

Trend Study 00-3-06

Study site name: Garden Springs Flat South.

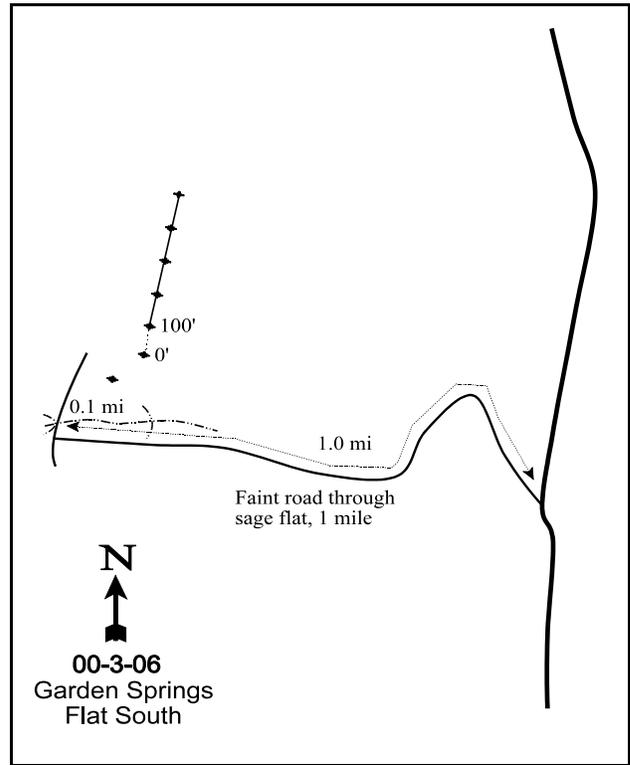
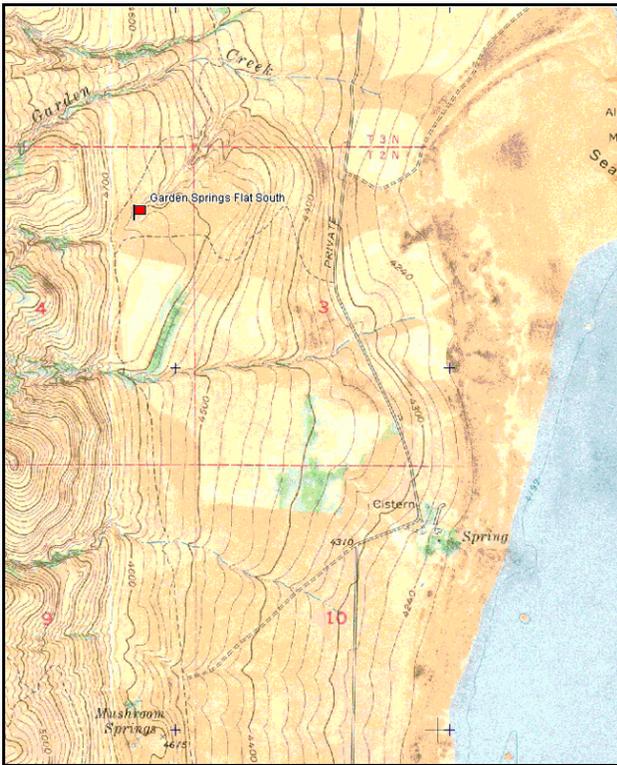
Vegetation type: Annual Grass.

Compass bearing: frequency baseline 14 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (35ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Rebar at 1ft on all belts.

LOCATION DESCRIPTION

From the main gate on Antelope Island, travel south for 9.1 miles to a faint road on the right, walk up the road for 1.0 mile to where the road crosses a gully. Travel 0.1 miles from the gully to the witness post on the east side of the road. The baseline runs 14 degrees magnetic. The 0 foot stake is marked with browse tag number 172.



Map Name: Antelope Island

Diagrammatic Sketch

Township 2N, Range 3W, Section 4

UTM NAD 27, UTM 12T 4532576 N 400161 E

DISCUSSION

Garden Spring Flat South - Trend Study No. 00-3

Study Information

This study is located about 1/4 mile south of Garden Creek on the east side of Antelope Island about 1 mile west of the shoreline (elevation: 4,660 feet, slope: 5-10%, aspect: east). A fire burned through the area between the 1995 and 1996 readings, but did not substantially change the plant community structure. The pellet group transect data in 2001 estimated 44 bison days use/acre (109 bison days use/ha). There was also an indication of light use by bighorn sheep. The pellet group estimates in 2006 were 1 deer and 28 bison days use/acre (2 ddu/ha and 68 bdu/ha). A deer was seen near the study in 2006.

Soil

The soils are in the Kilburn series, which consists of very deep, somewhat excessively drained, moderately rapidly permeable soils. They are formed in alluvium and colluvium derived dominantly from gneiss, schist, and quartzite on fan terraces, lake terraces, stream terraces, and deltas (USDA-NRCS 2006). These are derived specifically from alluvial deposits from Lake Bonneville. The soil texture is a sandy clay loam with a neutral pH (6.6). The estimated effective rooting depth was 23 inches. Very little rock was measured within the soil profile. Erosion is not a problem with vegetation and litter covering nearly the entire soil surface. The erosion condition class was stable in 2006.

Browse

As with most of the other range trend studies on the island, fire has eliminated nearly all the browse. Only broom snakeweed was sampled in density and cover measurements. This species has been low in abundance and has not exceeded a density of 100 plants/acre, despite the fire between the 1995 and 1996 readings. Several basin big sagebrush individuals were sampled for the first time in 2006 in the height/crown measurements.

Herbaceous Understory

The grass composition has been dominated by two annual species, cheatgrass and rattail fescue. Both species combined to provide nearly half of the total vegetation cover in 1995 and 1996. In 2001, rattail fescue substantially decreased in nested frequency, quadrat frequency, and percent cover. Although cheatgrass decreased in nested frequency in 2001, it still remained abundant and was sampled in nearly every quadrat (98%). In 2006, cheatgrass nested frequency decreased significantly and cover decreased from 19 to 10%; rattail fescue nested frequency did not change, but cover increased from 1 to 4%. The decrease in annual grasses in 2001 and 2006 is likely a product of increases in the low value perennial purple three-awn and bulbous bluegrass jumpstarted by the drought in 2000-01. Purple three-awn nested frequency increased significantly every year through 2001, then did not change significantly in 2006. Its cover has increased from 7% in 1995 to 27% in 2001 and 25% in 2006. Bulbous bluegrass nested frequency increased significantly from 1996 to 2001 and has remained unchanged since. Its cover increased from 2% in 1995 to 12% in 2001, then decreased to 5% in 2006. It was suggested by Stewart and Hull (1949) that bulbous bluegrass can outcompete cheatgrass. Two desired perennial grasses, Sandberg bluegrass and sand dropseed, are also present. Sand dropseed is scarce, but Sandberg bluegrass nested frequency increased significantly in 2001 and 2006 and has increased from less than 1% cover in 1995 to 9% in 2006.

Forbs are also dominated by weedy annual and perennial species. Storksbill has been the dominant forb in both frequency and cover. Other weedy species, such as prickly lettuce, yellow salsify, and moth mullein were abundant in previous readings, but due to low precipitation in 2000-2001, these species' abundances were greatly reduced in 2001; prickly lettuce had recovered by 2006. The nested frequency of all perennial forbs declined by 81% in 2001 due to the dry conditions, but had increased somewhat by 2006. Some utilization of yellow salsify was apparent in 1996. Annual agoseris, prickly lettuce, and yellow salsify are the only desirable forb species.

1996 TREND ASSESSMENT

The browse trend is stable with few plants sampled and little change in their respective densities. Annual weeds provide rigorous competition with browse species and will likely prohibit the population from expanding. Cheatgrass and rattail fescue dominate the grasses and rattail nested frequency increased significantly. Despite this high annual grass abundance, perennial grass nested frequency (excluding bulbous bluegrass) increased 41%. Sand dropseed and purple three-awn nested frequencies increased significantly. The grass trend is slightly up. Forb composition has changed because of fire, but remains poor. Even if fire is suppressed, it will be extremely difficult to change the composition of the community. The beneficial forbs, yellow salsify and prickly lettuce, nested frequencies increased significantly and the nested frequency of storksbill decreased significantly. A few other weedy species increased significantly, but nested frequency of annual forbs decreased 51%. The forb trend is up. The 1995 Desirable Components Index score was very poor because of the lack of browse cover and high annual grass cover. It did not change in 1996.

1995 winter range condition (DC Index) - very poor (2) Lower potential scale

1996 winter range condition (DC Index) - very poor (3) Lower potential scale

browse - stable (0)

grass - slightly up (+1)

forb - up (+2)

2001 TREND ASSESSMENT

Browse is sparse and has not changed due to short fire intervals. Therefore, the browse trend is stable. Broom snakeweed is the only shrub species sampled and has had an estimated density of less than 100 plants/acre in all years. Desirable shrubs, primarily sagebrush, have very little chance to establish and persist due to the extreme fire hazard and high competition with annual species. The grass trend is slightly up. The nested frequency of perennial grasses, excluding bulbous bluegrass, remained unchanged. However, the nested frequencies of cheatgrass and rattail fescue decreased significantly. The nested frequencies of Sandberg bluegrass and purple three-awn increased significantly. Unfortunately, the nested frequency of sand dropseed decreased significantly. Perennial grass cover (excluding that of bulbous bluegrass) increased from 10 to 28%. The forb trend is down. The nested frequency of perennial forbs decreased by 81%; prickly lettuce, yellow salsify, and annual agoseris nested frequencies decreased significantly. As well, the nested frequency of storksbill increased significantly. Storksbill has been shown to outcompete and prevent the establishment of native species (Kimball and Schiffman 2003). The DCI score improved to poor-fair due the increase in perennial grass cover, increase in perennial forb cover, and decrease in annual grass cover.

winter range condition (DC Index) - poor-fair (25) Lower potential scale

browse - stable (0)

grass - slightly up (+1)

forb - down (-2)

2006 TREND ASSESSMENT

The browse trend is stable. Broom snakeweed continued to be the only browse species, and its density was very low. Sagebrush was sampled for the first time in a height/crown measurement. The grass trend is slightly up. The nested frequency of cheatgrass decreased significantly, annual grass cover decreased slightly, and perennial grass cover (excluding bulbous bluegrass) increased slightly. The nested frequency of Sandberg bluegrass increased significantly. Perennial grass nested frequency was unchanged. The forb trend is stable. The nested frequency of perennial forbs increased, due to increases in prickly lettuce, foothill death kamas, and curlcup gumweed. The nested frequency of annual species increased substantially. Fortunately, storksbill nested frequency decreased significantly. The increase in prickly lettuce and decrease in storksbill are positive, but are countered by the increase in weedy annuals and perennials. The DCI score increased to fair due to the decrease in annual grass cover.

winter range condition (DC Index) - fair (28) Lower potential scale

browse - stable (0)

grass - slightly up (+1)

forb - stable (0)

HERBACEOUS TRENDS --
Management unit 00 , Study no: 3

T y p e	Species	Nested Frequency				Average Cover %			
		'95	'96	'01	'06	'95	'96	'01	'06
G	<i>Agropyron intermedium</i>	-	-	-	3	-	-	-	.03
G	<i>Aristida purpurea</i>	_a 203	_b 266	_c 303	_{bc} 272	6.98	9.07	26.89	25.31
G	<i>Bromus japonicus</i> (a)	_a -	_a -	_a 4	_b 29	-	-	.00	.08
G	<i>Bromus tectorum</i> (a)	_{bc} 436	_c 463	_b 416	_a 355	18.07	20.18	19.46	9.63
G	<i>Festuca myuros</i> (a)	_b 270	_c 379	_a 153	_a 150	14.43	18.01	1.11	4.15
G	<i>Poa bulbosa</i>	_a 157	_a 120	_b 271	_b 274	2.10	3.58	12.21	5.16
G	<i>Poa secunda</i>	_{ab} 65	_a 43	_b 103	_c 178	.14	.28	1.01	9.41
G	<i>Sporobolus cryptandrus</i>	_a 49	_b 139	_a 37	_a 23	.11	.69	.10	.22
G	<i>Vulpia octoflora</i> (a)	_{ab} 8	_a -	_{ab} 2	_b 18	.01	-	.00	.17
Total for Annual Grasses		714	842	575	552	32.52	38.19	20.58	14.05
Total for Perennial Grasses		474	568	714	750	9.35	13.62	40.24	40.14
Total for Grasses		1188	1410	1289	1302	41.88	51.82	60.83	54.19
F	<i>Agoseris heterophylla</i> (a)	_b 123	_b 126	_a 9	_a 23	.43	.35	.01	.11
F	<i>Ambrosia psilostachya</i>	_a -	_a -	_{ab} 6	_b 16	-	-	.06	.12
F	<i>Arabidopsis thaliana</i> (a)	-	-	-	10	-	-	-	.19
F	<i>Astragalus cibarius</i>	-	3	-	3	-	.01	-	.03
F	<i>Aster</i> sp.	_a 8	_b 17	_a -	_a -	.03	.07	-	-
F	<i>Calochortus nuttallii</i>	_b 34	_a 4	_b 37	_b 36	.08	.00	.11	.09
F	<i>Cirsium undulatum</i>	1	4	8	18	.01	.33	.39	.13
F	<i>Descurainia pinnata</i> (a)	_b 24	_a -	_a -	_a 6	.04	-	-	.01
F	<i>Draba nemorosa</i> (a)	_b 115	_a 3	_a -	_b 144	.26	.00	-	.24
F	<i>Epilobium brachycarpum</i> (a)	_a -	_a -	_a -	_b 145	-	-	-	.64
F	<i>Eriogonum cernuum</i> (a)	-	-	-	4	-	-	-	.15
F	<i>Erodium cicutarium</i> (a)	_d 459	_b 311	_c 388	_a 259	26.47	3.29	13.95	3.27
F	<i>Erigeron divergens</i>	_a -	_c 25	_{ab} 3	_b 11	-	.11	.15	.25
F	<i>Grindelia squarrosa</i>	_a -	_b 18	_a -	_b 22	-	.15	-	.40
F	<i>Helianthus annuus</i> (a)	_a -	_a -	_a -	_b 51	-	-	-	.13
F	<i>Heterotheca villosa</i>	_a -	_b 8	_{ab} 3	_a 1	-	.05	.03	.15
F	<i>Holosteum umbellatum</i> (a)	_b 31	_a -	_a 2	_c 104	.07	-	.03	1.31
F	<i>Lappula occidentalis</i> (a)	_b 13	_a -	_a -	_{ab} 10	.02	-	-	.04
F	<i>Lactuca serriola</i>	_b 54	_c 116	_a -	_c 109	.17	1.37	-	.60
F	<i>Lychnis drummondii</i>	-	-	3	1	-	-	.03	.00
F	<i>Machaeranthera</i> spp	_b 15	_b 18	_a -	_a -	.03	.08	-	-
F	<i>Tragopogon dubius</i>	_b 60	_c 263	_a 12	_a 17	.11	3.10	.07	.06
F	<i>Verbascum blattaria</i>	_a 5	_c 134	_{ab} 23	_b 36	.02	2.40	1.25	.71

Type	Species	Nested Frequency				Average Cover %			
		'95	'96	'01	'06	'95	'96	'01	'06
F	Zigadenus paniculatus	_a .50	_a .46	_a .48	_b .74	.62	.62	2.33	1.30
Total for Annual Forbs		765	440	399	756	27.31	3.65	14.00	6.12
Total for Perennial Forbs		227	656	143	344	1.10	8.32	4.43	3.87
Total for Forbs		992	1096	542	1100	28.41	11.97	18.44	9.99

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

BROWSE TRENDS --

Management unit 00 , Study no: 3

Type	Species	Strip Frequency				Average Cover %			
		'95	'96	'01	'06	'95	'96	'01	'06
B	Gutierrezia sarothrae	2	1	2	2	-	.00	.06	.00
Total for Browse		2	1	2	2	0	0.00	0.06	0.00

BASIC COVER --

Management unit 00 , Study no: 3

Cover Type	Average Cover %			
	'95	'96	'01	'06
Vegetation	69.59	64.01	72.55	66.74
Rock	.09	.02	0	0
Pavement	0	.50	.12	.03
Litter	69.98	69.05	42.34	40.68
Cryptogams	.00	.18	0	.01
Bare Ground	.98	1.14	2.08	3.32

SOIL ANALYSIS DATA --

Herd Unit 00, Study no: 03, Garden Spring Flat South

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
23.0	57.2 (19.7)	6.6	54.7	24.0	21.3	1.8	13.4	185.6	0.4

PELLET GROUP DATA --

Management unit 00 , Study no: 3

Type	Quadrat Frequency			
	'95	'96	'01	'06
Rabbit	-	-	-	1
Big Horn	-	-	-	-
Deer	-	5	-	-
Buffalo	5	12	7	12

Days use per acre (ha)	
'01	'06
-	-
1 (2)	-
-	1 (2)
44 (109)	28 (68)

BROWSE CHARACTERISTICS --

Management unit 00 , Study no: 3

		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>												
95	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	15/29
<i>Chrysothamnus nauseosus</i>												
95	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	14/39
<i>Gutierrezia sarothrae</i>												
95	60	-	-	60	-	-	0	0	-	-	0	6/9
96	80	20	-	80	-	-	0	0	-	-	0	11/14
01	40	-	-	40	-	-	0	0	-	-	0	9/10
06	40	-	20	20	-	-	0	0	-	-	0	11/13