

Trend Study 2-28-06

Study site name: North Eden.

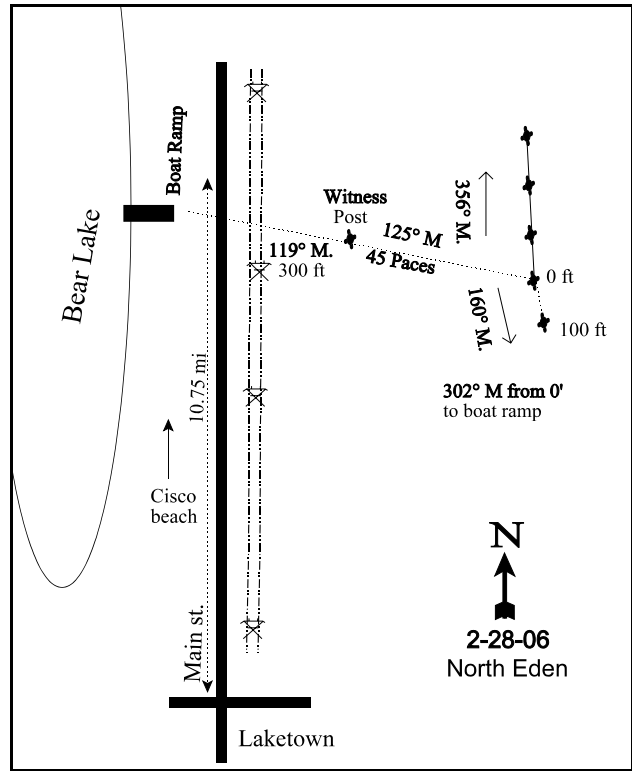
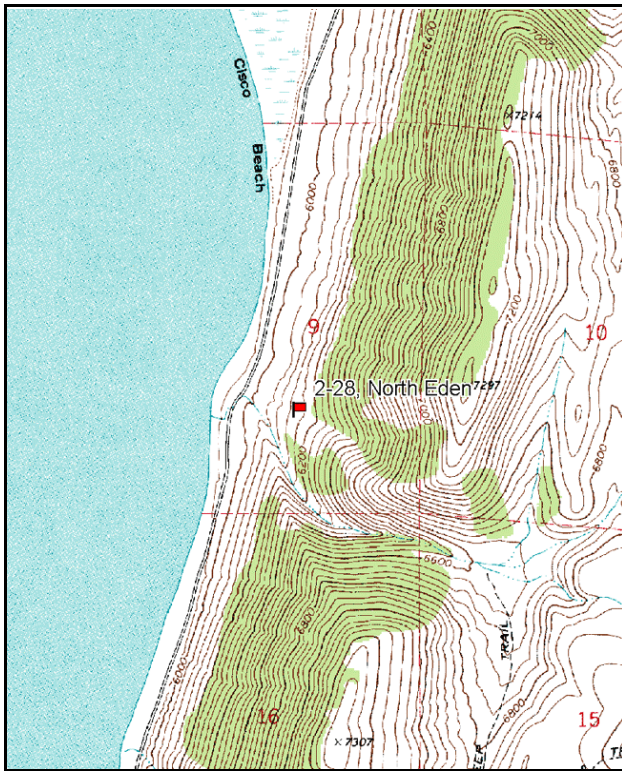
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 160 degrees magnetic.

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

LOCATION DESCRIPTION

From Bear Lake road and Main Street in Laketown, proceed north on Main Street 10.75 miles along the east shore. Turn right onto a dirt road proceeding to a power line. From the power line, walk up the slope on a bearing of 119 degrees magnetic for 300 feet to a witness post. From the witness post, walk 45 paces at 119 degrees magnetic to the 0-foot stake of the baseline, marked with browse tag #7979. The first 100 feet of the baseline runs 160 degrees magnetic. The rest of the baseline runs off the 0-foot baseline stake and runs in a direction of 356 degrees magnetic.



Map Name: Bear Lake South

Diagrammatic Sketch

Township 14N, Range 6E, Section 9

UTM NAD 27, UTM 12T 4645840 N, 477747 E

DISCUSSION

North Eden - Trend Study No. 2-28

Study Information

This study is located on the east side of Bear Lake between North and South Eden Canyons (elevation: 6,140 feet, slope: 20-25%, aspect: west). This study is located on the border of private land and land administered by the State Institutional Trust Land Administration. The vegetation type is a mixture of Wyoming big sagebrush and black sagebrush interrupted by scattered Utah juniper. Utilization by deer, cattle, and possibly sheep has been moderate to heavy. Quadrat frequency for deer pellet groups was moderately high at 39% in 1996, 36% in 2001 and 60% in 2006. A pellet group transect read in 2001 estimated 108 deer and 3 cow days use/acre (266 ddu/ha and 7 cdu/ha). Pellet group data from 2006 was estimated at 169 deer days use/acre (417 ddu/ha). Rabbit pellet groups were abundant in both 2001 and 2006.

Soil

The soil is classified within the Dagan series, a moderately deep, well drained soil derived from quartzite-sandstone conglomerate. This is a moderately calcareous soil with low water holding capability. Potential rooting depth is not significantly impaired even though there is sometimes a slight calcium carbonate accumulation at about 28 inches in depth. All the Dagan soils are subject to rapid runoff and have high erosion hazards (Campbell and Lacey 1982; USDA-NRCS 2006). Soil texture is a clay loam with a neutral pH. The effective rooting depth was estimated at nearly 12 inches. There is little rock on the surface and within the profile, but no evidence of a hardpan. There is some erosion occurring in the form of pedestalling, flow patterns, rills, and soil movement, but is localized and not severe. The ratio of protective cover (vegetation, litter, and cryptograms) to bare ground remained good at 5.3:1 in 2006. The erosion condition class was determined to be slight in 2001 and 2006.

Browse

The key browse species are Wyoming big sagebrush and black sagebrush. Wyoming big sagebrush density has declined every reading since 1984. Density was estimated at 5,332 plants/acre in 1984 and decreased to 3,465 plants/acre in 1990. In 1996, density was estimated at 2,800 plants/acre and in 2006 estimated 2,280 plants/acre. Decadence has remained consistently high, ranging from 46% in 1996 to 62% in 2006. In 2006, 33% of the population was classified as dying. Young recruitment was good in 2006 (19% of the population) and should help to replace those plants that have died or will die. Wyoming big sagebrush was heavily utilized in 1984, but has been light to moderate since 1990.

Density of black sagebrush declined from 2,065 to 440 plants/acre between 1990 and 1996. Due to the low number of dead plants and low decadence rate in 1996, this change in density is mostly the result of the larger sample used in 1996. This new estimate would be more representative of the whole area. Black sagebrush has continued to decrease from 440 plants/acre in 1996 to 280 plants/acre in 2006. Use on black sagebrush was heavy in 1984 and moderate in 1996, but all other years have been light.

Other shrub species include stickleaf low rabbitbrush, white rubber rabbitbrush, prickly pear, and Utah juniper. None occur very frequently or sustain much browsing use. They will likely remain secondary in importance. Point-center quarter data from 2001 estimated 72 juniper trees/acre with an average diameter of just over 3 inches. In 2006, density decreased to 40 juniper trees/acre, but the diameter was larger at 8.3 inches.

Herbaceous Understory

Herbaceous cover consists mainly of perennial grasses, which have increased in cover from 17% in 1996 to 35% in 2006. Cheatgrass is also abundant and has averaged 2-4% cover since 1996. The dominant perennial grasses are bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail. Bluebunch wheatgrass nested frequency significantly increased in 2006 and cover increased from 10% to 18%. Forbs are uncommon

and produce only 2% cover, except in 2001 when annual forb cover spiked to 8%. That increase was created by a single species, bush birdbeak.

1990 TREND ASSESSMENT

Trend for browse is down. Wyoming big sagebrush and black sagebrush have both declined and many dead and decadent sagebrush are evident. The Wyoming big sagebrush population is 60% decadent, while the black sagebrush population improved from 70% to 32% decadence. As opposed to the heavily hedged growth forms recorded in 1984, the sagebrush appear to be only moderately hedged. Trend for grasses is up. Perennial grass sum of nested frequency increased by 30%, due to a significant increase in bluebunch wheatgrass and Sandberg bluegrass. This increase in cover occurred even though the grasses were heavily grazed. Trend for forbs is up. Two perennial forbs significantly increased in nested frequency, which were longleaf phlox and tapertip hawksbeard.

browse - down (-2)

grasses - up (+2)

forbs - up (+2)

1996 TREND ASSESSMENT

The larger sample used in 1996 estimated cover of black sagebrush at only about 2%, while Wyoming big sagebrush at cover was 14%. This new, larger sample estimated only 440 black sagebrush plants/acre instead of 2,065 estimated in 1990. The differences in density may be due to the larger sample better estimates shrub populations which sometimes have aggregated and/or discontinuous distributions. Black sagebrush displays a stable trend with light to moderate use, generally good vigor, and a low decadence rate. Wyoming big sagebrush use is more moderate, yet vigor is still poor on 26% of the population. Decadence has declined, but it is still high at 46%. Young recruitment is down. The overall browse trend is stable. Trend for grasses is slightly down. The sum of nested frequency for perennial grasses declined by 10%, mainly due to a significant decrease in bluebunch wheatgrass. Annual grasses were included in the sample for the first time and cheatgrass averaged 4% cover. Trend for forbs is down. The perennial forb sum of nested frequency decreased by 64%, mainly due a significant decrease in longleaf phlox and hoods phlox. The Desirable Components Index rated this study as good due to good browse cover and excellent perennial grass cover. Annual grass cover is low, but negatively affects the score.

winter range condition (DC Index) - good (56) Low Potential scale

browse - stable (0)

grasses - slightly down (-1)

forbs - down (-2)

2001 TREND ASSESSMENT

Trend for browse is down slightly for both black sagebrush and Wyoming big sagebrush. Both sagebrush have declined in density, increased in decadence, and display poor reproduction. Wyoming big sagebrush accounts for 53% of the browse cover. It shows similar moderate to heavy use that was reported in 1996. Decadence has increased from 46% to 56% and 16% of population were classified as dying. Reproduction is poor and not nearly enough to maintain the population. Trend for grasses is stable. Sum of nested frequency for perennial grasses and forbs has not changed substantially. Sandberg bluegrass has declined significantly in nested frequency, but cover has remained at 7%, similar to 1996 estimates. Cheatgrass nested frequency has remained similar to 1996 estimates. Trend for forbs is stable. Forbs are still lacking. The Desirable Components Index rated this study as good due to good browse cover and excellent perennial grass cover. Annual grass cover is low, but negatively affects the score.

winter range condition (DC Index) - good (52) Low Potential scale

browse - slightly down (-1)

grasses - stable (0)

forbs - stable (0)

2006 TREND ASSESSMENT

Trend for key browse, black and Wyoming sagebrush, is slightly down. The density of mature and decadent Wyoming big sagebrush decreased by 26%, from 2,500 plants/acre in 2001 to 1,840 plants/acre in 2006.

Decadence increased to 62% of the population and 33% were classified as dying. Young recruitment increased to 19% of the population, which will help replace dying plants. Black sagebrush density remained similar to 2001 estimates, although plants classified as dying increased from 17% to 29% and young recruitment remains minimal. Trend for grasses is up. Perennial grass sum of nested frequency increased by 28%, mainly due to a significant increase in bluebunch wheatgrass. Bluebunch wheatgrass cover increased from 10% in 2001 to 18% in 2006. Cheatgrass continues to remain around 2-4% cover. Trend for forbs is slightly up. Forbs provided 2% cover, but false dandelion was sampled for the first time and yellow salsify has not been sampled since 1984. The Desirable Components Index rated this study as good due to good browse cover and excellent perennial grass cover, but with sagebrush decadence was high. Annual grass cover is low, but still negatively affects the score.

winter range condition (DC Index) - good (51) Low Potential scale

browse - down (-2)

grasses - up (+2)

forbs - slightly up (+1)

HERBACEOUS TRENDS --

Management unit 02 , Study no: 28

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron spicatum	a161	b210	a137	a155	b222	7.19	10.05	17.88
G	Bromus tectorum (a)	-	-	152	173	168	4.32	2.15	3.40
G	Oryzopsis hymenoides	3	-	-	14	7	.03	.86	.77
G	Poa secunda	a210	c303	c284	b239	ab280	8.09	7.41	14.00
G	Sitanion hystrix	bc26	a5	c47	ab20	bc39	1.29	.75	1.85
Total for Annual Grasses		0	0	152	173	168	4.32	2.15	3.40
Total for Perennial Grasses		400	518	468	428	548	16.61	19.08	34.50
Total for Grasses		400	518	620	601	716	20.94	21.24	37.91
F	Agoseris glauca	a-	a-	a-	a-	b10	-	-	.05
F	Arabis sp.	-	-	-	1	3	-	.00	.00
F	Astragalus convallarius	b9	a-	a-	b9	b11	-	.02	.11
F	Astragalus sp.	2	-	-	-	3	-	-	.00
F	Balsamorhiza sagittata	-	-	1	4	5	.30	.21	.24
F	Calochortus nuttallii	-	3	-	-	2	-	-	.00
F	Chaenactis douglasii	-	-	3	-	-	.00	-	-
F	Collomia linearis (a)	-	-	-	-	8	-	-	.02
F	Collinsia parviflora (a)	-	-	7	5	3	.18	.01	.00
F	Cordylanthus ramosus (a)	-	-	ab30	b55	a16	.48	7.51	.09
F	Crepis acuminata	a9	bc33	ab16	abc25	c35	.14	.56	1.00
F	Cryptantha sp.	1	2	-	-	7	-	-	.02
F	Descurainia pinnata (a)	-	-	-	3	6	-	.00	.04
F	Draba sp. (a)	-	-	-	-	3	-	-	.00
F	Erigeron sp.	a-	a5	a6	ab11	b21	.09	.48	.52

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Hackelia patens	-	-	-	1	-	-	.00	-
F	Holosteum umbellatum (a)	-	-	a1	a-	b12	.00	-	.03
F	Penstemon sp.	-	-	-	5	-	-	.01	.03
F	Phlox hoodii	a6	b26	a-	a6	ab12	-	.03	.08
F	Phlox longifolia	a-	c149	b53	a1	a6	.19	.00	.04
F	Sphaeralcea grossulariifolia	-	-	3	-	-	.15	-	-
F	Tragopogon dubius	b10	a-	a-	a-	a1	-	-	.03
F	Unknown forb-perennial	a-	b12	a-	a-	a-	-	-	-
Total for Annual Forbs		0	0	38	63	48	0.67	7.53	0.20
Total for Perennial Forbs		37	230	82	63	116	0.88	1.34	2.17
Total for Forbs		37	230	120	126	164	1.55	8.88	2.37

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

BROWSE TRENDS --

Management unit 02 , Study no: 28

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia nova	10	8	7	1.60	1.92	1.06
B	Artemisia tridentata wyomingensis	80	72	70	14.01	11.19	7.11
B	Atriplex canescens	0	0	0	-	.38	-
B	Chrysothamnus nauseosus	0	0	1	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	13	17	13	1.30	2.28	.86
B	Eriogonum microthecum	2	0	2	-	-	-
B	Gutierrezia sarothrae	0	1	0	-	-	-
B	Juniperus osteosperma	3	3	5	3.94	5.14	5.63
B	Opuntia polyacantha	3	3	3	.03	-	.18
Total for Browse		111	104	101	20.89	20.92	14.85

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 28

Species	Percent Cover	
	'01	'06
Artemisia nova	-	1.41
Artemisia tridentata wyomingensis	-	9.60
Chrysothamnus viscidiflorus viscidiflorus	-	.96
Juniperus osteosperma	9.00	8.88

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 28

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata wyomingensis	1.0	1.5

POINT-QUARTER TREE DATA --

Management unit 02 , Study no: 28

Species	Trees per Acre		Average diameter (in)	
	'01	'06	'01	'06
Juniperus osteosperma	72	40	3.1	8.3

BASIC COVER --

Management unit 02 , Study no: 28

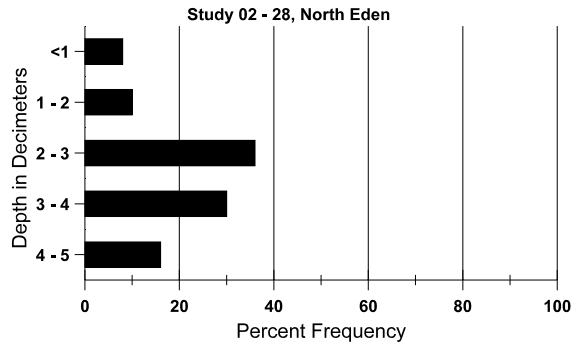
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	2.25	10.00	43.52	45.41	57.80
Rock	1.00	1.00	.74	.28	1.01
Pavement	0	0	.75	1.60	1.26
Litter	54.25	43.25	44.15	61.11	39.27
Cryptogams	20.50	16.00	11.19	6.84	12.67
Bare Ground	22.00	29.75	12.75	12.17	11.55

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 28, North Eden

Effective rooting depth (in)	Temp °F (depth)	PH				%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
11.8	62.6 (12.7)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Stoniness Index



PELLET GROUP DATA --

Management unit 02 , Study no: 28

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	25	41	46
Elk	-	-	1
Deer	39	36	60
Cattle	7	1	-

Days use per acre (ha)	
'01	'06
-	-
-	-
108 (266)	169 (417)
3 (7)	-

BROWSE CHARACTERISTICS --

Management unit 02 , Study no: 28

		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)
Artemisia nova												
84	3332	-	66	933	2333	-	40	60	70	-	12	13/14
90	2065	66	333	1066	666	-	0	0	32	-	3	15/19
96	440	-	20	360	60	40	82	0	14	-	9	13/21
01	240	-	20	160	60	100	17	0	25	17	17	15/29
06	280	-	20	180	80	80	0	0	29	29	29	19/31
Artemisia tridentata wyomingensis												
84	5332	533	266	2266	2800	-	30	65	53	-	10	24/25
90	3465	66	333	1066	2066	-	23	17	60	3	33	22/20
96	2800	-	80	1420	1300	1900	40	10	46	13	26	29/38
01	2560	40	60	1060	1440	1640	43	12	56	16	16	27/39
06	2280	80	440	420	1420	1380	23	5	62	33	40	26/38

		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												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	20	-	20	-	-	-	0	0	-	-	0	28/31
Chrysothamnus viscidiflorus viscidiflorus												
84	199	-	-	66	133	-	0	0	67	-	67	21/11
90	199	-	-	66	133	-	33	33	67	-	33	6/7
96	400	-	20	340	40	20	20	0	10	-	45	15/23
01	360	-	-	220	140	-	0	0	39	11	11	15/26
06	360	20	40	160	160	-	22	0	44	6	17	14/24
Eriogonum microthecum												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	40	-	-	40	-	-	0	0	0	-	0	8/9
01	0	-	-	-	-	-	0	0	0	-	0	-/-
06	40	-	-	20	20	-	0	0	50	50	50	9/11
Gutierrezia sarothrae												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	20	-	-	20	-	-	0	0	-	-	0	6/4
06	0	-	-	-	-	-	0	0	-	-	0	-/-
Juniperus osteosperma												
84	133	66	-	133	-	-	0	0	-	-	0	69/49
90	132	-	66	66	-	-	0	0	-	-	0	93/63
96	60	-	20	40	-	-	0	0	-	-	0	-/-
01	60	-	20	40	-	-	0	0	-	-	0	-/-
06	100	20	40	60	-	-	0	0	-	-	0	-/-
Opuntia polyacantha												
84	200	-	-	200	-	-	0	0	-	-	0	6/7
90	400	66	-	400	-	-	0	0	-	-	0	4/7
96	80	-	-	80	-	-	0	0	-	-	0	6/20
01	60	-	-	60	-	-	0	0	-	-	0	6/15
06	100	-	20	80	-	-	0	0	-	-	0	6/12

		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>Symphoricarpos oreophilus</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	26/57