

Trend Study 28-8-08

Study site name: Grass Valley .

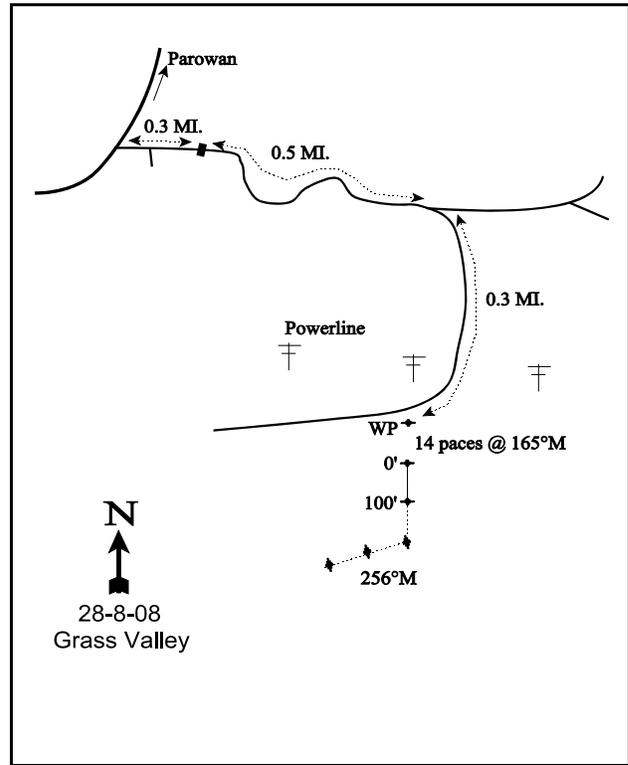
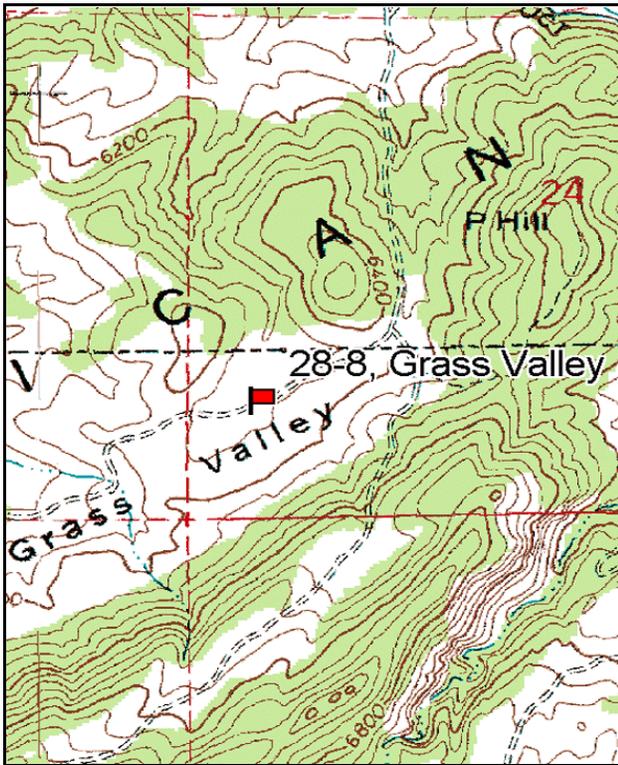
Vegetation type: Mountain Big Sagebrush .

Compass bearing: frequency baseline 165 degrees magnetic. (Lines 3-4, 256° M degrees).

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

LOCATION DESCRIPTION

From I-15 take the north Parowan exit and go south into town. Continue down Main Street to a big gradual curve on the south end of town. Just passed the Parowan Heritage Park, turn east off the highway across from a log house onto a road, go past other houses staying on the main road 0.3 miles to cattleguard. From the cattleguard, continue 0.5 miles to a fork. Bear right. Proceed 0.3 miles underneath the powerlines to a witness post on left side of the road. The baseline starts 68 feet away at a bearing of 165 degrees magnetic and is marked by 2 foot tall fenceposts with no browse tag.



Map Name: Parowan

Diagrammatic Sketch

Township 34S, Range 9W, Section 24

GPS: NAD 83, UTM 12S 339053 E, 4188116 N

## DISCUSSION

### Grass Valley - Trend Study No. 28-8

#### Study Information

This trend study is located in the foothills south of Parowan [elevation: 6,400 feet (1,951 m), slope: 5%, aspect: northwest]. The site is surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) covered hills. Most of the valley was chained and seeded in the mid-1960's by the BLM. The site itself is dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and seeded grasses and is considered critical deer winter range. There is a 3-way exclosure which was built in the late 1970's approximately 0.3 miles west of the site. A pellet group transect read in conjunction with the range trend transect in 1998 estimated 61 deer, 1 elk, and 9 cow days use/acre (151 ddu/ha, 3 edu/ha, and 22 cdu/ha). Pellet group transect data collected in 2003 estimated 57 deer, 1 elk, and 11 cow days use/acre (141 ddu/ha, 3 edu/ha, and 27 cdu/ha) on the site. Pellet group data collected in 2008 estimated 96 deer days use/acre (236 ddu/ha) and 4 cow day use/acre (11 cdu/ha).

#### Soils

Soil textural and chemical analysis indicates a sandy loam with a slightly acidic pH (6.4). The soil surface in the shrub interspaces is characterized by bare patches with concentrations of small rocks and pavement that appear to be of volcanic origin. Relative combined average vegetation and litter cover was 60%-65% , and relative combined average rock and pavement cover was 13%-24% since 1992. Relative average bare ground cover has been moderate at 15%-25% since 1992. The erosion condition class assessment rated erosion as stable in 2003 and 2008.

#### Browse

Mountain big sagebrush is the dominant browse as it provides over 90% of the average browse cover in all readings. The population of sagebrush is moderately dense with an average density of about 3,600 plants/acre since 1992, but has also declined since 1992. This population has been characterized by moderate to high decadence (34%-60%), and the proportion of plants displaying poor vigor has been low to moderate (5%-33%). Recruitment of young sagebrush plants has been relatively low with young plants comprising only 2%-9% of the population in all readings. Utilization has been moderate to heavy in all surveys, with the highest use being documented in 1987, and lightest use in 1998. Some of the sagebrush plants have the growth form of the more erect but less preferred basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and are likely hybrids between the two subspecies. Additional palatable forage is provided by bitterbrush (*Purshia tridentata*) and squaw apple (*Peraphyllum ramosissimum*) which are heavily browsed, but occur in very low densities on the site.

Pinyon and juniper trees are more prominent as you move south toward the hills. Point-center quarter data estimated 76 pinyon and 17 juniper trees/acre in 2003, and 32 pinyon and 37 juniper trees/acre in 2008. Additional browse sampled on the site include mostly less preferred increasers such as low rabbitbrush (*Chrysothamnus viscidiflorus*), prickly phlox (*Leptodactylon pungens*), and prickly pear cactus (*Opuntia* sp.).

#### Herbaceous Understory

Perennial grasses are abundant and dominate the herbaceous understory. Two seeded species, crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*Agropyron intermedium*), are the most common species. Of the perennials, they have the highest nested frequency values in all years and together have provided an average of 69% of the grass cover since 1992. Native perennials include Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail (*Sitanion hystrix*), and needle-and-thread grass (*Stipa comata*). The annual species cheatgrass (*Bromus tectorum*) has steadily increased on the site with significant increases in nested frequency each reading from 1992 to 2003, before decreasing significantly in 2008. Another negative factor is the continued increase of bulbous bluegrass (*Poa bulbosa*), a low value short-lived perennial. The

forb component is limited, and perennial forb species are insignificant on the site.

#### 1992 TREND ASSESSMENT

Trend for browse is stable. Density differences for browse species may be related to the larger sample area used in 1992, therefore, trend for browse was determined using other parameters. Decadence of mountain big sagebrush has increased slightly and is very high (60%), and vigor has declined slightly. The proportion of young sagebrush plants in the population increased slightly to 7%. Trend for both the grasses and forbs is stable. There was little change in measurements for perennial grasses or forbs since 1987. The herbaceous understory consists almost entirely of grasses. Perennial forbs are nearly absent.

winter range condition (DCI) - poor-fair (50) Mid-level potential scale  
browse - stable (0)                      grass - stable (0)                      forb - stable (0)

#### 1998 TREND ASSESSMENT

Trend for browse is slightly down. Density of mountain big sagebrush has decreased by 23% from 1992 to 3,480 plants/acre. Decadence of sagebrush decreased to 34%, and plants displaying poor vigor decreased to 5%. Recruitment of young sagebrush plants has improved slightly, but is still low at 9%. It appears that the population may not be able to sustain itself at current levels. The trend for grasses is stable. The sum of nested frequency of perennial grasses increased slightly, but there was a significant increase in the nested frequency of cheatgrass and bulbous bluegrass. The trend for forbs is stable. Forbs are lacking on this site, and perennial forbs are nearly absent.

winter range condition (DCI) - fair (55) Mid-level potential scale  
browse - slightly down (-1)                      grass - stable (0)                      forb - stable (0)

#### 2003 TREND ASSESSMENT

Trend for browse is slightly down. Mountain big sagebrush continued to decline in density although at a slower rate than in previous surveys. The sagebrush population has increased decadence to 47%, and plants displaying poor vigor increased to 21%. The proportion of young in the population declined to just 2%. Trend for grasses is slightly down. The sum of nested frequency of perennial grasses declined slightly, and the nested frequency of cheatgrass and bulbous bluegrass increased significantly. Production of cheatgrass increased to 6% of the total cover and 29% of the grass cover. Trend for the forbs is stable. Forbs are lacking on the site, and perennial forbs are nearly absent.

winter range condition (DCI) - poor (42) Mid-level potential scale  
browse - slightly down (-1)                      grass - slightly down (-1)                      forb - stable (0)

#### 2008 TREND ASSESSMENT

Trend for browse is stable. Density of mountain big sagebrush has not changed from 2003. Decadence of sagebrush is similar and the proportion of plants displaying poor vigor has increased slightly since 2003. Recruitment of young sagebrush is up slightly, but is similar to 2003. Density of pinyon/juniper has decreased from 93 trees/acre in 2003 to 69 trees/acre. Trend for the grasses is up. Sum of nested frequency of perennial grasses increased by 25%, and production of perennial grasses increased to 22% of the total cover. There was a significant decrease in the nested frequency of cheatgrass, and cover of cheatgrass declined to less than 0.1% of the total cover. Trend for the forbs is stable. Forbs are lacking on the site, and perennial forbs are nearly absent.

winter range condition (DCI) - poor (46) Mid-level potential scale  
browse - stable (0)                      grass - up (+2)                      forb - stable (0)

HERBACEOUS TRENDS --  
Management unit 28 , Study no: 8

T y p e	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
G	Agropyron cristatum	b <sub>144</sub>	ab <sub>111</sub>	ab <sub>132</sub>	a <sub>97</sub>	a <sub>102</sub>	6.79	10.14	5.32	7.33
G	Agropyron intermedium	b <sub>133</sub>	a <sub>168</sub>	a <sub>120</sub>	b <sub>146</sub>	b <sub>179</sub>	8.02	5.08	5.65	9.04
G	Aristida purpurea	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sub>10</sub>	-	.15	.00	.22
G	Bromus inermis	b <sub>21</sub>	ab <sub>16</sub>	ab <sub>18</sub>	a <sub>5</sub>	a <sub>3</sub>	.25	.21	.06	.03
G	Bromus tectorum (a)	-	b <sub>124</sub>	c <sub>194</sub>	d <sub>261</sub>	a <sub>40</sub>	2.26	2.14	5.69	.09
G	Oryzopsis hymenoides	6	9	5	2	8	.21	.04	.03	.42
G	Poa bulbosa	a <sup>-</sup>	b <sub>7</sub>	c <sub>77</sub>	d <sub>94</sub>	d <sub>124</sub>	.10	1.10	1.67	2.96
G	Poa secunda	a <sup>-</sup>	ab <sub>4</sub>	ab <sub>12</sub>	b <sub>15</sub>	b <sub>16</sub>	.02	.07	.25	.10
G	Sitanion hystrix	bc <sub>29</sub>	bc <sub>46</sub>	c <sub>56</sub>	ab <sub>26</sub>	a <sub>1</sub>	1.90	2.02	.55	.03
G	Sporobolus cryptandrus	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sub>21</sub>	-	-	-	.21
G	Stipa comata	b <sub>53</sub>	ab <sub>30</sub>	a <sub>13</sub>	a <sub>14</sub>	ab <sub>34</sub>	.69	.72	.37	1.49
Total for Annual Grasses		0	124	194	261	40	2.26	2.14	5.69	0.08
Total for Perennial Grasses		386	391	433	399	498	18.00	19.54	13.92	21.88
Total for Grasses		386	515	627	660	538	20.27	21.69	19.61	21.97
F	Agoseris glauca	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sub>2</sub>	b <sub>11</sub>	-	-	.00	.05
F	Alyssum alyssoides (a)	-	-	a <sub>1</sub>	a <sub>1</sub>	b <sub>8</sub>	-	.00	.00	.01
F	Arabis sp.	-	-	-	-	1	-	-	-	.00
F	Astragalus sp.	-	-	4	-	3	-	.06	-	.00
F	Calochortus nuttallii	-	-	-	-	3	-	-	-	.01
F	Chaenactis douglasii	1	-	2	-	-	-	.01	-	-
F	Cruciferae	-	9	4	-	-	.04	.01	-	-
F	Draba sp. (a)	-	-	1	-	-	-	.00	-	-
F	Eriogonum cernuum (a)	-	6	-	-	-	.39	-	-	-
F	Gayophytum ramosissimum(a)	-	a <sup>-</sup>	a <sup>-</sup>	a <sub>7</sub>	b <sub>22</sub>	-	-	.02	.06
F	Microsteris gracilis (a)	-	a <sup>-</sup>	a <sub>8</sub>	b <sub>35</sub>	a <sub>16</sub>	-	.02	.10	.03
F	Orobanche fasciculata	-	-	2	-	-	-	.00	-	-
F	Phlox longifolia	-	-	-	3	1	-	-	.00	.03
F	Polygonum douglasii (a)	-	a <sub>1</sub>	a <sub>4</sub>	a <sup>-</sup>	b <sub>12</sub>	.00	.01	-	.04
F	Ranunculus testiculatus (a)	-	a <sup>-</sup>	b <sub>12</sub>	c <sub>47</sub>	c <sub>65</sub>	-	.03	.21	.26
F	Streptanthus cordatus	-	-	-	3	-	-	-	.00	-
F	Taraxacum officinale	-	3	1	3	-	.00	.00	.01	-
F	Unknown forb-annual (a)	-	b <sub>40</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	.11	-	-	-
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-
F	Zigadenus paniculatus	-	-	-	-	-	-	-	-	.00

Type	Species	Nested Frequency					Average Cover %			
		'87	'92	'98	'03	'08	'92	'98	'03	'08
	Total for Annual Forbs	0	47	26	90	123	0.50	0.07	0.34	0.41
	Total for Perennial Forbs	2	12	13	11	19	0.04	0.08	0.02	0.11
	Total for Forbs	2	59	39	101	142	0.55	0.15	0.36	0.52

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

#### BROWSE TRENDS --

Management unit 28 , Study no: 8

Type	Species	Strip Frequency				Average Cover %			
		'92	'98	'03	'08	'92	'98	'03	'08
B	<i>Artemisia tridentata vaseyana</i>	90	85	79	73	16.55	13.69	16.11	10.42
B	<i>Chrysothamnus viscidiflorus</i>	1	0	0	0	.00	-	-	-
B	<i>Juniperus osteosperma</i>	0	2	1	1	.03	.93	.15	.03
B	<i>Leptodactylon pungens</i>	11	7	7	8	.25	.27	.24	.21
B	<i>Opuntia sp.</i>	3	0	0	0	.00	-	-	-
B	<i>Peraphyllum ramosissimum</i>	0	1	1	0	-	.00	.00	-
B	<i>Pediocactus simpsonii</i>	0	0	0	1	-	-	-	.00
	Total for Browse	105	95	88	83	16.84	14.90	16.51	10.66

#### CANOPY COVER, LINE INTERCEPT --

Management unit 28 , Study no: 8

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	12.75	12.48
<i>Leptodactylon pungens</i>	-	.11

#### KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 28 , Study no: 8

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	1.6	1.0

POINT-QUARTER TREE DATA --  
Management unit 28 , Study no: 8

Species	Trees per Acre		
	'98	'03	'08
Juniperus osteosperma	40	17	37
Pinus edulis	20	7	32

Average diameter (in)		
'98	'03	'08
3.4	1.6	2.5
4.7	1.3	1.2

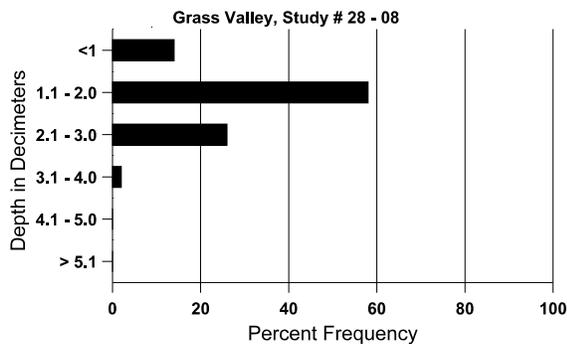
BASIC COVER --  
Management unit 28 , Study no: 8

Cover Type	Average Cover %				
	'87	'92	'98	'03	'08
Vegetation	4.75	32.46	37.59	35.54	35.48
Rock	3.00	1.86	3.20	3.13	2.15
Pavement	21.25	23.52	20.40	11.61	20.28
Litter	54.25	31.47	48.00	34.69	38.73
Cryptogams	0	.16	.47	.10	.28
Bare Ground	16.75	16.85	21.84	28.43	17.62

SOIL ANALYSIS DATA --  
Management unit 28, Study no: 8, Study Name: Grass Valley

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
			% sand	% silt	% clay				
15.9	69.6 (12.4)	6.4	60.7	20.7	18.6	1.7	9.4	192.0	0.4

### Stoniness Index



PELLET GROUP DATA --

Management unit 28 , Study no: 8

Type	Quadrat Frequency		
	'98	'03	'08
Sheep	1	-	-
Rabbit	48	30	71
Elk	-	1	-
Deer	46	30	56
Cattle	3	3	1

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	-	-
1 (2)	1 (3)	-
61 (151)	57 (141)	96 (236)
9 (22)	11 (27)	4 (11)

BROWSE CHARACTERISTICS --

Management unit 28 , Study no: 8

		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>Artemisia tridentata vaseyana</i>												
87	<b>5531</b>	66	199	2533	2799	-	20	80	51	2	11	20/20
92	<b>4480</b>	240	300	1480	2700	-	41	40	60	11	16	-/-
98	<b>3460</b>	100	320	1960	1180	1080	47	3	34	5	5	25/35
03	<b>3280</b>	-	80	1660	1540	1060	35	24	47	21	21	22/29
08	<b>3280</b>	120	120	1540	1620	1320	49	13	49	30	33	22/33
<i>Chrysothamnus viscidiflorus</i>												
87	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
92	<b>20</b>	-	20	-	-	-	0	0	-	-	0	-/-
98	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
03	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
08	<b>0</b>	-	-	-	-	-	0	0	-	-	0	15/17
<i>Juniperus osteosperma</i>												
87	<b>66</b>	-	-	66	-	-	0	0	-	-	0	57/39
92	<b>0</b>	40	-	-	-	-	0	0	-	-	0	-/-
98	<b>40</b>	20	-	40	-	-	0	0	-	-	0	-/-
03	<b>20</b>	-	-	20	-	-	0	0	-	-	0	35/11
08	<b>20</b>	-	-	20	-	-	0	0	-	-	0	-/-
<i>Leptodactylon pungens</i>												
87	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
92	<b>920</b>	20	160	760	-	-	11	9	0	-	4	-/-
98	<b>320</b>	-	-	320	-	-	0	0	0	-	0	6/9
03	<b>300</b>	-	-	260	40	-	0	0	13	7	7	6/8
08	<b>340</b>	-	20	300	20	-	0	0	6	6	6	5/8

		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>Opuntia</i> sp.												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	60	-	-	60	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	3/7
08	0	-	-	-	-	-	0	0	-	-	0	6/16
<i>Peraphyllum ramosissimum</i>												
87	133	-	-	-	133	-	0	100	100	-	0	-/-
92	0	-	-	-	-	-	0	0	0	-	0	-/-
98	20	-	-	20	-	-	0	100	0	-	0	25/22
03	20	-	-	20	-	-	0	100	0	-	0	27/40
08	0	-	-	-	-	-	0	0	0	-	0	36/67
<i>Pediocactus simpsonii</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	20	-	20	-	-	-	0	0	-	-	0	-/-
<i>Pinus edulis</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	20	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Purshia tridentata</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
92	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	42/81
08	0	-	-	-	-	-	0	0	-	-	0	32/35