

Trend Study 29-3-08

Study site name: North Hills .

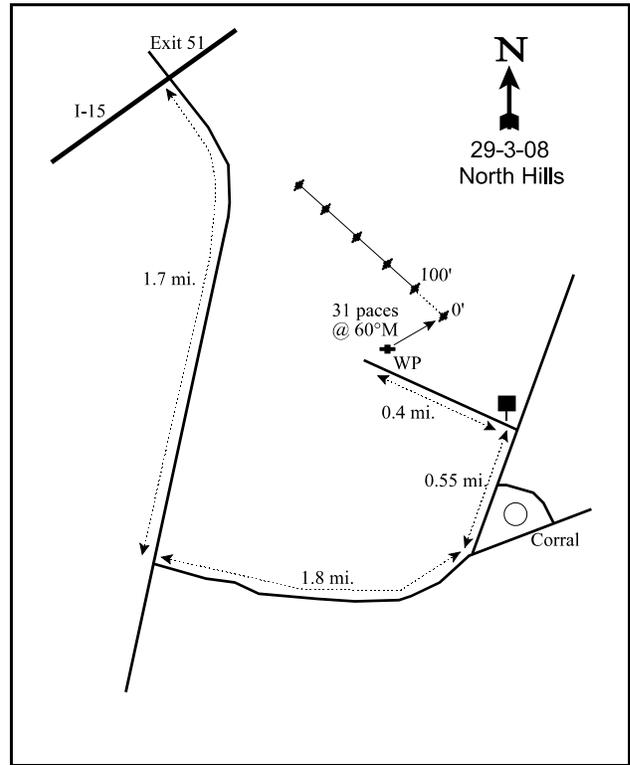
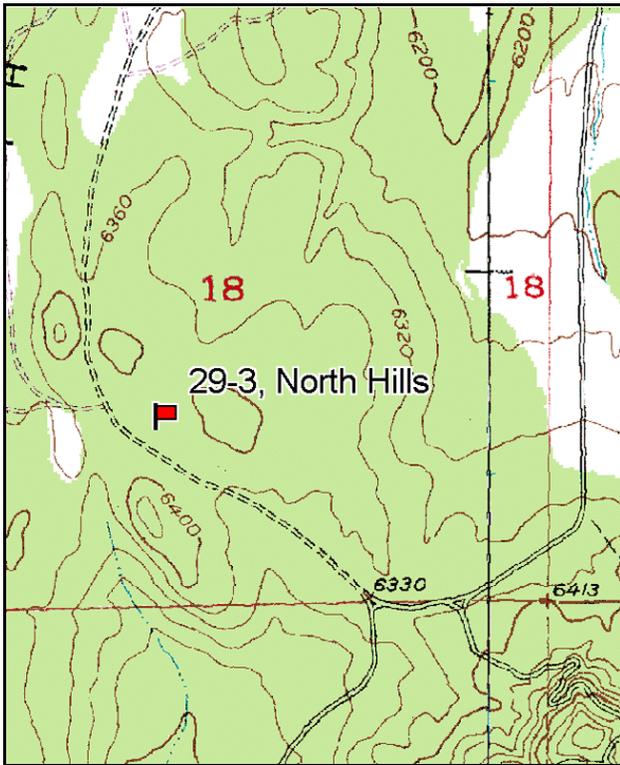
Vegetation type: Chained,Seeded P-J .

Compass bearing: frequency baseline 323 degrees magnetic.

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

LOCATION DESCRIPTION

From Exit 51 (Hamilton Fort), cross under the highway and proceed south on the east side of the freeway for 1.7 miles. Turn left and go 1.8 miles to a corral. Stay left for 0.55 miles to a turnoff into the chaining with a sign that says “North Hills Reseeding.” Continue 0.4 miles to a witness post on the right. Walk 31 paces at 60 degrees magnetic to the 0-foot stake.



Map Name: Kanarraville

Diagrammatic Sketch

Township 37S , Range 11W , Section 18

GPS: NAD 83, UTM 12S 311446 E, 4161327 N

DISCUSSION

North Hills - Trend Study No. 29-3

Study Information

This trend study was established in 1998 on a chained and seeded pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) site in the North Hills located north of Kanarraville. The area lies between Interstate 15 and the Hurricane Cliffs to the east on BLM land [elevation: 6,400 feet (1,950 m), slope: 5%, aspect: south]. The site was chained in 1967 and seeded to crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*A. intermedium*). The area contains rolling terrain with the study established on a wide ridge top. Pinyon pine and Utah juniper trees are found on the site in low densities. Deer use on the site is heavy, and there is also some sign of elk and cattle use. Pellet group data from 1998 estimated 103 deer days use/acre (254 ddu/ha). Deer were seen near the site during study site establishment on 16 July 1998. Estimated elk and cattle use was low at 6 elk and 4 cow days use/acre (15 edu/ha and 10 cdu/ha) in 1998. Pellet group data from 2003 estimated 118 deer days use/acre (291 ddu/ha), while 2008 pellet data estimated 60 deer days use/acre (147 ddu/ha), 3 elk days use/acre (7 edu/ha), and 10 cow days use/acre (25 cdu/ha).

Soil

Soil is somewhat shallow with a moderate amount of rock and pavement on the surface and within the profile. Effective rooting depth is estimated at only 10 inches. Soil texture is a sandy loam which is neutral in reaction (pH 6.8). Relative combined vegetation and litter cover has decreased from 69% in 1998 to 50% in 2008. Relative bare ground cover has ranged from 16%-29% since 1998. Erosion is not a problem on the site due to the abundance of herbaceous vegetation and the gentle terrain. The soil erosion condition was classified as stable in 2003 and 2008.

Browse

The site supports a variety of browse species including Utah serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), mountain big sagebrush (*A. tridentata* ssp. *vaseyana*), and Gambel oak (*Quercus gambelii*). Mountain big sagebrush was the most numerous species with an average density of 1,840 plants/acre in 1998 and 2003, and 2,240 plants/acre in 2008. Sagebrush has averaged 12% since 1998. Utilization was moderate to heavy during both readings. The number of decadent plants was moderately high in 1998 at 31% of the population, increasing to 48% in 2003, then dropping to 24% in 2008. Young recruitment was 14% in 2008, an improvement from about 5% in previous readings. There was a small number of moderately utilized black sagebrush which appear to be black/mountain big sagebrush hybrids.

Utah serviceberry provided 25% of browse cover in 2008 (up from an average of 14% in 1998 and 2003) with an increase in density from 560 plants/acre in 2003 to 740 plants/acre in 2008. They displayed light to moderate use, good vigor, and low decadence. There were also some isolated thick oak clones on the site. Mature plants averaged over 4 feet in height, making much of the oak partly unavailable to browsing. Available plants appeared unutilized. A few scattered heavily hedged bitterbrush (*Purshia tridentata*) provided some additional browse forage. Point-quarter data estimated only 18 pinyon and 29 juniper trees/acre in 1998. Average basal diameter was 2 inches for pinyon and 1.3 inches for juniper. There was some evidence of hand cutting of young trees in the past. By 2008, pinyon/juniper density was estimated at 25 and 38 trees/acre, respectively. Pinyon diameter was 2.2 inches and juniper diameter was 2.6 inches, in 2008.

Herbaceous Understory

The herbaceous understory has dominated the site with seeded perennial grasses, crested and intermediate wheatgrass, providing most of the herbaceous cover. Combined, these species significantly declined in nested frequency in 2003 and 2008, and also showed declines in cover. A few other perennial grasses occur occasionally. Cheatgrass (*Bromus tectorum*) although a small part of the herbaceous understory is increasing. Forbs are severely limited and produce less than 1% cover.

1998 DESIRABLE COMPONENTS INDEX

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

2003 TREND ASSESSMENT

The key browse species, mountain big sagebrush, is showing the effects of several years of drought. Annual precipitation was only 49% of normal in 2002 at Cedar City. Spring precipitation (April to June) has been poor for the past three years (2001 - 2003), averaging only 59% of normal (Utah Climate Summary 2008). The density of mountain big sagebrush has remained similar to 1998 levels, but the number of decadent plants has increased to 48% of the population. No seedlings were encountered and young plants accounted for only 4% of the population. Serviceberry is also important although it provides only 15% of the browse cover. It has remained stable in average cover and strip frequency. Serviceberry vigor remains good and no plants were classified as decadent. Trend for browse is considered slightly down due to increasing decadence and poor young recruitment of sagebrush. The herbaceous understory is also showing the effects of drought. Sum of nested frequency of perennial grasses has declined 26%, and cover has dropped from 24% in 1998 to 9%, a decrease of more than 60%. Seeded crested and intermediate wheatgrass provide nearly all of the grass cover. Both species declined significantly in nested frequency. Forbs are still rare. Trend for grasses is down and trend for forbs is stable.

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

browse - slightly down (-1) grasses - down (-2) forbs - stable (0)

2008 TREND ASSESSMENT

Browse trend is up. Mountain big sagebrush density has increased from 1,860 plants/acre in 2003 to 2,240, and decadence has declined from 48% to 24%. Recruitment appears good with 320 young/acre (14% of plants). Utah serviceberry has a density of 740 plants/acre with 65% classified as young and no decadent plants. Grass trend is slightly down. Perennial grass nested frequency has declined 14% and cover has declined 41%. Annual grass nested frequency has increased 600% (from 17 in 2003 to 120) due to an increase in cheatgrass. Forb trend is stable. Forbs still account for very little cover on the site.

Winter range condition (DCI) - fair (58) Mid-level potential scale

browse - up (+2) grasses - slightly down (-1) forbs - stable (0)

HERBACEOUS TRENDS --
 Management unit 29 , Study no: 3

T y p e	Species	Nested Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
G	<i>Agropyron cristatum</i>	_b 271	_a 233	_a 231	19.65	7.71	4.41
G	<i>Agropyron intermedium</i>	_c 142	_b 86	_a 43	3.04	1.12	.89
G	<i>Aristida purpurea</i>	-	4	-	-	.15	.00
G	<i>Bromus tectorum</i> (a)	_a 24	_a 17	_b 120	.23	.05	.62
G	<i>Hilaria jamesii</i>	6	6	3	.41	.18	.03
G	<i>Oryzopsis hymenoides</i>	3	-	-	.00	-	-
G	<i>Poa secunda</i>	_b 10	_a -	_a 2	.33	-	.03
G	<i>Sitanion hystrix</i>	_b 21	_a 6	_a 3	.46	.06	.03
G	<i>Stipa comata</i>	-	-	5	-	-	.01
G	<i>Vulpia octoflora</i> (a)	3	-	-	.00	-	-
Total for Annual Grasses		27	17	120	0.23	0.05	0.62
Total for Perennial Grasses		453	335	287	23.91	9.22	5.42
Total for Grasses		480	352	407	24.15	9.27	6.04
F	<i>Arabis</i> sp.	1	-	-	.00	-	-
F	<i>Astragalus</i> sp.	12	9	12	.30	.36	.06
F	<i>Chaenactis douglasii</i>	-	1	-	-	.03	-
F	<i>Draba</i> sp. (a)	-	2	-	-	.03	-
F	<i>Gilia</i> sp. (a)	-	3	-	-	.00	-
F	<i>Lithospermum</i> sp.	10	9	4	.03	.07	.03
F	<i>Microsteris gracilis</i> (a)	-	4	-	-	.01	-
F	<i>Navarretia intertexta</i> (a)	1	-	-	.00	-	-
F	<i>Oenothera albicaulis</i> (a)	-	-	8	-	-	.01
F	<i>Oenothera</i> sp.	-	3	-	-	.03	-
F	<i>Phlox longifolia</i>	-	-	4	-	-	.01
F	<i>Ranunculus testiculatus</i> (a)	_a -	_a 4	_b 18	-	.01	.03
F	<i>Sphaeralcea grossulariifolia</i>	-	2	2	-	.00	.00
Total for Annual Forbs		1	13	26	0.00	0.06	0.05
Total for Perennial Forbs		23	24	22	0.34	0.50	0.10
Total for Forbs		24	37	48	0.34	0.56	0.15

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

BROWSE TRENDS --

Management unit 29 , Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	Amelanchier utahensis	15	16	17	2.34	2.57	4.55
B	Artemisia nova	5	1	5	.30	.00	.18
B	Artemisia tridentata vaseyana	59	55	60	13.00	11.44	11.49
B	Chrysothamnus viscidiflorus	0	1	1	-	.00	.15
B	Gutierrezia sarothrae	0	1	2	-	.00	.00
B	Juniperus osteosperma	0	1	1	-	.00	.00
B	Opuntia sp.	2	0	0	.00	-	-
B	Purshia tridentata	1	1	1	.00	.00	.03
B	Quercus gambelii	6	10	8	2.19	2.79	1.69
Total for Browse		88	86	95	17.84	16.81	18.09

CANOPY COVER, LINE INTERCEPT --

Management unit 29 , Study no: 3

Species		
	'03	'08
Amelanchier utahensis	3.95	4.65
Artemisia nova	.15	.71
Artemisia tridentata vaseyana	8.23	12.14
Purshia tridentata	-	.01
Quercus gambelii	4.36	7.36

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 29 , Study no: 3

Species	Average leader growth (in)	
	'03	'08
Artemisia tridentata vaseyana	2.9	1.4
Purshia tridentata	4.0	0.6

POINT-QUARTER TREE DATA --

Management unit 29 , Study no: 3

Species	Trees per Acre		
	'98	'03	'08
Juniperus osteosperma	29	38	38
Pinus edulis	18	<18	25

Average diameter (in)		
'98	'03	'08
1.3	1.2	2.6
2.0	-	2.2

BASIC COVER --

Management unit 29 , Study no: 3

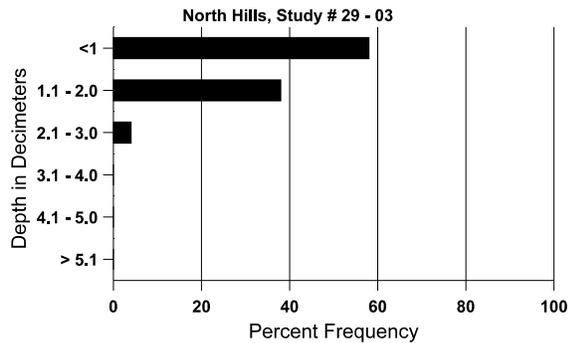
Cover Type	Average Cover %		
	'98	'03	'08
Vegetation	39.57	24.71	22.64
Rock	6.71	5.57	6.50
Pavement	12.20	17.24	25.10
Litter	51.77	36.99	34.38
Cryptogams	.41	.03	.01
Bare Ground	21.43	34.08	25.32

SOIL ANALYSIS DATA --

Management unit 29, Study no: 3, Study Name: North Hills

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
9.9	78.7 (8.5)	6.8	70.0	14.2	15.8	3.1	9.4	16.0	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 29 , Study no: 3

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	28	32	78
Elk	5	-	2
Deer	58	34	28
Cattle	1	2	5

Days use per acre (ha)		
'98	'03	'08
-	-	-
6 (15)	1 (2)	3 (7)
103 (254)	118 (291)	60 (147)
4 (10)	5 (13)	10 (25)

BROWSE CHARACTERISTICS --
Management unit 29 , 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)
Amelanchier utahensis												
98	1040	-	380	620	40	-	21	2	4	-	0	38/56
03	560	-	280	280	-	20	29	14	0	-	0	42/51
08	740	20	480	260	-	-	22	22	0	-	3	46/53
Artemisia nova												
98	120	-	-	100	20	20	83	0	17	-	0	13/24
03	20	-	-	20	-	-	0	0	0	-	0	13/28
08	120	-	40	80	-	20	17	33	0	-	0	15/33
Artemisia tridentata vaseyana												
98	1860	120	100	1180	580	500	56	14	31	5	13	26/37
03	1820	-	80	860	880	400	48	37	48	9	9	25/33
08	2240	580	320	1380	540	360	39	21	24	4	5	27/42
Chrysothamnus nauseosus hololeucus												
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	42/26
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Chrysothamnus viscidiflorus												
98	0	20	-	-	-	-	0	0	-	-	0	-/-
03	20	-	20	-	-	-	0	0	-	-	0	-/-
08	20	-	-	20	-	-	0	0	-	-	0	6/7
Gutierrezia sarothrae												
98	0	-	-	-	-	-	0	0	-	-	0	12/9
03	20	-	-	20	-	-	0	0	-	-	0	8/11
08	100	-	20	80	-	-	0	0	-	-	0	5/5
Juniperus osteosperma												
98	0	-	-	-	-	20	0	0	-	-	0	-/-
03	20	-	20	-	-	-	0	0	-	-	0	-/-
08	20	-	20	-	-	-	0	0	-	-	0	-/-
Opuntia sp.												
98	40	-	-	20	20	-	0	0	50	50	50	5/6
03	0	-	-	-	-	-	0	0	0	-	0	5/13
08	0	-	-	-	-	-	0	0	0	-	0	4/11

		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)
Purshia tridentata												
98	20	-	-	20	-	-	100	0	-	-	0	39/72
03	20	-	-	20	-	-	0	100	-	-	0	37/52
08	20	80	-	20	-	-	0	0	-	-	0	32/56
Quercus gambelii												
98	940	60	340	600	-	-	0	0	-	-	0	50/28
03	1420	-	220	1200	-	140	0	0	-	-	0	49/32
08	1900	140	500	1400	-	100	5	0	-	-	0	39/23