Trend Study 00-4-06

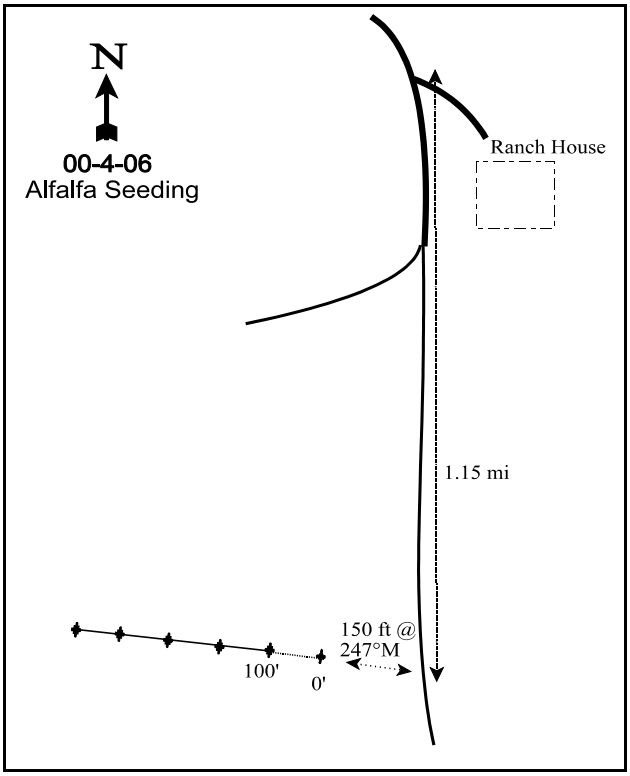
Study site name: Alfalfa Seeding . Vegetation type: Alfalfa Seeding .

Compass bearing: frequency baseline 295 degrees magnetic.

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

LOCATION DESCRIPTION

From the ranch house, travel south for 1.15 miles to a witness post on the right hand (west) side of the road. From the witness post walk 150 feet at 247 degrees magnetic to the 0-foot baseline stake. The baseline runs 295 degrees magnetic. The 0 foot stake is marked with browse tag number 171.



Map Name: Antelope Island

Diagrammatic Sketch

Township 2N , Range 3W , Section 15

UTM NAD 27, UTM 12T 4529216 N 401284 E

DISCUSSION

Alfalfa Seeding - Trend Study No. 00-4

Study Information

This study is located south of the old ranch house and northeast of Blackburn Spring (elevation: 4,280 feet, slope: 9%, aspect: east). It was placed in a burn that was seeded primarily with alfalfa, intermediate wheatgrass, and crested wheatgrass. Bison use is heavy. In 2001, the pellet group transect data estimated 121 bison days use/acre (299 bison days use/ha). Deer use of the area is very low at an estimated 2 deer days use/acre (5 ddu/ha). The estimated pellet group data in 2006 was only 23 bison days use/acre (57 bdu/ha). The area had received year round use and the bison pats counted were only those left since late fall.

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 is shallow with a layer of gravel about 4 inches below the soil surface. The soil texture is a sandy loam with a slightly alkaline pH (7.7). Effective rooting depth was estimated at less than 11 inches. Phosphorus may be limiting factor at only 7.6 ppm, values less than 6 ppm may limit normal growth and development (Tiedemann and Lopez 2004). Cover from vegetation and litter were abundant and well disbursed prior to 2006; by 2006, drought and heavy use by bison had greatly reduced vegetation cover. Except for a few bison wallowing areas, erosion is minimal. The erosion condition class rating in 2006 was stable.

Browse

Only one browse species was sampled, white rubber rabbitbrush. Rabbitbrush density was estimated at only 20 plants/acre in 1994 and 1996. It was only sampled in the height and crown measurements in 2001 and 2006. The lower height and crown measurements in 2001 and 2006 indicated that big game had been browsing the shrubs.

Herbaceous Understory

Cheatgrass is the dominant grass despite the seeding of intermediate and crested wheatgrass. Cheatgrass provided 29% cover in 1994, 24% in 1996, 12% in 2001, and 20% in 2006. In 2001, cheatgrass significantly decreased in nested frequency, but did not change significantly in 2006. Cheatgrass quadrat frequency was at its lowest in 1994 at 96%. Intermediate wheatgrass is the most abundant perennial species followed by crested wheatgrass and bulbous bluegrass. Intermediate wheatgrass and bulbous bluegrass both significantly increased in nested frequency in 2001, but neither species increased in 2006. Crested wheatgrass nested frequency did not change until 2006, when it decreased significantly. Moderate to heavy use was noted on intermediate and crested wheatgrass in 2001 and all species had been heavily utilized by bison in 2006.

The dominant forb is alfalfa; it contributed 21% cover in 1994, 32% in 1996, 28% in 2001, but only 2% in 2006. These plants were very robust, healthy, and displayed some use previous to 2006, but were very heavily grazed in 2006. Most plants were nearly 2 feet tall in 2001, but were only 6-8 inches tall in 2006. Storksbill nested frequency was low in 1994 and 1996, sharply increased in 2001, then decreased again in 2006. Storksbill had an estimated cover of less than 1% in 1994 and 1996, 24% in 2001, then only 2% in 2006. All other forbs have been infrequent and provided very little cover.

1996 TREND ASSESSMENT

The browse trend is stable with only white rubber rabbitbrush sampled. Although cheatgrass is the dominant grass, other seeded grass species are present to help keep it in check. The grass trend is stable. Alfalfa is large, vigorous, and provides excellent cover and forage. Weedy species are few. The forb trend is stable. The 1994 Desirable Components Index score is very poor-poor due to the lack of browse cover and the high

annual grass cover. It decreased to very poor in 1996 due to decreased perennial grass cover.

1994 winter range condition (DC Index) - very poor-poor (8) Lower potential scale
1996 winter range condition (DC Index) - very poor (5) Lower potential scale
browse - stable (0) grass - stable (0) forb - stable (0)

2001 TREND ASSESSMENT

The browse trend is stable. Rubber rabbitbrush was measured only in the height and crown measurements. The grass trend is up. The nested frequency of perennial grasses, excluding bulbous bluegrass, increased 33% and cheatgrass nested frequency decrease significantly. The nested frequency of intermediate wheatgrass and bulbous bluegrass increased significantly. The forb trend is slightly down. The nested frequency of storksbill increased significantly and cover increased from less than 1% in 1996 to 24% in 2001. The nested frequency of perennial forbs also decreased 13%. Alfalfa, which maintained a relatively stable nested frequency, remains the dominant forb. The DCI score increased to poor due to an increase in perennial grass cover and a decrease in annual grass cover.

winter range condition (DC Index) - poor (22) Lower potential scale
browse - stable (0) grass - up (+2) forb - slightly down (-1)

2006 TREND ASSESSMENT

The browse trend is stable. No browse species were sampled in the density measurements again. The grass trend is down. The nested frequency of perennial grasses, excluding bulbous bluegrass, decreased 37%. Crested wheatgrass nested frequency deceased significantly. Cheatgrass nested frequency did not change, but cover increased from 12 to 20%. The forb trend is down. Alfalfa nested frequency decreased significantly and cover decreased from 28 to 2%. Drought and overgrazing by the bison are the causes of the decrease. Some could grow back with lighter grazing and normal precipitation, but will not likely return to the previous condition and abundance. Storksbill nested frequency decreased significantly and cover also decreased, which is beneficial to the rangeland health. The DCI score decreased because of decreased perennial forb cover and increased annual grass cover.

winter range condition (DC Index) - very poor-poor (12) Lower potential scale
browse - stable (0) grass - down (-2) forb - down (-2)

HERBACEOUS TRENDS --
Management unit 00 , Study no: 4

Type	Species	Nested Frequency				Average Cover %			
		'94	'96	'01	'06	'94	'96	'01	'06
G	Agropyron cristatum	$_{b}$98	$_{b}$77	$_{b}$76	$_{a}$18	2.75	1.09	1.47	.33
G	Agropyron intermedium	$_{a}$116	$_{b}$156	$_{c}$230	$_{ab}$170	6.19	5.06	5.57	7.77
G	Aristida purpurea	-	-	-	2	-	-	-	.15
G	Bromus tectorum (a)	$_{b}$427	$_{b}$455	$_{a}$393	$_{a}$405	29.17	23.51	12.03	19.76
G	Elymus cinereus	1	-	-	-	.03	.00	.03	-
G	Festuca myuros (a)	$_{a}$-	$_{b}$21	$_{c}$38	$_{c}$32	-	.43	1.21	.31
G	Poa bulbosa	$_{a}$-	$_{a}$3	$_{b}$81	$_{b}$109	-	.15	3.42	2.98
G	Poa fendleriana	1	-	-	3	.00	-	-	.00

Type	Species	Nested Frequency				Average Cover %			
		'94	'96	'01	'06	'94	'96	'01	'06
G	Poa secunda	5	-	4	1	.15	.00	.30	.00
G	Vulpia octoflora (a)	$_{a}$-	$_{a}$-	$_{ab}$10	$_{b}$11	-	-	.04	.42
Total for Annual Grasses		427	476	441	448	29.17	23.95	13.29	20.50
Total for Perennial Grasses		221	236	391	303	9.14	6.31	10.80	11.25
Total for Grasses		648	712	832	751	38.31	30.27	24.09	31.75
F	Alyssum alyssoides (a)	-	-	-	6	-	-	-	.01
F	Arabidopsis thaliana (a)	$_{a}$-	$_{a}$-	$_{a}$-	$_{b}$12	-	-	-	.07
F	Descurainia pinnata (a)	-	-	-	1	-	-	-	.00
F	Draba nemorosa (a)	$_{a}$-	$_{a}$-	$_{a}$8	$_{b}$31	-	-	.02	.10
F	Erodium cicutarium (a)	$_{a}$33	$_{b}$102	$_{c}$379	$_{b}$120	.22	.58	23.91	2.41
F	Holosteum umbellatum (a)	$_{ab}$5	$_{a}$2	$_{b}$16	$_{ab}$6	.01	.00	.11	.02
F	Lappula occidentalis (a)	-	-	1	2	-	-	.00	.00
F	Lactuca serriola	-	-	-	3	-	-	-	.03
F	Medicago sativa	$_{b}$211	$_{b}$209	$_{b}$182	$_{a}$36	21.29	32.47	27.95	2.21
F	Polygonum douglasii (a)	-	2	-	-	-	.00	-	-
F	Ranunculus testiculatus (a)	-	-	-	2	-	-	-	.00
F	Salsola iberica (a)	3	-	-	-	.03	-	-	-
F	Sisymbrium altissimum (a)	$_{a}$-	$_{a}$-	$_{a}$8	$_{b}$85	-	-	.01	1.60
F	Tragopogon dubius	-	-	-	-	-	-	.03	.00
Total for Annual Forbs		41	106	412	265	0.27	0.59	24.06	4.24
Total for Perennial Forbs		211	209	182	39	21.29	32.47	27.98	2.25
Total for Forbs		252	315	594	304	21.57	33.06	52.05	6.49

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

BROWSE TRENDS --
Management unit 00 , Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'94	'96	'01	'06	'94	'96	'01	'06
B	Chrysothamnus nauseosus hololeucus	1	1	0	0	.15	.03	.00	-
Total for Browse		1	1	0	0	0.15	0.03	0.00	0

BASIC COVER --
Management unit 00 , Study no: 4

Cover Type	Average Cover %			
	'94	'96	'01	'06
Vegetation	69.76	62.37	68.24	44.75
Rock	1.02	.61	1.77	.98
Pavement	.39	.14	.19	.86
Litter	60.32	69.96	46.87	59.75
Cryptogams	.23	.04	.18	.06
Bare Ground	1.83	.78	3.91	5.31

SOIL ANALYSIS DATA --
Herd Unit 00, Study no: 04, Alfalfa Seeding

Effective rooting depth (in)	Temp °F (depth)	PH	Sandy loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
10.7	61.4 (11.3)	7.7	72.7	14.0	13.3	1.1	7.6	259.2	0.8

PELLET GROUP DATA --
Management unit 00 , Study no: 4

Type	Quadrat Frequency			
	'94	'96	'01	'06
Rabbit	1	-	-	-
Deer	1	-	-	-
Buffalo	3	10	29	24
Antelope	-	1	-	1

Days use per acre (ha)	
'01	'06
-	-
2 (5)	-
121 (299)	23 (57)
-	-

BROWSE CHARACTERISTICS --
Management unit 00 , Study no: 4

		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)
Chrysothamnus nauseosus hololeucus												
94	**20**	-	-	-	20	-	100	0	100	-	0	25/38
96	**20**	-	-	20	-	-	0	0	0	-	0	23/44
01	**0**	-	-	-	-	-	0	0	0	-	0	5/15
06	**0**	-	-	-	-	-	0	0	0	-	0	18/43