Trend Study 15-2-04

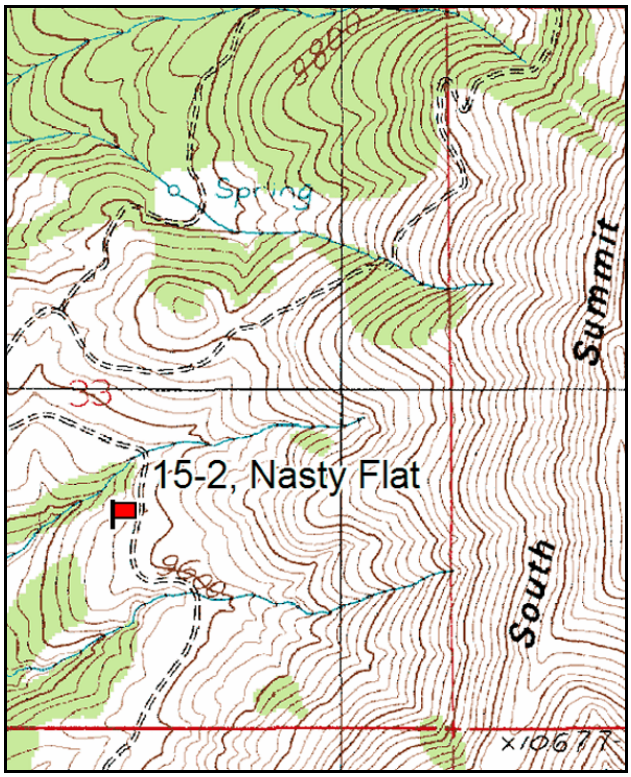
Study site name: Nasty Flat . Vegetation type: Quaking Aspen .

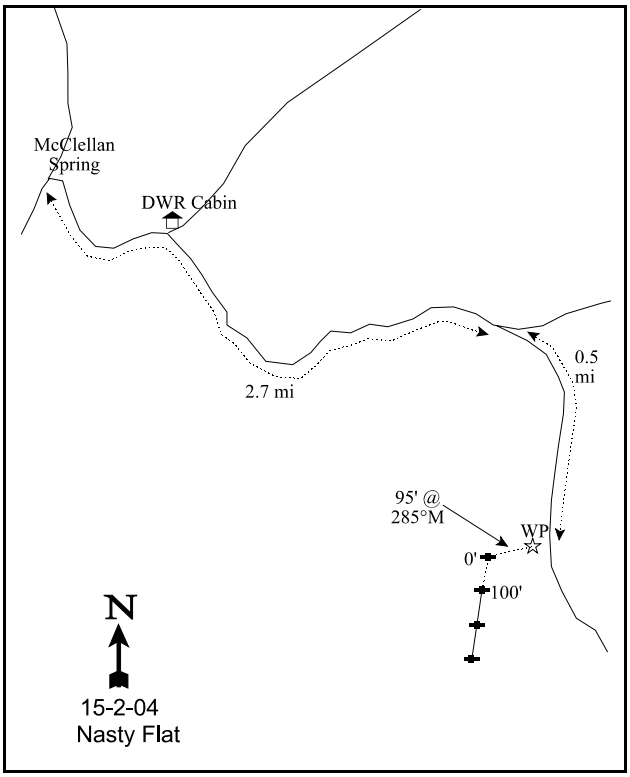
Compass bearing: frequency baseline 213 degrees magnetic.

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

LOCATION DESCRIPTION

From the McMillan (McClellan) Spring Campground (BLM), proceed east on the road past Willow Spring and the DWR cabin for 2.7 miles to a fork. Stay right and continue 0.5 miles. The transect is located in the patch of aspens below the road. A witness post is located on the right side of the road. From this fence post, walk 95 feet bearing 285° to the start of the baseline. The first stake is under the aspens, and tagged with a red browse tag, #7852.





Map Name: Mount Ellen

Diagrammatic Sketch

Township 31S , Range 10E , Section 33

GPS: NAD 27, UTM 12S 4212681 N, 516493 E

DISCUSSION

Nasty Flat - Trend Study No. 15-2

The Nasty Flat study samples an aspen stand in the Henry Mountains. The aspen type is not very extensive and does not occur often within this management unit. The site is located at an elevation of 9,500 ft on a moderately steep (33%), west facing slope. The site was selected to include an area of deer summer range which is more critical for deer than the winter range on the unit. This is a mature aspen stand with a considerable number of young aspen in the understory as well as a few conifers. When the baseline was lengthened in 1994, a more dense portion of the aspen was sampled. Total canopy cover was estimated at almost 84%. In 1999, the baseline was realigned to better sample aspen regeneration and animal use near the edge of the aspen clone. Pellet group data from 1999 indicated light animal use with 13 deer and 12 cow days use/acre (32 ddu/ha and 30 cdu/ha), however this site was read early in the season (June 9). A few bison pats from the previous fall were sampled as well. Pellet group data from 2004 shows that there continues to be light to moderate use in the area with 22 deer, 16 bison days use/acre, and 2 cow days use/acre (55 ddu/ha, 39 bdu/ha, and 5 cdu/ha). Differentiating between bison and cattle was difficult.

The soil is a loam with substantial amounts of organic matter in the surface horizon. Erosion is not a problem on the site due to the high litter cover provided from dead aspen leaves. Erosion control efforts have been undertaken by the BLM to limit erosion in nearby drainages with fabric check dams. Most of these have been effective in holding soil on the steep, eroded slopes of the area. The soil is moderately acidic (pH 5.9) with moderately deep soil with an estimated effective rooting depth of over 19 inches. Rock is uniformly scattered throughout the profile.

Aspen is the key browse species. During the 1987 reading, aspen density was estimated using three 1/200 acre density plots which estimated a total of 5,132 trees/acre. Ninety-four percent of the trees were young trees growing beneath the aspen canopy. About 64% of these young plants were moderately or heavily hedged (40-60% of the twigs are browsed). In 1994, point quarter data estimated the aspen density at 2,396 trees/acre with an average diameter of 2.4 inches. Aspen were mistakenly not counted in the shrubs strips and not classified for form class and vigor in 1994, so no comparisons can be made with the 1987 data. Point quarter data from 1999 estimated the aspen population to be 4,797 trees/acre. Much of the disparity in aspen density over sampling years is due to the realignment of the baseline in 1999. In 1999, the majority of the population was represented by young plants (75%). In 2004 young plants only represented 36% of the population and with few young plants density decreased to 1,511 trees/acre (point-quarter method). Most of the aspen population sampled in 1999 and 2004 showed light use and good vigor, with several of the smaller trees being used as antler rubs by deer. In 1999, aspen had an estimated canopy cover of 61% and this increased to 68% in 2004. Of note is the increase in those individuals classified as dying. In 1999 only 1% was classified as dying, but increased to 19% in 2004. This would indicate that the drought is starting to effect the higher elevation species.

Mountain big sagebrush was sampled more accurately in 1999 after the baseline was relocated closer to the edge of the aspen clone, but this species is not considered a key species as this site is a summer range. The population was estimated at 1,460 plants/acre in 1999. The population at that time was represented by mostly mature, lightly utilized plants that are low in stature (average height/crown of 12" x 20"). In 2004 density decreased by 26% and decadence has increased from 5% to 19%. The percent decadence is still within the reasonable range of a normal sagebrush community. However, the decrease in density and increase in those classified as dying are relatively high for a high elevation site. Limber pine and Douglas fir were also encountered in 1994 with densities of 111 and 65 trees/acre respectively. The majority of the limber pine were young as average diameter was estimated at only 1.5 inches. Douglas fir averaged 5.8 inches in diameter. In 1999, point quarter estimated Douglas fir at 105 trees/acre with a mean stem diameter of 3 inches, and an overhead canopy cover of 9%. Limber pine was estimated at 76 trees/acre with a mean stem diameter of 2

inches, and has a canopy cover of 2%. In 2004, there has been a noticeable increase in Douglas fir from 105 to 137/acre. Cover for Douglas fir has slightly increased from 9% to 10%. Limber pine has only seen a slight increase in density from 76 to 80/acre. Less abundant shrubs that were sampled include snowberry and Oregon grape.

The herbaceous understory is dominated by perennial species. *Stellaria jamesiana* and *Taraxacum officinale*, increaser species, continue to be the most abundant forbs, far exceeding the number of more desirable species. In 1999, these two species made up 73% of the forb cover, or 39% of the total herbaceous cover. In 2004, they made up 80% of the forb cover, or 38% of the total herbaceous cover. Nested and quadrat frequencies for these species remained similar to those in 1999. In 2004, the key grass species were mutton bluegrass and slender wheatgrass, which accounted for 88% of the grass cover (63% in 1999) or 46% of the total herbaceous cover (30% in 1999). From 1994 to 1999, mutton bluegrass significantly decreased in nested frequency, while it significantly increased in 2004 with its highest cover value. Slender wheatgrass and elk sedge significantly increased from 1994 to 1999, while both significantly decreased in 2004. This decrease was more than compensated for by the increase in mutton bluegrass in 2004. The site fits most closely with the description given by Mueggler & Campbell (1986) as a *Populus tremuloides/Symphoricarpos oreophilus/Carex geyeri* community type. They indicate that this type is often a climax type that may have some incidental conifers present, but are not expected to dominate the site.

1994 TREND ASSESSMENT

Protective ground cover is nearly 100% on the site, so erosion is minimal. Soil trend is stable. Aspen is the primary browse species on the site. During the 1994 reading, aspen was mistakenly not classified for form and vigor classes because it was a tree species so no comparisons can be made. Other browse on the site are few in number and are of little importance. The herbaceous understory is diverse and fairly abundant. Forbs are dominated by the increasers dandelion, and tuber starwort. Since 1987, sum of nested frequencies for grasses have declined, while those of forbs have increased. Overall, nested frequencies of grasses and forbs combined have remained similar to those of 1987.

TREND ASSESSMENT
soil - stable (3)
browse - stable, although the browse component is not as important on this summer range site (3)
herbaceous understory - stable (3)

1999 TREND ASSESSMENT

Trend for soil is stable due to abundant litter cover, and minimal bare ground present. Direct comparisons for browse are difficult as the baseline was relocated in 1999. Trend for the key browse (aspen) appears stable. Seventy-five percent of the population consists of young plants, use is mostly light, and vigor good. Cover and sum of nested frequencies of perennial grasses and forbs decreased from previous readings. However, this decrease, especially in forbs, is likely due to the relocation of the baseline. Once again, direct comparisons with earlier readings is difficult, but apparent trend appears stable.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

2004 TREND ASSESSMENT

Trend for soil is stable due to abundant litter cover and minimal bare ground present. The ratios of protective

ground cover to bare soil are very high. Usually values greater than 3.0 are good, yet these values are greater than 8.0. Trend for the key browse (aspen) appears to be down because of the following reasons: (1) the amount of cover it contributes to browse cover has gone from 25% down to 15%; (2) its density has decreased by 11%; (3) percent decadence has increased from 3% to 22%; (4) percent of population classified as dying has gone from 1% up to 19%; and (5) the increase in Douglas fir cover. All these point to a downward trend for aspen. Sum of nested frequencies for perennial grasses and forbs decreased slightly (-4%) from previous readings. However, cover for grasses and forbs increased by 60% (9% to 14%). The decrease in sum of nested frequency is from drought, however, the timing of precipitation allowed these individuals to produce more cover. Overall, trend for the herbaceous understory would be considered stable.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Management unit 15 , Study no: 2

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
G	Agropyron trachycaulum	111	88	110	76	.41	1.14	.96
G	Bromus carinatus	-	-	-	2	-	-	.03
G	Bromus inermis	$_{b}$51	$_{a}$4	$_{a}$4	$_{a}$-	.03	.03	-
G	Carex geyeri	$_{a}$4	$_{a}$13	$_{b}$70	$_{a}$24	.26	1.02	.25
G	Festuca ovina	5	-	2	-	-	.00	-
G	Poa fendleriana	$_{c}$259	$_{c}$236	$_{a}$125	$_{b}$183	4.14	1.50	5.57
G	Sitanion hystrix	$_{b}$10	$_{a}$-	$_{ab}$10	$_{c}$40	-	.02	.55
G	Stipa lettermani	$_{a}$1	$_{b}$66	$_{b}$49	$_{a}$5	1.86	.42	.07
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		441	407	370	330	6.71	4.15	7.44
Total for Grasses		441	407	370	330	6.71	4.15	7.44
F	Achillea millefolium	-	-	3	2	-	.00	.00
F	Agoseris glauca	$_{a}$-	$_{ab}$6	$_{ab}$3	$_{b}$11	.01	.00	.05
F	Allium spp.	-	-	4	2	-	.06	.00
F	Androsace septentrionalis (a)	-	3	7	3	.00	.01	.00
F	Arabis drummondi	13	16	19	4	.09	.09	.01
F	Astragalus spp.	$_{a}$-	$_{b}$69	$_{a}$-	$_{a}$-	1.47	-	-
F	Calochortus nuttallii	4	-	4	-	-	.01	-
F	Chenopodium fremontii (a)	-	5	-	7	.01	-	.02
F	Cymopterus lemmonii	3	-	4	4	-	.01	.04
F	Descurainia pinnata (a)	4	-	-	-	-	-	-
F	Erigeron eatonii	$_{a}$15	$_{a}$27	$_{b}$66	$_{b}$62	.09	.54	.50
F	Erigeron spp.	4	-	-	-	-	-	-

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
F	Fritillaria atropurpurea	-	-	4	-	-	.01	-
F	Lychnis drummondii	$_{a}$-	$_{a}$-	$_{a}$-	$_{b}$14	-	-	.03
F	Penstemon watsonii	41	21	39	20	.17	.34	.52
F	Phlox longifolia	22	16	25	22	.09	.11	.07
F	Physalis spp.	-	3	-	-	.00	-	-
F	Polygonum douglasii (a)	-	$_{a}$-	$_{a}$-	$_{b}$49	-	-	.09
F	Sedum lanceolatum	1	-	6	3	-	.06	.01
F	Senecio spp.	$_{b}$13	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
F	Stellaria jamesiana	$_{b}$282	$_{b}$277	$_{a}$172	$_{a}$184	2.97	1.07	3.04
F	Taraxacum officinale	$_{b}$187	$_{b}$187	$_{ab}$141	$_{a}$110	5.84	2.45	2.48
F	Unknown forb-perennial	$_{b}$23	$_{a}$-	$_{a}$-	$_{a}$3	-	-	.00
F	Vicia spp.	3	-	-	-	-	-	-
F	Viola spp.	$_{a}$-	$_{b}$52	$_{a}$-	$_{a}$-	1.12	-	-
Total for Annual Forbs		4	8	7	59	0.01	0.00	0.11
Total for Perennial Forbs		611	674	490	441	11.88	4.78	6.78
Total for Forbs		615	682	497	500	11.90	4.79	6.90

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

BROWSE TRENDS --
Management unit 15 , Study no: 2

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Artemisia tridentata vaseyana	12	37	27	.16	1.01	1.26
B	Juniperus communis	1	0	3	1.00	-	-
B	Mahonia repens	0	1	0	-	-	-
B	Pinus flexilis	0	3	3	.46	.56	.41
B	Populus tremuloides	0	66	62	2.21	1.58	1.45
B	Pseudotsuga menziesii	0	18	20	.85	3.06	6.50
B	Ribes velutinum velutinum	1	0	0	.21	-	-
B	Symphoricarpos oreophilus	4	4	6	.30	.15	.30
Total for Browse		18	129	121	5.21	6.38	9.93

CANOPY COVER, LINE INTERCEPT --
Management unit 15 , Study no: 2

Species	Percent Cover	
	'99	'04
Artemisia tridentata vaseyana	-	1.66
Juniperus communis	-	.18
Pinus flexilis	2.00	.53
Populus tremuloides	61.40	67.84
Pseudotsuga menziesii	9.39	10.28
Symphoricarpos oreophilus	-	.86

POINT-QUARTER TREE DATA --
Management unit 15 , Study no: 2

Species	Trees per Acre	
	'99	'04
Pinus flexilis	76	80
Populus tremuloides	4797	1512
Pseudotsuga menziesii	105	137

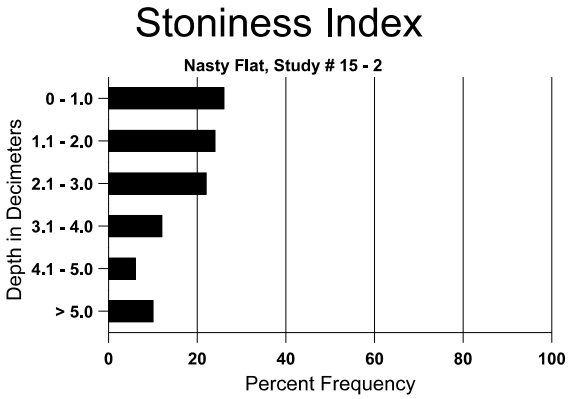
Average diameter (in)	
'99	'04
2	2.1
1.3	3.8
2.9	4

BASIC COVER --
Management unit 15 , Study no: 2

Cover Type	Average Cover %			
	'87	'94	'99	'04
Vegetation	4.50	24.53	15.80	24.68
Rock	1.00	.66	6.27	5.71
Pavement	0	.03	.02	.46
Litter	93.75	77.49	82.88	75.55
Cryptogams	0	0	.03	0
Bare Ground	.75	1.26	1.17	4.59

SOIL ANALYSIS DATA --
Management unit 15, Study no: 2, Study Name: Nasty Flat

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
19.2	50.7 (15.4)	5.9	49.3	30.2	20.6	5.4	31.3	204.8	0.5



PELLET GROUP DATA --
Management unit 15 , Study no: 2

Type	Quadrat Frequency		
	'94	'99	'04
Grouse	-	-	1
Elk	2	-	-
Deer	3	5	11
Cattle	-	1	4
Bison	-	-	-

Days use per acre (ha)	
'99	'04
-	-
-	-
13 (32)	22 (55)
12 (30)	2 (5)
3 (7)	16 (39)

BROWSE CHARACTERISTICS --
Management unit 15 , Study no: 2

		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 vaseyana												
87	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**300**	-	140	140	20	-	0	0	7	7	7	8/11
99	**1460**	60	360	1020	80	180	0	0	5	5	5	12/20
04	**1080**	-	40	840	200	120	17	4	19	9	9	11/19
Juniperus communis												
87	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**20**	-	-	20	-	-	0	0	0	-	0	14/73
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**60**	-	-	40	20	-	0	0	33	-	0	-/-

		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)
Mahonia repens												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**100**	-	-	100	-	-	0	0	-	-	0	3/17
04	**0**	-	-	-	-	-	0	0	-	-	0	7/8
Pinus flexilis												
87	**66**	66	66	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**60**	20	40	20	-	-	0	0	-	-	0	-/-
04	**60**	-	40	20	-	-	0	0	-	-	0	-/-
Populus tremuloides												
87	**5132**	600	4800	266	66	-	39	22	1	-	0	393/157
94	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**2840**	-	2140	620	80	800	0	0	3	.70	3	-/-
04	**2540**	-	920	1060	560	220	24	6	22	19	19	-/-
Pseudotsuga menziesii												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**500**	60	440	60	-	-	0	0	-	-	0	-/-
04	**460**	60	280	180	-	-	0	0	-	-	0	-/-
Ribes velutinum velutinum												
87	**66**	-	66	-	-	-	100	0	-	-	0	-/-
94	**20**	-	-	20	-	-	0	0	-	-	0	15/48
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Symphoricarpos oreophilus												
87	**133**	-	-	133	-	-	0	100	-	-	0	14/16
94	**80**	-	20	60	-	-	0	0	-	-	0	19/28
99	**220**	-	180	40	-	-	0	0	-	-	0	20/30
04	**220**	-	20	200	-	-	0	0	-	-	0	19/25