

Trend Study 3-2-06

Study site name: NE Mantua Reservoir .

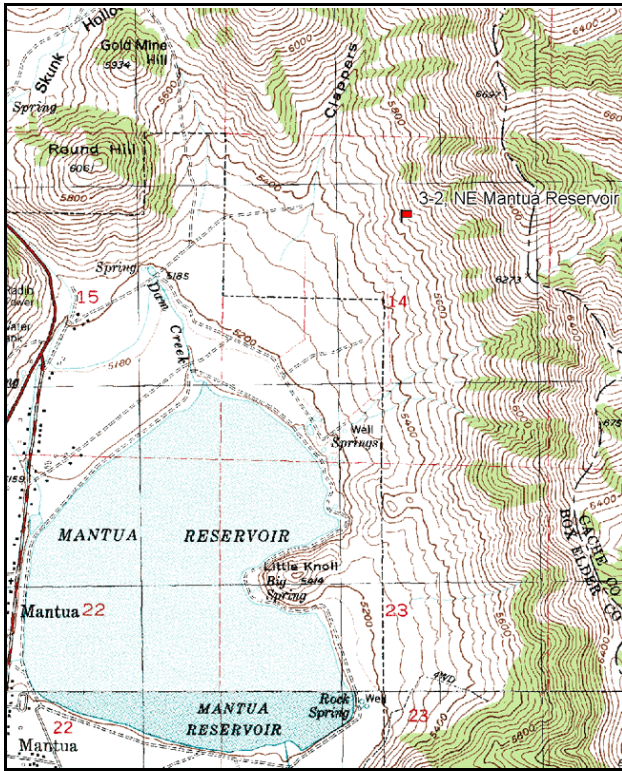
Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 168 degrees magnetic.

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

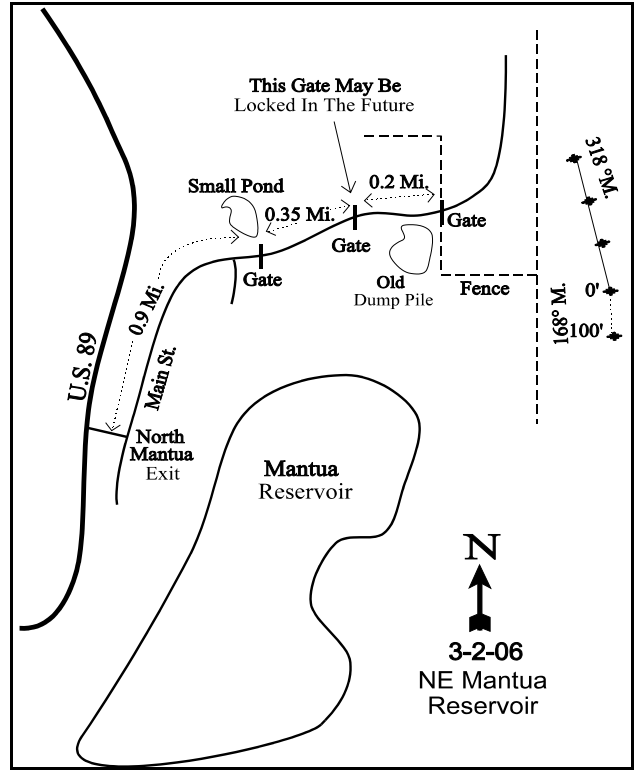
LOCATION DESCRIPTION

Turn east off of U.S. 89-91 at the north Mantua exit and travel east to main street in Mantua. Turn left (north) on main street and proceed 0.9 miles to a gate with a small pond to the left. Proceed through the gate, stopping at another gate after 0.35 miles (this gate may be locked in the future). Proceed 0.2 mile to another gate with an old dump to the south. From the gate walk south-east to a “T” in the fence. From the “T” in the fence, walk 60 paces at a bearing of 112 degrees magnetic to the 0-foot baseline stake. Baseline 0-foot stake is marked by browse tag #7105. The first 100 feet of the baseline runs south at a bearing of 165 degrees magnetic. The last 300 feet run north off of the 0-foot stake at a bearing of 318 degrees magnetic.



Map Name: Mount Pisgah

Township 9N, Range 1W, Section 14



Diagrammatic Sketch

UTM NAD 27, UTM 12T 4596798 N 423322 E

## DISCUSSION

### Northeast Mantua Reservoir - Trend Study No. 3-2

#### Study Information

This study samples a mountain big sagebrush community about 1 mile northeast of Mantua Reservoir (elevation 5,600 feet, slope 25%, aspect west). Big game use has been light from 1996 to 2006. Pellet group data in 2001 estimated 21 deer days use/acre (51 ddu/ha) and 25 deer days use/acre in 2006 (63 ddu/ha). Domestic livestock use the surrounding area in summer, but appear to have little impact on the immediate area.

#### Soil

The soils is part of the Goring series, which is derived from alluvial deposited sandstone and quartzite parent material (USDA-NRCS 2006). Soil reaction is slightly alkaline (pH of 7.4) and contains moderately high organic matter (3.6%). Soils are deep and well drained and have a clay texture in the upper horizons with a clay loam, grading to a more gravelly clay below. Complete drying of the soil seldom occurs below a depth of 12 inches. Although the erosion hazard is moderate (Chadwick et al. 1975), an erosion condition classification determined soils to be stable in 2001 and 2006. The ratio of protective cover (vegetation, litter, and cryptograms) to bare ground has remained high at 4 to 1.

#### Browse

Browse composition from 1984 to 2001 was dominated by a moderately dense population of mountain big sagebrush. The population decreased from 1,840 plants/acre in 2001 to 940 plants/acre in 2006. Subsequently, cover also decreased from 16% in 1996 and 2001 to 4% in 2006. Vigor has been good in the past, but in 2006, 38% were classified with poor vigor and decadent plants accounted for over half (55%) of the population. Utilization was heavy in 1984, but has been light to moderate until 2006 when use increased to moderate to heavy. This is understandable, because deer are only using 25% of what was originally present in 2001. Recruitment of young sagebrush was relatively high in 1996 at 17% and 15% in 2001, but was slightly lower in 2006 at 9%. Annual leader growth averaged about 3 inches in 2001 and 2006.

Only a single bitterbrush plant has been sampled since 1996 and it displayed heavy use. A larger population of bitterbrush occurs around the study. Other shrubs include bigtooth maple and chokecherry. Of particular interest is a small population of Stansbury cliffrose and cliffrose/bitterbrush hybrids growing slightly north of the study site. Broom snakeweed density was estimated at 740 plants/acre in 1996 and 2001. In 2006, it had decreased to 140 plants/acre.

#### Herbaceous Understory

The herbaceous understory associated with this mountain big sagebrush community is diverse and vigorous. Perennial grass cover increased from 9 % in 1996 to 23% in 2006. The main increase in perennial grass cover was bluebunch wheatgrass, although its nested frequency remained similar to previous readings. Bulbous bluegrass cover increased from 4% in 1996 to 8% in 2001 and 2006. This species is a weedy, introduced, short-lived perennial that is not desirable. Annual grasses are abundant. Cheatgrass cover and nested frequency have continued to expand since 1996. In 1996, cheatgrass cover was less than 1% and increased to over 8% in 2006. Japanese brome cover was abundant in 1996 at 16%, but decreased to 3% in 2006. Medsuahead, a noxious weed, was not sampled in the quadrats, but was observed around the study area in 2006.

A wide variety of forbs were sampled. Total forb cover was only about 5% in 1996, but increased to 14% in 2001 and 16% in 2006. This increase in forb cover is due to increases in both perennial and annual species. The most common perennial forbs include western yarrow, arrowleaf balsamroot, wayside gromwell, and yellow salsify. The most abundant annual species were autumn willowherb and storksbill. Dyer's woad, a noxious weed, was present in low numbers.

### 1990 TREND ASSESSMENT

Trend is up for browse. Density of mature big sagebrush increased by 19% on the density plots (from 1,732 to 2,132 plants/acre). Plants show light to moderate hedging and have good vigor. There is a robust population of young sagebrush and few decadent plants. Trend for perennial grasses is up. Perennial grasses doubled in nested frequency. Trend for perennial forbs is down. Sum of nested frequency for perennial forbs decreased by 28%.

browse - up (+2)

grasses - up (+2)

forbs - down (-2)

### 1996 TREND ASSESSMENT

The sagebrush density has remained similar between readings, utilization is light to moderate, vigor good, and percent decadence low at 14%. Reproduction remains high at 17%, which is adequate to maintain the population. The herbaceous understory is dominated by annual brome grasses. This was the first reading that annual grass and forb data was collected, so changes in annual species are unknown. Trend for perennial grasses is down. Nested frequency decreased by 29%. A low value species, bulbous bluegrass, is the only perennial species that increased in sum of nested frequency, while bluebunch wheatgrass decreased significantly. Trend for perennial forbs is down. Nested frequency decreased by 45%. Forbs are diverse but not abundant. Dyer's woad is still not abundant, although it has doubled in nested frequency since 1990. The Desirable Components Index rated this site as poor with a score of 44 due to good browse cover, low decadence, and moderate perennial grass and forb cover.

winter range condition (DC Index) - poor (46) Mid Potential scale

browse - stable (0)

grasses - down (-2)

forbs - down (-2)

### 2001 TREND ASSESSMENT

Trend for browse is stable. Mountain big sagebrush shows mostly light to moderate use, good vigor, and adequate recruitment from young plants. Decadence did increase from 14% to 26%, but the current level is not excessive even with 2 years of below average precipitation. Trend for grasses is slightly up. Sandberg bluegrass increased significantly as did bulbosa bluegrass, which is invasive much like cheatgrass. Cheatgrass and Japanese brome total nested frequency has remained similar to 1996, but Japanese brome decreased while cheatgrass increased. Trend for forbs is up. Annual and perennial forb cover and nested frequency have both double. Yellow salsify and storksbill were the two main species that increased. The Desirable Components Index rated this site as fair with a score of 52 due to good browse cover and moderate perennial grass cover and good forb cover.

winter range condition (DC Index) - fair (52) Mid Potential scale

browse - stable (0)

grasses - slightly up (+1)

forbs - up (+2)

### 2006 TREND ASSESSMENT

Trend for browse is down. Density of mountain big sagebrush has decreased from 1,840 plants/acre in 2001 to 940 plants/acre in 2006. Cover decreased from 16% to 4%. Over half (55%) the population was decadent and 38% were classified as dying. Trend for grasses is stable. Cover increased from 26% in 2001 to 34% in 2006 with above average precipitation, although nested frequency values remained similar to previous years. Trend for forbs is stable. Perennial forb cover and nested frequency remained similar. The nested frequency of annuals nearly doubled, but cover remained at 5%. The Desirable Components Index rated this site as poor with a score of 44 due to low browse cover, high decadence, and good perennial grass and forb cover.

winter range condition (DC Index) - poor (44) Mid Potential scale

browse - down (-2)

grasses - stable (0)

forbs - stable (0)

HERBACEOUS TRENDS --  
Management unit 03 , Study no: 2

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron spicatum	a140	b204	ab163	ab167	ab168	5.26	6.80	13.30
G	Bromus japonicus (a)	-	-	c349	b201	a139	16.42	3.60	2.69
G	Bromus tectorum (a)	-	-	a36	b179	b181	.86	7.52	8.30
G	Koeleria cristata	-	-	2	6	5	.00	.12	.18
G	Melica bulbosa	a7	a3	a-	a-	b26	-	-	1.14
G	Oryzopsis hymenoides	-	-	-	-	2	-	-	.03
G	Poa bulbosa	a5	a41	b79	c192	c177	4.22	7.69	7.80
G	Poa fendleriana	4	-	-	-	-	-	-	-
G	Poa secunda	ab20	c113	a12	b41	ab42	.05	.35	.76
Total for Annual Grasses		0	0	385	380	320	17.28	11.13	10.99
Total for Perennial Grasses		176	361	256	406	420	9.54	14.97	23.22
Total for Grasses		176	361	641	786	740	26.82	26.10	34.21
F	Achillea millefolium	c119	ab47	ab57	b82	a44	1.41	1.87	.90
F	Agoseris glauca	a-	a3	a1	a-	b13	.00	-	.05
F	Allium acuminatum	2	-	-	-	-	-	-	-
F	Alyssum alyssoides (a)	-	-	a94	b205	b216	.20	1.60	.83
F	Arabis sp.	-	-	-	-	4	-	-	.03
F	Artemisia ludoviciana	1	5	3	4	6	.15	.41	.53
F	Aster chilensis	-	-	-	7	6	-	.30	.30
F	Astragalus sp.	b32	b30	a-	a8	a1	-	.07	.03
F	Balsamorhiza sagittata	ab17	a20	a13	a14	b32	.66	1.94	3.53
F	Camelina microcarpa (a)	-	-	-	-	-	-	.03	-
F	Calochortus nuttallii	ab5	a-	ab3	b10	a4	.00	.05	.01
F	Cirsium undulatum	-	-	2	-	-	.00	-	-
F	Collomia linearis (a)	-	-	a5	b22	ab17	.01	.07	.05
F	Comandra pallida	-	-	-	9	8	-	.04	.07
F	Collinsia parviflora (a)	-	-	a-	a1	b19	-	.00	.04
F	Cryptantha sp.(a)	-	-	a-	a-	b16	-	-	.03
F	Cymopterus sp.	-	-	-	2	5	-	.00	.06
F	Draba sp. (a)	-	-	-	-	2	-	-	.00
F	Epilobium brachycarpum (a)	-	-	b155	a64	c232	1.39	.21	2.00
F	Erodium cicutarium (a)	-	-	a3	b76	c131	.03	2.55	1.75
F	Eriogonum umbellatum	-	-	-	1	-	-	.00	-
F	Galium aparine (a)	-	-	a-	a3	b11	-	.03	.08
F	Gilia sp. (a)	-	-	-	-	3	-	-	.00

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	Hackelia patens	a <sup>3</sup>	b <sup>35</sup>	a <sup>3</sup>	a <sup>11</sup>	b <sup>49</sup>	.06	.16	.93
F	Helianthus annuus (a)	-	-	-	-	1	-	-	.00
F	Hedysarum boreale	-	-	-	2	-	-	.03	-
F	Holosteum umbellatum (a)	-	-	a <sup>-</sup>	b <sup>15</sup>	b <sup>12</sup>	-	.20	.03
F	Isatis tinctoria	3	9	18	9	20	.24	.08	.42
F	Lappula occidentalis (a)	-	-	5	5	10	.01	.39	.02
F	Lactuca serriola	a <sup>-</sup>	a <sup>3</sup>	a <sup>-</sup>	b <sup>30</sup>	c <sup>68</sup>	-	.24	.60
F	Lithospermum ruderales	a <sup>2</sup>	a <sup>-</sup>	a <sup>2</sup>	ab <sup>11</sup>	b <sup>17</sup>	.18	.38	1.74
F	Lupinus argenteus	a <sup>-</sup>	a <sup>-</sup>	ab <sup>4</sup>	b <sup>9</sup>	b <sup>9</sup>	.21	.39	.63
F	Madia glomerata (a)	-	-	2	-	-	.00	-	-
F	Microsteris gracilis (a)	b <sup>54</sup>	a <sup>-</sup>	a <sup>3</sup>	a <sup>6</sup>	b <sup>35</sup>	.00	.01	.10
F	Polygonum douglasii (a)	-	-	7	8	7	.03	.04	.01
F	Ranunculus testiculatus (a)	-	-	2	5	3	.00	.01	.00
F	Rumex sp.	-	-	-	3	-	-	.03	-
F	Senecio multilobatus	-	-	-	1	-	-	.03	-
F	Tragopogon dubius	c <sup>122</sup>	b <sup>74</sup>	a <sup>12</sup>	c <sup>109</sup>	b <sup>69</sup>	.04	2.66	1.00
F	Unknown forb-perennial	-	5	-	-	-	-	-	-
F	Veronica biloba (a)	-	-	a <sup>9</sup>	a <sup>27</sup>	b <sup>46</sup>	.01	.12	.15
F	Wyethia amplexicaulis	b <sup>14</sup>	a <sup>-</sup>	a <sup>3</sup>	a <sup>-</sup>	a <sup>2</sup>	.03	-	.15
F	Zigadenus paniculatus	-	-	7	-	3	.04	.01	.03
Total for Annual Forbs		54	0	285	437	761	1.70	5.30	5.14
Total for Perennial Forbs		320	231	128	322	360	3.05	8.73	11.05
Total for Forbs		374	231	413	759	1121	4.76	14.04	16.20

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

#### BROWSE TRENDS --

Management unit 03 , Study no: 2

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	Artemisia tridentata vaseyana	60	55	37	16.34	15.71	4.01
B	Gutierrezia sarothrae	11	13	4	.36	.78	.30
B	Prunus virginiana	2	2	2	.00	.15	.38
B	Purshia tridentata	1	1	1	.66	.85	.15
Total for Browse		74	71	44	17.37	17.49	4.85

CANOPY COVER, LINE INTERCEPT --  
Management unit 03 , Study no: 2

Species	Percent Cover
	'06
Artemisia tridentata vaseyana	4.73
Gutierrezia sarothrae	.20
Prunus virginiana	.05
Purshia tridentata	.96

KEY BROWSE ANNUAL LEADER GROWTH --  
Management unit 03 , Study no: 2

Species	Average leader growth (in)	
	'01	'06
Artemisia tridentata vaseyana	3.4	2.9

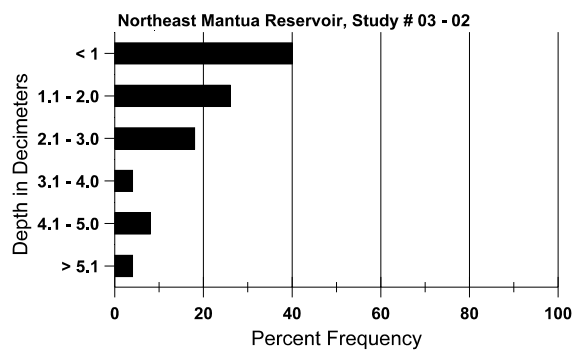
BASIC COVER --  
Management unit 03 , Study no: 2

Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	3.25	10.25	50.70	55.77	59.57
Rock	6.75	4.75	5.68	4.36	4.72
Pavement	6.50	11.75	3.84	3.82	3.36
Litter	66.00	57.25	58.45	45.47	41.06
Cryptogams	0	0	0	0	.03
Bare Ground	17.50	16.00	5.36	9.88	11.09

SOIL ANALYSIS DATA --  
Herd Unit 03, Study no: 02, NE Mantua Reservoir

Effective rooting depth (in)	Temp °F (depth)	PH	Clay			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
15.1	66.0 (14.0)	7.4	22.0	36.4	41.6	3.6	29.4	179.2	0.5

### Stoniness Index



PELLET GROUP DATA --

Management unit 03 , Study no: 2

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	-	2	-
Elk	-	1	1
Deer	5	10	7
Cattle	2	-	-
Sheep	-	-	-

Days use per acre (ha)	
'01	'06
-	-
-	-
21 (51)	25 (63)
-	-
-	1 (3)

BROWSE CHARACTERISTICS --

Management unit 03 , 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)
<i>Amelanchier alnifolia</i>												
84	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
96	<b>0</b>	-	-	-	-	-	0	0	-	-	0	37/37
01	<b>0</b>	-	-	-	-	-	0	0	-	-	0	30/35
06	<b>0</b>	-	-	-	-	-	0	0	-	-	0	41/40
<i>Artemisia tridentata vaseyana</i>												
84	<b>1732</b>	3133	66	1400	266	-	19	81	15	-	4	33/36
90	<b>2132</b>	133	933	866	333	-	3	0	16	-	3	35/36
96	<b>1860</b>	20	320	1280	260	200	32	0	14	2	4	27/49
01	<b>1840</b>	40	280	1080	480	420	42	8	26	3	3	27/44
06	<b>940</b>	240	80	340	520	780	55	11	55	38	38	22/31
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
84	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
96	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
01	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
06	<b>0</b>	-	-	-	-	-	0	0	-	-	0	13/21
<i>Gutierrezia sarothrae</i>												
84	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
96	<b>740</b>	-	320	420	-	-	0	0	0	-	0	11/15
01	<b>740</b>	-	-	680	60	20	0	0	8	5	5	11/17
06	<b>140</b>	-	-	140	-	-	0	0	0	-	0	13/19

		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)
<b>Prunus virginiana</b>												
84	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
96	<b>60</b>	-	60	-	-	-	0	0	-	-	0	20/13
01	<b>120</b>	-	-	120	-	-	0	0	-	-	0	-/-
06	<b>200</b>	-	200	-	-	-	60	0	-	-	0	30/7
<b>Purshia tridentata</b>												
84	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
90	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
96	<b>20</b>	-	-	20	-	-	0	100	0	-	0	75/98
01	<b>20</b>	-	-	-	20	20	0	0	100	-	0	-/-
06	<b>20</b>	-	-	20	-	-	0	100	0	-	0	44/66