

Trend Study 13A-1-04

Study site name: Two Mile Chaining.

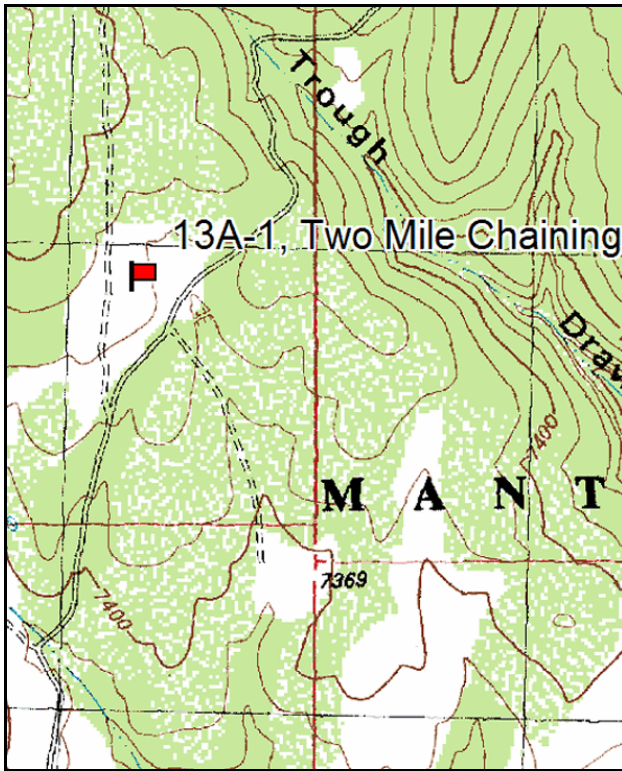
Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 165 degrees magnetic.

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

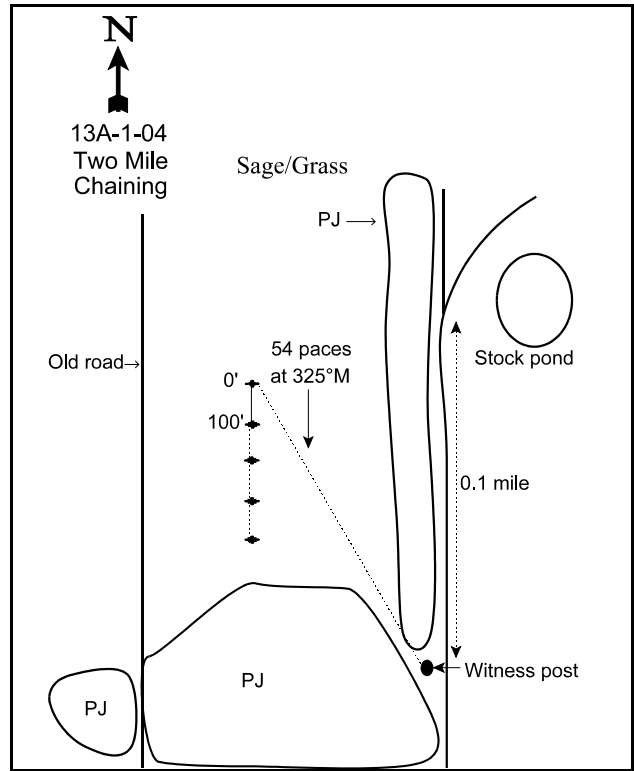
LOCATION DESCRIPTION

Travel east on SR 46 through the town of LaSal to mile marker 16. Continue 0.1 miles, then turn left off the highway. Proceed 1.2 miles to a fork. Turn right and proceed toward Buckeye Reservoir for 0.8 miles to another fork. Stay left and continue 2.95 miles to a witness post (fencepost) on the left side of the road. The transect is located in the chaining opposite a fork further up the road and can be reached from the witness post by walking 54 paces northwest (325°M). The 0-foot baseline stake is a 1-foot tall fencepost, tagged #7813.



Map Name: Ray Mesa

Township 28S, Range 25E, Section 13



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4247896 N, 665141 E

DISCUSSION

Two Mile Chaining - Trend Study No.13A -1

This study is located in the Two Mile Chaining on the south end of the LaSal Mountains. Nine hundred acres were chained and seeded in 1978. This Forest Service chaining is thought to be important as spring/fall transition big game range and is becoming increasingly important as elk winter range. Pellet group data from 1999 estimated 32 deer (79 ddu/ha) and 70 elk days use/acre (173 edu/ha). During 2004 surveys, deer and elk pellet groups were almost half they were in 1999. Pellet group data from 2004 estimated 16 deer, 27 elk, and 4 cow days use/acre (40 ddu/ha, 68 edu/ha, and 11 cdu/ha). This site is located on the South Paradox allotment which receives summer/fall cattle use. A fire on Ray Mesa burned about 300 yards from the edge of this site in 2003.

The study site is characterized by long, gently sloping foothills (4-6%), generally with a southeast aspect and an elevation of 7,500 feet. The soil is a loam with a slightly acidic pH (6.5) and an effective rooting depth of 11 inches. Phosphorus could be a limiting factor on this site with only 8ppm. Values below 10 ppm may limit normal plant growth and development. Organic matter appears to be well below average (2%). The sites in this herd unit average 3.5% organic matter. The erosion condition class determined soil movement as slight in 2004, but there is a fair amount of bare soil exposed.

Mountain big sagebrush is the dominant browse species on the site. Density was estimated at 3,199 plants/acre in 1987, 4,800 in 1994, then has continually decreased to 4,080 in 1999 and 3,800 in 2004. It made up 60% of the total browse cover in 1994, 39% in 1999 and 32% in 2004. The sagebrush population is composed mainly of moderately hedged mature plants that generally have good vigor. The proportion of the plants that are moderately hedged has increased from 13% in 1994, 41% in 1999, to 33% in 2004. The proportion of seedlings in the population was quite high in 1994 at 20%, down to 9% in 1999, but no seedlings were found in 2004. The proportion of decadent plants in the population rose from 13% in 1987 to 42% in 1994. However, it decreased to 24% in 1999 and has remained at 22% in 2004. Low rabbitbrush is twice as abundant as the sagebrush, but only contributed 13% of the total browse cover in 1994, 21% in 1999, and 15% in 2004.

Density of Utah serviceberry was 480 plants/acre in 1994, 440 in 1999, and slightly decreased to 400 in 2004. Percent cover has increased from 2.3% in 1994, 3.7% in 1999, to 6.5% in 2004. Utilization has increased from moderate to heavy use in previous years to heavy use in 2004, although annual leader growth average 4.6 inches. Scattered oak clumps are vigorous and show light to moderate hedging. Pinyon pine continues to creep back onto this site. In 2004, density was estimated at 175 trees/acre with average diameter of 2.8 inches.

Herbaceous species diversity is relatively high and plants are vigorous. Seeded grasses are well established and productive. Overall, crested wheatgrass was the most abundant seeded species, making up 21% of the grass cover in 1994, 18% in 1999, and has increased to 42% in 2004. Being more drought tolerant than the other species, this would be expected. Intermediate wheatgrass and smooth brome have decreased substantially in providing consistent cover with the drought. Bulbous bluegrass decreased significantly, which can dominate a site like cheatgrass. Silvery lupine was the dominant forb in 1994 but was not found on the site in 2004. Some individual plants show damage by insects. The number of forb species have fluctuated over the years from 16 in 1987, 12 in 1994, 16 in 1999, and to 13 in 2004.

1994 TREND ASSESSMENT

The trend for soils would be slightly down because of the increase in the amount of bare soil (now 32%) and the decrease in percent litter cover (from 61% to 46%). However, there does not appear to be a problem with soil erosion because of the high amounts of grass cover and fairly level terrain. Trend for the key browse

species is stable to slightly down. Mountain big sagebrush makes up 61% of the browse cover with a population of 4,800 plants/acre, but the trend for percent decadency should be watched closely to see if this trend continues because there is a ratio of 1:40 (one dead plant to every 40 live plants). As the rate of percent decadency increases, there are going to be more dead plants in the population. With the low percentage of plants that are being heavily browsed (only 1%), this increased decadency has most likely been caused by the extended drought and associated winter injury. The trend for the herbaceous understory is easier to interpret as the nested frequency values for both the grasses and forbs have significantly decreased since 1987. Again, this has basically been caused by the prolonged drought. The Desirable Components Index rated this site as good with a score of 69 due to high decadency and few young shrubs.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - down (1)

winter range condition (DC Index) - 69 (good) Mountain big sagebrush type

1999 TREND ASSESSMENT

The trend for soils is considered stable at this time even with the slight decreases in percent bare soil and the slight improvement in the ratio of protective cover vs bare soil (2.8 to 3.3). Soil erosion still does not appear to be a problem because of the relatively large amounts of protective cover and gentle terrain. Trend for the key browse species is slightly down even with the improvement in percent decadence from 42% to 24%. Mountain big sagebrush made up 61% of the browse cover in 1994, now it only makes up 39% of the cover. It has also experienced a loss in numbers since 1994 (4,800 plants/acre), currently down to 4,080 plants/acre. The ratio of dead to live plants has also increased from 1:40 (2%) to now where it is 1:15 (6%). All this has taken place with only light to moderate use. The many years of drought have had a profound effect on sagebrush populations, along with competition with winter annuals. On this site, bulbous bluegrass now makes up 50% of the total herbaceous cover. The trend for the herbaceous understory is considered stable even with some slight increases in sum of nested frequency for the grasses which make up almost 90% of the herbaceous cover. The Desirable Components Index rated this site as good with a score of 69 with an increase in perennial grass cover, but preferred browse cover and perennial forbs both decreased.

TREND ASSESSMENT

soil - up slightly (4)

browse - slightly down (2)

herbaceous understory - stable (3)

winter range condition (DC Index) - 69 (good) Mountain big sagebrush type

2004 TREND ASSESSMENT

The trend for soils is stable. Overall, protective ground cover is good, although patches of bare soil account for 30% of the soil surface. Rock and pavement does not contribute very much to the ground cover on this site (<0.1%). Percent litter cover has decreased steadily since 1987, although it has slightly increased this year. Trend for key browse, mountain big sagebrush and serviceberry, is slightly down. Densities of both species have slightly decreased, but mature mountain big sagebrush have increased from previous estimates. Utilization is moderate on sagebrush, but increased to heavy on serviceberry, although it appears to be doing well. The ratio of dead to live plants continues to increase from 1:40 in 1994, 1:15 in 1999, to 1:6 in 2004. The trend for the herbaceous understory is stable. There was a drop in perennial grass sum of nested frequency, but was due to a decrease in bulbous bluegrass, which is a short lived perennial with low forage value. Crested wheatgrass, mutton bluegrass, and needle-and-thread grass all increased slightly in nested frequency and cover. Forbs contribute little to percent cover, most are low growing, although they are diverse

in the number of species. The Desirable Components Index rated this site as good with a score of 75 due to increase in preferred browse cover, decrease in shrub decadence, and a relatively stable amount of perennial grass cover.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - stable (3)

winter range condition (DC Index) - 75 (good) Mountain big sagebrush type

HERBACEOUS TRENDS --

Management unit 13A, Study no: 1

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
G	Agropyron cristatum	135	106	100	112	2.46	2.50	4.81
G	Agropyron intermedium	-	-	3	2	-	.03	.00
G	Bouteloua gracilis	15	19	17	13	1.07	.14	.53
G	Bromus inermis	75	67	63	68	.63	2.40	1.00
G	Bromus tectorum (a)	-	-	3	-	-	.00	-
G	Carex spp.	-	-	-	-	.00	-	-
G	Hilaria jamesii	-	-	-	2	-	-	.03
G	Koeleria cristata	_b 61	_a 3	_a 19	_a 3	.03	.18	.01
G	Oryzopsis hymenoides	-	3	3	3	.00	.00	.03
G	Poa bulbosa	_b 220	_c 256	_c 250	_a 129	7.14	8.01	2.43
G	Poa fendleriana	_a -	_b 16	_c 53	_c 55	.06	.38	1.24
G	Sitanion hystrix	6	1	-	-	.00	-	-
G	Stipa comata	_b 48	_a 14	_{ab} 24	_{ab} 30	.11	.23	1.24
Total for Annual Grasses		0	0	3	0	0	0.00	0
Total for Perennial Grasses		560	485	532	417	11.52	13.89	11.35
Total for Grasses		560	485	535	417	11.52	13.90	11.35
F	Agoseris glauca	-	-	-	-	-	-	.00
F	Astragalus convallarius	40	17	25	37	.10	.42	.99
F	Castilleja chromosa	_b 38	_a 4	_a -	_a -	.01	-	-
F	Castilleja linariaefolia	-	2	1	-	.01	.03	-
F	Calochortus nuttallii	8	-	-	1	-	-	.00
F	Comandra pallida	-	-	-	3	-	-	.01
F	Cordylanthus spp. (a)	-	-	-	5	-	-	.16
F	Crepis acuminata	_b 14	_a 6	_a -	_a -	.03	-	-
F	Erigeron flagellaris	-	-	3	-	-	.15	-
F	Erigeron pumilus	_b 111	_a 21	_a 43	_a 20	.07	.51	.53
F	Eriogonum racemosum	_b 63	_a 30	_a 34	_a 25	.14	.30	.35

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
F	Hymenoxys acaulis	3	-	3	1	-	.00	.03
F	Lomatium triternatum	_b 31	_a -	_a -	_a -	-	-	-
F	Lupinus argenteus	_c 162	_a 57	_b 20	_a -	3.64	.14	-
F	Machaeranthera canescens	1	-	2	-	-	.01	-
F	Penstemon caespitosus	_b 85	_a 2	_a 6	_a 6	.01	.03	.07
F	Petradoria pumila	-	-	5	-	-	.06	-
F	Phlox longifolia	_c 67	_{bc} 53	_{ab} 31	_a 7	.14	.06	.05
F	Senecio multilobatus	-	1	1	-	.00	.00	-
F	Sphaeralcea coccinea	58	55	52	49	1.24	.38	.60
F	Tragopogon dubius	6	-	-	-	-	-	-
F	Trifolium gymnocarpon	-	3	3	2	.00	.00	.00
F	Unknown forb-perennial	6	-	-	-	-	-	-
F	Zigadenus paniculatus	-	-	3	-	-	.00	.00
Total for Annual Forbs		0	0	0	5	0	0	0.15
Total for Perennial Forbs		693	251	232	151	5.43	2.15	2.66
Total for Forbs		693	251	232	156	5.43	2.15	2.82

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

BROWSE TRENDS --

Management unit 13A, Study no: 1

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	18	18	16	2.25	3.74	6.50
B	Artemisia tridentata vaseyana	86	82	85	16.28	9.40	10.65
B	Chrysothamnus depressus	12	26	23	.66	.72	1.46
B	Chrysothamnus viscidiflorus viscidiflorus	86	81	72	3.62	4.96	5.00
B	Coryphantha vivipara arizonica	0	2	5	-	-	.00
B	Eriogonum microthecum	10	16	10	.01	.53	.12
B	Gutierrezia sarothrae	0	4	8	.01	.04	.15
B	Opuntia spp.	36	35	41	.32	.56	1.12
B	Pinus edulis	0	16	14	2.92	3.53	7.21
B	Purshia tridentata	0	1	1	-	-	-
B	Quercus gambelii	0	3	3	.76	.63	1.48
B	Symphoricarpos oreophilus	3	2	4	-	-	-
Total for Browse		251	286	282	26.86	24.13	33.72

CANOPY COVER, LINE INTERCEPT --

Management unit 13A, Study no: 1

Species	Percent Cover	
	'99	'04
Amelanchier utahensis	.80	7.25
Artemisia tridentata vaseyana	-	13.21
Chrysothamnus depressus	-	1.04
Chrysothamnus viscidiflorus viscidiflorus	-	4.73
Eriogonum microthecum	-	.11
Opuntia spp.	-	.65
Pinus edulis	3.59	11.86
Quercus gambelii	-	1.23

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 13A, Study no: 1

Species	Average leader growth (in)
	'04
Amelanchier utahensis	1.8
Artemisia tridentata vaseyana	1.3

POINT-QUARTER TREE DATA --
Management unit 13A, Study no: 1

Species	Trees per Acre		Average diameter (in)	
	'99	'04	'99	'04
Pinus edulis	201	175	2.1	2.8

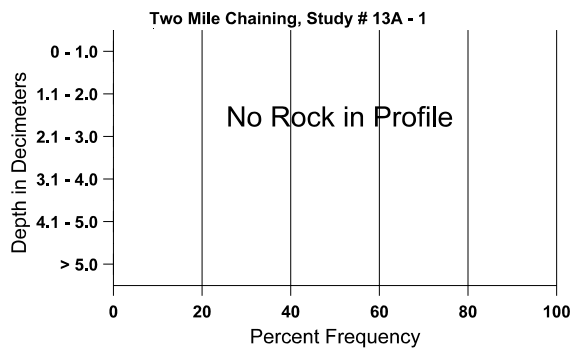
BASIC COVER --
Management unit 13A, Study no: 1

Cover Type	Average Cover %			
	'87	'94	'99	'04
Vegetation	15.25	33.38	39.61	42.08
Rock	0	.02	.00	.00
Pavement	0	.03	.04	.05
Litter	61.00	46.05	40.37	45.25
Cryptogams	3.50	1.50	8.07	2.74
Bare Ground	20.25	32.20	29.56	34.09

SOIL ANALYSIS DATA --
Management unit 13A, Study no: 1, Study Name: Two Mile Chaining

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
11.0	62.0 (16.3)	6.5	48.2	30.6	21.3	2.0	8.0	105.6	0.4

Stoniness Index



PELLET GROUP DATA --

Management unit 13A, Study no: 1

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	44	6	6
Elk	28	26	11
Deer	14	28	15
Cattle	-	2	-

Days use per acre (ha)	
'99	'04
-	-
70 (173)	27 (68)
32 (79)	16 (40)
6 (14)	4 (11)

BROWSE CHARACTERISTICS --

Management unit 13A, 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)
Amelanchier utahensis												
87	66	66	66	-	-	-	0	0	0	-	0	-/-
94	480	-	180	280	20	-	21	4	4	-	0	41/42
99	440	60	100	300	40	20	36	32	9	9	9	51/53
04	400	60	120	260	20	-	5	70	5	-	0	42/46
Artemisia tridentata vaseyana												
87	3199	-	266	2533	400	-	42	8	13	-	2	13/17
94	4800	940	200	2580	2020	120	13	2	42	5	10	18/32
99	4080	360	540	2580	960	280	41	3	24	2	3	21/31
04	3800	-	200	2760	840	660	33	10	22	8	9	15/24
Cercocarpus montanus												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	0	-	-	-	-	-	0	0	-	-	0	101/113
Chrysothamnus depressus												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
94	560	80	-	560	-	-	0	0	0	-	0	16/22
99	1580	40	100	1480	-	20	33	0	0	-	0	4/9
04	1180	20	20	1140	20	-	22	36	2	2	2	5/9
Chrysothamnus viscidiflorus viscidiflorus												
87	6199	66	1533	4666	-	-	14	1	0	-	1	5/8
94	7300	2500	240	7040	20	20	0	0	0	-	1	9/20
99	8500	-	480	7940	80	-	2	0	1	.23	.23	5/10
04	5080	20	100	4860	120	40	5	0	2	1	1	6/11

		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)
<i>Coleogyne ramosissima</i>												
87	66	-	-	66	-	-	0	0	-	-	0	11/4
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	0	-	-	-	-	-	0	0	-	-	0	-/-
04	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Coryphantha vivipara arizonica</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	60	-	-	60	-	-	0	0	-	-	0	3/5
04	100	-	20	80	-	-	0	0	-	-	0	2/4
<i>Eriogonum microthecum</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
94	280	20	-	280	-	-	0	0	-	-	0	8/8
99	400	20	20	380	-	-	15	0	-	-	0	5/7
04	340	-	-	340	-	-	6	0	-	-	0	7/7
<i>Gutierrezia sarothrae</i>												
87	66	-	-	66	-	-	0	0	-	-	0	8/6
94	0	-	-	-	-	-	0	0	-	-	0	7/9
99	160	-	20	140	-	-	0	0	-	-	0	11/8
04	180	-	-	180	-	-	0	0	-	-	0	8/10
<i>Opuntia spp.</i>												
87	200	-	-	200	-	-	0	0	0	-	67	3/6
94	1480	40	240	1020	220	20	3	0	15	-	7	2/7
99	1320	20	400	860	60	-	0	0	5	-	0	3/9
04	1800	40	20	1620	160	-	0	0	9	7	9	4/8
<i>Pinus edulis</i>												
87	133	-	133	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
99	340	80	180	160	-	-	0	0	-	-	0	-/-
04	380	40	120	260	-	-	0	0	-	-	0	-/-
<i>Purshia tridentata</i>												
87	0	66	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	12/28
99	20	-	-	20	-	-	0	0	-	-	0	12/40
04	20	-	-	20	-	-	100	0	-	-	0	10/23

		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)
Quercus gambelii												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
94	0	-	-	-	-	-	0	0	0	-	0	-/-
99	220	20	40	180	-	-	0	0	0	-	0	43/18
04	140	-	20	20	100	-	0	0	71	-	0	43/19
Symphoricarpos oreophilus												
87	0	66	-	-	-	-	0	0	-	-	0	-/-
94	80	-	-	80	-	-	25	0	-	-	0	8/19
99	40	-	20	20	-	-	0	0	-	-	0	22/36
04	80	-	-	80	-	-	0	0	-	-	0	10/12