LOCATION DESCRIPTION

From U. S. 89 go approximately 0.4 miles south of mile marker 111 to a road on the left. Go 0.6 miles to a fork. Stay on Bryce Woodland Road (right) and go 1 mile to a fork. Continue straight and go 0.25 to a locked gate (get combination). Go through the gate and go 1.65 miles, staying on the main road, to a fork. Go left 0.45 miles to another fork with a shack on the left. Go right for 0.85 miles to a witness post on the right (west). From the witness post walk 31 paces at 255 degrees magnetic to the 0-foot stake. The 0-foot stake is marked by browse tag #289. The study is marked by green, steel fenceposts approximately 12-18 inches in height.

*Land owners- Raymond Heaton: (435) 648-2124, (435) 691-2829 (cell)
Wade Heaton: (435) 648-2028, (435) 691-1997 (cell)



Map name: George Mountain

Diagrammatic Sketch

Township 38S, Range 5W, Section 7

GPS: NAD 83, UTM 12S 371748 E, 4153528 N

DISCUSSION

Heaton - Trend Study No. 27-13

Study Information

This study was established in 1997 in conjunction with the Moons Landing study to monitor transitional range on the west side of the Paunsaugunt Plateau [elevation: 7,700 feet (2,347 m), slope: 3%, aspect: north]. The study site is found east of U.S. 89 about two miles north of the Moons Landing study site and samples a black sagebrush (*Artemisia tridentata*) and antelope bitterbrush (*Purshia tridentata*) community. The study area is on private land owned by the Heaton family and is part of the Heaton private hunting unit. Pellet group data estimated deer use to be very heavy in 1997 and 2008 (113 ddu/acre:279 ddu/ha and 83 ddu/acre:205 ddu/ha, respectively), and substantially lower, but still heavy, use in 2003 (45 ddu/acre:111 ddu/ha). Elk use was estimated to be light in 1997, 2003, and 2008 (5 edu/acre:12 edu/ha, 2 edu/acre:5 edu/ha, and 7 edu/acre:17 edu/ha, respectively). Cattle grazing on the site was very heavy in 1997 and 2008 (79 cdu/acre:195 cdu/ha and 92 cdu/acre:227 cdu/ha, respectively), and moderate in 2003 (25 cdu/acre:61 cdu/ha). This site was aerated between the initial reading in 1997 and the 2003 survey, with the last four belts on the transect being effected.

Soil

Soil texture is a sandy loam with a slightly acidic pH (6.1). There is little rock on the surface or in the profile. Erosion is not a problem locally due to the gentle terrain and adequate vegetation and litter cover. Relative combined vegetation and litter cover was high in 1997 at 81%, but decreased to 69% and 73% in 2003 and 2008, respectively. Relative bare ground cover increased from 16% in 1997 to 26% in both 2003 and 2008. The aerator treatment, coupled with drought, likely accounts for an increase in bare ground and decrease in litter and vegetation cover after 1997. The erosion condition class was considered to be stable in 2003 and 2008.

Browse

Sagebrush on the site is a hybrid between black sagebrush and mountain big sagebrush as determined by a florescence test under a black light. Sagebrush provided 69% of the total browse cover in 1997 and 2008, and 75% in 2003 respectively. Total browse cover, including sagebrush cover, declined from 1997 to 2008 primarily due to the aerator treatment. However, the most abundant browse species either increased or remained stable in overall density. Sagebrush density was estimated at 8,800 plants/acre in 1997, increased to 11,140 plants/acre in 2003, and decreased to 8520 plants/acre in 2008. Decadence in sagebrush has remained normal in all three sample years, though it increased to a high of 23% in 2008. Sagebrush vigor has also been relatively good, although poor vigor increased in 2003 to 29% as some of the plants that had been aerated were in poor condition. Use was light on sagebrush in all three years.

The other primary browse species, antelope bitterbrush, has a stable population at nearly 1,300 plants/acre. Use on bitterbrush was moderate to heavy in all three sample years, but decadence was low. Poor vigor increased to 53% in 2003 with the aerator treatment effecting a lot of the bitterbrush on the site, but decreased to 6% in 2008. Although total browse cover declined from 35% in 1997, to 21% in 2003, and further to 16% in 2008, shrub density remained stable or slightly increased.

Herbaceous Understory

The herbaceous understory accounted for 28% of the total vegetation cover on the site in 1997, 33% in 2003, and 47% in 2008. Nine species of perennial grasses have been sampled between the three surveys, with mutton bluegrass (*Poa fendleriana*), prairie Junegrass (*Koeleria cristata*), needle-and-thread (*Stipa comata*), and blue grama (*Bouteloua gracilis*) being the most common. As a group, perennial grasses showed a large decline in sum of nested frequency between 1997 and 2003, but increased again in 2008. Forbs are diverse on the site but not abundant. Twenty-nine species were sampled on the site between 1997 and 2008. Perennial forbs also declined in sum of nested frequency between 1997 and 2003, but increased above 1997 values in

2008.

1997 DESIRABLE COMPONENTS INDEX

winter range condition (DCI) - good-excellent (82) Mid-level potential scale

2003 TREND ASSESSMENT

Trend for browse is stable. Black sagebrush increased in density even with the aerator treatment that was done on the site. Bitterbrush density remained stable. Decadence is low for both species, although vigor was reduced in both populations with the treatment. Black sagebrush is still very abundant, and this site will recover quickly. Trend for both the grasses and forbs is down. Perennial grasses and forbs both showed declined sum of nested frequency values. A combination of the mechanical treatment and drought likely account for this loss.

winter range condition (DCI) - good (68) Mid-level potential scale

browse - stable (0)

grass - down (-2)

forb - down (-2)

2008 TREND ASSESSMENT

Trend for browse is stable. Black sagebrush density decreased to around 1997 estimates. It appears the sagebrush population may be in a period of turnover as young plants comprised nearly half of the population and a large number of dead plants were sampled. Decadence in sagebrush increased from 9% in 2003 to 23%, and plants displaying poor vigor decreased from 29% in 2003 to 14%. Bitterbrush density did not change, and decadence in bitterbrush remained about the same. Vigor improved in bitterbrush with a decrease in the number of plants displaying poor vigor from 53% in 2003 to 6%. The trend for both grasses and forbs is up. The sum of nested frequency of perennial grasses increased, with significant increases in the nested frequency of four of the eight grass species sampled. There has been a change in species composition with prairie junegrass decreasing in frequency and cover since 1997, and a significant increase in the frequency and cover of blue grama since 2003. Sum of nested frequency and cover of perennial forbs increased to higher than pretreatment values recorded in 1997.

winter range condition (DCI) - good (71) Mid-level potential scale

browse - stable (0)

grass - up (+2)

forb - up (+2)

HERBACEOUS TRENDS --

Management unit 27 , Study no: 13

T y p e	Species	Nested Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
G	Agropyron cristatum	a4	ab6	b13	.53	.30	.18
G	Agropyron smithii	23	26	31	.07	.45	.38
G	Bouteloua gracilis	a35	a15	b83	.28	.11	2.54
G	Koeleria cristata	b155	a92	a80	2.65	1.73	1.00
G	Poa fendleriana	b273	a194	a140	6.67	4.59	2.82
G	Poa secunda	a6	a4	b22	.15	.00	.17
G	Sitanion hystrix	a-	a2	b8	-	.06	.11
G	Stipa comata	a90	a103	b158	1.12	1.64	3.94
G	Stipa lettermani	b29	a-	a-	.59	-	-

Type	Species	Nested Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
		Total for Annual Grasses	0	0	0	0	0
Total for Perennial Grasses	615	442	535	12.09	8.90	11.18	
Total for Grasses	615	442	535	12.09	8.90	11.18	
F	<i>Agoseris glauca</i>	a-	b13	a-	-	.03	-
F	<i>Alyssum alyssoides</i> (a)	-	9	-	-	.01	-
F	<i>Allium</i> sp.	1	-	-	.00	-	-
F	<i>Antennaria rosea</i>	a13	a1	b22	.21	.00	.09
F	<i>Arabis</i> sp.	2	-	-	.00	-	-
F	<i>Astragalus</i> sp.	b41	a-	b21	.37	-	.53
F	<i>Calochortus nuttallii</i>	1	-	-	.00	-	-
F	<i>Castilleja</i> sp.	2	1	-	.00	.00	-
F	<i>Chenopodium leptophyllum</i> (a)	-	-	11	-	-	.02
F	<i>Cirsium</i> sp.	5	-	3	.00	-	.03
F	<i>Collinsia parviflora</i> (a)	a12	b123	a35	.05	.52	.11
F	<i>Crepis acuminata</i>	-	2	-	-	.00	-
F	<i>Eriogonum racemosum</i>	ab31	a20	b41	.37	.29	.53
F	<i>Eriogonum umbellatum</i>	7	13	-	.03	.08	-
F	<i>Gayophytum ramosissimum</i> (a)	a-	a5	b68	-	.04	.57
F	<i>Gilia</i> sp. (a)	8	-	-	.04	-	-
F	<i>Lomatium</i> sp.	3	-	2	.03	-	.00
F	<i>Lotus utahensis</i>	b45	a6	a15	.22	.01	.09
F	<i>Lychnis drummondii</i>	-	2	-	-	.00	-
F	<i>Microsteris gracilis</i> (a)	a-	b14	a4	-	.09	.01
F	<i>Oenothera</i> sp.	1	-	-	.00	-	-
F	<i>Orthocarpus luteus</i> (a)	3	7	1	.01	.06	.00
F	<i>Penstemon comarrhenus</i>	a-	a-	b24	-	-	.14
F	<i>Penstemon</i> sp.	b22	a2	a-	.09	.01	-
F	<i>Penstemon pachyphyllus</i>	-	-	2	-	-	.00
F	<i>Phlox longifolia</i>	a43	a51	b130	.14	.09	.66
F	<i>Polygonum douglasii</i> (a)	b44	a9	b48	.08	.01	.13
F	<i>Potentilla gracilis</i>	-	-	2	-	-	.03
F	<i>Stellaria jamesiana</i>	-	-	3	-	-	.00
Total for Annual Forbs	67	167	167	0.19	0.75	0.85	
Total for Perennial Forbs	217	111	265	1.51	0.54	2.15	
Total for Forbs	284	278	432	1.70	1.29	3.01	

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

BROWSE TRENDS --

Management unit 27 , Study no: 13

Type	Species	Strip Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
B	Amelanchier utahensis	1	2	1	.03	.00	.00
B	Artemisia nova	96	98	88	24.60	15.75	11.00
B	Chrysothamnus depressus	8	1	1	.24	.03	.00
B	Chrysothamnus nauseosus hololeucus	1	0	0	.00	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	22	29	37	.55	.66	1.08
B	Gutierrezia sarothrae	1	12	2	.00	.39	.03
B	Opuntia sp.	6	3	6	.18	.00	.03
B	Purshia tridentata	43	44	44	10.25	4.25	3.89
B	Rosa woodsii	1	0	0	.00	-	-
B	Symphoricarpos oreophilus	0	1	0	-	.00	-
B	Tetradymia canescens	1	2	1	.00	.06	.00
Total for Browse		180	192	180	35.86	21.14	16.04

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 13

Species	Percent Cover	
	'03	'08
Artemisia nova	17.88	10.56
Chrysothamnus depressus	.23	-
Chrysothamnus viscidiflorus viscidiflorus	.85	1.85
Gutierrezia sarothrae	-	.36
Opuntia sp.	-	.03
Purshia tridentata	3.76	6.15
Tetradymia canescens	.11	-

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 27 , Study no: 13

Species	Average leader growth (in)	
	'03	'08
Artemisia nova	1.1	1.1
Purshia tridentata	2.7	0.8

BASIC COVER --

Management unit 27 , Study no: 13

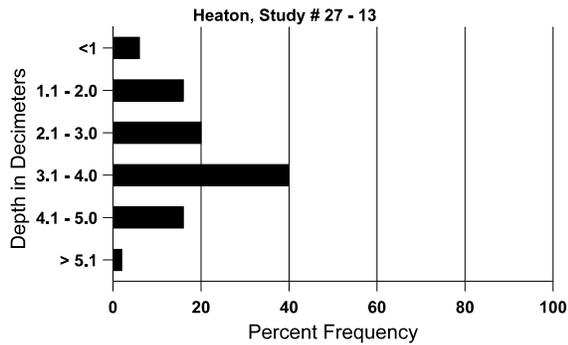
Cover Type	Average Cover %		
	'97	'03	'08
Vegetation	49.70	32.78	28.83
Rock	.14	.22	.30
Pavement	3.04	3.96	1.67
Litter	53.33	42.73	51.95
Cryptogams	.06	.03	.15
Bare Ground	20.90	28.71	28.53

SOIL ANALYSIS DATA --

Management unit 27, Study no: 13, Study Name: Heaton

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
16.5	65.3 (10.6)	6.1	65.0	19.2	15.8	2.1	13.4	131.2	0.4

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 13

Type	Quadrat Frequency		
	'97	'03	'08
Rabbit	3	2	39
Elk	8	2	5
Deer	51	19	42
Cattle	13	5	16

Days use per acre (ha)	
'03	'08
-	-
2 (5)	7 (17)
45 (111)	83 (205)
25 (61)	92 (227)

BROWSE CHARACTERISTICS --
Management unit 27 , 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)
Amelanchier utahensis												
97	20	20	-	20	-	-	0	100	-	-	0	-/-
03	40	-	20	20	-	-	0	50	-	-	50	26/33
08	20	40	20	-	-	-	0	0	-	-	0	12/19
Artemisia nova												
97	8800	2180	2820	4940	1040	700	10	2	12	6	7	15/28
03	11140	20	2820	7360	960	300	4	2	9	3	29	15/21
08	8520	2900	4040	2560	1920	5340	9	3	23	11	14	11/16
Chrysothamnus depressus												
97	240	-	20	220	-	-	0	0	-	-	0	6/10
03	60	-	-	60	-	-	0	100	-	-	0	6/8
08	40	-	-	40	-	-	0	100	-	-	0	3/4
Chrysothamnus nauseosus hololeucus												
97	20	-	-	20	-	-	0	0	-	-	0	24/30
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	4/6
Chrysothamnus viscidiflorus viscidiflorus												
97	1060	-	120	940	-	-	0	0	0	-	0	6/11
03	1440	-	80	1320	40	-	0	0	3	3	14	7/12
08	2480	-	80	2020	380	120	8	0	15	4	11	8/16
Gutierrezia sarothrae												
97	20	-	-	20	-	-	0	0	0	-	0	-/-
03	360	-	-	360	-	-	0	0	0	-	6	5/10
08	60	-	-	-	60	-	0	0	100	-	100	5/11
Opuntia sp.												
97	160	-	40	100	20	-	0	0	13	13	13	4/13
03	60	-	-	60	-	-	0	0	0	-	0	3/8
08	140	20	-	140	-	-	0	0	0	-	0	4/13
Purshia tridentata												
97	1220	180	140	1000	80	-	61	21	7	3	3	22/51
03	1280	-	60	1080	140	-	36	61	11	2	53	16/32
08	1280	60	40	1080	160	60	23	63	13	6	6	18/37