

Trend Study 25A-1-04

Study site name: Triangle Mountain .

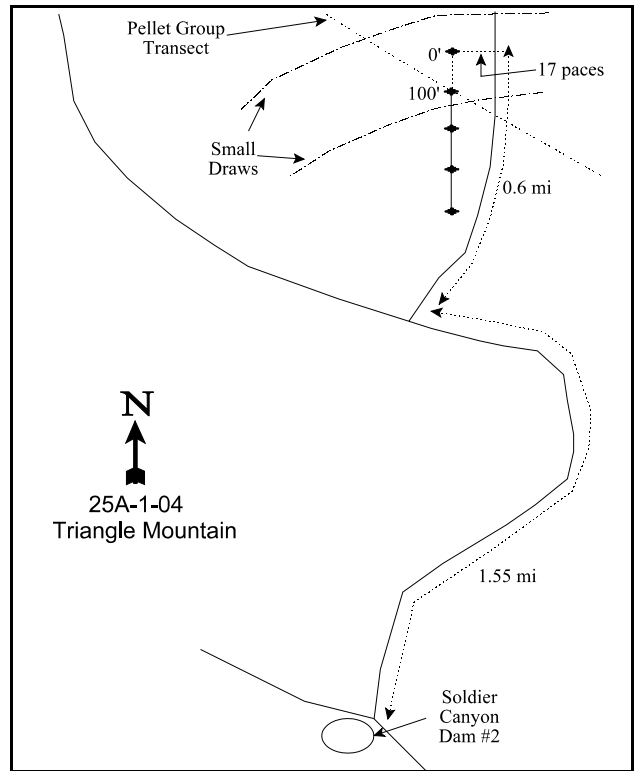
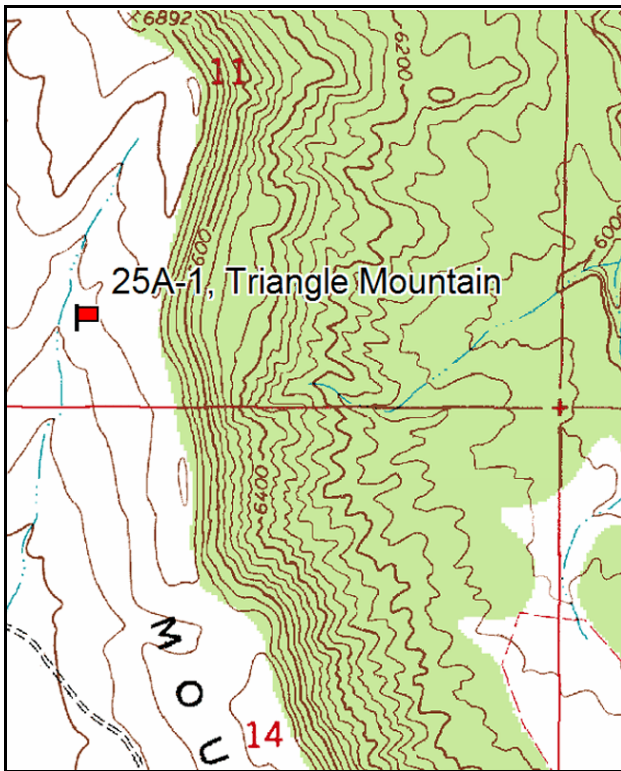
Vegetation type: Chained, Seeded P-J .

Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

From the Gooseberry Creek Road outside Salina, take the Soldier Canyon Road west approximately 2.5 miles to Soldier Canyon Dam #2. At the dam, turn right up the road to Triangle Mountain. Go 1.55 miles to a fork. Take the right fork 0.6 miles to the top of a low rise between 2 small draws. Walk 17 paces due west of the road to the 0-foot baseline stake, which is a 4-foot rebar. A pellet group transect crosses the frequency baseline at the 100-foot mark.



Map Name: Salina, Utah

Diagrammatic Sketch

Township 22S , Range 1E , Section 11

GPS: NAD 27, UTM 12S 4306250 N, 433224 E

DISCUSSION

Triangle Mountain - Trend Study No. 25A-1

The Triangle Mountain study is located on a gentle sloping (5%-10%) southwest side of Triangle Mountain in the Fish Lake National Forest at an elevation of 6,700 feet. The area was formerly dominated by pinyon-juniper. It was chained and seeded in 1970. It is presently occupied by evenly scattered young pinyon and juniper trees that escaped the chain, and seeded perennial grasses. Cattle use the area in early summer and the grazing is heavy. The area is within the Brown's Hole allotment which allows grazing for approximately a two week period from June 1 to June 15 depending on conditions. In 1985, deer use at a nearby pellet group transect was relatively low at 31 deer days use/hectare when compared to the figures shown by other pellet group transects on the herd unit (average 69 deer days use/hectare) (Jense et al. 1985). Pellet group data from 1991 estimated 7 elk days use/acre (18 edu/ha). Pellet group data from 1999 estimate 21 deer (53 ddu/ha), 66 elk (162 edu/ha), and 49 cow days use/acre (120 cdu/ha). Pellet group data from 2004 estimated 10 deer (25 ddu/ha), 12 elk (30 edu/ha), and 5 cow days use/acre (13 cdu/ha). Rabbit use is fairly abundant on this site.

The soil is a light-colored, loam soil that is relatively shallow due to the prevalence of rock on the surface and throughout the profile. The estimated effective rooting depth is just under 12 inches. It is derived from a limestone parent material, and has a slightly alkaline pH (7.6). The amount of phosphorus is low and could be a limiting factor at 6.5 ppm because values below 10 ppm may limit normal plant growth and development. Soil organic matter is relatively high at 5.8%. There is good surface litter cover. Erosion is not severe due to the gentle slope and adequate cover from herbaceous vegetation and litter. The erosion condition class determined soil movement as stable in 2004. The area itself is quite dry with an average of about 10 inches of precipitation per year measured in Salina (5 miles away to the northwest and 1,600 feet lower).

Browse is infrequent on the site, resulting in light use by deer. Black sagebrush is the key browse species, but has a very low density. In 1985, black sagebrush density was 66 plants/acre, 199 in 1991, 480 in 1999, and 420 in 2004. Use is mostly light, but recruitment was high in 1999 (38%), with some seedlings (8%). No young recruitment or seedlings were observed in 2004 and decadence was 19%. White-stemmed rubber rabbitbrush is scattered throughout the site in low numbers. Young pinyons and junipers were 4-8 feet in height in 2004. Density was estimated at 43 pinyon trees/acre and 35 juniper trees/acre in 1999. In 2004, pinyon was estimated at 33 trees/acre with an average diameter of 5.6 inches and juniper was estimated at 34 trees/acre with an average diameter of 7.8 inches. Some junipers were lightly hedged. Nearby, more dense stands of pinyon-juniper provide good cover.

Herbaceous vegetation makes up the majority of the vegetation cover at the site. In 1999, grasses and forbs combined made up 97% of the total vegetation and in 2004 they made up 94%. Seeded perennial grass species dominate the understory. The major species present are: crested wheatgrass, intermediate wheatgrass, and Russian wildrye. Crested wheatgrass is the dominate species overall, it provided 45% of the total vegetation cover in 1999 and 52% in 2004. Russian wildrye is scattered throughout the site in clumps that display a halo effect. Cheatgrass was sampled in 1999 and 2004, however it was infrequent, occurring in only 7 out of 100 quadrats. Seeded alfalfa decreased significantly in nested frequency and percent cover dropped from 48% of the forb cover to 12%. The annual, pale alyssum, is abundant and provided 28% of the forb cover and bur buttercup provided 58% in 2004, a significant increase from 1999. Other forbs are infrequent and unimportant.

1985 APPARENT TREND ASSESSMENT

Juniper and pinyon are regaining their former dominance in the chained areas with good vigor and virtually no competition. Other browse species are sporadic but may be slowly increasing. The grasses are well-established. The soil condition is poor, but relatively stable considering the relatively high amount of

bare soil.

1991 TREND ASSESSMENT

It appears that the juniper and pinyon trees, on the site, are those that escaped the chaining treatment and have been released from competing with the older adult trees. Density for the key browse species, black sagebrush, has increased by 67%, but is still low at about 200 plants/acre. This increase in density for black sagebrush would be expected to continue. All major seeded grasses have increased sum of nested frequency and quadrat frequency values. Another plus is that alfalfa has also increased since 1985, at which time it was questioned if it would survive. It has a 49% quadrat frequency, which is excellent for a 20 year old chaining. Bare ground has also decreased substantially.

TREND ASSESSMENT

soil - slightly up (4)

browse - up (5), but preferred browse still provides less than .1% cover

herbaceous understory - slightly up (4)

1999 TREND ASSESSMENT

Trend for soil is stable. Erosion is minimal due to adequate protective cover from herbaceous vegetation and litter. Percent cover from bare ground has stayed nearly the same as the previous reading. Trend for browse is stable, but insignificant on this site. Black sagebrush is the most abundant species, but it occurs at a very low density. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses decreased slightly, but the most abundant species, crested wheatgrass and Russian wildrye, have remained fairly stable, while nested frequency of intermediate wheatgrass has increased slightly. Sum of nested frequency for perennial forbs remained stable. Herbaceous plants are low in stature and moderately to heavily utilized. The Desirable Components Index rated this site as fair with a score of 31 due to very low shrub cover, good perennial grass cover, and no young shrubs.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3), preferred browse still only provides less than .1% cover

herbaceous understory - stable (3)

winter range condition (DC Index) - 31 (fair) Black sagebrush type

2004 TREND ASSESSMENT

Trend for soil is stable. Overall protective cover increased while percent bare ground decreased. Pavement increased suggesting perhaps some soil movement, but no current soil erosion was present on the site. Trend for key browse, black sagebrush, is stable, but is very low in density. Percent decadence increased from 0% to 19% in 2004 and no recruitment from the young or seedlings age classes were observed in 2004. Trend for the herbaceous understory is slightly down. Seeded perennial grasses (crested wheatgrass and Russian wildrye) decreased significantly in nested frequency. Cheatgrass is present on the site, but continues to remain at relatively low values. Alfalfa (major perennial forb) decreased significantly in nested frequency. Annual forbs increased (bur buttercup) in percent cover and frequency. The Desirable Components Index rated this site as fair with a score of 31 due to very low shrub cover, excellent perennial grass cover, and no young shrubs.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3), preferred browse still only provides less than 0.2% cover

herbaceous understory - slightly down (2)

winter range condition (DC Index) - 31 (fair) Black sagebrush type

HERBACEOUS TRENDS --

Management unit 25A, Study no: 1

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'99	'04	'99	'04
G	Agropyron cristatum	b267	b293	b242	a208	7.19	13.39
G	Agropyron intermedium	a109	a158	b180	b163	2.45	4.88
G	Agropyron smithii	a1	b18	a-	a-	-	-
G	Agropyron spicatum	7	7	2	-	.00	-
G	Bromus tectorum (a)	-	-	a6	b19	.02	.11
G	Elymus junceus	b79	b99	b95	a24	1.76	.59
G	Elymus salina	a-	a-	a-	b18	-	.99
G	Festuca ovina	b9	c25	a-	a-	-	-
G	Oryzopsis hymenoides	-	-	1	2	.00	.06
G	Poa secunda	a-	a-	c29	b19	.20	.13
G	Sitanion hystrix	3	-	-	-	-	-
Total for Annual Grasses		0	0	6	19	0.01	0.10
Total for Perennial Grasses		475	600	549	434	11.62	20.05
Total for Grasses		475	600	555	453	11.64	20.16
F	Alyssum alyssoides (a)	-	-	b260	a205	1.41	1.14
F	Antennaria rosea	b18	a-	ab7	a2	.04	.01
F	Aster spp.	5	-	1	-	.00	-
F	Astragalus spp.	1	11	6	2	.21	.00
F	Chaenactis douglasii	-	2	-	-	-	-
F	Cryptantha spp.	a-	b19	c52	ab1	.92	.00
F	Descurainia pinnata (a)	-	-	-	4	-	.02
F	Gilia spp. (a)	-	-	-	-	-	.00
F	Hymenoxys acaulis	-	8	-	-	-	-
F	Lithospermum ruderales	1	1	3	-	.03	-
F	Medicago sativa	b74	b110	b99	a24	2.43	.47
F	Phlox austromontana	ab4	b13	a1	ab2	.00	.01
F	Ranunculus testiculatus (a)	-	-	a3	b192	.00	2.35
F	Streptanthus cordatus	-	-	-	3	-	.03
F	Townsendia spp.	-	6	-	-	-	-
Total for Annual Forbs		0	0	263	401	1.41	3.53

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'99	'04	'99	'04
	Total for Perennial Forbs	103	170	169	34	3.65	0.53
	Total for Forbs	103	170	432	435	5.07	4.06

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

BROWSE TRENDS --

Management unit 25A, Study no: 1

Type	Species	Strip Frequency		Average Cover %	
		'99	'04	'99	'04
B	Artemisia nova	15	14	.01	.18
B	Chrysothamnus nauseosus	2	0	-	-
B	Chrysothamnus viscidiflorus	2	2	-	.15
B	Gutierrezia sarothrae	1	4	-	-
B	Juniperus osteosperma	0	1	-	1.18
B	Leptodactylon pungens	2	2	-	-
B	Pinus edulis	3	0	.48	-
	Total for Browse	25	23	0.49	1.51

CANOPY COVER, LINE INTERCEPT --

Management unit 25A, Study no: 1

Species	Percent Cover	
	'99	'04
Artemisia nova	-	.88
Chrysothamnus viscidiflorus	-	.03
Gutierrezia sarothrae	-	.48
Juniperus osteosperma	-	1.39
Pinus edulis	3.00	-

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 25A, Study no: 1

Species	Average leader growth (in)
	'04
Artemisia nova	2.0

POINT-QUARTER TREE DATA --
 Management unit 25A, Study no: 1

Species	Trees per Acre	
	'99	'04
Juniperus osteosperma	35	34
Pinus edulis	43	33

Average diameter (in)	
'99	'04
5.3	4.8
4.0	5.6

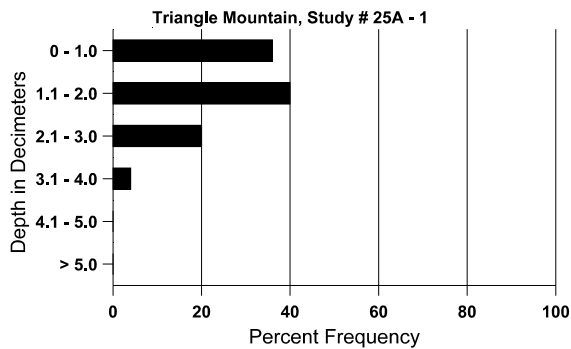
BASIC COVER --
 Management unit 25A, Study no: 1

Cover Type	Average Cover %			
	'85	'91	'99	'04
Vegetation	10.50	12.50	19.34	26.27
Rock	4.50	4.75	4.50	6.74
Pavement	19.50	13.50	10.88	23.19
Litter	30.75	48.00	26.33	31.02
Cryptogams	0	.50	1.20	2.27
Bare Ground	34.75	20.75	18.20	18.53

SOIL ANALYSIS DATA --
 Management unit 25A, Study no: 1, Study Name: Triangle Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
11.7	53.0 (9.6)	7.6	40.0	34.7	25.3	5.8	6.5	243.2	0.7

Stoniness Index



PELLET GROUP DATA --

Management unit 25A, Study no: 1

Type	Quadrat Frequency		Days use per acre (ha)	
	'99	'04	'99	'04
Rabbit	27	44	-	-
Elk	18	12	66 (162)	12 (30)
Deer	18	16	21 (53)	10 (25)
Cattle	10	12	49 (120)	5 (13)

BROWSE CHARACTERISTICS --

Management unit 25A, Study no: 1

		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 nova</i>												
85	66	-	-	66	-	-	0	0	0	-	0	12/20
91	199	-	133	66	-	-	33	0	0	-	0	19/36
99	480	40	180	300	-	60	29	0	0	-	0	15/23
04	420	-	-	340	80	-	19	0	19	5	5	11/18
<i>Chrysothamnus nauseosus</i>												
85	66	-	-	66	-	-	0	0	0	-	0	14/9
91	399	-	333	-	66	-	17	0	17	-	17	-/-
99	40	-	20	20	-	-	0	0	0	-	0	18/16
04	0	-	-	-	-	-	0	0	0	-	0	17/19
<i>Chrysothamnus nauseosus hololeucus</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	0	-	-	-	-	-	0	0	-	-	0	26/40
<i>Chrysothamnus viscidiflorus</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
99	40	-	-	40	-	-	0	0	-	-	0	8/8
04	60	-	-	60	-	-	0	0	-	-	0	6/7
<i>Gutierrezia sarothrae</i>												
85	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
99	20	-	-	20	-	-	0	0	-	-	0	9/7
04	120	-	-	120	-	-	0	0	-	-	0	10/14

		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)	
Juniperus osteosperma													
85	0	-	-	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
99	0	-	-	-	-	-	0	0	-	-	0	-/-	
04	20	-	-	20	-	-	0	0	-	-	0	-/-	
Leptodactylon pungens													
85	0	-	-	-	-	-	0	0	-	-	0	-/-	
91	0	-	-	-	-	-	0	0	-	-	0	-/-	
99	60	-	-	60	-	-	0	0	-	-	0	4/13	
04	40	-	-	40	-	-	0	0	-	-	0	5/10	
Pinus edulis													
85	66	-	-	66	-	-	0	0	-	-	0	51/31	
91	66	-	-	66	-	-	0	0	-	-	0	72/75	
99	60	-	-	60	-	20	0	0	-	-	0	-/-	
04	0	-	-	-	-	-	0	0	-	-	0	-/-	