Trend Study 14-15-04

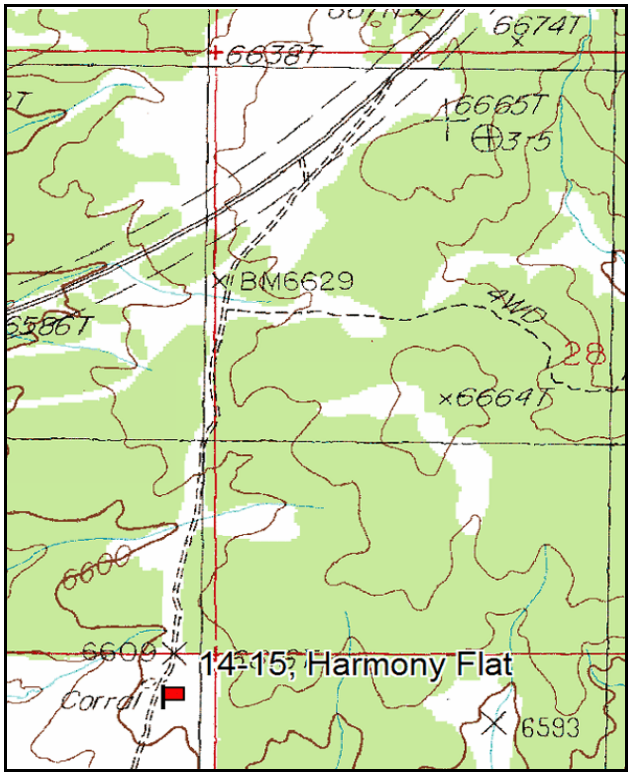
Study site name: Harmony Flat . Vegetation type: Chained, Seeded P-J .

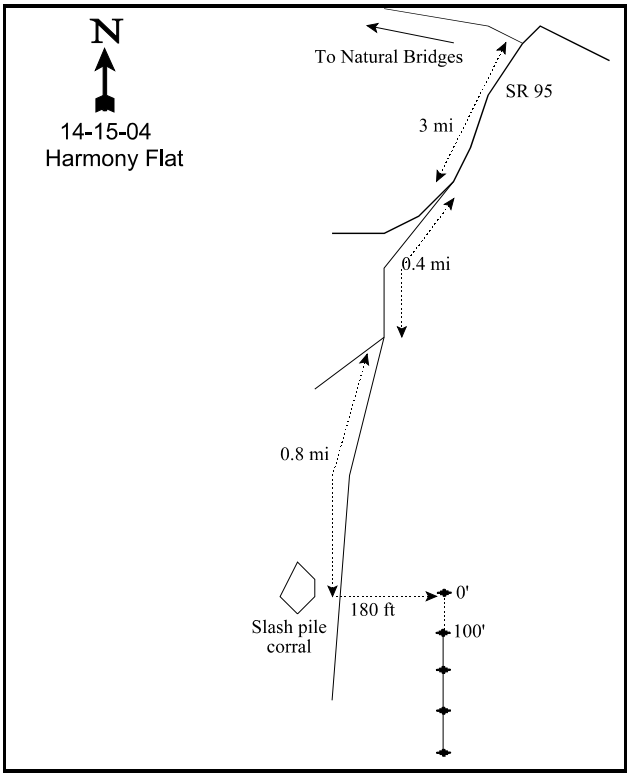
Compass bearing: frequency baseline 165 degrees magnetic.

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

LOCATION DESCRIPTION

From the intersection of SR 95 and the road to Natural Bridges National Monument, go approximately 3 miles southwest on Route 95. At a point 0.4 miles beyond mile marker 89, look for a dirt road going straight off to the left before SR 95 makes a bend to the right. Follow the dirt road (Road #231a) south for 0.2 miles to a gate, staying left and continuing another 0.2 miles to a fork. Stay left and continue 0.8 miles to a corral made out of slash from the chaining. The transect starts on the opposite (left) side of the road. Park by the corral and walk 180 feet east to the starting point of the frequency baseline. The transect stakes are all 3-foot tall green and white fence posts.





Map Name: Kane Gulch

Diagrammatic Sketch

Township 37S , Range 18E , Section 32

GPS: NAD 27, UTM 12S 4154274 N, 592911 E

DISCUSSION

Harmony Flat - Trend Study No. 14-15

Harmony Flat is considered an important wintering area for deer coming off the south end of Elk Ridge and the Abajo Mountains. It is a large flat pinyon-Juniper woodlands intermixed with sagebrush parks. Much of the woodland has been chained. The trend study is set up in the old BLM chaining. The site has an aspect which is generally south with a gentle slope of 2% to 8% and drains south into Grand Gulch. Elevation is 6,600 feet. Crested wheatgrass is the principal forage species for cattle. According to the BLM, past use of the area usually consisted of 600 cattle trailing through every spring from about May 5 to June 5. However, cattle were observed trespassing in the area on July 22 when the transect was being set up in 1986. The Harmony Flat pellet group trend transect measures generally light to moderate deer use with an average of 13 deer days use/acre (32 ddu/ha) since 1975 (Jense et al. 1992; DWR 1998). Pellet group data taken along the study site baseline in 1999 estimated 21 deer days use/acre (52 ddu/ha) and 19 cow days use/acre (47 cdu/ha). In 2004, use was lower with an estimated 15 deer days use/acre (36 ddu/ha) and 16 cow days use/acre (39 cdu/ha).

Soil at the site is a deep sandy clay loam with a slightly alkaline pH (7.4). Effective rooting depth is estimated at nearly 15 inches. The soil is very compact, which makes it difficult to accurately measure effective rooting depth. There is virtually no rock on the surface or within the soil profile. There is a slight hardpan at about 12 inches in depth, although it does not appear to be hard or thick enough to be a consistent root barrier. The soil temperature was relatively high at 72°F in both 1999 and 2004 at an average depth between and 12-15 inches. Soil erosion has been a problem on this site. In 1986, heavy rains for two days previous to data collection caused fresh rill and gully erosion. Sheet erosion has also been evident with pedestalling. The fine, sandy loam bare soil occupied 47% of the ground surface in 1986, and remained at that high level in 1999. It increased to 60% in 2004. The lack of consistent cover, cattle trails, and trampling escalates erosion. Large quantities of litter left from the chaining still provides important soil protection and also protects some grasses from excessive grazing. However, litter cover is slowly declining. It was highest in 1986 with 47% cover and has declined to 30% by 2004.

Young juniper and pinyon continue to occupy the site which was treated more than twenty years ago. Average height was 6-8 feet in 2004, which probably represents mostly the small trees that survived the chaining. Point quarter data from 1999 estimate 91 juniper and 47 pinyon trees/acre. Average diameter of juniper is 2.5 inches while that of pinyon is 3 inches. In 2004, juniper density was lower at 70 trees/acre and diameter increased to 4.3 inches. Pinyon density remained stable at 47 trees/acre with an average diameter of 2.9 inches. Pinyon and juniper cover has increased with each reading since 1992. Pinyon and juniper made up 26% of the total browse cover. Pinyon and juniper density doesn't appear to be increasing, but the population is maturing and becoming larger.

The most abundant browse and also key species for the site is Wyoming big sagebrush. It provided 83% of the browse cover in 1992, 81% in 1999, and 74% in 2004. Sagebrush density was highest in 1986 with 5,198 plants/acre. This remained fairly stable in 1992 at 5,060 plants/acre. Density declined 29% in 1999 to 3,600 plants/acre. In 2004 density was again lower at 3,160 plants/acre. Sagebrush density has declined 39% between 1986 and 2004. Percent decadency was 28% and 30% in 1986 and 1999 respectively, but increased to 72% by 2004. Vigor was good each reading until 2004 when those rated as having poor vigor increased to 54%. Young plants made up a large portion of the population in 1986 (28%) and 1992 (37%). This decreased to 9% in 1999 and to 0% in 2004. Seedlings have not been very abundant except in 2004. Utilization was moderate to heavy from 1992 to 1999, but decreased to mostly light use in 2004.

Crested wheatgrass has been the dominant understory species. Nested frequency was stable from 1986-1999, but declined significantly in 2004. Very few live plants were found in 2004 and those that were alive were

found under sagebrush canopies. Grass cover declined from about 10% to less than 1% by 2004. Heavy utilization was noted in 1986. Utilization was evident in 1999, at a level of 30% to 40% on individual plants. Use was inconsistent however. Forbs are uncommon. Alfalfa has not been sampled since 1986.

1986 APPARENT TREND ASSESSMENT

The reestablishment and/or release of pinyon-Juniper in the treatment area, poor sagebrush vigor, lack of vegetative diversity, and heavy grazing by cattle would indicate a downward vegetative trend. The Wyoming big sagebrush should maintain itself within the stand, but production is low and apparently with low palatability. Steps should be taken to restrict season-long grazing in order to maintain vigor on the crested wheatgrass and allow enough forage for wildlife in early spring. The soil trend is also down due to a lack of ground cover and high erodibility.

1992 TREND ASSESSMENT

Soil trend appears to be stable, but poor condition. The browse trend is stable with only a 3% loss in it's population, a decline in percent decadence from 28% to only 2%, and no plants were classified as having poor vigor. The herbaceous understory is stable. The most dominant species, crested wheatgrass, has remained at a similar nested frequency compared to 1986. There are few if any other perennial grasses on the site worthy of note. In 1986, there was only one forb found (alfalfa), which had been seeded with crested wheatgrass. By 1992, the seeded alfalfa could not be found on site, but there were eight forbs of which the majority was made up by the annual, Wright's birdbeak. The site still lacks diversity because the community is basically composed of only two species, Wyoming big sagebrush and crested wheatgrass. The Desirable Components Index (see methods) rating is excellent at 67 for a Wyoming big sagebrush community. Sagebrush is healthy and the grass understory is abundant.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)
winter range condition (DC Index) - 67 (excelling) Wyoming big sagebrush/chaining type

1999 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1992. Erosion is still a problem however, and there is a considerable unprotected bare soil. Trend for browse is down slightly. Utilization is similar to 1992, but density has declined, more plants are showing poor vigor, recruitment is down, and percent decadence has increased from 2% to 30%. It does not appear that the population will continue to decline in density however. Trend for the herbaceous understory is stable. Nested frequency of the only common herbaceous species, crested wheatgrass, has remained stable since 1992. Sum of nested frequency for perennial forbs has declined slightly, but forbs are so rare that they account for very little cover. The DCI score declined to fair to good (45) due to increased decadence and a lower proportion of young sagebrush plants.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - stable (3)
winter range condition (DC Index) - 49 (good) Wyoming big sagebrush/chaining type

2004 TREND ASSESSMENT

The soil trend is down slightly. Relative bare ground has increased to 54%. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) declined from 1:2.0 to 1:1.6, which is very poor. The browse trend is down. Density has decreased 12% since 1999 and percent decadency has increased to 72%. Thirty-four percent of the population was classified as dying. Poor vigor has also increased to 54%. The trend for the herbaceous understory is down. The herbaceous understory makes up only 13% of the total vegetation cover, which is down from contributing 37% of the total vegetation in 1999. Crested wheatgrass has declined significantly and is in very poor condition. A return to more favorable weather patterns may allow crested wheatgrass to return its formally higher numbers. The DCI score dropped again to a poor rating. High decadence and no young sagebrush plants with the decline of the herbaceous understory caused the score to decline to such a low rating.

TREND ASSESSMENT
soil - slightly down (2), very poor condition
browse - down (1)
herbaceous understory - down (1)
winter range condition (DC Index) - 13 (poor) Wyoming big sagebrush/chaining type

HERBACEOUS TRENDS --
Management unit 14 , Study no: 15

Type	Species	Nested Frequency				Average Cover %		
		'86	'92	'99	'04	'92	'99	'04
G	Agropyron cristatum	b235	b227	b228	a37	10.14	8.51	.50
G	Agropyron smithii	3	-	-	-	-	-	-
G	Bromus inermis	4	1	-	-	.00	-	-
G	Sitanion hystrix	3	-	2	-	-	.00	-
G	Vulpia octoflora (a)	-	a-	a-	b19	-	-	.07
Total for Annual Grasses		0	0	0	19	0	0	0.07
Total for Perennial Grasses		245	228	230	37	10.14	8.51	0.50
Total for Grasses		245	228	230	56	10.14	8.51	0.57
F	Astragalus convallarius	-	5	1	-	.09	.00	-
F	Chenopodium album (a)	-	2	-	-	.00	-	-
F	Collinsia parviflora (a)	-	-	1	-	-	.00	-
F	Cordylanthus wrightii (a)	-	c134	a-	b38	5.47	-	.29
F	Descurainia pinnata (a)	-	a-	a-	b41	-	-	1.41
F	Gilia spp. (a)	-	ab4	a-	b9	.01	-	.08
F	Lomatium spp.	-	3	-	4	.01	-	.00
F	Medicago sativa	b14	a-	a-	a-	-	-	-
F	Phlox longifolia	a-	b11	ab8	ab3	.02	.02	.03
F	Senecio multilobatus	-	-	-	-	-	-	.15
F	Streptanthus cordatus	-	2	-	-	.00	-	-
Total for Annual Forbs		0	140	1	88	5.48	0.00	1.80

Type	Species	Nested Frequency				Average Cover %		
		'86	'92	'99	'04	'92	'99	'04
Total for Perennial Forbs		14	21	9	7	0.13	0.02	0.18
Total for Forbs		14	161	10	95	5.62	0.02	1.98

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

BROWSE TRENDS --
Management unit 14 , Study no: 15

Type	Species	Strip Frequency			Average Cover %		
		'92	'99	'04	'92	'99	'04
B	Artemisia tridentata wyomingensis	71	69	65	11.02	11.82	12.32
B	Gutierrezia sarothrae	0	2	0	.03	.00	.00
B	Juniperus osteosperma	6	6	7	2.03	1.43	2.39
B	Opuntia spp.	1	0	0	-	-	-
B	Pinus edulis	2	2	1	.18	1.31	1.85
Total for Browse		80	79	73	13.27	14.57	16.56

CANOPY COVER, LINE INTERCEPT --
Management unit 14 , Study no: 15

Species	Percent Cover	
	'99	'04
Artemisia tridentata wyomingensis	-	12.88
Juniperus osteosperma	2.00	1.83
Pinus edulis	-	1.53

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 14 , Study no: 15

Species	Average leader growth (in)
	'04
Artemisia tridentata wyomingensis	1.8

POINT-QUARTER TREE DATA --
Management unit 14 , Study no: 15

Species	Trees per Acre	
	'99	'04
Juniperus osteosperma	91	70
Pinus edulis	47	47

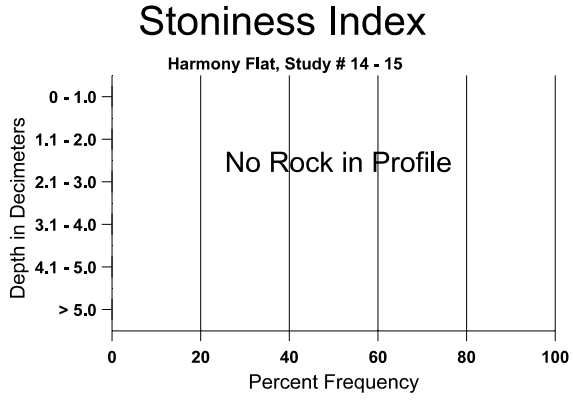
Average diameter (in)	
'99	'04
2.5	4.3
3	2.9

BASIC COVER --
Management unit 14 , Study no: 15

Cover Type	Average Cover %			
	'86	'92	'99	'04
Vegetation	3.00	20.40	21.62	18.27
Rock	0	.38	0	0
Pavement	0	0	.01	.01
Litter	50.00	37.43	34.76	30.44
Cryptogams	0	1.05	1.44	1.71
Bare Ground	47.00	44.36	47.77	60.25

SOIL ANALYSIS DATA --
Management unit 14, Study no: 15, Study Name: Harmony Flat

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
14.9	72.0 (12.1)	7.4	60.9	16.6	22.6	1.5	70.4	35.2	0.4



PELLET GROUP DATA --
Management unit 14 , Study no: 15

Type	Quadrat Frequency		
	'92	'99	'04
Rabbit	61	63	25
Deer	23	15	13
Cattle	3	8	6

Days use per acre (ha)	
'99	'04
-	-
21 (52)	15 (36)
19 (47)	16 (39)

BROWSE CHARACTERISTICS --
Management unit 14 , Study no: 15

		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 tridentata wyomingensis												
86	**5198**	133	1466	2266	1466	-	13	0	28	1	4	18/17
92	**5060**	100	1860	3080	120	-	56	25	2	-	0	-/-
99	**3600**	60	340	2180	1080	60	57	37	30	3	11	24/31
04	**3160**	2140	-	880	2280	560	31	.63	72	34	54	20/29
Atriplex canescens												
86	**66**	-	-	-	66	-	0	100	100	-	0	-/-
92	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**0**	-	-	-	-	-	0	0	0	-	0	24/24
Gutierrezia sarothrae												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**40**	-	-	40	-	20	0	0	-	-	0	5/6
04	**0**	-	-	-	-	-	0	0	-	-	0	5/7
Juniperus osteosperma												
86	**0**	-	-	-	-	-	0	0	0	-	0	-/-
92	**120**	40	20	80	20	-	0	0	17	-	0	-/-
99	**140**	-	20	120	-	40	0	0	0	-	0	-/-
04	**140**	-	-	120	20	40	0	0	14	-	0	-/-
Opuntia spp.												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**20**	-	-	20	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	9/21
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Pinus edulis												
86	**0**	-	-	-	-	-	0	0	-	-	0	-/-
92	**40**	-	40	-	-	-	0	0	-	-	0	-/-
99	**40**	20	-	40	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	20	0	0	-	-	0	-/-