Trend Study 14-27-04

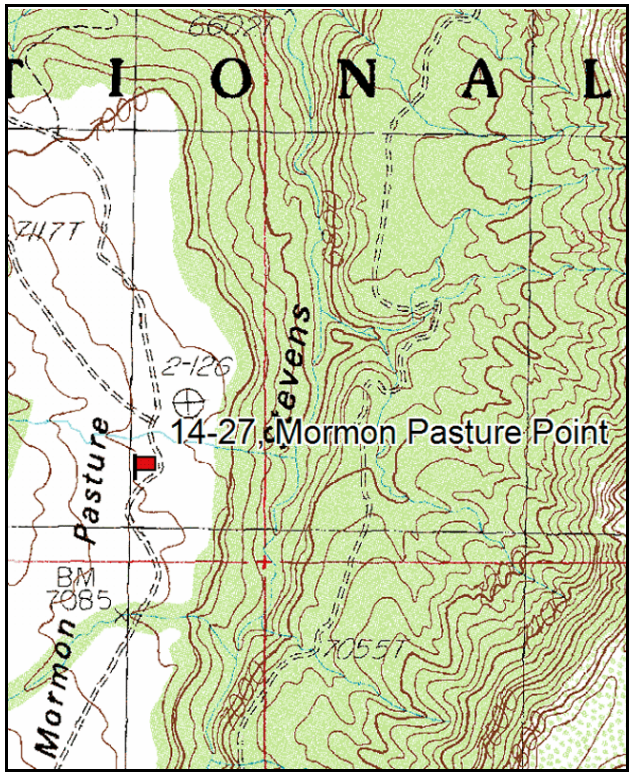
Study site name: Mormon Pasture Point . Vegetation type: Chained, Seeded P-J .

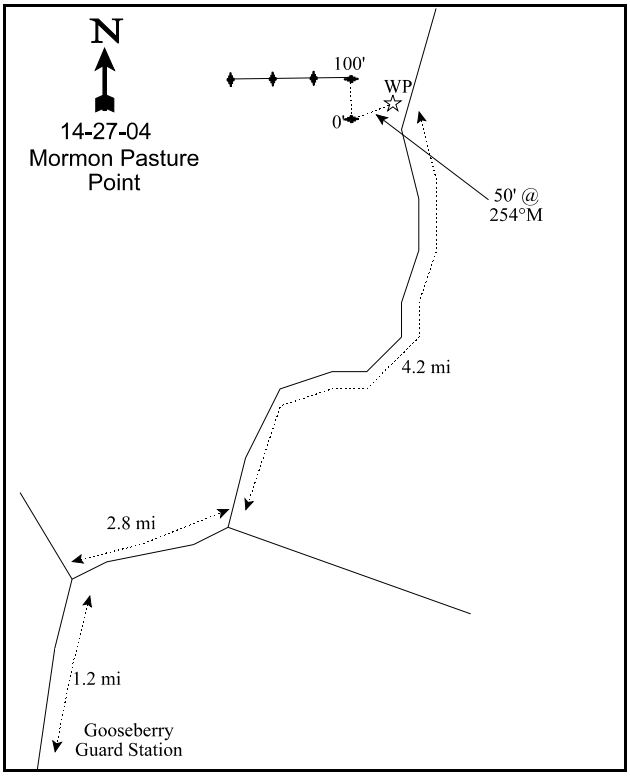
Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

From the Gooseberry Guard Station, go 1.2 miles to the Causeway to a fork. Turn right and go 2.8 miles to a fork. Turn left towards Mormon Pasture and drive 1.2 miles to two mining cabins. Stay right, pass the uranium quarry, and go 0.9 miles to a fork. Stay left for 2.1 miles to the transect. There is a witness post (3 foot tall green fence post) on the left side of the road. The 0-foot end of the baseline is 50 feet west of the witness post (@ 254°M) and is marked with browse tag #7883.





Map Name: Cathedral Butte Diagrammatic Sketch

Township 33S , Range 20E , Section 22 GPS: NAD 27, UTM 12S 4194117 N, 614015 E

DISCUSSION

Mormon Pasture Point - Trend Study No. 14-27

The Mormon Pasture Point trend study is located in an open rolling valley between high red cliffs and the head of a deep canyon. The area drains to the north into Steven's Canyon. The aspect is east on a 10% slope at an elevation of 7,100 feet. The site once supported a pinyon-juniper woodland, but approximately 900 acres were chained and seeded in the early 1970's. A follow-up treatment of Tordon was done in 1985 on 200 acres at the north end of the chaining. Prescribed burning is a possible future treatment. The Forest Service is managing the area for cattle grazing. As part of the Cottonwood allotment, it is grazed by 676 cattle (3,718 AUMs) on a three unit rest-rotation system. In 1986, this unit was grazed during the first half of the season. Utilization of grasses was light to moderate. In 1992, cattle use was moderate for grasses. The area also receives spring and fall deer and elk use, with some summer use. Pellet group data from 1999 estimated 5 deer days use/acre (12 ddu/ha), 21 elk days use/acre (52 edu/ha), and 36 cow days use/acre (89 cdu/ha). Most of the cow pats appeared to be from the previous season, however there were some cows a few hundred yards south of the study site in 1999. In 2004, use was lower for each species with an estimated 4 deer days use/acre (10 ddu/ha), 6 elk days use/acre (15 edu/ha), and 14 cow days use/acre (34 cdu/ha).

The light tan soil is moderately deep with a layer of loose duff on the surface. Effective rooting depth varied from about 8 inches to 21 inches and averaged almost 16 inches. A calcium carbonate hard pan was encountered in some areas of the study, overall there is little rock in the profile. Soil texture is a sandy clay loam with a slightly alkaline pH (7.5). Phosphorus is limited at just 3.8 ppm. Amounts less than 10 ppm may inhibit normal plant growth and development. There are some gullies on the site, although they appear to be healing. Protective ground cover is moderately high leaving only isolated areas of exposed bare ground.

Point quarter data from 1999 estimated 52 juniper and 41 pinyon trees/acre. Juniper average diameter was 3.5 inches and pinyon was 3.1 inches. Twenty-one percent of the juniper sampled were knocked down (tipped over) chained trees that are still living. In 2004, density remained stable. Juniper density was estimated at 54 trees/acre with an average diameter of 6.7 inches. Thirty eight percent of the junipers were trees that survived the chaining. Pinyon density was 43 trees/acre with an average diameter of 3.2 inches. Cover increased slightly for each species between 1999 and 2004. Combined cover was approaching 5% in 2004. Some kind of followup treatment should be utilized in the near future and not allow the increasing tree cover to effect the production of the herbaceous understory.

The chained site is dominated by mixed browse in association with a dense perennial grass understory. The browse component is mainly clumps of Gambel oak, with scattered serviceberry, true mountain mahogany, bitterbrush, snowberry, and young pinyon and juniper. There is also some mountain big sagebrush that was not encountered in the 1986 or 1992 samples, but was picked up in 1999. The low-growing bitterbrush, a preferred browse forage, is heavily utilized giving plants a clubbed growth form. The oak and serviceberry are the largest plants, averaging 5 to 7 feet in height. The oak, serviceberry, and bitterbrush were healthy and had slightly higher densities in 2004. Each species, including sagebrush, had good leader growth in 2004.

Perennial grasses are abundant and provide valuable forage. Intermediate wheatgrass is the most abundant species, nested frequency and cover have slowly declined since 1992. Intermediate wheatgrass made up 67% of the total grass cover in 2004 with 11% cover. Crested wheatgrass was the other dominant species. In 2004, nested frequency had declined significantly since 1992, but cover was just as high as it was in 1992. In 2004, these two seeded grasses accounted for 95% of the grass cover. There were a few native perennial grasses present, but they only occur in small numbers. At least 12 species of forbs occur on the site, with none especially abundant, nor do they provide much forage. Looseflower milkvetch, bladderpod, and scarlet globemallow are the most abundant forbs.

1986 APPARENT TREND ASSESSMENT

It appears that the woody plants, especially oak and possibly pinyon-juniper are on the increase. However, the grasses are also vigorous. Without heavy grazing pressure, they should be able to maintain a stable population. Currently the area provides a variety of browse and herbaceous forage. Considering the variety of uses it receives, it appears at the ideal successional point at which to maintain the composition. The woody species will continue to increase, as demonstrated by nearby areas with a thick browse cover. Future treatments may be warranted on small tracts of woody species. The soil is easily erodible and disturbance could cause serious soil loss. Current trend is probably improving because of the increasing vegetation and litter cover.

1992 TREND ASSESSMENT

Trend for soil appears to be improving. Percent cover for bare ground has declined from 27% to 19%. Litter cover has also declined slightly, but not enough to warrant a declining trend. Because of the expanded sampling size more shrub species have been picked up. This gives a much better estimate of some species, especially oak. By inspecting the data, one can see that with only one exception (bitterbrush), the shrubs all show signs of expanding populations with outstanding biotic potentials (proportion of seedlings to the population) with a high percentage of young plants. Trend for browse is up. Trend for herbaceous understory is down slightly with nested frequency values for grasses and forbs both showing significant declines since 1986. The Desirable Components Index (see methods) rating is fair to good with 63 points. The herbaceous understory is good and the proportion of young browse is excellent. Preferred browse cover is lower than would be desired for a higher rating.

TREND ASSESSMENT
soil - slightly up (4)
browse - up (5)
herbaceous understory - slightly down (2)
winter range condition (DC Index) - 63 (fair to good) Mountain big sagebrush/chaining type

1999 TREND ASSESSMENT

Trend for soil is slightly down since 1992 due to a small decline in litter cover combined with a dramatic increase in relative percent cover of bare ground from 17% to 28%. Relative percent cover of vegetation also fell from 36% to 26%. Trend for browse is up slightly. Density of bitterbrush and Gambel oak have increased and Mountain big sagebrush has finally become abundant enough to be picked up in the sample. Utilization of bitterbrush is more moderate this year, but vigor is poor on 38% of the plants sampled and percent decadence has increased to 38%. Oak is more heavily browsed, although vigor is good and percent decadence has declined from 16% to only 1%. Trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses has declined slightly, while frequency of forbs increased slightly. However, perennial forbs only contribute to only 10% of the herbaceous cover. Nested frequency of the dominant grass, intermediate wheatgrass declined, but not significantly. The DCI score is fair at 60. Preferred browse cover is not as high as desired, but the herbaceous understory is very good.

TREND ASSESSMENT
soil - down (1)
browse - up slightly (4)
herbaceous understory - slightly down (2)
winter range condition (DC Index) - 60 (fair) Mountain big sagebrush/chaining type

2004 TREND ASSESSMENT

Trend for soil is stable. Bare ground increased slightly, but the ratio of bare soil to protective ground cover (vegetation, litter, and cryptogams) has actually improved slightly from 1:2.5 to 1:2.7. Grasses and litter are abundant to prevent erosion. The browse trend is slightly up. Serviceberry density and cover increased, while use was lower. Bitterbrush density also increased slightly and continues to receive heavy use, yet percent decadence went down. Oak density and cover also increased. Pinyon and juniper density has remained stable, but cover has increased as the trees continue to mature. The herbaceous understory trend is slightly down. Sum of nested frequency for perennial grasses declined 18% since 1999, while cover remained about the same at about 17%. Intermediate wheatgrass nested frequency was not significantly lower than it was in 1999, but it was significantly lower than 1992. Nested frequency of perennial forbs was 27% lower than it was in 1999, but they were more robust. Cover of forbs increased from 2% to nearly 4%. The DCI rating has remained at fair with 60 points.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly (4)
herbaceous understory - down slightly (2)
winter range condition (DC Index) - 60 (fair) Mountain big sagebrush/chaining type

HERBACEOUS TRENDS --
Management unit 14 , Study no: 27

Type	Species	Nested Frequency				Average Cover %		
		'86	'92	'99	'04	'92	'99	'04
G	Agropyron cristatum	$_{a}$32	$_{c}$88	$_{bc}$80	$_{ab}$57	4.67	2.90	4.52
G	Agropyron dasystachyum	$_{b}$218	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
G	Agropyron intermedium	$_{a}$157	$_{b}$316	$_{b}$270	$_{b}$227	19.59	13.35	10.83
G	Carex spp.	12	9	14	15	.46	.16	.28
G	Oryzopsis hymenoides	$_{b}$36	$_{a}$16	$_{ab}$19	$_{ab}$15	.28	.26	.16
G	Poa fendleriana	$_{a}$1	$_{b}$25	$_{b}$22	$_{ab}$16	.23	.29	.43
G	Poa pratensis	7	-	-	-	-	-	-
G	Sitanion hystrix	$_{b}$63	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
G	Stipa comata	-	-	3	3	-	.03	.04
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		526	454	408	333	25.26	17.00	16.28
Total for Grasses		526	454	408	333	25.26	17.00	16.28
F	Arabis spp.	-	-	6	-	-	.01	-
F	Astragalus tenellus	$_{b}$68	$_{a}$29	$_{a}$9	$_{a}$12	.85	.49	.98
F	Calochortus nuttallii	3	-	7	-	-	.01	-
F	Cirsium spp.	3	6	5	3	.18	.01	.03
F	Cymopterus spp.	5	-	7	8	-	.04	.02
F	Descurainia pinnata (a)	-	-	1	-	-	.00	-
F	Eriogonum racemosum	2	-	-	3	-	-	.00

Type	Species	Nested Frequency				Average Cover %		
		'86	'92	'99	'04	'92	'99	'04
F	Hedysarum boreale	-	-	-	8	-	-	.63
F	Heterotheca villosa	-	3	-	-	.03	.00	.00
F	Hymenoxys acaulis	$_{b}$22	$_{a}$-	$_{ab}$12	$_{ab}$6	-	.09	.21
F	Ipomopsis aggregata	3	3	-	-	.01	.00	-
F	Lappula occidentalis (a)	-	-	-	8	-	-	.04
F	Lesquerella rectipes	$_{a}$17	$_{b}$42	$_{ab}$30	$_{ab}$25	.28	.16	.11
F	Lomatium spp.	-	-	6	-	-	.02	-
F	Machaeranthera canescens	3	3	1	-	.00	.00	-
F	Pedicularis centranthera	-	-	4	-	-	.00	-
F	Penstemon lentus	$_{b}$26	$_{ab}$20	$_{ab}$18	$_{a}$4	.59	.20	.07
F	Petradoria pumila	3	8	14	18	.66	.66	.90
F	Phlox longifolia	11	11	25	7	.04	.07	.04
F	Polygonum douglasii (a)	-	-	1	-	-	.00	-
F	Senecio multilobatus	2	-	3	4	-	.00	.01
F	Sphaeralcea coccinea	$_{b}$70	$_{ab}$45	$_{ab}$38	$_{a}$38	.76	.35	.72
F	Taraxacum officinale	1	1	-	-	.03	-	-
F	Tragopogon dubius	$_{b}$22	$_{a}$-	$_{a}$-	$_{a}$-	-	-	.00
F	Trifolium spp.	$_{a}$-	$_{ab}$7	$_{b}$12	$_{ab}$7	.04	.07	.02
Total for Annual Forbs		0	0	2	8	0	0.00	0.04
Total for Perennial Forbs		261	178	197	143	3.49	2.23	3.78
Total for Forbs		261	178	199	151	3.49	2.24	3.83

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

BROWSE TRENDS --
Management unit 14 , Study no: 27

Type	Species	Strip Frequency			Average Cover %		
		'92	'99	'04	'92	'99	'04
B	Amelanchier utahensis	5	4	5	1.33	1.97	2.14
B	Artemisia tridentata vaseyana	0	5	4	-	.01	.15
B	Cercocarpus montanus	1	0	0	-	.15	.38
B	Gutierrezia sarothrae	8	1	7	.00	.15	.36
B	Juniperus osteosperma	5	2	1	1.67	1.38	.68
B	Juniperus scopulorum	1	0	0			
B	Opuntia spp.	5	6	6	.04	.03	.18
B	Pinus edulis	0	2	3	3.08	.88	3.07
B	Purshia tridentata	2	7	8	1.00	.93	.33
B	Quercus gambelii	4	13	19	2.00	2.59	4.13
B	Ribes spp.	1	0	0	-	-	-
B	Symphoricarpos oreophilus	1	0	0	-	-	-
Total for Browse		33	40	53	9.17	8.13	11.43

CANOPY COVER, LINE INTERCEPT --
Management unit 14 , Study no: 27

Species	Percent Cover	
	'99	'04
Amelanchier utahensis	.40	6.84
Artemisia tridentata vaseyana	-	.23
Gutierrezia sarothrae	-	.31
Juniperus osteosperma	.80	1.76
Pinus edulis	2.40	3.16
Purshia tridentata	-	.55
Quercus gambelii	4.59	8.88

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 14 , Study no: 27

Species	Average leader growth (in)
	'04
Amelanchier utahensis	1.3
Artemisia tridentata vaseyana	2.2
Cercocarpus montanus	3.9
Purshia tridentata	2.6

POINT-QUARTER TREE DATA --
Management unit 14 , Study no: 27

Species	Trees per Acre	
	'99	'04
Juniperus osteosperma	52	54
Pinus edulis	41	43
Quercus gambelii	31	-

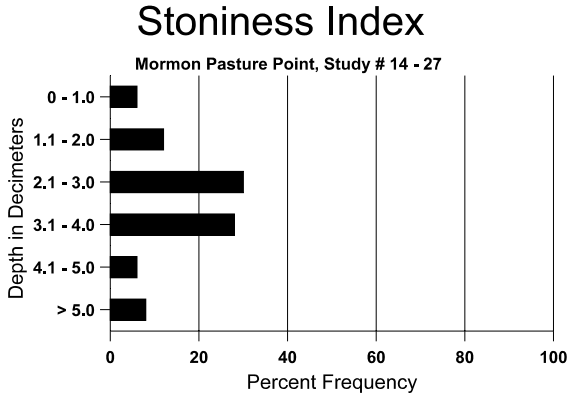
Average diameter (in)	
'99	'04
3.5	6.7
3.1	3.2
1.1	-

BASIC COVER --
Management unit 14 , Study no: 27

Cover Type	Average Cover %			
	'86	'92	'99	'04
Vegetation	2.50	39.79	29.47	30.57
Rock	0	2.72	.47	.54
Pavement	.75	0	1.24	1.02
Litter	69.50	51.04	48.66	45.04
Cryptogams	0	.24	.06	.66
Bare Ground	27.25	18.57	31.65	36.72

SOIL ANALYSIS DATA --
Management unit 14, Study no: 27, Study Name: Mormon Pasture Point

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
15.8	50.7 (12.2)	7.5	53.6	17.8	28.6	1.4	3.9	118.4	0.6



PELLET GROUP DATA --
Management unit 14 , Study no: 27

Type	Quadrat Frequency		
	'92	'99	'04
Rabbit	51	20	19
Elk	8	8	4
Deer	15	1	-
Cattle	7	5	4

Days use per acre (ha)	
'99	'04
-	-
21 (52)	6 (15)
5 (12)	4 (10)
36 (89)	14 (34)

BROWSE CHARACTERISTICS --
Management unit 14 , Study no: 27

		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												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**100**	-	60	40	-	-	60	0	-	-	0	-/-
99	**80**	-	-	80	-	-	25	25	-	-	0	89/90
04	**220**	-	20	200	-	-	9	0	-	-	0	69/70
Artemisia tridentata vaseyana												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**200**	20	80	120	-	-	40	10	-	-	0	16/24
04	**140**	-	20	120	-	-	86	0	-	-	0	25/37
Cercocarpus montanus												
86	**33**	-	-	33	-	-	100	0	-	-	0	55/43
92	**20**	40	-	20	-	-	100	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	44/39
04	**0**	-	-	-	-	-	0	0	-	-	0	64/66
Chrysothamnus nauseosus												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	21/32
04	**0**	-	-	-	-	-	0	0	-	-	0	33/38
Gutierrezia sarothrae												
86	**0**	-	-	-	-	-	0	0	0	-	0	-/-
92	**380**	120	140	240	-	-	0	0	0	-	0	-/-
99	**40**	-	20	20	-	-	0	0	0	-	0	-/-
04	**240**	-	-	200	40	-	0	0	17	-	0	9/10

		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												
86	**33**	-	33	-	-	-	0	0	-	-	0	-/-
92	**100**	-	80	20	-	-	0	0	-	-	0	-/-
99	**40**	-	-	40	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	-/-
Juniperus scopulorum												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**20**	-	-	20	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Opuntia spp.												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**200**	-	120	80	-	-	0	0	-	-	0	-/-
99	**200**	20	120	80	-	-	0	0	-	-	0	4/13
04	**240**	-	20	220	-	40	0	0	-	-	0	8/12
Pinus edulis												
86	**33**	66	33	-	-	-	0	0	-	-	0	-/-
92	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**40**	-	20	20	-	-	0	0	-	-	0	-/-
04	**60**	-	-	60	-	-	0	0	-	-	0	-/-
Purshia tridentata												
86	**100**	-	-	100	-	-	33	67	0	-	0	12/20
92	**80**	-	-	80	-	-	0	100	0	-	0	-/-
99	**160**	-	-	100	60	40	50	50	38	25	38	19/50
04	**200**	-	-	140	60	240	30	70	30	30	30	18/43
Quercus gambelii												
86	**2165**	800	1266	566	333	-	62	3	15	.92	3	63/35
92	**500**	40	340	80	80	-	4	0	16	-	0	-/-
99	**1380**	20	620	740	20	140	0	14	1	-	0	61/40
04	**1460**	-	320	1060	80	80	0	0	5	3	21	46/35
Ribes spp.												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**20**	-	20	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	59/31
04	**0**	-	-	-	-	-	0	0	-	-	0	60/33

		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)
Symphoricarpos oreophilus												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**20**	40	20	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	28/72
04	**0**	-	-	-	-	-	0	0	-	-	0	31/53