Trend Study 7-2-06

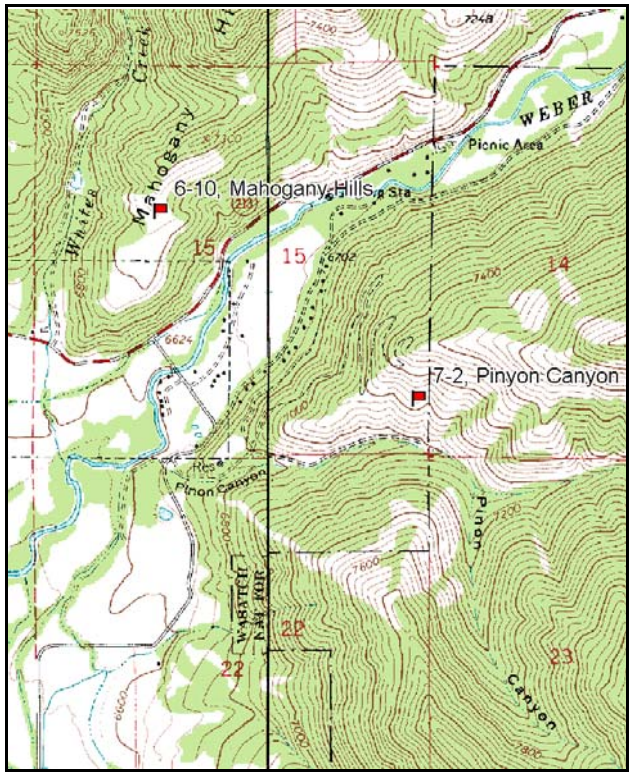
Study site name: Pinyon Canyon . Vegetation type: Mountain Brush .

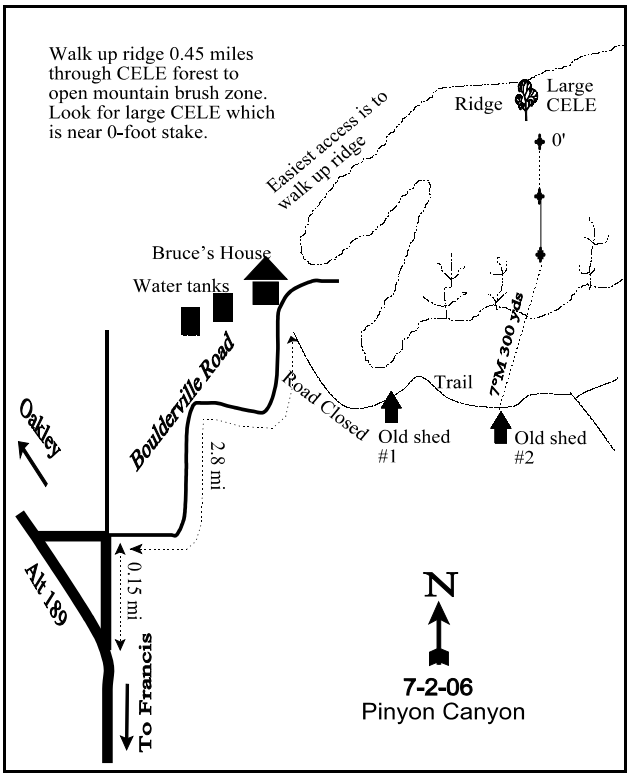
Compass bearing: frequency baseline 180 degrees magnetic.

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

LOCATION DESCRIPTION

Where Highway 189 turns northwest between Kamas and Oakley, proceed north for 0.15 miles. At this intersection turn right (east) onto Boulderville Road and travel 2.8 miles. Turn right onto a dirt road proceeding up Pinyon Canyon to a private home, passing two water storage tanks. Contact landowner before proceeding through private land. From the land owners home, walk up the ridge through a Curlleaf mahogany and pinyon forest for about a half mile. As the forest opens up into a mountain brush vegetation type look for a lone, large Curlleaf mahogany on the southwest facing slope. The 0-foot baseline stake is just below this mahogany. The 0-foot stake is marked by browse tag #7957.





Map Name: Hoyt Peak

Diagrammatic Sketch

Township 1S , Range 6E , Section 15

UTM NAD 27, UTM 12T 4508531 N 479481 E

DISCUSSION

Pinyon Canyon - Trend Study No. 7-2

Study Information

The Pinyon Canyon study is located in a drainage containing one of the better and more important mountain brush big game wintering areas in the herd unit (elevation: 7,200 feet, slope: 35-40%, aspect: south). This site is rather high for winter range, but with the favorable aspect and slope, the area remains available to big game during all but the most severe winters. Pellet group quadrat frequencies and pellet group transect data have indicated that elk utilize the area much more than deer. Pellet group transect data collected in 2001 estimated 69 elk days use/acre (170 edu/ha) and 30 deer days use/acre (74 ddu/ha). In 2006, elk use was estimated at 100 days use/acre (248 edu/ha) and deer use was at 11 days use/acre (26 ddu/ha). Several moose pellet groups have also been observed on the site, but occurred outside the sampling area. The mountain brush community in this area exhibits considerable variation in overstory dominance. The mixture of shrubs includes varying densities of true mountain mahogany, serviceberry, mountain big sagebrush, antelope bitterbrush, Gambel oakbrush, mountain snowberry, and a few scattered curlleaf mountain mahogany.

Soil

The Agassiz soil series consists of very shallow and shallow, somewhat excessively drained, moderate or moderately rapidly permeable soils on mountainsides. They formed in shallow material over weathered limestone (USDA-NRCS 2006). Soils are moderately rocky on the surface and throughout the profile. Parent material appears to be limestone, sandstone, and shale. In places, the soil has a reddish color, indicating a high iron oxide content. Effective rooting depth was estimated at about 12 inches. This should not be a limiting factor to vegetation growth. Soil texture is classified as a loam with a slightly alkaline soil reaction (7.7 pH). Permeability would be moderately slow when combined with the steep slope and high surface rock cover. There is a moderately high potential for runoff and erosion. Vegetation and litter cover are fair. Under most conditions this will help prevent erosion from most high intensity summer rain events. A condition class assessment estimated slight soil erosion in 2001, but stable in 2006.

Browse

The browse component is composed of many species that include true mountain mahogany, mountain snowberry, mountain big sagebrush, antelope bitterbrush, Gambel oak, and Saskatoon serviceberry. The browse component provides about one-third of the total vegetation cover. The preferred species: serviceberry, mountain big sagebrush, and true mountain mahogany had on average a much lower decadence in 1996, 2001, and 2006 compared to the 1984 and 1990 readings. The level of use exhibited on these species has been moderate to heavy in most readings, with generally less use in the last readings. Utilization on mountain big sagebrush has shown the most improvement since 1984,when 100% were classified as having heavy use. Utilization of big sagebrush was classified as light to moderate for the last three readings. Recruitment from young plants has been moderate to high for serviceberry and true mountain mahogany in all samples. Sagebrush density has declined slightly at each reading, but cover has increased as plant size has increased.

Herbaceous Understory

The herbaceous composition consists of an excellent grass component, dominated primarily by bluebunch wheatgrass. Bluebunch wheatgrass contributed 65% of the grass cover in 1996 and 73% in 2006. Nested frequency significantly decreased in 2001, but remained stable in 2006. Sandberg bluegrass is the second most abundant perennial grass and has maintained a stable frequency from 1990 to 2001, but declined significantly in 2006. Cheatgrass is also moderately abundant. It was less abundant in 2001. In 2006, cheatgrass was abundant (found in 93% of quadrats), but was not as robust and cover was lower. Forbs occur only occasionally. All forbs combined have provided only about 13% of the total vegetation cover from 1996 to 2006. None of the forbs provide significant amounts of forage or ground cover except for rock goldenrod. Pale alyssum is an annual species that has increased at each of the last two readings.

1990 TREND ASSESSMENT

True mountain mahogany is heavily to severely hedged. Its density has slightly decreased since 1984. The density of young and mature plants also declined slightly, while decadent mahogany shrubs increased to 36% of the population. Contrasting data was found for the serviceberry population. These palatable shrubs are moderately to heavily hedged but have normal vigor. Density is stable to slightly increasing. Decadent plants decreased from 65% to 11% of the population. Oregon grape is still the most numerous woody species. In comparison with the 1977 line intercept transect data from the same site, mountain big sagebrush continues on the downward trend that was noted in 1984. The moderately dense grass understory of bluebunch wheatgrass and Sandberg and mutton bluegrasses is almost unchanged. Sum of nested frequency for perennial forbs increased.

browse - slightly down (-1) grass - stable (0) forb - up (+2)

1996 TREND ASSESSMENT

The key browse, serviceberry, mountain big sagebrush, and true mountain mahogany, provide 59% of the total browse cover. Overall, there has been a decrease in those plants classified as heavily browsed, vigor has improved, and percent decadence has decreased for all key species. Overall, the trend for browse is improving. The grass trend is slightly up as the nested frequency for bluebunch wheatgrass increased. The trend for cheatgrass should be monitored closely. Perennial forb nested frequency decreased 41%. The forb trend is down.

winter range condition (DC Index) - fair-good (69) Higher potential scale
browse - slightly up (+1) grass - slightly up (+1) forb - down (-2)

2001 TREND ASSESSMENT

Trend for browse is stable. Serviceberry, mountain big sagebrush, and true mountain mahogany have stable densities and low percent decadence. Use remains moderate to heavy on serviceberry and mountain mahogany, but mostly light on mountain big sagebrush. Trend for grasses is stable. Bluebunch wheatgrass decreased in nested frequency, but Sandberg bluegrass increased. Cheatgrass nested frequency was significantly lower, but still very abundant. The trend for forbs is up as perennial forbs increased in sum of nested frequency although they continue to be in low abundance.

winter range condition (DC Index) - fair (65) Higher potential scale
browse - stable (0) grass - stable (0) forb - up (+2)

2006 TREND ASSESSMENT

The browse trend is stable. Serviceberry density decreased, while bitterbrush density increased. True mountain mahogany density has remained stable and recruitment has been very good. A greater amount of preferred browse cover would be desired. The grass trend is slightly down. Sandberg bluegrass nested frequency declined significantly. Total perennial grass nested frequency declined about 14%. Cheatgrass increased significantly to the same level as the 1996 reading. The forb trend is slightly down. Perennial forb nested frequency decreased about 10%. The annual pale alyssum also increased significantly in 2006.

winter range condition (DC Index) - fair (65) Higher potential scale
browse - stable (0) grass - slightly down (-1) forb - slightly down (-1)

HERBACEOUS TRENDS --
Management unit 07 , Study no: 2

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron dasystachyum	5	-	-	-	-	-	-	-
G	Agropyron spicatum	ab275	a266	c322	ab286	b288	19.45	11.37	17.66
G	Bromus japonicus (a)	-	-	-	-	4	-	-	.01
G	Bromus tectorum (a)	-	-	b274	a215	b272	6.51	5.66	3.95
G	Poa fendleriana	c107	bc65	ab50	a28	a23	.67	.60	.53
G	Poa secunda	a93	b172	b175	b196	a127	3.40	4.27	1.92
Total for Annual Grasses		0	0	274	215	276	6.51	5.66	3.96
Total for Perennial Grasses		480	503	547	510	438	23.54	16.25	20.12
Total for Grasses		480	503	821	725	714	30.05	21.92	24.08
F	Agoseris glauca	a-	a-	a-	b10	b11	-	.05	.07
F	Allium acuminatum	b34	bc37	a5	bc50	c64	.01	.25	.33
F	Alyssum alyssoides (a)	-	-	a28	b64	c281	.16	.61	2.60
F	Astragalus sp.	-	1	-	2	2	-	.01	.15
F	Balsamorhiza sagittata	3	-	-	-	1	-	-	.15
F	Camelina microcarpa (a)	-	-	c117	b51	a3	.61	.23	.03
F	Calochortus nuttallii	6	3	-	4	6	-	.01	.02
F	Chaenactis douglasii	ab6	c28	b13	a-	a-	.05	-	-
F	Chenopodium fremontii (a)	-	-	-	1	-	-	.00	-
F	Cirsium undulatum	b41	b40	a9	a12	a6	.10	.54	.59
F	Comandra pallida	24	21	26	21	18	.23	.31	.53
F	Collinsia parviflora (a)	-	-	-	2	-	-	.00	-
F	Crepis acuminata	-	3	1	2	7	.03	.03	.12
F	Cymopterus sp.	-	-	2	5	1	.03	.36	.00
F	Descurainia pinnata (a)	-	-	-	7	5	-	.07	.01
F	Draba sp. (a)	-	-	-	-	6	-	-	.01
F	Epilobium brachycarpum (a)	-	-	-	9	8	-	.02	.04
F	Erigeron pumilus	-	-	2	2	1	.15	.03	.03
F	Erigeron strigosis	-	-	2	-	-	.00	-	-
F	Gayophytum ramosissimum(a)	-	-	6	-	1	.01	-	.00
F	Gilia sp. (a)	-	-	-	4	-	-	.00	-
F	Helianthus sp.	-	-	7	-	-	.06	-	-
F	Holosteum umbellatum (a)	-	-	8	8	-	.09	.01	-
F	Ipomopsis aggregata	-	-	-	2	-	-	.00	-
F	Lappula occidentalis (a)	-	-	-	-	1	-	-	.00
F	Lomatium sp.	-	-	1	-	5	.01	-	.18

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Microsteris gracilis (a)	-	-	$_{a}$-	$_{b}$68	$_{a}$7	-	.24	.01
F	Penstemon humilis	14	22	19	11	11	.43	.27	.45
F	Petradoria pumila	$_{ab}$41	$_{b}$61	$_{ab}$38	$_{a}$34	$_{a}$24	1.62	1.86	1.11
F	Phlox longifolia	-	-	1	-	-	.00	-	-
F	Polygonum douglasii (a)	-	-	3	-	-	.00	-	-
F	Ranunculus testiculatus (a)	-	-	$_{a}$8	$_{b}$47	$_{b}$54	.02	.41	.62
F	Streptanthus cordatus	-	3	-	-	-	-	-	-
F	Tragopogon dubius	$_{a}$4	$_{a}$-	$_{a}$7	$_{b}$21	$_{a}$5	.09	.38	.07
F	Unknown forb-perennial	-	2	-	-	-	-	-	-
F	Viguiera multiflora	2	3	-	5	1	-	.03	.00
F	Zigadenus paniculatus	-	1	-	-	-	-	-	-
Total for Annual Forbs		0	0	170	261	366	0.91	1.63	3.36
Total for Perennial Forbs		175	225	133	181	163	2.84	4.18	3.83
Total for Forbs		175	225	303	442	529	3.75	5.82	7.20

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

BROWSE TRENDS --
Management unit 07 , Study no: 2

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Amelanchier alnifolia	27	25	19	1.41	.66	.93
B	Artemisia tridentata vaseyana	17	13	12	.68	1.86	2.51
B	Cercocarpus montanus	35	32	33	3.99	4.24	3.01
B	Gutierrezia sarothrae	3	0	1	.18	-	-
B	Mahonia repens	3	4	5	.15	.24	.09
B	Purshia tridentata	4	3	4	1.14	1.66	1.76
B	Quercus gambelii	1	3	1	.33	.93	1.17
B	Symphoricarpos oreophilus	19	19	22	2.37	3.75	3.40
Total for Browse		109	99	97	10.26	13.35	12.91

CANOPY COVER, LINE INTERCEPT --
Management unit 07 , Study no: 2

Species	Percent Cover '06
Amelanchier alnifolia	3.08
Artemisia tridentata vaseyana	3.63
Cercocarpus montanus	3.84
Mahonia repens	.08
Purshia tridentata	2.90
Quercus gambelii	1.08
Symphoricarpos oreophilus	1.54

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 07 , Study no: 2

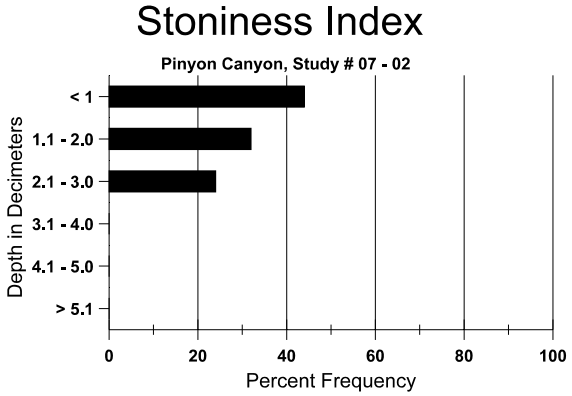
Species	Average leader growth (in)	
	'01	'06
Amelanchier alnifolia	3.8	4.6
Artemisia tridentata vaseyana	-	1.3
Cercocarpus montanus	2.1	4.0
Purshia tridentata	-	3.7

BASIC COVER --
Management unit 07 , Study no: 2

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	3.50	9.50	43.43	39.25	39.79
Rock	23.00	25.25	17.19	15.94	18.73
Pavement	8.25	4.00	6.61	5.94	7.36
Litter	45.75	40.00	41.18	30.26	25.50
Cryptogams	1.75	0	.39	.15	.01
Bare Ground	17.75	21.25	14.82	33.31	22.39

SOIL ANALYSIS DATA --
Herd Unit 07, Study no: 02, Pinyon Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
11.9	60.3 (11.0)	7.7	40.6	32.4	27.0	3.8	8.4	89.6	0.8



PELLET GROUP DATA --
Management unit 07 , Study no: 2

Type	Quadrat Frequency		
	'96	'01	'06
Elk	32	43	49
Deer	11	14	3

Days use per acre (ha)	
'01	'06
69 (170)	100 (248)
30 (74)	11 (26)

BROWSE CHARACTERISTICS --
Management unit 07 , 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)
Amelanchier alnifolia												
84	**1133**	66	200	200	733	-	6	88	65	4	65	27/21
90	**1266**	-	533	600	133	-	21	26	11	-	0	22/22
96	**940**	80	420	500	20	-	53	13	2	2	2	29/37
01	**1260**	-	640	460	160	20	19	22	13	11	14	30/39
06	**560**	20	200	320	40	20	0	50	7	4	4	31/35
Artemisia tridentata vaseyana												
84	**132**	-	-	66	66	-	0	100	50	-	0	24/20
90	**66**	-	-	-	66	-	100	0	100	-	0	-/-
96	**380**	-	140	160	80	160	47	0	21	11	11	21/31
01	**280**	-	20	220	40	120	14	0	14	-	7	22/34
06	**240**	-	20	200	20	60	33	17	8	8	17	31/43

		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)
Cercocarpus montanus												
84	**1066**	-	466	400	200	-	0	56	19	-	0	46/28
90	**932**	-	333	266	333	-	14	64	36	-	0	42/27
96	**780**	-	200	560	20	20	44	41	3	-	0	34/40
01	**760**	20	120	540	100	40	34	50	13	-	0	34/37
06	**740**	40	120	480	140	20	19	70	19	5	8	32/36
Chrysothamnus viscidiflorus viscidiflorus												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**0**	-	-	-	-	-	0	0	-	-	0	14/21
01	**0**	-	-	-	-	-	0	0	-	-	0	19/27
06	**0**	-	-	-	-	-	0	0	-	-	0	12/24
Gutierrezia sarothrae												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**140**	-	-	140	-	-	0	0	-	-	0	7/10
01	**0**	-	-	-	-	-	0	0	-	-	0	9/32
06	**20**	-	-	20	-	-	0	0	-	-	0	8/9
Mahonia repens												
84	**8600**	-	8600	-	-	-	0	0	-	-	0	-/-
90	**10466**	-	4800	5666	-	-	0	0	-	-	0	4/4
96	**380**	20	80	300	-	-	0	0	-	-	0	4/5
01	**680**	-	-	680	-	-	0	0	-	-	0	4/6
06	**840**	-	60	780	-	-	0	0	-	-	0	4/4
Purshia tridentata												
84	**0**	-	-	-	-	-	0	0	0	-	0	-/-
90	**0**	-	-	-	-	-	0	0	0	-	0	-/-
96	**240**	-	-	240	-	-	75	25	0	-	0	19/47
01	**60**	-	-	60	-	-	100	0	0	-	0	22/84
06	**420**	-	-	400	20	-	29	5	5	-	0	24/55
Quercus gambelii												
84	**2200**	-	400	1400	400	-	15	61	18	-	0	47/19
90	**1933**	-	1200	733	-	-	66	0	0	-	0	43/29
96	**20**	-	20	-	-	-	0	0	0	-	0	64/65
01	**120**	-	-	120	-	-	0	0	0	-	0	58/34
06	**40**	80	-	20	20	-	0	0	50	50	50	58/39

		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)
Sambucus cerulea												
84	**0**	-	-	-	-	-	0	0	-	-	0	-/-
90	**0**	-	-	-	-	-	0	0	-	-	0	-/-
96	**0**	-	-	-	-	-	0	0	-	-	0	-/-
01	**0**	-	-	-	-	-	0	0	-	-	0	28/66
06	**0**	-	-	-	-	-	0	0	-	-	0	37/72
Symphoricarpos oreophilus												
84	**1533**	-	200	1000	333	-	65	13	22	-	0	22/23
90	**2199**	-	400	1133	666	-	42	0	30	.90	3	21/26
96	**600**	40	160	440	-	-	27	0	0	-	0	18/33
01	**420**	-	-	420	-	-	14	0	0	-	0	20/43
06	**700**	40	80	580	40	20	0	3	6	3	3	20/25